

Proceedings of the 7th  
International Scientific Conference

# FINANCE AND PERFORMANCE OF FIRMS IN SCIENCE, EDUCATION AND PRACTICE

Under the auspices of the Dean  
prof. Dr. Ing. Drahomíra Pavelková

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**April 23 - 24, 2015**  
Zlín, Czech Republic



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ISBN 978-80-7454-482-8

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## **Preface**

### **Dear Conference Participants!**

The conference “Finance and Performance of Firms in Science, Education and Practice” creates the possibility for gathering and exchange of knowledge and experience of all those, who are actively engaged in this area: researchers, representatives of companies, banks, insurance companies and other financial institutions, public administration as well as PhD students. After successful conferences held in previous years, the Faculty of Management and Economics of the Tomas Bata University in Zlín has decided to organize already the seventh annual conference in order to again create a platform for professional discussions and dialogues of participants from different countries.

The programme of the conference, as well as the proceedings you have received, confirm that all these subjects and relevant problems are covered and that there is an opportunity for exchange of ideas and opinions. On the basis of double blind reviews, only papers that met the requirements of reviewers regarding the content, structure, and the completeness of the references cited were included in the Conference Proceedings.

Based on the good experience from previous years, this year again the conference programme includes contributions presented by economists from academic, public and private spheres; this creates a bridge between theoretical knowledge and practical experience in the area of finance and management of performance of organizations.

I hope that the course of the conference, the opportunity of personal contacts, exchange of knowledge and experience as well as information contained in the proceedings will contribute to the enrichment of understanding of the given set of current problems and to the support of further growth of cooperation.

***prof. Dr. Ing. Drahomíra Pavelková***

*Dean of the Faculty of Management and Economics of TBU in Zlín*

Zlín, April 2015

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## **EXPORT BARRIERS AND EXPORT PERFORMANCE SEAFOOD INTO INTERNATIONAL MARKETS**

*Ai Tran Huu, Hau Tran Van*

### **Abstract**

The purpose of this paper is to identify main export barriers and to test empirically their impact their on export performance of seafood firms, Vietnam, targeting the U.S market. Reviewing the literature and using expert opinions, 5 factors of the export barrier were identified. A structured questionnaire was applied to survey managers of 152 seafood firms and exploratory and confirmatory factor analyses were used to categorize variables in 5 the barrier dimensions. Then, a structural equation model was developed to determine which dimension has a greater negative effect on export performance. This model identifies the export barrier of products dimension (- 0.168), the barrier of price dimension (- 0.130), the barrier of distribution dimension (- 0.222), the barrier of promotion dimension (+ 0.101) and logistic dimension have a significant negative impact on export performance (- 0.156) have a effective export barriers to the export performance of seafood. Based on the relative importance of the different marketing barriers, seafood firms should firstly focus on quality improvements in order to improve their export performance.

*Keywords: Export barriers, Export performance, Seafood industry, Vietnam.*

JEL Classification: M11, F15, O19.

### **1 INTRODUCTION**

The structure of the seafood industry has changed significantly in recent years as changes in technology have promoted globalization in the industry. Technological advances in communication and transportation have reduced transaction costs, improving the ease of access to markets around the world. Consequently, international trade in seafood increased first by 25% in the 2000s, followed by a significant global trade boom of 50% growth from 2000 to 2013. Over 60% of that growth is contributed to market access in developing countries (Gehlher and Dohlman, 2009).

Export as an important economic activity to a firm and a driver of economic development of a nation has widely been acknowledged. In spite of numerous benefits of exporting, most firms do not export despite exporting being considered as inevitable in the increasingly integrated world markets (Papadopoulos & Martins, 2010), although the benefits derived from exporting in an increasingly globalized marketplace, for many smaller-sized manufacturers the internationalization path is beset by numerous obstacles. In particular, marketing barriers, such as product, price, distribution, promotion, and logistics, occupy an important position because they often cause financial losses and negative attitudes towards international activities (Leonidou, 2002; Balabanis, 2000).

The key role of exporting in national economies has resulted in export performance attracting considerable interest in many studies. Most research focuses on the relationships between performance and organizational or environmental factors; less has been done into the specific factors that could hinder exporting. The determinants of the export performance of small and medium-sized firms are of vital importance for policy makers, firm managers, and researchers (Baldauf et al., 2000; Katsikeas et al., 2000; Sousa et al., 2008). While most research focusing on export performance has been undertaken in the United States and Europe, limited work has been conducted in developing countries. Enhancing export performance is crucial for firms



based in developing countries that view the global marketplace as a means to ensure growth, survival or competitiveness (Matanda and Freeman, 2009).

## **2 LITERATURE REVIEW**

There is a growing block of literature on the impact of both globalisation and regional integration agreements on international business as well as on the issue of internationalisation of firms via exporting (Falbe & Welsh 1998; Pett & Wolff, 2000, 2003). Studies that identify problems firms face in exporting are scarce and relatively out dated and do not address the changing business environment as a result of increasing bilateral and regional trade agreements (Gripsrud, 1990; Ramaswami & Yang, 1990). The European Union (EU) and India are presently negotiating a free trade agreement (FTA), which aims to eliminate tariffs within a 7-year time frame with the target implementation date as 2010-11. Such an agreement could transform the overall business environment from the interconnectedness of these trading economies. Bilkey (1978) suggests that if trade agreements between countries and/or economic blocs are to achieve their potential and bestow benefits public policy may be required to help firms in overcoming export problems.

### **2.1 Export Performance**

Export performance has been a widely studied concept in international business literature (Shoham, 1999). Export performance both past and present are essential to the survival of the organization in diverse ways. Whereas past performance motivates managerial strategy actions, present performance signals the effectiveness of management strategy modifications as well as set forth new strategy actions, (Lages et al, 2008). There are many different perspectives on performance. The concept of performance has changed over time and expanded with the development of production management. In broad term, concept of performance can change depending on the scope of use (Tangent, 2005). Performance is also a theme that has been concerned by technicians, sociologists, economists and most managers for many years.

In technical aspect, efficiency is the ratio between output and input. It measures performance-using resources to produce the required output. However, this can lead to focus on quantity but little attention to quality aspects.

However, with the flurry of studies conducted over the years scholars are yet to generally agree on the conceptual as well as the operational definition of the concept. Operational definitions of export performance vary across the literature so far. Some scholars including Ahmed and Julian (2004) define export performance through export efficiency, export effectiveness and continuous engagement in export. Other scholars including (Koh, 1991 and Bilkey, 1982) define export performance through a construct that measures export intensity, perceived export profitability and continuous export activity. It is the latter construct that would form the basis of our measurement of export performance in latter chapters of this study. According to Shoham (1999) a conceptual definition of export performance should address two parts: export and performance.

Export performance is regarded as one of the key indicators of the success of a firm's operations. Research into export performance has grown considerably during the past few decades (Ibeh, 2008). While numerous studies have been conducted to explain export performance and its antecedents, there is no generally accepted conceptualization. Export performance represents the outcome of a firm's activities in export markets (Papadopoulos and Martin, 2010). Export performance can also be defined as the outcomes from the firm's international activities. From this perspective, export performance is the extent to which the firm achieves its objectives when exporting a product to a foreign market (Navarro et al., 2010).

## **2.2 Export Barriers**

Export barriers can be defined as the attitudinal, structural, operational and other constraints that hinder a firm's ability to initiate, develop or sustain international operations (Koksal and Kettaneh, 2011). It is important to achieve a better understanding of export barriers, since these barriers waste the resource of firms and threaten the efficiency and effectiveness of a firm's operations. The negative impact that export barriers can have on medium and small enterprises internationalization behaviors and activities has attracted the attention of many researchers in international business (Ortega, 2003; Da Silva and Da Rocha, 2001). Studies have employed different perspectives to establish a set of notable barriers, especially with regard to the specific industry or geographical area.

There are so many difficulties in foreign trade; some of them are as follow: 1- lack of awareness of export opportunities (data barrier), 2- managerial resource, 3- non-managerial human resources, 4- financial resources (investment), 5- production related barriers, 6- technical barriers, 7- competitive barriers, 8- distributive barriers, 9- official rituals and instructions, 10- payment barriers, 11- currency price barriers, 12- regulatory barriers (regulations), 13- governmental barriers and cultural barriers.

Leonidou has classified export barriers into two internal organizational barriers and external organizational barrier groups that affect the export activities of company. Studies show that, internal barriers are as management related difficulties, distribution problem, and problems related to the documents, lack of knowledge, social cultural and managerial factors. On the other hand, external barriers rooted on the environments outside of the exporter companies (Leonidou, 2004, Testom and Lutz, 2006).

Results of various studies showed that exporters' sensitivity to the barriers of foreign markets is determined through managerial perception that in its turn is affected by underlying factors in relation to the size, resource, and capability of company and its partnership in export and its international analysis (Barney, 1991; Suarez, 2003 & Ojal, 2007). Also researches show that exporters consider high bank profits, use of low potentials, and weak technology as big problems that affect their business performance (Frimpong and Mmeh, 2007:74-76). In general conditions, changes in consumers' preferences, the existence of brokers and agents, import tariffs, the risk of losing money in foreign markets, safety and quality standards, are other barriers to exports of companies (Rabino, 1980; Korth 1991).

## **3 THE RESEARCH RELATED TO MARKETING BARRIERS**

Marketing barriers refer to obstacles in the firm's overseas activities, such as product quality, price, distribution, logistics, and promotion (Karelakis et al., 2008; Sousa and Bradley, 2008). The overall review in Table 1 shows a comprehensive picture of the effects of those marketing barriers on export performance.

Tab. 1 - The Literature Review of the Effect of Marketing Barriers on Export Performance.

Source: Literature reviewed by the authors

Literature review	Industrial sector	Product barrier	Price barrier	Distribution Barrier	Promotion barrier	Logistics Barrier
Leonidou (2000)	M	X		X		X
Karelakis et al. (2008)	O	X	X			
Sousa and Bradley (2008)	M		X			
Kaynak and Kothari (1980)	M		X	X	X	X
Czinkota and Ursic (1983)	M		X			
Barrett and Wilkinson (1985)	M	X	X			X
Kedia and Chhokar (1986)	M	X	X		X	X
Moini (1998)	M		X	X		
Cheong and Chong (1988)	M	X			X	
Keng and Juian (1989)	M	X	X	X	X	
Bauerschmidt et al. (1985)	O	X		X		X
Dichtel et al. (1990)	M	X	X			
Howard and Borgia (1990)	M	X	X		X	
Kaleka and Katsikeas (1995)	M	X				X

Notes: \* Reversed scale; M: multiple industries; O: one industry.

Generally, marketing barriers have been found to affect export performance negatively in most previous studies. Technical barriers to trade (TBTs) exist in most industries but are particularly widespread in the international exchange of primary and processed agricultural and aquaculture products. Recently, a considerable number of Vietnamese seafood products have been rejected at U.S. ports because they failed to comply with U.S. regulations on environmental amenities, food safety, and so on, causing significant losses to Vietnamese producers and exporters. This paper discusses TBTs that have been applied to Vietnam's seafood products as a means of import restriction. The paper also evaluates the effects of marketing barriers on Vietnamese seafood exported to the U.S. market. The resolution of this problem will contribute to the Vietnamese business community, assisting them to expand the volume of its trade with the U.S and gain a solid foothold in this important market. However, empirical evidence has often been found using data from multiple industries and investigating mostly one, two, or three kinds of marketing barriers.

The product barrier occurs in developing new products for foreign markets, meeting export product quality standards, adapting export product design/styles, and providing an after-sales service (Kaleka and Katsikeas, 1995; Leonidou, 2000, 2004). Small and medium-sized firms often lack managerial expertise, research skills, R&D competence, and financial resources, thus limiting the firms' fulfillment of the high-quality standards for products required by foreign markets (Leonidou, 2004). Different facets of the product barrier have been found to impact differently on export performance. Some facets have a very low impact (e.g., developing new products for foreign markets), while others have a low (e.g., meeting export product quality standards) to moderate influence (e.g., providing a technical/after-sales service) on export performance (see Leonidou, 2004 for a review). Generally, the relative role of product barriers is the weakest among the marketing barriers to the export performance of small and medium-sized firms across industries (Leonidou, 2004).

The price barrier involves offering satisfactory prices to customers and the difficulty in matching competitors' prices and granting credit facilities to foreign customers (Kedia and Chhokar, 1986; Moini, 1998; Leonidou, 2004). Small and medium-sized firms often suffer

high costs due to the lack of economies of scale, causing them to face difficulties in controlling their exporting operations. The aspects of the price barrier are documented to have a high to very high impact on export performance across industries, and among the marketing barriers, it is the strongest predictor of export performance (Leonidou, 2004).

The distribution barrier refers to complex foreign distribution channels, accessing export distribution channels, obtaining reliable foreign representation and maintaining control over foreign middlemen, and facing difficulties in supplying inventory abroad (Leonidou, 1995; 2004). The complexity and length of foreign distribution channels makes it difficult for firms to enter international markets. Small and medium-sized firms face a very low to a high impact of the different facets of the distribution barrier on their export performance. For example, while accessing export distribution channels and obtaining reliable foreign representation have a high influence, maintaining control over foreign middlemen has only a very small effect on export performance (Leonidou, 2004).

The logistics barrier is considered as an extensive dimension of the distribution barrier (Kaleka and Katsikeas, 1995; Yeung, 2006). The logistics barrier reflects the difficulties in supplying inventory in overseas markets, unavailable foreign warehousing facilities, and excessive transportation and insurance costs (Kaynak and Kothari, 1984). The lack of financial and human resources and a large geographical distance generate many problems for the firms in delivering products on time as well as maintaining the reasonable storage of products abroad. Most small and medium-sized firms feel that the excessive transportation/insurance costs are a major problem, while supplying inventory and warehousing facilities abroad is popular but relatively weak (Leonidou, 2004).

The promotion barrier, finally, deals with adjusting export promotional activities to individual foreign market requirements in relation to the variations in buying motives, consumption patterns, and government regulations (Howard and Borgia, 1990; Leonidou, 2004). The lack of resources and geographical distance also generate difficulties in adjusting export promotional activities. However, the effect of the promotion barrier on export performance for small and medium-sized firms is at a moderate level (Leonidou, 2004).

#### **4 THEORETICAL MODELS AND HYPOTHESES**

Tab. 2 - Measures of the variables in the model proposal. Source: Measures reviewed by the authors

<b>Measures</b>	<b>Measures review</b>
The product barrier	Howard and Borgia, 1990; Kaleka and Katsikeas, 1995; Leonidou, 2000, 2004.
The price barrier	Barrett and Wilkinson, 1985; Kedia and Chhokar, 1986; Keng and Juian, 1989; Moini, 1997; Leonidou, 2004.
The distribution barrier	Bauerschmidt et al., 1985; Keng and Juian, 1989; Leonidou, 1995, 2004.
The logistics barrier	Kaynak and Kothari, 1984; Barrett and Wilkinson, 1985; Leonidou, 2004.
The promotion barrier	Sullivan and Bauerschmidt, 1989; Howard and Borgia, 1990; Leonidou, 2004.
Enterprise Performance	Zou et al., 1998; Aaby and Slater, 1989 and Piercy et al., 1998; Jorge Carneiro, 2011.

Based on the above discussions, this study explores whether different categories of marketing barriers (product, price, distribution, logistics, and promotion) influence export performance

simultaneously in the context of one industry. Because different industries have different success factors and drivers of export performance (Leonidou, 2004), a comparison within one specific industry can be more reliable for the firms or managers within this industry. The following hypotheses are suggested:

*H1: The product barrier has a negative effect on export performance.*

*H2: The price barrier has a negative effect on export performance.*

*H3: The distribution barrier has a negative effect on export performance.*

*H4: The logistics barrier has a negative effect on export performance.*

*H5: The promotion barrier has a negative effect on export performance.*

In order to prioritize the different categories of marketing strategies, it is important to gain an insight into the relative role of those marketing barriers in export performance for a specific industry (Leonidou, 2004). This study expects that the price barrier has the strongest impact, then distribution, logistics, promotion, and finally the product barrier with the weakest impact on export performance. The theoretical model is shown in the figure below (Fig. 1).

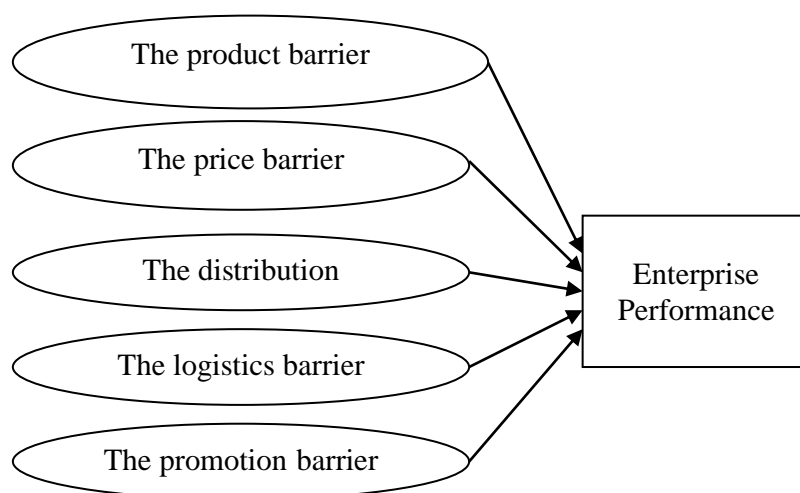


Fig. 1: Theoretical model. Source: Research results by author

Scales of variables are adjusted to suit the conditions of the VN seafood exporters based on in-depth interviews of experts and business managers.

Theoretical models have five independent variables measured by 24 observed variables and one dependent variable measured by four observed variables. Result measurement model is applied for all scale variables to access Cronbach's alpha coefficients.

Scale of the product barrier (S1) is measured by six observed variables, whose content refers to how developing new products for foreign markets.

Scale of the price barrier (S2) is measured by four observed variables, whose content refer to how offering satisfactory prices to customers and the difficulty in matching competitors' prices.

Scale of the distribution barrier (S3) is measured by five variables, whose content refers to complex foreign distribution channels, accessing export distribution channels.

Scale of the logistics barrier (S4) is measured by five variables, whose content refer to how extensive dimension of the distribution barrier.

Scale of the promotion barrier (S5) is measured by four observed concepts, whose content refer to deals with adjusting export promotional activities to foreign markets.

Scale of Enterprise Performance (F) includes levels where companies meet customer requirements of product quality measured by four observed concepts, whose content mention to how companies provide customers with quality products satisfying their requirements.

Export performance is regarded as one of the key indicators of the success of a firm's operations. Export performance can also be defined as the outcomes from the firm's exporting products to a foreign market (Navarro et al., 2010).

## **5 METHODOLOGY**

- ***Procedure for data collection***

This study aimed to investigate the relationship between export barriers and export performance in the commercial relationship of seafood firms, Vietnam, targeting the U.S market. Based on the aim of the study, an empirical analysis was conducted of Vietnam firms that target US as the market for their products. Since the majority of studies about international business and export performance have been conducted in the USA and Europe, there is a need for studies from developing countries to improve their poor export performance. On the other hand, with regard to volume of bilateral trade, Vietnam is a significant commercial partner for US in the ASEAN. Trade between Vietnam and US shows significant fluctuations in the trade balance.

Thus, focusing on this industry is expected to generate a comprehensive view of the role of marketing barriers in export performance in Vietnam. Seafood companies operate along all the coastal provinces in Vietnam with exporting markets covering over 165 nations and geographical areas. In preparation for this study, we focused on three key exported products: pangasius, shrimp, and surimi. About 200 seafood companies fulfilled the criteria and operate mainly in the south of Vietnam.

Quantitative research methods are used in this study. Theoretical models have five independent concept measured by 25 observed concepts and one dependent concept measured by three observed concept. Scale concepts studied in theoretical models are multivariate scale. The observed concepts are measured on a 5-point Likert scale (1: strongly disagree to 5: strongly agree). To ensure that the questionnaire's content and design would be unambiguously understood by the respondents, it was pre-tested by 12 experts (Four academic professors in the international business field, four consultants in exporting and international business and four managers of respected exporting firms in Vietnam) and the questionnaire was revised in light of their comments. The questionnaire was then mailed to managers of these firms.

A survey questionnaire was sent by e-mail to the business managers of 200 seafood companies with labour numbers over 300. We decided to ignore about 30 companies with fewer than 300 employees, as their sizes are too small to contribute significantly to the export activities, especially due to the labour intensity of the industry. In order to increase the response ratio, the firms' managers were contacted by phone to confirm their participation in the survey. Of the 200 questionnaires dispatched, 152 usable responses were received, representing an effective response rate of 76%. Statistical analyses were done in two phases; first an explanatory factor analysis was performed and then a structural equation model employed to determine which barrier groups have a greater effect on export performance. SPSS 22.0 and were used as statistical software for analyses.

- ***Description of the Survey***

The data collected from 152 seafood exporters in Vietnam with the characteristics are presented in Tab. 3.

Tab. 3 - Characteristics of the sample seafood exporters in Vietnam. Source: Data analysis of research data by SPSS 22.0

<b>Ownership</b>	<b>Quantity</b>	<b>Percentage</b>
Stock enterprises	64	42.11
Private enterprises	88	57.89
<b>Size</b>	<b>Quantity</b>	<b>100.00</b>
300 < Firm < 500	84	55.26
Up 500	68	44.74
<b>Total</b>	<b>152</b>	<b>100.00</b>

- **Reliability and Validity**

First, statistical analysis to calculate both the factor analysis and the scale reliability analysis, before carrying out factor analyses, a reliability analysis for the scale was run through Cronbach's alpha. The reliability of the questionnaire was 0.775, which is in the acceptable range. So, scales of this study have a rather high level of internal consistency and are reliable. The concept scales of the study are preliminarily assessed and screened by EFA method and Cronbach Alpha coefficients for each component. Selection criteria are satisfied when concepts have correlation coefficients turn-total (item-total correlation) >0.30, Cronbach alpha coefficients > 0.60; system load factor (factor loading) >0.40; total variance extracted for  $\geq 50\%$  (Hair & CTG, 1998).

Tab. 4 - KMO, measure and Bartlett's test. Source: Data analysis of research data by SPSS 22.0

<b>KMO and Bartlett's Test</b>		
Kaiser-Meyer- Olkin Measure of Sampling Adequacy.		.793
Approx. Chi-Square		1209.111
Bartlett's Test of Sphericity	df	190
	Sig.	.000

The results of the EFA, summarized in Table 5, showed 24 variations observed in 5 components of the enterprise performance scale and retained 5 factors with 20 observed concepts. There are four items of excluded observed concepts: *the product barrier*<sup>6</sup>, *the price barrier*<sup>4</sup>, *the distribution barrier*<sup>4</sup> and *the distribution barrier*<sup>5</sup>.

After excluding the four concepts, the EFA results 5 factors of enterprise scale. As KMO coefficient = 0.793, EFA matches the data and the statistical test Chi-square Bertlett 1209.111 worth 0.000 significance level. Thus, the observed concepts are correlated with each other considering the overall scope. The variance extracted by 64.903 shows that factors derived from 64.903% explained variance of the data, eigenvalues in the system by 1.247. Therefore, the scale draw is acceptable. The scales have observed concepts excluded by of EFA, Cronbach Alpha coefficients were recalculated, and the results achieved reliability requirements.

Tab. 5 - Constructs, Factor Loadings, and Reliability (EFA). Source: Data analysis of research data by SPSS 22.0

<b>Rotated Component Matrix<sup>a</sup></b>					
	<b>Component</b>				
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>

Logistics barrier1	.769				
Logistics barrier2	.738				
Logistics barrier3	.824				
Logistics barrier4	.784				
Logistics barrier5	.758				
Product barrier1		.794			
Product barrier2		.747			
Product barrier3		.742			
Product barrier4		.564			
Product barrier5		.678			
Promotion barrier1			.761		
Promotion barrier2			.671		
Promotion barrier3			.726		
Promotion barrier4			.726		
Price barrier1				.810	
Price barrier2				.879	
Price barrier2				.834	
Distribution barrier1					.790
Distribution barrier2					.874
Distribution barrier3					.818
<b>Eigenvalues / KMO = 793</b>	<b>5.021</b>	<b>3.006</b>	<b>2.204</b>	<b>1.501</b>	<b>1.247</b>
<b>Variance (%)</b>	<b>16.927</b>	<b>31.373</b>	<b>42.906</b>	<b>53.990</b>	<b>64.903</b>
<b>Cronbach's Alpha</b>	<b>0.875</b>	<b>0.808</b>	<b>0.723</b>	<b>0.801</b>	<b>0.802</b>

Tab. 6 - The table summarizes the results of scale. Source: Data analysis of research data by SPSS 22.0

Model	Variables	Cronbach's alpha	Variance (%)	Value
Product barrier (S1)	5	0.808	<b>64.903</b>	Satisfactory
Price barrier (S2)	3	0.801		
Distribution barrier (S3)	3	0.802		
Logistics barrier (S4)	5	0.875		
Promotion barrier (S5)	4	0.723		
Enterprise Performance (F)	4	0.779	<b>60.308</b>	

- *Analysis of the Correlation Matrix*

The first step of conducting linear regression analysis is to consider the linear correlation between all the concepts. That means to consider the overall relationship between each independent variable with the dependent variable, and between the independent concepts (Hoang Trong & Chu Nguyen Mong Ngoc, 2008).

Tab. 7 - The correlation coefficient between the components. Source: Data analysis of research data by SPSS 22.0

Constructs	Mean	S.D	1	2	3	4	5	6
1. Export performance	4.10	1.49	–					
2. Product barrier	3.88	1.29	-0.49**	–				



3. Price barrier	4.05	1.45	-0.02**	0.04**	–		
4. Distribution barrier	4.12	1.91	-0.68**	0.57**	0.05**	–	
5. Logistics barrier	3.72	1.39	0.07**	-0.56**	0.07**	0.97**	–
6. Promotion barrier	4.20	2.09	-0.04**	0.06**	-0.03**	0.09**	0.07**

Notes: Correlations in bold are significant at  $p < 0.05$ .

• **Regression Analysis**

The estimated results of the multiple regression model indicate a good fit with the data ( $F = 31.470$ ,  $p < 0.001$ ;  $R^2 = 50.2\%$ ; all  $VIF < 2.0$ ). The results of testing the effects of marketing on export performance are shown in Tab. 8. This study expected that the product, price, distribution, logistics, and promotion barriers, irrespectively, affect export performance negatively.

Tab .8 - The Effects of Marketing Barriers on Export Performance Source: Data analysis of research data by SPSS 22.0

Independent variable	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	1.341	.440		3.047	.003		
Product barrier	-.112	.074	<b>-.108</b>	-1.513	<b>.032</b>	.651	1.535
Price barrier	-.327	.051	<b>-.130</b>	-2.527	<b>.039</b>	.993	1.007
Distribution barrier	-.219	.056	<b>-.222</b>	-2.348	<b>.028</b>	.858	1.166
Logistics barrier	-.451	.072	<b>-.156</b>	-4.097	<b>.000</b>	.633	1.579
Promotion barrier	.104	.063	.101	1.643	.103	.870	1.150

Notes: \*  $p < 0.05$ ; \*\*  $p < 0.01$ ; ns: non-significant; all  $VIF < 2.0$ ;  $R^2$  (export performance) = 50.2%;  $F = 31.470$ ,  $p < 0.001$ .

Table 8 shows that the dependent variable correlates have quite strong linear correlation in the sense  $\alpha > 0.05$  with five independent concepts S1, S2, S3, S4, and S5. Since all absolute correlation coefficients between the concepts are in range of 0.633 to 0.993 satisfying  $-1 \geq r \geq +1$ , all concepts satisfy the rule of multiple linear regressions.

This proves that the value achieved distinction in other words; the scales of this study measured the different variables of studies. Correlation matrix also shows that variables of distribution barrier have the strongest negative impact on the dependent variable of the enterprise performance. In contrast, promotion barrier has the least impact on the dependent variable of the enterprise performance.

From Table 8, show that all four factors S1, S2, S3 and S4 of scale factors affect export performance, have a negative impact on export performance (F) at the means  $Sig = 0000-0039 < 0.05$ . The remaining factors S5 ( $Sig = .101$ ), there is no statistically significant. Thus, researchers can conclude that the hypothesis H1 (S1), H2 (S2), H3 (S3), and H4 (S4) are accepted. The regression equation for the normalized variable coefficient takes the following form:

$$F1 = -0.108 X1 - 0.130X2 - 0.222X3 - 0.156X4 + 0.101X5 + \epsilon_i$$

Among them: F: Enterprise Performance (F)  
 Product barrier (S1)  
 Price barrier (S2)

Distribution barrier (S3)  
Logistics barrier (S4)  
Promotion barrier (S5)

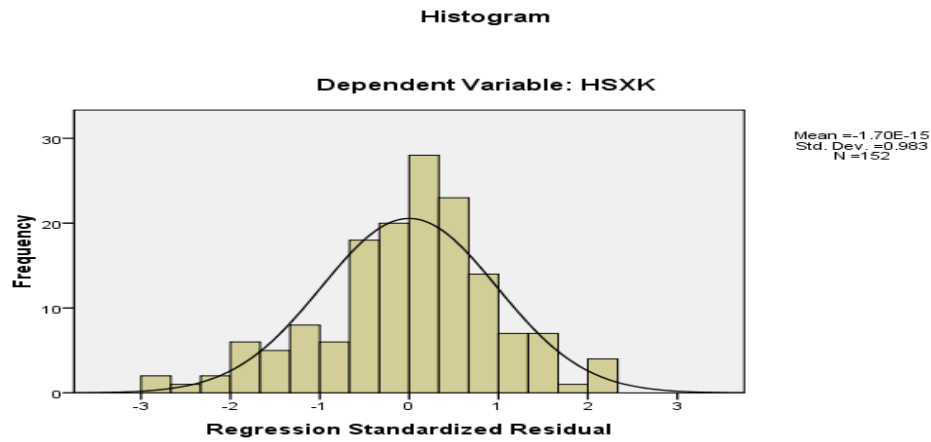


Fig. 2 – Regression standardized residual. Source: Data analysis of research data by SPSS 22.0

- *Assuming normal distribution of residuals*

According to the analysis of the residue showed the average value  $1.70E^{-15}$  Mean =  $\sim 0$  and standard deviation Std. Dev = 0983  $\sim 1$  can distributed approximately standardized residuals. Therefore it can be concluded that the hypothesis of normal distribution model is not violated.

Normal P-P Plot of Regression Standardized Residual

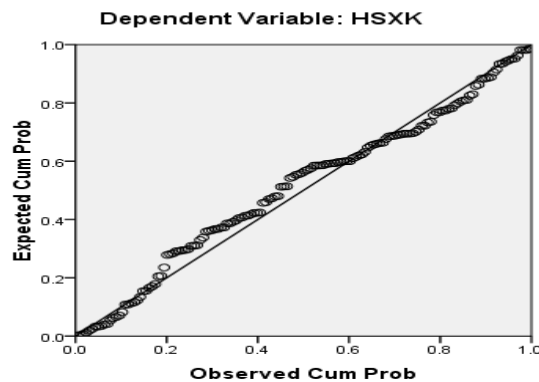


Fig. 3 – Normal P-P Plot of Regression standardized residual. Source: Data analysis of research data by SPSS 22.0

- **Assume contact linear**

Considering the relationship between standardized residuals and predicted values through scatter plots, assuming a linear contact and equal variance is satisfied there is no contact between the predicted value and the part balance, we will randomly distributed in a way around the vertical axis passing through the 0 and does not form a specific shape.

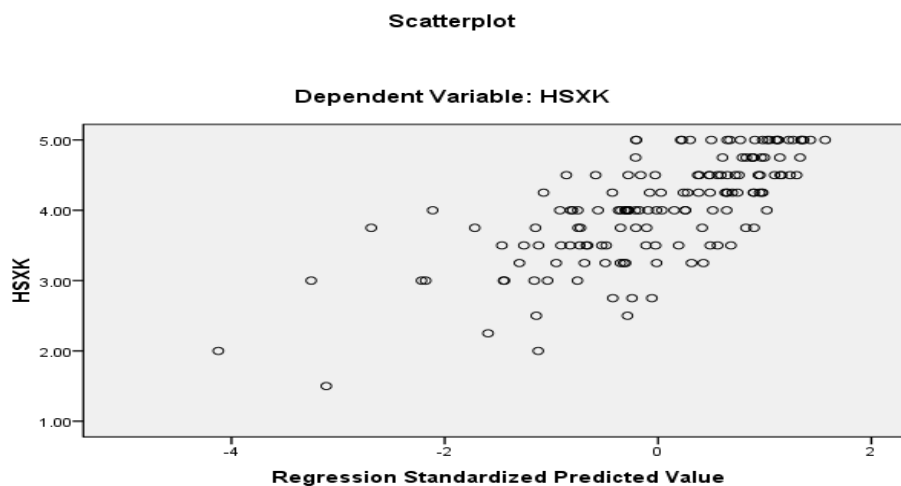


Fig. 4 – Regression standardized Predicted Value. Source: Data analysis of research data by SPSS 22.0

## 6 CONCLUSION

### 6.1 Results and Discussion

This study extended previous studies (Kaynak and Kothari, 1984; Leonidou, 2000) by analyzing and assessing the impact of trade barriers (product, price, distribution, logistics and promotion of export performance in a commercial industry homogeneous distribution and production environments. The study used data from the fishery industry of Vietnam, has inherited the previous studies, conducted mainly in the West.

- The results confirm the negative relationship between products barrier for export performance ( $\beta = -0.108$ , Sig = 0.032,  $t = -1.513$   $p < 0.05$ ). This result is consistent with most previous studies (Kaleka and Katsikes, 1995; Karelakis et al, 2008). However, whereas most previous studies here in the developed countries showed the importance of the product barriers is the weakest (Moini, 1998; Leonidou, 2004), this study confirmed the predicted barriers are the most important products for export performance of seafood companies in Vietnam.

Most seafood companies in Vietnam only export a few product lines, such as shrimp, fish, or crab, as frozen raw products. In particular, most products are sold through foreign middlemen, and not to the ultimate consumers. This limits the ability to develop new products for a specific foreign market's needs and wants, regardless of the diversity of consumer preferences across countries. In addition, although the production of high-value-added products is encouraged and aided by the Government, many firm seem to be afraid of the risks due to the lack of international market understanding.

- The findings show a negative effect of the price barrier on export performance ( $\beta = -0.130$ , Sig = 0.039,  $t = -2.527$ ,  $p < 0.05$ ). This result is similar to those of most previous studies (Moini, 1998; Leonidou, 2000). The price barrier is also found to be the second most important predictor of export performance in the industry. Although

most seafood firms in Vietnam take advantage of the low labour cost, the price barrier is becoming more serious due to increasingly scarce materials and a polluted environment.

- The present results also confirm a negative relationship between the distribution barrier and export performance ( $\beta = -0.222$ , Sig = 0.028,  $t = -2.348$ ,  $p < 0.05$ ). This result is consistent with most previous studies (Leonidou, 2002; Moini, 1998). Although the distribution barrier's impact on export performance is weaker than that of the product and price barriers in the industry, the magnitude of its effect is relatively strong. In fact, most export markets in the seafood industry are in developed countries. Therefore, the firms have to face distribution channels consisting of many layers, direct distribution systems, and the diversity of the services required by distribution members across countries (Leonidou, 1995, 2000). This complexity of the distribution systems creates serious difficulties for the firms.
- The findings also reveal a negative effect of the logistics barrier on export performance ( $\beta = -0.156$ , Sig= 0.000,  $t = -4.097$ ,  $p < 0.05$ ). This result is consistent with most previous studies (Katsikeas, 2008). Although the export revenue has continuously increased in recent years, the export markets of the firms focus mainly on the US, the EU, and Japan; the great geographical distance increases the transportation costs as well as limiting the ability to supply adequately. In addition, most firms have no warehousing facilities abroad. Thus, the flow of products to the host markets is not constant and is sometimes delayed. The characteristics of seafood products, which require special storage and faster transportation means, force the firms to pay extra costs. In most cases, the firms have to cover additional insurance, which increases the price of the products for the end-users. As a result, the logistics barrier can decrease the firms' competitiveness in international markets.

Finally, the results do not support a negative relationship between the promotion barrier and export performance ( $\beta = 0.101$ , Sig= 0.103,  $t = 1.643$ ,  $p > 0.10$ ). This result is inconsistent with most previous studies (Koksal, M.H. and Kettaneh, T., 2011). However, it is worth noticing that although the effect of the promotion barrier on export performance is not significant, the promotion barrier correlates highly with other marketing barriers. Thus, its effect on export performance may occur indirectly through other barriers, such as product, price, or distribution. As a result, it would be a mistake to ignore the role of the promotion barrier in export performance. In fact, not many seafood firms in Vietnam can carry out their promotion strategy abroad effectively. What we can observe is that only a few firms introduce their products at expo exhibitions, some have a website to advertise and provide limited information about their products, while most firms have no advertising activities in overseas markets due to high costs. These shortcomings generate risks for the firms when their export revenue is mainly based on a certain amount of familiar customers.

## **6.2 Implications for practical trading**

This study has implications for the management of commercial and industrial sector. First, the seafood company should pay attention to the various trade barriers based on the impact to reduce or improve export performance. Despite the importance of each type of barriers, as well as every aspect of every category, most of the aspects of trade barriers play a certain role in the export performance. This means that managers and traders should have a comprehensive view of the limitations of the barriers to trade mixed strategy of the company. A combination of tight link between the activities of the members of the company and build a mechanism for sharing information as well as the use of common resources can be a good solution to overcome institutional barriers to trade on the international market.

According to the study of the industry Vietnam seafood exports, enterprises should focus primarily on the barriers to product, price, distribution, logistics and promotion. More importantly, for each type of trade barriers, companies should determine the cause of each problem. For example, lack of knowledge and information about consumer attitudes, preferences, habits, may be the cause of the production does not meet the desired needs of the consumer. Thus, a survey of consumers in the target market can help solve this problem.

Finally, as mentioned in the introduction, the fisheries sectors plays a very important role in the economy, especially in providing jobs for the people and bring a large amount of foreign currency for the country. Thus, policy makers in the fisheries industry to support enterprises to minimize the negative impact of trade barriers. They should organize workshops or classes guide how to improve strategic commercial mixture of seafood exporters.

They can also help businesses by providing information on food safety standards, potential customers or how to enter a foreign market wants. Enhanced tools to encourage exports, such as financial assistance or consult experts and consultants to help businesses operate more efficiently export (Karelakis et al, 2008).

The first two objectives, to identify and evaluate product marketing opportunities including product specifications for potential exports, are through the survey data. In recent years, the Vietnamese seafood export industry has been exponentially increasing in value added agriculture and food products. The seafood industry in VN is already very active in international markets. A larger sample size which more accurately reflects seafood businesses would identify product marketing opportunities more specifically.

Regarding the objective to identify and evaluate transaction requirements for potential exports, the results indicate that high costs to exporting are perceived mainly by non-exporters. Few current exporters cited costs, exchange rates, or record keeping as constraints to exporting; rather trade barriers and tariffs were important to exporting firms. Transaction costs such as exchange rates did, however, play a role in the withdrawal of former export participants from international markets.

### **6.3 Policy Implications**

Export assistance and promotion programs are designed to increase the Vietnamese seafood export industry, and those programs have evolved to focus on encouraging exports among small to medium sized firms. From a firm perspective, the programs are designed to bridge information gaps about international markets and assist in the initial pursuit of international markets. Few studies have analyzed the efficiency of export promotion programs on the sustainability of exports among smaller businesses. Balabanis, G. I. (2000) found a positive correlation between the trade leads and export programs and a firm's self-proclaimed export success. The results of this research are useful for the policymakers in the design of the Vietnamese trade policy. Assistance programs for international marketing are available to seafood firms through the Vietnamese Directorate of fisheries and also through trade associations like the Vietnam Association of Seafood Exporters and Processors (VASEP).

Among participating current exporters, 63% did not use government assistance programs, stating that those programs were either not useful or the firm was unaware of such programs. Only one of the exporting firms used the Vietnamese Directorate of fisheries for export assistance. Further export research should include a cost benefit analysis of export promotion policies in the Vietnamese.

### **6.4 Suggestions for Further Research**

Currently, research pertaining to the international involvement of the Vietnamese seafood export industry is limited. Additional information in this area will help identify the needs of the Vietnamese seafood for potential exports and the overall perception in the industry about

international marketing. Further research will also benefit policymakers in the design of state export promotion and assistance programs. A more in-depth investigation is needed into the role of a firms' competitive advantage in international markets, and also into the conflict between export promotion programs and the "buy local, sell local" campaign.

Future studies would benefit from exploring other barriers (e.g. procedural, informational, or environmental) that affect export performance. The results presented here are based on self-reported measures of export performance relating to the Vietnamese seafood industry. Objective measures of export performance could be used to increase the generalizability of the study.

Increasing the sample size for this study, following survey sampling protocol, will permit a more thorough analysis with the inclusion of additional variables and theories. A mail survey might be more efficient at increasing the sample size and a comparison of response rates for different data collection methods among seafood businesses would be informative for researchers. The study could be enhanced using case study and interview approaches to gather more information about the Vietnamese seafood businesses and food processors.

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## **PERFORMANCE MANAGEMENT AND MEASUREMENT OF ENTERPRISES: A THEORETICAL AND EMPIRICAL STUDY**

*Dawuda Alhassan, Felicita Chromjaková*

### **Abstract**

Research on performance management and measurement of enterprises has recently become a topic of importance to policy makers, media and academics alike. This field of performance management and measurement is rising quickly as respond to the roles of enterprises and companies changing and the global trends. Even though, much research has been developed in this field, there is no approved standpoint for an ideal framework in the literature for performance management and measurement. At the same time, theoretical and empirical evidence linking performance management and measurement is limited. Therefore, this study investigates theoretically and empirically performance management and measurement of small and medium-sized enterprises in the Czech Republic. It proceeds with relevant theoretical and empirical review of performance management and measurement. Then, this study discusses the impacts of performance management and measurement on Czech small and medium-sized enterprise performance. In order to fulfil these purposes, this study uses a case study approach.

*Keywords: Management, Measurement, Performance, Performance management, Performance measurement, small and medium-sized enterprises*

JEL Classification: H12, L25, M10, P17

## **1 INTRODUCTION**

Normally, the term “Performance” can be applied at these levels: personal, team or organization. One of the basic functions of management is managing and measuring performance. Also, in the management science, the two processes that cannot move apart from one another, as both proceeds and follows each other are the performance management and measurement. Moreover, the recent global financial crisis or economic recession has enforced policy makers, enterprises, companies and organizations to reassess their management structures and strategies. One of the growing responses to these expectations is the performance management and measurement as a control system. At the same time, governments, managers, public and private sector organizations and academics have recognized the importance to deploy and develop performance management and measurement to stay high performance. For example, one of the key systems the European Commission uses yearly to assess and check its member countries progress basis in implementing the Small Business Act (SBA) is the performance review of the small and medium-sized enterprises (SMEs).

The goal of this study is to assess, discuss and comment on the importance, challenges, limitations and benefit of performance management and performance measurement, as well as its linkage. For instance, in the Czech Republic SBA Fact Sheet 2014, it states that there existed many SME policy areas where action needed and where Czech performance fails to match with the European average. Though, this primarily concerns, responsive internationalization and administration, and all other areas in the year 2013 report showed

average performance. Hence, this partly explains why Czech SMEs performance remained weak.

The research problem of this study derives from the SBA Fact Sheet 2014. Therefore, this present research paper tries to find out why Czech SMEs performance is still weak? Then, what are the current problems and challenges facing Czech SMEs?

The structure of the research paper is as follows. Section two is the theoretical background of performance management and measurement. Next is a brief, relevant literature review of performance management and measurement. Section four is the research method and strategy. Then, the findings and discussion is the section five. Conclusion is the last section.

## **2 THEORETICAL BACKGROUND**

This section presents a brief theoretical background of performance management and measurement (in companies or organizations) using a maturity model of performance management and measurement – assessing organizational capabilities of performance management and measurement (Chelnicuic, 2010). Performance measurement is like a sub process of performance management, as (Brudan, 2010) highlights that; it concentrates primarily “on the identification, tracking and communication of performance results, by the use of performance indicators”.

### **2.1 Performance management maturity model**

According to (Klimko, 2001) a maturity model is a procedure that describes the progress of an entity over time and has the following four features, First, the development process draw by employing a few levels. Then, each level distinguishes from a certain need, which must get to pass to the next level. Third, the levels arrange sequentially, from the first up to the end level. Fourth, the development process takes progress from one level to the next. For example, Maslow Pyramid was one of the well-known examples of a maturity model. (Maslow 1943) argue that there is a hierarchy of human needs, starts from physiology to self-actualization needs and during the hierarchy that is all levels must achieve by ideally individuals. Though, similar adapted plans can apply to assess the progress of every entity, no matter of its form or nature. Such an entity could be present-day organization or SMEs or enterprises.

Management models aim to assess performance and find different opportunities for development of the organizations or enterprises or SMEs, as its main strategic tools for building capabilities and attain competitive advantages. In line with these, for example, in the United Kingdom, from the Office of Government Commerce (OGC UK 2008) specialists highlight that, maturity models have become important tools for assessing organization's capabilities which help in their activities to carry out change and develop in a structured way. According to the OGC, the reasons why organizations or enterprises might choose to use a maturity model to assess their capabilities; first, better understand of weaknesses and strengths to enable development to happen. Second, service quality recognition to support proposals, third is justifying investments in development processes, fourth is mapping for continual progression and development. Fifth is focusing on the organization's maturity and not precise initiatives. Figure 1 shows the performance management maturity model (PMMM a) and it is an academic research project result using different data sources such as, specialized literature in performance management and measurement review, highly acknowledged maturity models review and performance management practitioners' insights. According to (Chelnicuic, 2010), (Brudan, 2009) was the originator of the maturity model.

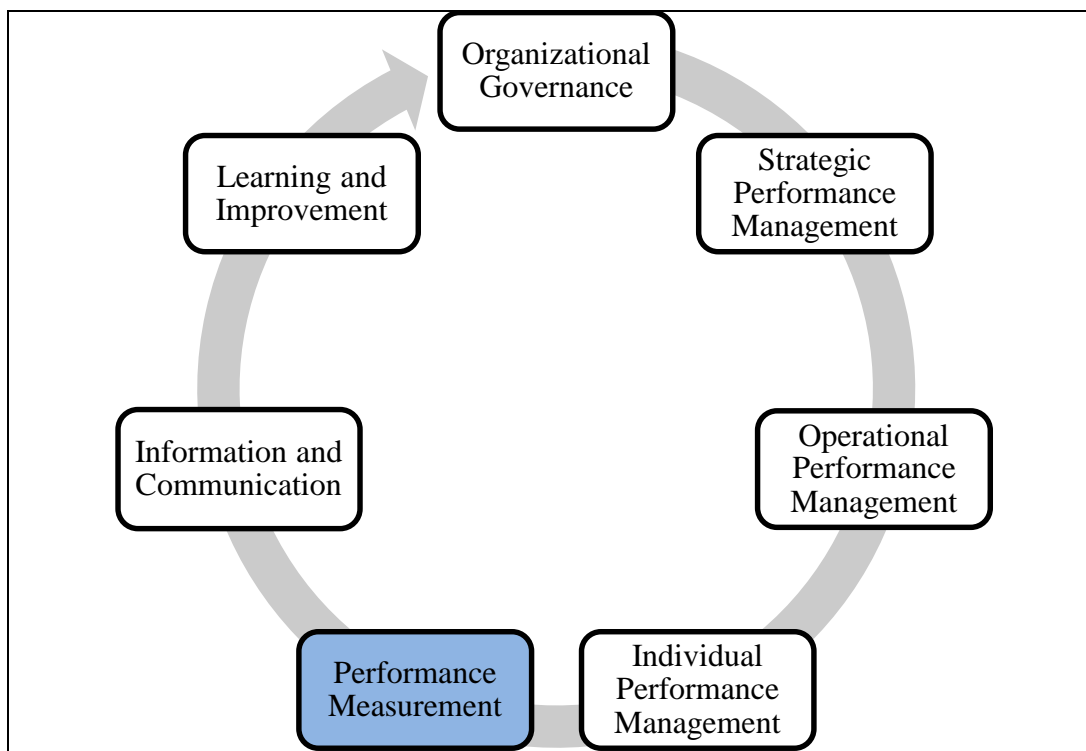


Fig. 1 – The (PMMM a). Source: Adapted from (Chelniciuc, 2010)

The performance management maturity model is built on seven steps each defining characteristics of performance management system. The maturity model for performance management also employs a five levels maturity framework (see table 1) adapted from Portfolio, Programme and Project Management Maturity Model (P3M3 Models, 2008) and The Capability Maturity Model Integration (CMMI, 2001). Therefore, organizations or enterprises or SMEs can assess the level of maturity of their performance management practices in each of these seven steps of the maturity model against the five levels maturity identified and described (in the appendix A).

Tab. 1 – The five maturity levels. Source: Adapted from (Chelniciuc, 2010)

Maturity Levels				
Level 1	Level 2	Level 3	Level 4	Level 5
<i>Ad – hoc</i>	<i>Beginner</i>	<i>Intermediate</i>	<i>Advanced</i>	<i>Proficient</i>

## 2.2 Performance measurement maturity model

The roles and importance of performance measurement; according to (Neely, 2002), commentators and researchers are discussing the several roles of measurement, as it acknowledges that performance measurement allows managers to do more than simply check improvement. Performance measurement system is a procedure supporting a constant learning in which feedback employ for making adjustments and identifying successes to agree upon initiatives or strategies to make sure continued excellence of services and activities, and to advance for the achievement of the organization's objectives, mission and vision. Performance measurement can also give a systematic and balanced attempt to evaluate the organizations' effectiveness operations from different viewpoints: business performance, employees, clients or customers and financial. In this situation, it is a must support performance measurement

system. Thus, to ensure that a mature and streamlined performance measurement practice is in place is to evaluate the present measurement capabilities against a “Performance Measurement Maturity Model” (see figure 2).

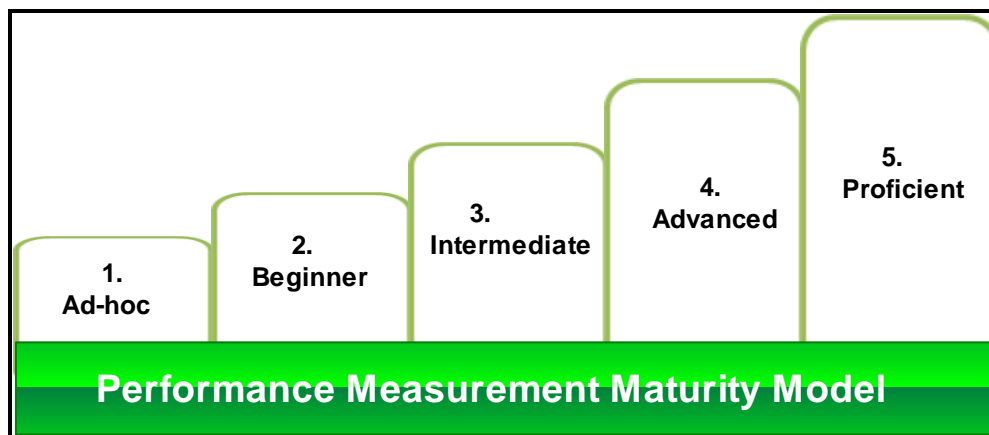


Fig. 2 – Performance measurement maturity. Source: Adapted from (Chelniciuc, 2010)

This model was also proposed by (Brudan, 2009) supported by experience obtained as implementers of Performance Management Systems and smartKPIs.com as developers, one of the finest repositories in the world with KPIs. Facts about maturity models; the major reasons why organization or enterprises might choose to employ a maturity model to assess their present capabilities are as follows: First, better understanding of weaknesses and strengths to enable development to happen. Second is the service quality recognition to support proposals. Third is justifying investments in the development process. Four, is mapping for continual progression and development. Five, is the focusing on the organization’s maturity rather than precise initiatives. Therefore, the maturity models demonstrate to be important implements to help SMEs or enterprises, or organizations guide their process maturity, processes to a common standard, following a step by step structured and predefined track. In addition, the performance measurement maturity model represents new implements that SMEs or enterprises or organizations can employ in evaluating the maturity of their performance measurement capability.

The performance measurement maturity model (PMMM b) is based on five dimensions (see figure 3) each describing the step or characteristic of it process (table 2).

#### ***The need of Performance management and measurement maturity model***

The following points are the summary of the performance management and measurement maturity model need. First is the organizational performance. Second is the organizational capability. The third need is the trained and motivated staff and the fourth is the having the right processes in place.

#### ***The benefits of using performance management and measurement maturity model***

The following points are the summary of the performance management and measurement maturity model potential benefits when organizations or enterprises are using as an assessment and review tool. First is the better understanding of weaknesses and strengths. Second is the basis of a roadmap for improvement. The third is the justifying investments. The fourth is the concentrating on the organization’s performance maturity and the fifth is the improving organizational performance.

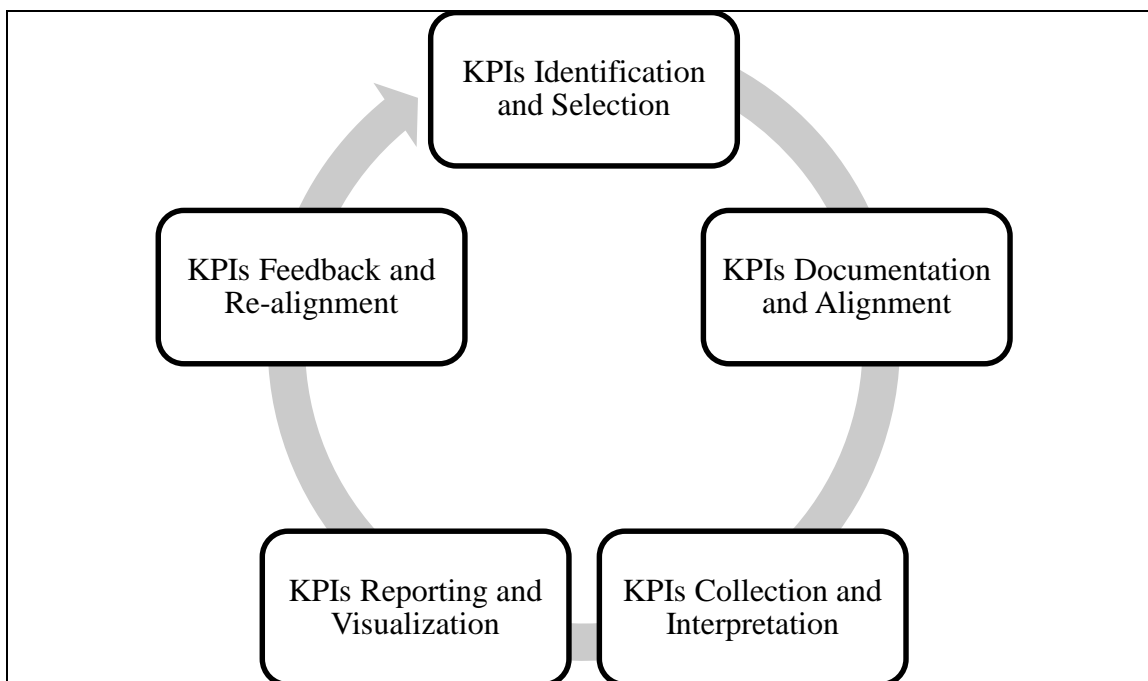


Fig. 3 – The (PMMM b) - Dimensions. Source: Adapted from (Chelniciuc, 2010)

Tab. 2 – Describing the step. Source: Adapted from (Chelniciuc, 2010)

<p>KPIs Identification and Selection – has an impact on the directions of organizational strategic. Indicators should focus on actions, services provided in order to achieve the organizational strategic objectives at each level. This must be considered at all times the measurement of what is important and not necessarily easy.</p>
<p>KPIs Documentation and Alignment – secures that the selected indicators are actionable, by establishing definitions, purpose, calculation formulas, targets, methods of data collection and reporting and data owners and custodians.</p>
<p>KPIs Collection and Interpretation – needs to be supported by a well-defined and optimized system solution that responds to the performance measurement collection needs of the organization. Responsible for data gathering must be identified and assured data availability for each KPI tracked in the Performance Scorecards and Dashboards.</p>
<p>KPIs Reporting and Visualization – regardless of the parties involved in the reporting process it must be assured that the process is effective and efficient. An inefficient and ineffective reporting system will not generate any positive effect on improving the performance of an organization. Data visualization is an important part of the measurement process, and this involves processing information with a graphic description of it in order to be understood and transmitted more easily, faster and more efficiently.</p>
<p>KPIs Feedback and Re-alignment – is one of the most important parts of the performance measurement cycle. It secures that the KPIs are kept on track and aligned with the organizational strategy, in order to provide with valuable information that will allow improved organizational practices.</p>

### **3 LITERATURE REVIEW**

This section presents a brief literature review of performance management and measurement, focusing on enterprises, SMEs, large companies or organizations and extended enterprise. Then, it talks about the linking of performance management and measurement for SMEs. Furthermore, the importance, challenges, limitations and benefit of performance management and measurement.

Researchers for example (Taticchi, et al., 2010) reported details literature review on performance management and measurement for large companies and SMEs. (Garengo, et al., 2005) are among the researchers to review the literature on performance measurement in SMEs manufacturing. (Hudson, et al., 2001) investigation focus on the development process of strategic performance measurement system for SMEs, by employing topology, survey and case study approaches. In contrast, (Bititci, et al. 2005) are among the investigators conducted research in extended enterprises. (Taticchi, et al., 2010) claim that, the review of the literature reveals a certain maturity relating to large companies and a significant lack for SMEs. Therefore, the evolution and development of this discipline are entering new directions, and these directions are by challenge, by context and by theme conceptualized. However, (Garengo, et al., 2005) described characteristics and the main factors influencing performance measurement in SMEs. Then, claimed that few companies or enterprises carry out performance management in SMEs. There are gaps between practice and theory, thus, little study focusing on performance measurement in SMEs is available. Besides, to introduce performance measurement in SMEs there are obstacles and these are endogenous barriers (short –term strategic planning) and exogenous barriers (financial and human resources). (Garengo, et al., 2005) get the conclusion that, only two researchers (Laitinen 1996, 2002; and Chennell et al., 2000) models exclusively concentrate on SMEs. Therefore, it is necessary to carry out further study of performance measurement systems in SMEs and large companies. (Hudson, et al., 2001) get the conclusions that, there is inadequate literature in respect of specific SMEs context, inadequate empirical evidence that describes the performance measurement practice in SMEs, as none of the SMEs studied had taken steps to update or redesign it performance measurement. There are barriers to the development of strategic performance measurement in SMEs such as strategically oriented and resource intensive. In addition, these issues are problematic because developing strategic performance measurement is a long term and requires measures should be focused. Alternatively, (Bititci, et al. 2005) studies how performance measurement may be embraced to manage and measure performance in extended enterprises. (Bititci, et al. 2005) claim that, due to structural differences between traditional and extended enterprises, performance measurement systems requires to manage and measure performance of extended enterprises, though being built upon existing performance measurement frameworks, would be operationally and structurally different. Therefore, from this, (Bititci, et al. 2005) proposed their model for managing and measuring performance in extended enterprises.

Lately, (Ahmed, and Sun, 2012) also developed a model to follow up, improvement and assessment for production performance management for SMEs in Sweden. At that point, (Peci, et al. 2012) employed case study with an unstructured questionnaire to study the impact of informal and formal factors on the development of SMEs in Kosovo. (Ahmed, and Sun, 2012) highlighted that, most frameworks are developed for large companies and SMEs lack effective performance management framework. (Ahmed, and Sun, 2012) model were based on literature study, and multiple case study was employed to check the applicability of the case study. Then, (Peci, et al. 2012) get the conclusion that, informal activities caused by low levels of professional, ethics of officials in institutions and poor enforcement of regulations

have significant impact on transaction costs, as these are obstacles to further growth for SMEs in Kosovo.

(Lukeš, 2013) use the innovative behaviour inventory with a total number of 3508 working populations of the Czech Republic, Germany, Switzerland and Italy. (Mohelská and Sokolová, 2014) study take a look at different forms of education in using e-learning for business disciplines. For example, (Kaňovská and Tomášková, 2014) employed a new method questionnaire, standard statistical methods and Cronbach alpha techniques to investigate the relationships between strategic behaviour and market orientation at the high-tech companies in the Czech Republic. (Lukeš, 2013) investigate whether entrepreneurs differ from managers in different areas of innovative behaviour at workplaces and whether this behaviour differs for entrepreneurs who have and do not have workers. (Lukeš, 2013) conclude that people in entrepreneurial activities, develop new ideas and try to overcome difficulties during implementation over employed people. Hence, these show that entrepreneurs' positions are high in attaining innovation outputs. (Mohelská and Sokolová, 2014) uses university students in the academic year 2009/10 and 2010/11 participating in the course Principle of Management, as their goals are to compare e-learning or training with the traditional training of employees. Mohelská and Sokolová, 2014) find out that both the e-learning and traditional way of training in basic managerial skills are the same as efficient. Then, (Kanovska and Tomaskova, 2014) find out that strategic behaviour is a part of market orientation. Therefore, strategic behaviour can be classified as decision making and methods of information. Thus, these influence business performance.

## **4 RESEARCH METHODOLOGY AND STRATEGY**

This section presents the research methodology and the use of scientific approaches and research strategy to ensure reliability and validity.

### **4.1 Scientific knowledge**

Academics claim that scientific knowledge is a knowledge acquired through scientific methods that are supported by sufficient validation. The following are the main factors to determine whether the facts or evidence are scientific knowledge. First, is testing. Second, a peer review and publication. Third, is the potential rate of error and the fourth, is the degree of acceptance among the scientific community. At the moment, competition in the globalization has also increased; the business environment has become a complex about the uncertainties of the market conditions. At the same time, organizations or companies or enterprises are facing challenges, and are willing to embrace the uncertainties of adopting the best practices, and this study provides these goals. For example, (Gray, 2013) claims that, SMEs needs to identify and adopt best practices so as to face the changing and complex business environment.

Therefore, this study is based on scientific knowledge and adopting an appropriate methodology. Thus, by implementing and identifying the best practices, uncertainties could be avoided in the study. These practices would be add-on to SMEs to compete with the current market conditions by managing and improving their performance in a scientific manner.

### **Scientific approach**

According to (Ghauri and Gronhaug, 2005) academics can embrace different approaches to research, such as abduction, deduction and induction. The deductive reasoning, (Zhang and Wu, 2010) claims it was built on logic, from generalization to precise cases. In the deductive

method hypothesis is tested and its lead to modification, approval or cancelation of principle. (Gray, 2013) argue that this process requires concepts or ideas to be measurable in order to make empirical research reject or validate the hypothesis. Thus, based on the empirical research the relationship between these concepts is checked. Inductive reasoning (Zhang and Wu, 2010) claim is a movement from precise cases to generalize and this could lead to discovery. (Gray, 2013) argue that in inductive method, the patterns of data collection are analyzed to review the relationships between variables and these lead to generalization even to theory development. However, deductive and inductive methods have many differences, for instance, structure of construction, data collection, generalization, and time duration and so on. (Lewis et al. 2007) highlight that the combination of deductive or inductive methods could be applied only when the implementation of these research methods cannot fulfil the requirement of research design. Then, the abductive method, (Dubois and Gadde, 2002) claimed that, it back to discover variables, relationships and new things. Thus, the abduction reasoning employs both the deduction and induction reasoning. Therefore, abduction method is the scientific approach employ in this study.

#### **4.2 Research strategy**

The research strategy employs in this study is a case study. A case study is described by (Thomas, 2010), as a focus rather than a method or procedure. Then, (Thomas, 2010) point out that, case study covers many methods to research. Besides, case study has the following questions that a researcher usually faced with; in the first place, what's the situation? Then, what's going on here? Next, what happens when? And the fourth what is related to what? Thus, case study can answer these questions. Furthermore, (Silver, 2013) identified three case studies, namely collective, instrumental and intrinsic. The collective case study is for building theories or studying general phenomenon and require investigate many cases. Then, the instrumental case study revises generalization or examines a case give inside of an issue. Lastly, the intrinsic case study solves problem with a single case.

A case study also gives a chance to accumulate data through different sources (Gray, 2013). This comprises structured and semi structured interviews, document analysis, possibility of conducting open, and filed observation. Moreover, (Thomas 2010) claims that, data collection of case studies makes the evidence and information built on data, but it leads to disapprove or approve of the proposal. Hence, structured planning of information collected for proposal makes the data collection as evidence for further research.

Tab. 3 – Thomas 2010 case study. Source: Adapted from (Thomas 2010)

Mainly use words	Use words, images and/or numbers	Mainly use numbers
<u>Interview</u> – Structured, -Unstructured, - Semi-structured	Questionnaires	Measurements and tests
Accounts	<u>Observation</u> – Structured observation, -Unstructured observation, -Participant observation	Official statistics
Diaries	Image – based methods	Other numerical data
Groups interviews		
Focus groups		
Interrogating documents		



Data assembling tools also back case study purpose. Table 3 above shows divergent approaches for collecting evidence. However, earlier scholar (Yin, 1989) had suggested that in case study there are three conditions that determine research type programme, these are firstly, the research question; secondly, researcher control possible; and thirdly, focus on contemporary events desired. Table 4 shows an outline of performance of each research strategy under each condition. Generally, a case study offers a better chance to research the phenomenon; hence the nature of case study employs in this research is instrumental and intrinsic case study.

Tab. 4 – Outline of performance of research strategy. Source: Adapted from (Schell, 1992)

Strategy	Case study	Experiment	History	Survey	Archival analysis
Form of research question	How, why	How, why	How, why	Who what, where, how many, how much	Who what, where, how many, how much
Requires control over behavioural events?	No	Yes	No	No	No
Focuses on contemporary events?	Yes	Yes	No	Yes	Yes/No

## 5 FINDINGS AND DISCUSSION

Sections two, three and four have provided the theoretical background and literature review of performance management and measurement of enterprises, organizations, companies and SMEs, research methodology and strategies. In this section, the findings of the study are shown and the discussion of the entire paper.

First of all, the data sources of this study are from Enterprise and Industry, 2014 SBA Fact Sheet – Czech Republic (SBA Fact Sheet 2014) and the Final Report – July 2014 (Muller, et al. 2014). The annually published SBA Fact Sheets objective is to improve the understanding of up-to-date trends and national policies affecting SMEs. The Czech SMEs are important in the economy as in the European Union (EU). Table 5 below shows the basic figures of SMEs in the Czech Republic.

These figures are estimates for 2013 produced by DIW Econ, based on 2008 to 2011 figures from the Structural Business Statistics Database (SBSD – Eurostat). This data covers the ‘business economy’ comprises construction, industry, services and trade (NACE Rev. 2 section B to J, L, M and N), but not enterprises in fisheries, forestry and agriculture and the non-market service sectors for instance health and education. The drawback of employing Eurostat data is that for some countries the data may not be the same from those published by national authorities. The benefit is that the statistics are comparable and harmonized across countries. Figure 4 below shows the SMEs trends in the Czech Republic.

According to the (SBA Fact Sheet 2014), it is difficult to describe the trends in the demography of Czech SMEs because companies are documented separately from private entrepreneurs (self – employed) and the documenting methodology on the latter changed in 2013. Figure 5 below displays the Czech Republic’s SBA profile.

Tab. 5 – Czech Republic SMEs – basic figures. Source: Adapted from SBA Fact Sheet (2014)

			Micro	Small	Medium-sized	SMEs	Large
Number of enterprises	Czech Republic	Number	968,998	31,850	6,273	<b>1,007,121</b>	1,406
		Proportion	96.1%	3.2%	0.6%	<b>99.9%</b>	0.1%
	EU-28	Proportion	92.4%	6.4%	1.0%	<b>99.8%</b>	0.2%
Number of employees	Czech Republic	Number	1,132,769	637,865	654,056	<b>2,424,690</b>	1,100,327
		Proportion	32.1%	18.1%	18.6%	<b>68.8%</b>	1.2%
	EU-28	Proportion	29.1%	20.6%	17.2%	<b>66.9%</b>	33.1%
Value added	Czech Republic	Billion €	16	12	16	<b>45</b>	38
		Proportion	19.8%	14.5%	19.9%	<b>54.1%</b>	45.9%
	EU-28	Proportion	21.6%	18.2%	18.3%	<b>58.1%</b>	41.9%

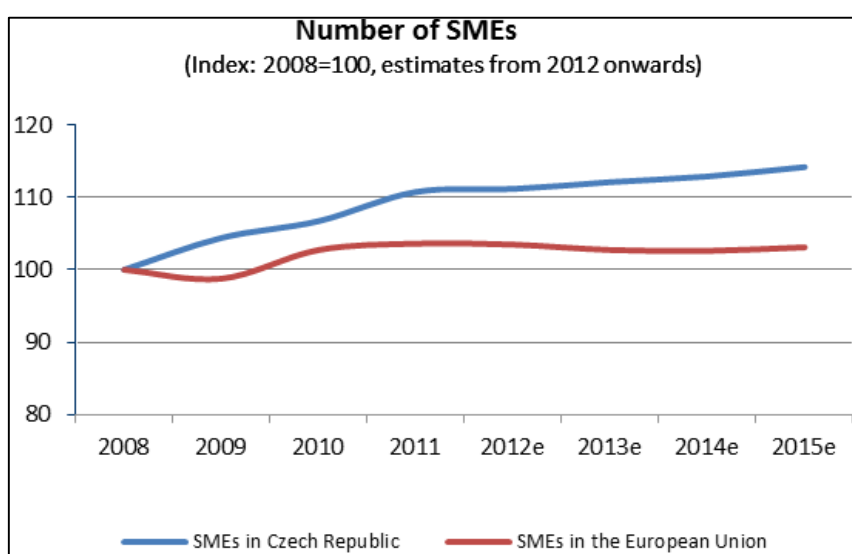


Fig. 4 – The Czech Republic SMEs trends. Source: Adapted from SBA Fact Sheet (2014)

The figure of Czech SBA profile indicates that, the skills and innovation and the state aid and public procurement perform well. Though, the responsive administration (public administration) remains low: this hampers business opportunities and has negative spill – over effects in other areas. For instance, it is difficult for Czech SMEs to do business across borders, both outside the EU and in the single market, due to unfavourable export and import procedures. Other areas of SBA have average results. Thus, generally, the implementation of SBA has been modest. As a result, some improvements from previous measures introduced became manifest in the course of 2013. The field of second chance is an example, where data indicate that time needed to settle liquidation fell from three to two years. According to the SBA 2014 report, 5 of the 10 policy areas were addressed in 2013 during implemented policy measures. Hence, improving the application of the ‘think small first’ principle, skills and innovation and access to finance were the main focus. For example, skills and innovation contribute to the development of long – term competitive advantage. In addition, future improvements are expected from SMEs support strategy 2014 – 2020. Though, these strategies appear to provide attention to the skills and innovation, and access to finance. This might pose risks to other areas of SBA to keep up with developments in other EU countries. Figure 6 displays the number of adopted/ implemented policy measures in EU 28 per SBA principle – 2013/2014.

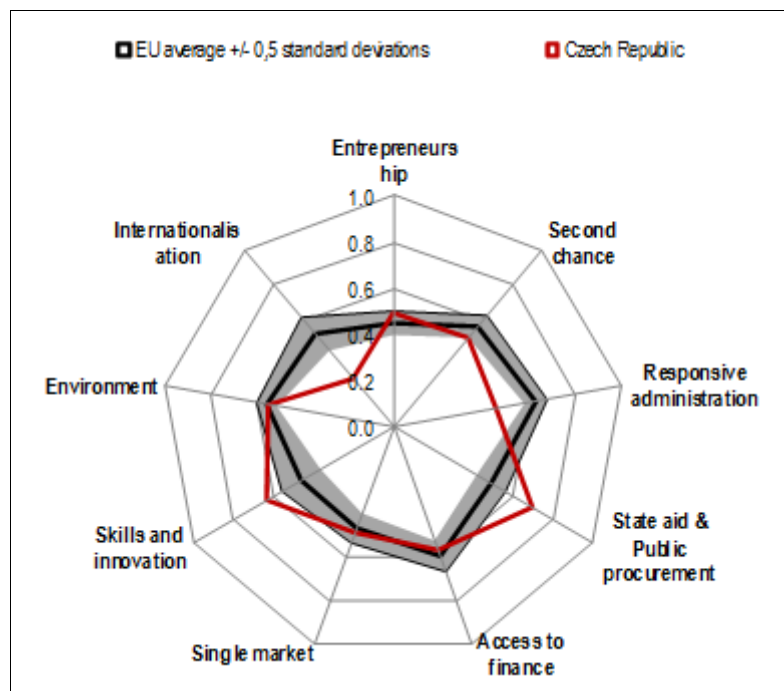


Fig. 5 – The Czech Republic's SBA profile. Source: Adapted from SBA Fact Sheet (2014)

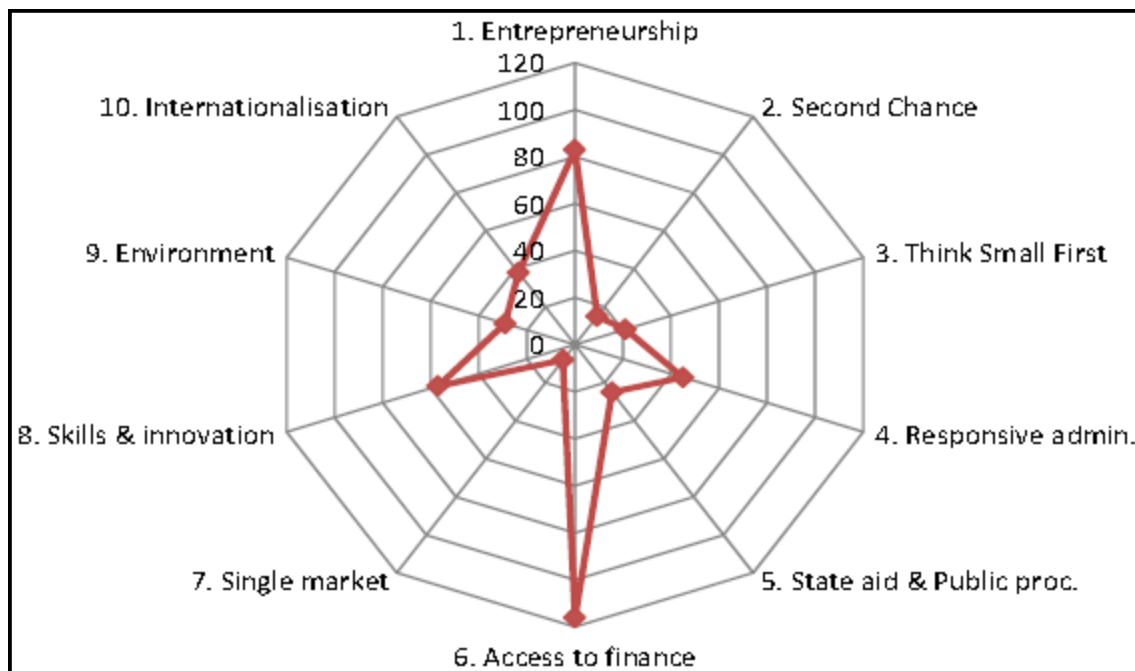


Fig. 6 – Policy measures. Source: SME Performance Review 2013/2014 – Policy database

It is observed that, Access to finance saw the top policy progress (116) during this period, then Entrepreneurship (83) and Skills & Innovation (57), whereas Second chance and Single market with (8) and (15) measures, respectively. Generally, the number of SBA policy measures adopted/ implemented during this period 2013/2014 in EU 28 was higher than the previous period. Table 6 shows 2014 and 2015 forecast of annual growth in SMEs performance indicators – EU 28.

Tab. 6 – EU28 SMEs forecast. Source: Eurostat, National Statistical Offices and DIW Econ

Size class	Indicator	% change 2012 – 2013	% change 2013 – 2014	% change 2014 – 2015
Large	Enterprises	-0.40%	-0.49%	-0.25%
	Value Added	-0.03%	2.39%	2.90%
	Employment	0.05%	-0.08%	0.47%
SMEs	<b>Enterprises</b>	<b>0.90%</b>	<b>-0.23%</b>	<b>0.38%</b>
	<b>Value Added</b>	<b>1.12%</b>	<b>2.80%</b>	<b>3.44%</b>
	<b>Employment</b>	<b>-0.51%</b>	<b>0.16%</b>	<b>0.68%</b>

As illustrated in table 6, the value added in EU28 SMEs continues to increase; growing by 2.80% in 2014 and 3.4% in 2015. Employment by SMEs in the EU28 continues to increase by 2015 that is, expanding by 0.1% in 2014 and 0.7% in 2015. Therefore, according to the final report, these amounts to 740, 000 jobs in SMEs. EU28 SMEs is predicted to increase in 2015 by 0.38%. To sum up, in 2014 and 2015 outlook for SMEs in EU28 continues to expand by 6.3% in value added, 0.8% of employment and 0.1% for number of SMEs.

## 6 CONCLUSION

This research concentrated on the theoretical and empirical study of performance management and measurement of Czech SMEs with the aim to verify whether still SMEs in the Czech Republic performance is weak or not, and the current challenges and problems facing. Overall, this study has taken an overview of the theoretical background of performance management and measurement of organizations, showing the benefits and the need of a maturity model for enterprises, SMEs and companies. Followed by, an overview of literature review of earlier scholars' research of performance management and measurement focuses on SMEs, expanded enterprises, organizations and large companies. Then, an overview of research methodology and strategy, illustrating which scientific knowledge and approaches adopted. In addition, showing clearly the research method employed to conduct this study. The findings of this study confirm that, Czech SMEs plays an important role in the Czech Republic's economy as well as EU 28. However, comparing the SMEs in Czech with other EU 28 member states, Czech SMEs are growing (see table 5), as from the SBA Fact Sheet (2014). Therefore, Czech SMEs performance is improving for the better.

### Acknowledgements:

The authors would like to thank the Department of Industrial Engineering and Information Systems at the Faculty of Management and Economics of Tomas Bata University in Zlin, Czech Republic. The study was conducted with the support of the Internal Grant Agency of Tomas Bata University; project number IGA/Fame/2014/007.

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## Appendix

### Appendix A

Tab. 1 – The Characteristics of Maturity Levels. Source: Adapted from (Chelniciuc, 2010)

Level 1	The organization mission and objectives are not clearly defined. Processes are underdeveloped and not documented. Any success for the organization at this level is based on key individual competencies rather than organizational wide knowledge.
Level 2	Performance management practices are occurring within the strategic and operational level and less at the individual level. Activities and resources are identified to achieve goals. Operating unit's performance measures/metrics are identified. The organization does not have a purposed built IT system for data collection, nor the capability to disseminate the information across so the learning and improvement activities can occur.
Level 3	The efforts to disseminate performance management practices at the individual level are introduced, but there are gaps to be overcome. Measures tracking strategic and operational efficiencies are established to evaluate activities and work processes. Technology is used to support formal data integration and dynamic reporting. Enhanced data access and reporting.
Level 4	The organization can report the status of mission, goals, and efficiency of the activities. Data systems produce timely, relevant and accurate performance information. Performance management is a strategy and mission-driven throughout the enterprise. Performance ties resources to strategic plans' success and stakeholder satisfaction.
Level 5	The performance management system is integrated at all levels throughout the enterprise. Executive and enterprise-level accountability. Performance information helps pinpoint everyone's contribution to goal attainment. The organization provides clear transparency of cost and performance achievements to internal and external stakeholders.

## **SEGMENT OVER 55 YEARS OLD AS A NEW CHALLENGE FOR THE CZECH COMPANIES**

*Petra Barešová, Pavla Staňková*

### **Abstract**

The main aim of this study was to discover whether Czech companies providing leisure activities create specific marketing communication campaigns to target the segment of the population over age 55. Also to be ascertained was the level of interest of Czech companies in this societal segment and if they offer some of their products (services) to these customers. The second aim of this study was to identify what kinds of marketing communication tools they use. Results were found by analysing primary data obtained through an online research questionnaire distributed among Czech companies in 2014. The results show that Czech companies offer products (services) for this segment, but they do not design specific marketing communication campaigns to target this segment.

*Key words: aging, leisure industry, marketing communication, new trends*

JEL Classification: M31

## **1 THEORETICAL BACKGROUND**

Demographic changes and the rapidly increasing older population are currently important topics, as studies clearly indicate that the population is aging and will continue to do so in the coming years. (Malíková, 2011; EUROSTAT, 2011 Holmerová, 2006; Mumel, 2005; Leventhal, 1997) Statistics even show that 49 percent of the European population will be over age 50 by 2020. (Mumel, 2005) Similar figures are forecast for other countries, such as the United States, Australia, and Japan. (Long, 1998; Szmigin and Carrigan, 200) As a result, the older generations will likely dictate market trends and significantly affect the economy. (Dvorakova, 2011) For this reason, it is necessary to develop new marketing approaches and strategies. (Treguer 2002)

### **1.1 Aging and Old Age**

Each part of life is accompanied by specific changes that people can, in some cases, influence. On the other hand, it can also bring new possibilities and opportunities for everyone. (Malíková, 2011) Old age is generally perceived as problematic period of life associated with the health and social problems. In the 20th century, aging was for most of the people commonly associated with diseases, illnesses, social exclusion, dependency on others or on the health and social system. Several authors (Logan et al, 1992) (Dionigi, 2006) define old age as related to the health status or psychological changes. However, it is undeniable that old age brings about number of visible changes. Mühlpachr (2004) divided these changes into three groups - physiological, psychological and social.

The AXA (2008) research discusses the perception of old age by younger generation and whether they regard this part of life as pessimistic or optimistic. Czechs are, in comparison with other countries, more pessimistic nation when it comes to the retirement age. The countries which see this stage of life rather optimistically are namely: India, Malaysia, China or Thailand.



At the end of the 20th century, the tendency was to support and positively promote old age as a period of life when people can devote their time to activities they could not do in the productive life. The study "Berlin Aging" found out that elderly people (respondents were aged between 70 to 103 years) see themselves as fully active, being able to live an active life and, generally, their attitudes to the old age were positive. (Luo, 2009) Funderburk et al. (2006) and Harris & Dollinger (2001) suggested that the educational institutions should: strengthen and promote positive attitudes to older people and age; help to deal with this issue and positively spread the awareness of active aging among the general public. Malíková (2011) also showed the importance of seeing this part of life as an individual process and recommended not to consider this segment as homogenous group. The results of the research "50+ active" showed that the majority of Czechs over 50 years old are satisfied with their leisure time and activities.

## **1.2 Consumer Behaviour and Older Population**

It is obvious that current generation over 55 years old is significantly different from the previous generations. It is mainly because of the fact that current generation lives longer, healthier and more active life. These aspects lead to a different lifestyle, approach to life but also to shopping behaviour. (Mumel 2005)

Beck (1996) in his work highlights the demographic changes and new trends, leading to the creation of new markets and new opportunities in many sectors. Several authors (Long, 1998; Ahmad, 2002) hold the view that the target group over 55 years old can be interesting for the companies especially regarding their number, purchasing power or its diversity. With increasing age, the preferences and needs are changing, with that comes the need for different products, services in order to satisfy customers' expectations. The study of Herzmann and Petrova (2005) states that in the following twenty years, there will be three different groups of seniors in the Czech Republic - traditional seniors, modern seniors and wealthy seniors. Based on their study, modern seniors and wealthy seniors will be spending more money on travelling, entertainment, tourism, leisure activities and studying while wealthy seniors will spend more money on travelling, entertainment, spa, trendy cars and gastronomy.

According to the Czech Statistical Office (Czech Statistical Office, 2012), the current situation shows that Czech seniors spend most of their incomes on food and housing. They spend up to 5 percent of total expenditure on their households. (Kamenický, 2012) Statistics show that Czech people over 55 years old do not buy branded long term products in contrast to the rest of the population. Only 35 percent of people over 55 years old prefer branded goods, the rest consider the price the most important. On the other hand, people over 55 years old consume products, such as medicine, tea, vitamins or beer, in different amount than the rest of the population.

In the terms of hobbies and leisure activities, most people over 55 years old are interested in pets, gardening, reading books, walking, sports activities with their children and grandchildren. Based on the statistical analysis (Quis, 2012), men spend less than 10 percent of their income on recreation and cultural activities. These people also prefer to spend their holiday in the Czech Republic rather than abroad.

## **1.3 Integrated Marketing Communication**

As it was already mentioned in the previous chapter, the customer market over 55 years old is still growing and these customers will play an important role on the market. Therefore it is necessary to create effective marketing communication model and approaches to attract these customers.

The traditional marketing strategy discusses 4P model which includes product, place, price and promotion. In this case the emphasis is put on promotion however, the other three constituents of 4P are also important and have to be taken into consideration so that the customers' needs will be satisfied.

One part of the promotion is to create suitable marketing communication and select marketing communication tools. Nowadays lot of experts and companies tend to use holistic marketing concept, which highlight integrated marketing communication. Integrated Marketing Communication (IMC) is explained as a "concept, under which a company carefully integrates and coordinates their communication channels to the organization and its products has brought a clear, consistent and compelling message" (Kotler, 2007,) In other words, Lee & Park (2007) identify the IMC as a systematic combination (integration) of various communication tools and channels, but also as a joint coordination of all messages, so that it unifies communication mix of the company. Schultz (1999) sees the added value of integrated marketing communications in its entirety and its comprehensive plan combined with the individual marketing mix ensures clarity, consistency and coherence, but also brings a greater positive effect which has an impact on marketing communicative results of the company. Lee & Park (2007) point out that the integrated marketing communication and its implementation in the company's marketing strategy bring the significant benefits. On the other hand, Baack & Kenneth (2008) argue that the principles of integrated marketing communication and its complexity existed in the literature before without being termed and emphasized.

The process of integrated marketing communication and its implementation in the company can be considered from two viewpoints, tactical or strategic. The strategic approach, as stated by Porcu (2012), is explained by determining opportunities for planning marketing activities and development of businesses that will create long-term competitive advantages. The tactical approach is concerned with the short-term activities that will help to fulfil the strategic marketing objectives of the company. Kotler (2001) holds the view that the strength of integrated marketing is also based on the cooperation of particular company's departments while aiming at meeting the customers' needs (product management, sales, advertising, marketing research), but other departments also have to plan their concepts in order to meet the customer needs.

Porcu (2012) in his article presents four dimensions which strengthen the effect of integrated marketing communication. There are "one voice" (creating a single communication of the company), "cross-functional planning" (linking marketing communications planning between departments, not only in marketing), "interactivity" (mutual and long-term communication with customers but also with other stakeholders), "profitable long-term relations" (interactive communication leads to the creation of long-term relationships which is beneficial for the companies).

One of the objectives of integrated marketing communication is selection of marketing communication tools which fit perfectly to the strategy, but also ethically and effectively attract the customers.

Current customers can be divided into two groups in terms of attitudes to marketing communications. The first group are customers who are passive towards the promotion. In contrast, the second group contains customers, who are happy to be actively involved in the promotion process, for example through social networks, and who require marketing communications as a considerable interaction. Rakic & Rakic (2014) regard the growing implementation of digital media in the marketing communication as one of the current trends. The companies should follow these trends and adapt their marketing communications to them.

Fill (2009) in his book presents the basic tools of marketing communications including advertising, sales promotion, personal selling, public relations and direct marketing.

## **2 PROBLEM FORMULATION**

One of the survey's goals was to discover whether the Czech companies providing leisure activities are interested in the segment over 55 years old. There was a question if the companies create specific marketing communication strategy and what kind of marketing communication tools they use. Based on the available sources, it was founded that there are discussions about increasing number of older people, discussions about their significance in the future, but there is lack of surveys focused on marketing communication tools and suggestions which marketing communication tools should be used to attract this segment, especially on the Czech market.

## **3 RESEARCH METHODS AND METHODOLOGY**

The data presented in this paper were taken from the survey conducted in the Czech Republic in 2014. The research was designed based on the previous researches' experiences. The research design used in this work was deductive approach which allowed to set up the hypothesis and research questions based on the reading to gain a sense of key theoretical issues.

Quantitative primary data were obtained by questionnaire survey. This questionnaire was sent to the randomly selected companies which provide leisure activities in the Czech Republic, regardless of their business focus. The companies were selected via online databases which are available on the Internet. The online questionnaire was created in Formeese and was distributed by email. Open and closed questions with predefined answers were used in this questionnaire. There were in total 10 questions.

The research was obviously conducted under the ethical rules that all researches have to follow. In addition, respondents were also informed about the purpose of this research, the anonymity of their responses and were offered the opportunity to obtain the information about the results.

Before the survey started, there was a pilot research which was directed at 10 respondents to see whether all questions are understandable and clear, and whether the required data will be received from the questions. Based on their comments, two questions were modified.

As mentioned earlier, the deductive research approach was used in this research. Analysing the current sources and secondary data, two research questions and two hypothesis were introduced.

Research questions:

- 1) How many products Czech companies providing leisure activities offer to the target group over 55 years old?*
- 2) What kind of marketing communication tools companies use when trying to attract the target group over 55 years old?*

Hypothesis:

*H1: More than half of the Czech companies do not create specific marketing communication campaign to target group over 55 years old.*

*H2: There is no relation between the number of products intended for the target group and creation of the specific marketing communication campaign aiming at this group.*

The research questions were answered based on the statistical analyses of the primary data. The both hypothesis were tested based on the significant value  $\alpha=0,05$ . The  $\chi^2$  test was used for statistical evaluation of the H1 hypothesis to reject or not to reject the statement. The second hypothesis was evaluated by statistical analyses ANOVA test. This test was used to see if there is any relation between the two factors.

## 4 RESULTS

The total number of 287 respondents answered the questionnaire. The respondents were selected randomly within the companies which offer leisure activities throughout the Czech Republic. Representatives had three weeks to complete the online questionnaire. The respondent rate was 19.4% (i.e. 54 respondents).

The questionnaire consisted of various questions; some of them were used to indicate the features and characteristics of respondents (companies). The obtained data are shown in the table below (Tab. 1). The first part shows the division of the companies based on the number of employees. The most of the companies have 10 to 99 employees. The second question was related to their legal form, most companies are from non-profit sector (non profit organisations, citizens association or founded organisation). The respondents were also asked about the location of their customers. The majority of respondents answered that their customers are from the same district where the company is located.

Tab. 1 - Characteristic of the respondents. Source: own analysis

<b>Characteristic of the respondents</b>	<b>Relevant value</b>	
<b>Number of employees</b>	Entrepreneur without employees	5,6%
	1-9 employees	37,0%
	10-99 employees	42,6%
	100-499	14,8%
	More than 500 employees	5,6%
<b>Form of the company</b>	Non profit organisation	17%
	Citizens association	28%
	Entrepreneur	17%
	Founded organization	11%
	Ltd Company	28%
<b>Location of the company's customers</b>	Czech and foreigner customers	2%
	Location of whole Czech Republic	6%
	One Region	17%
	Town/city	30%
	District	37%
	More then one region	9%

The research question about interest and number of products of Czech companies in the target group over 55 years old was identified based on the two questions. The first question asked respondents about the number of their products which they are primarily offering to this generation. The second question answered the question of how many percent of the company's products portfolio are products for people over 55 years old.

The results show that 52% of respondents identified that the products targeting group over 55 years old create more than half of their products portfolio. These results can be compared with the number of products which companies offer to this segment. The numbers of products were divided into four categories: 1 – 3 products, 4 – 6 products, 7 – 9 products, 10 or more than 10 products. Most companies provide between 1 and 3 products or 4 and 6 products to the people over 55 years old. Almost 39% of respondents provides up to 3 products. In the second category (4 – 6 products) belongs 37% of the companies. The comparison of the number of products targeting people over 55 years old and their position in the company's product portfolio brings the following results. The obtained data showed that the first two categories (i.e. 1-3 and 4-6 products) mostly create less than half of the company's products portfolio. On the other hand, the rest of the two categories (7- 9 products, 10 or more than 10 products) create more than half of the company's products portfolio. Moreover, 26% of respondents stated that the products targeting people over 55 years old are the only products which company offers. From these results can be seen that the Czech companies providing leisure activities are aimed at this segment and even for some of them these, customers play the key role in the market.

The next section of the survey was concerned with the marketing communication tools which companies use to target their customers. The following graph illustrates which kind of marketing communication tools respondents used. More than half of the respondents have their own web page (almost 71%), they design leaflets or catalogues (68%), but surprisingly most of them use outdoor marketing communication tools including posters and billboards (87%). The grey line shows how many of respondents create the specific communication campaign targeting people over 55 years old by using particular marketing communication tool. As it can be seen from the graph (Fig. 1), only few companies design specific campaign and if so, they mostly use outdoor marketing communication tools, such as printed promotion materials including catalogue and leaflets, or online banner advertisement.

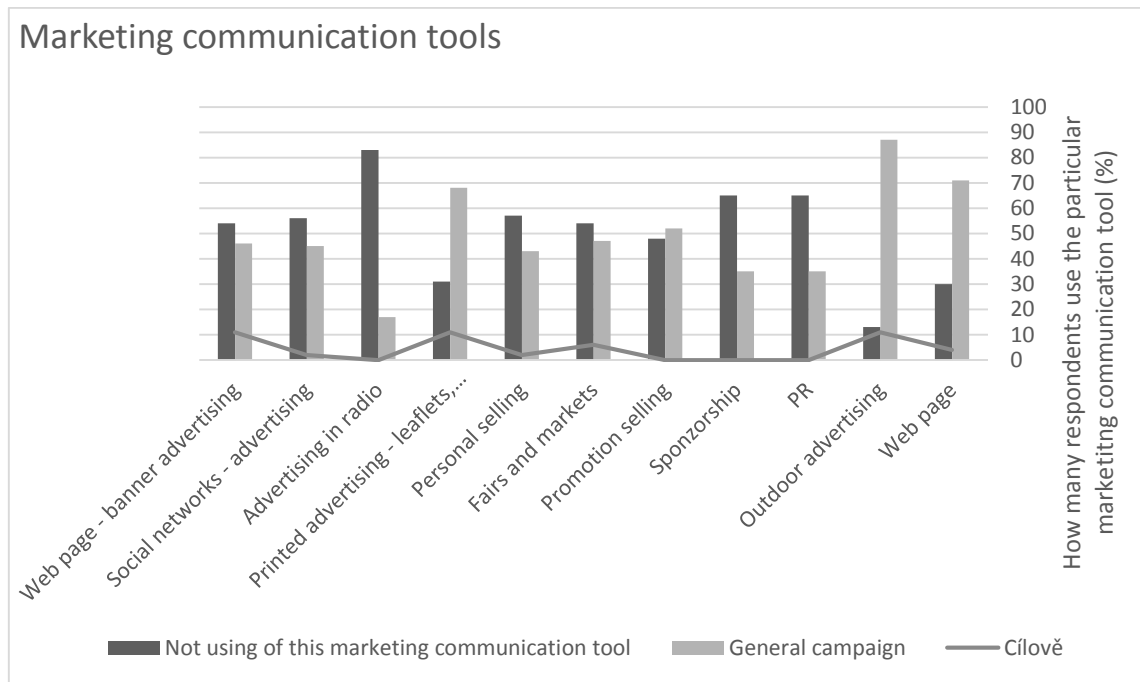


Fig. 1 - Marketing communication tools as used by Czech companies providing leisure activities. Source: own analysis.

## 5 CONCLUSION

The first hypothesis H1 was related to this topic. The hypothesis *H1: More than half of the Czech companies do not create specific marketing communication campaign to target group over 55 years old* was analysed by  $\chi^2$  test. The hypothesis was analysed based on the respondents' answers – Not using the marketing communication tools, generally using the marketing communication tool and using the marketing communication tool to specifically target people over 55 years old. Using of each marketing communication tool was compared with the required limitation of using (50%). The  $\chi^2$  test rejected the null hypothesis. In other words, the test rejected that more than half of the Czech companies do not use the particular marketing communication tools to create specific campaign and target customers over 55 years old.

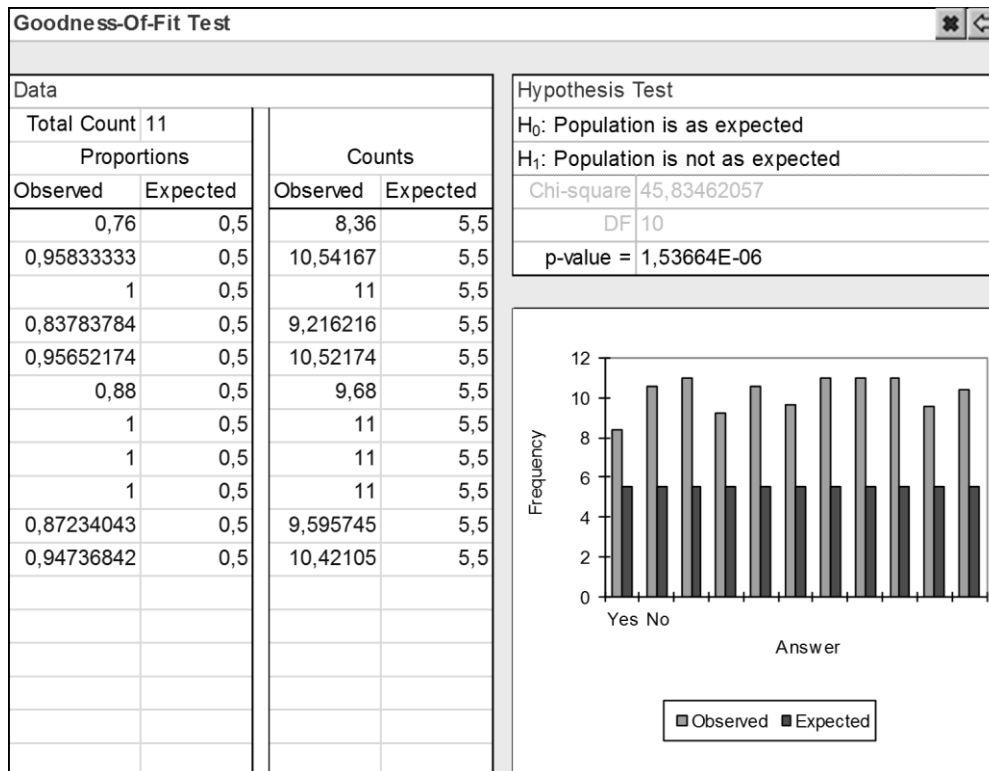


Fig. – Goodness-Of-Fit Test. Source: own analysis.

In the next part of the survey, respondents were asked about creation of the general specific marketing communication campaign. The given questions obtained data used to analyse the hypothesis which were created for this research. As it can be seen from the table 2 below, only 37% of respondents do not create specific marketing communication campaign targeting people over 55 years old. Almost 13% of these respondents provide up to 3 products for this segment, 9% of them offer from 4 to 6 products, more than 7% deliver between 7 and 9 products and the same number of percent provide 10 or more products. The rest of respondents (almost 63%) do not create specific campaign even though their products are available for people over 55 years old.

Tab. 1 - Number of products and marketing campaigns. Source: own analysis.

Campaign	Number of products				Total number
	1-3 products	4-6 products	7-9 products	10 or more than 10 products	
Company created specific campaign	12,96%	9,26%	7,41%	7,41%	37,04%
Company does not create specific campaign	25,93%	27,78%	1,85%	7,41%	62,96%
<b>Total number</b>	<b>38,89%</b>	<b>37,04%</b>	<b>9,26%</b>	<b>14,81%</b>	<b>100,00%</b>

The second hypothesis (H2: There is no relation between the number of products intended for the target group and creation of the specific marketing communication campaign aiming at this group.) determined whether there is relation between the two factors – number of products and creation of the specific campaign targeting people over 55 years old. To analyse this hypothesis, ANOVA test was used. The results showed that the relation between these factors is insignificant. Therefore the second hypothesis was not rejected (p-value 0,4 > 0,05).

There were several questions to find out why companies do not create the specific campaign. At first, it might have been due to the fact that the companies do not consider the specific campaign beneficial or they do not have enough experiences and knowledge to create the campaign. Another possible explanation might be that the demand is higher than supply, so companies do not need to focus their resources on creating specific campaign for this segment. These questions could be the objective for further studies.

### **Acknowledgement**

Authors are thankful to the Internal Grant Agency of FaME TBU No. IGA/FaME/2014/Výzkum a efektivní aplikace nástrojů marketingové komunikace zaměřené na generaci starší 55 let for financial support to carry out this research.

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## **IMPACT OF ALLOWED DEBT RELIEF OF INDIVIDUALS IN 2009 - 2014 ON CURRENT SATISFACTION OF CREDITORS**

*Dagmar Bařinová, Vojtěch Pinter, Kateřina Branžovská*

### **Abstract**

This article deals with personal bankruptcy and with impact of debt relief in the form of rescheduling on creditors. As part of the research the statistical sample of 366 borrowers in debt relief with the repayment schedule since 2009 was studied. Evaluation covered the whole process of debt relief within 5 years until the end of paying the rescheduling. Effect on debtors, creditors and also on future development in debt relief in the Czech Republic was evaluated. The research compared the total amount of debts due to borrowers, their final amount paid as well as level of satisfaction of creditors, further the number of months needed to repay the debt and also monthly installments for creditors. In the research there was examined the composition of filed claims and the representation of individual creditors in personal bankruptcy. In view of divide the individual creditors according to sectors the most dominate was banking sector which formed most of the identified claims. Furthermore, it was found that most borrowers repay more than half of their obligations and in addition they try to pay the statutory minimum off as quickly as possible.

*Keywords: debt relief, personal bankruptcy, insolvency, banking and non-banking sector, credit registers.*

JEL Classification: D1, G2

### **1 INTRODUCTION**

Basic information about the debt relief are defined by Actno.182/2006Coll., about bankruptcy and its solution. This legal standard is divided into three titles - general provisions, methods of solving the bankruptcy and common provisions.

Pilátová (2011) defines the basic relationship between the creditor and the debtor at the base of the contractual relation. In this relation the creditor is entitled to performance and the debtor has an obligation to perform. The basic assumption for at least partial satisfaction for the creditor is either actual filing of an insolvency proposal for the debtor or at least timely application into proceedings already commenced. (Crhová & Kuderová, 2013)

In solvency can be solved by bankruptcy, reorganization or debt relief. All creditors may be satisfied from the yield of realization of estate and their satisfaction is due to their ratio on debt. Debts of unsatisfied creditors do not expire and they are thus entitled to their further enforcement. Reorganization is mainly used by the debtor entrepreneur who performs recovery while maintaining the company's operations. The purpose of debt relief is simply an exemption the debtor from his debts, either in the form of five-year repayment schedule with at least 30% of fulfillment or one-time realization of assets.

The main benefit of debt relief by Hanousková (2010) is remission of remaining debt if the debtor complies with all the obligations according to the Insolvency Act. Another advantage is stopping all enforcement proceedings and growth of all charges and penalty fees for not paying the loans. Among the disadvantages Hanousková (2010) states the requirement for deposit payment before the initiation of insolvency proceedings up to 50,000 CZK.

Furthermore, the borrower cannot invoke against the decision of the court. If the court does not approve the debt relief, the debtor's situation is resolved with the slight bankruptcy – accelerated insolvency proceedings instead of common bankruptcy. Paseková and Bařinová (2013) further claim that approved debt relief deeply affects every debtor especially in the social area throughout the duration of the debt remittance according to a payment schedule.

Maršiková (2009) describes two ways for logging claims in the insolvency proceedings – for creditors and debtors. Creditor has to log himself in the insolvency petition along with his claims. On the contrary, if the debtor submits his insolvency petition, all creditors are entitled to submit an application for insolvency proceedings after the commencement of the insolvency court (30 day limitation period).

The way of filling claims in the insolvency proceedings is published. All creditors can find it out in the call for applications which is made by the insolvency court after commencement of insolvency proceedings. This claims must contain the general requirements and the reason of the formation. If the claim is secured the creditor must indicate the type and duration of collateral. All enforceable creditors are obliged to state the facts on which is the enforceability based. Maršiková (2009) states other creditor's right to change the amount, reason or the order of filed claims.

After the deadline for registration of claims the review meeting will be held within 30 days after the deadline. Kozak (2008) describes the review proceeding as a meeting for examination of all claims filed according to the list. This meeting is compulsory only for the insolvency administrator. During the review meeting, the insolvency administrator, debtor or logged creditor may deny the authenticity, amount and order of all claims filed. The result of the review hearing is a list of filed claims which will be paid during the debt relief.

Act No.21/1992Coll., about banks, describes the conditions of establishment the banks. This Act also divides the creditors on the banking and non-banking sector as the most common types of creditors in debt relief. Loans from banks are safer type of loans and they have also lower interest rates than non-banking institutions. However the loan approval by banking institutions is time-consuming and the loan may not always be granted. Among the largest banking institutions in the Czech market belongs for example Česká spořitelna a.s., Komerční banka a.s., ČSOB a.s. and UniCredit bank a.s.

The value of the performance of rescheduling is currently around 50% at its end. The main reason is establishment of minimum threshold performance (30 %) and also poor economic situation of borrowers (unemployment, low income). According to Kinslingerová (2013) the other aspect of low satisfaction of claims is the fact that no one explores the reason why debtors became insolvent and end in subsequent debt relief. Due to the growing number of personal bankruptcies and complexity of its approval, bankruptcy courts are not able to examine this aspect. Furthermore, according to Kinslingerová (2013) the courts should reconsider the possibility of repeated debt relief since the current legal legislation does not regulate their number. Therefore the "notorious" borrowers can go through the process of deleveraging repeatedly.

Credit registers are the most commonly used in assessing the creditworthiness of the clients. Kalabis(2012) defines the registry as a database of all types of clients - individuals, legal persons or entrepreneurs who are associated with certain lending operations. Purpose of this registry is providing client's data which helps the banking institutions to prevent providing a loan to non-creditworthy clients. Among the most popular registers belong Centrální registr úvěřů (operated by ČNB), CCB (Czech Credit Bureau) and Solus.

Smrčka (2007) discusses a similar theme which examines the social and psychological effects on the person of the debtor. According to him the main problem of debt is at the very beginning when the "potential" debtor does not realize the real necessity of the first loan. This carelessness can cause a ripple effect (reduction of attention to the risk of over-indebtedness) which ends with the bankruptcy of debtor. On the contrary, bank procedure is exactly the opposite- applicants for the first loan are almost never rejected. Conversely, the deterioration of the financial condition of the borrower increases bank's alertness. Borrower cannot obtain additional funding through this way anymore. Then the debtor's path leads towards the non-banking companies with very tough conditions. The borrower ends in debt spiral.

Paseková and Bařinová (2013) came with similar conclusion. The conditions for borrowing financial resources from financial institutions that not fall under the supervision of the Czech National Bank are markedly unfavourable. Interest and fees for providing loans are frequently many times higher than borrowed amount.

Crhová and Kuderová (2013) state that insolvency proceeding is becoming highly current theme in view of the adverse economic situation in the Czech Republic which has resulted in dramatically rising number of proposals filed at the insolvency courts.

## **2 ANALYSIS OF PERSONAL BANKRUPTCY**

The main objective of this research was evaluation of persons (resp. borrowers) who are in debt relief through rescheduling since the end of 2008 and especially since 2009. Debt relief lasts for 5 years. It means that debt relief which was approved in 2009 can be evaluated after those 5 years (in 2014). Our research was based on these data. We made an overall assessment of these borrowers with an indication of trends in future development in coming years. The second objective was to evaluate the composition of creditors whose claims appears in debt relief most frequently. This sample is abstracted of borrowers who are in debt relief in the form of realization of assets (in practice, this way solves only about 2 % of debt relief).

The overall statistical sample that we studied in the survey reached a specific value of 366 borrowers. For these borrowers we made an analysis of individual and total repayments in the context of debt relief and also the analysis of proportional representation of individual creditors for each debtor. Since the performance of rescheduling is designed for predetermined period of time which is 5 years (60 months), this research is based on borrowers who were allowed to debt relief at the end of 2008 and during 2009 (whose debt relief ended in 2013 or 2014). Evaluation of debt relief for this sample was processed in the second half of the year 2014. The average number of installments for all borrowers reached 56.19 months which is less than specified 60 months. This situation is caused by the fact that some borrowers fulfill its payment schedule to more than 100% of the expected level of performance at the end of the repayment schedule. Basically, this means that the borrower will pay its obligations before the predetermined period for performance of payment schedules that is before the expiry of 60 months.

The overall survey was quite extensive and also difficult for data processing. Therefore we used help of fifth grade students of the Faculty of Economics VŠB - TUO who performed basic analysis of individual borrowers. All available data were used from publicly accessible locations (primarily from the website of the insolvency register - [www.justice.cz](http://www.justice.cz)) and therefore there was no privacy violation. Fundamental evaluation is based on the overall summarization and total averages of individual borrowers.

### 3 RESEARCH RESULTS

Regarding other characteristics of statistical sample of borrowers it can be noted that this sample was represented by 59.3 % with men (which is 217 debtors) and 40.7 % with women (149 debtors). The average age of both genders was 48.8 years (in 2014) when the youngest was 27-year-old woman and the oldest 77-year-old man. Two borrowers of this sample died during debt relief (the first was man after 58 months of performance and the second was woman in the 45th month of performance rescheduling). They both reached the minimum performance of rescheduling - concretely 79% and 34% and they both are represented in some parts of the research.

The value of all filed claims of the sample is CZK 214 million. In review meetings which follow after the expiration of final deadline for filing the claims (after 30 days) the observed value was slightly lower, almost CZK 210 million (calculations in the research are based on this value, not on amount of filed claims). The resulting difference is caused by the situation where some claims submitted at the review hearing were negated by creditors or by insolvency administrators regarding their value, order or authenticity.

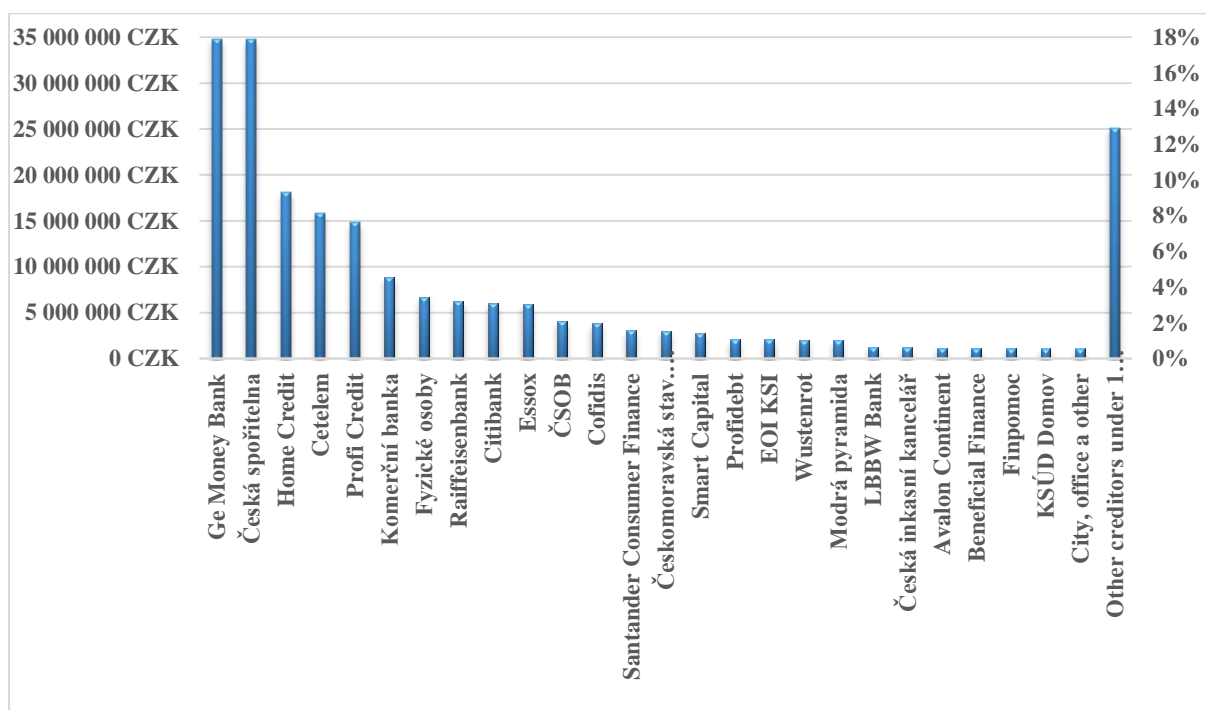


Fig. 1: Individual representation of the most numerous creditor entities and their share in the total value of filed claims. Source: own research

In terms of the representation of individual creditors in the statistical sample the total number of creditors was 102. A total of 2,505 claims was submitted in the insolvency proceedings. It therefore follows that one borrower has 7 different lenders. This value could be realistically slightly higher because the research has been abstracted from those borrowers who had more than 8 filed claims respectively creditors. Nevertheless, some students did research including those borrowers who partially crossed this threshold. It was about 90 borrowers who had primarily 9 or 10 creditors. One borrower had even 18 creditor entities.

The figure 1 illustrates some important information regarding individual creditors who enrolled their claims in insolvency proceedings. After approval of debt relief through

rescheduling are these lenders relatively satisfied from regular or irregular installments. The figure shows the most common creditor entities and their total filed claims (both absolute and percentage terms). The figure specifies those creditors whose total amount of filed claims exceeded the value of CZK 1 million. The last column includes all those creditors whose total amount does not exceed this limit. This group includes 76 creditor entities (from a total of 102 there was only 26 subjects over one million that are shown in the chart namely). Ensure creditors are not included in this group since they form only 1.5% of the total amount of established entitlements. They are satisfied beyond repayment schedule individually by the collateral. It is obvious that after summarizing of all creditor entities the final amount (that was found in the review meetings) is CZK 210 million.

In the research, we also further studied the total amount of debts of each borrower. It can be seen in figure 2 how many borrowers have occurred in each of these intervals. The most common amount of debts owed in debt relief is a value in the range of CZK 300,000 to CZK 400,000 which represents about 17 % of all borrowers in debt relief (the same value of 17 % of borrowers is represented by debtors who owe more than CZK 800,000, thus in the interval between CZK 800,000 and 2,200,000). The majority of borrowers is in the group of 100,000 - 800,000 CZK (marked in red with an average 41 borrowers per interval) followed a group of 800,000 – 1,500,000 CZK (marked in yellow with average 9 borrowers per interval) and the smallest group consists of borrowers with outstanding amount over 1.5 million CZK (marked in blue with an average 2 borrowers in interval). Within the statistical survey no one reached higher amount than 2,200,000 CZK (specific maximum amount was 2,193,608 CZK).

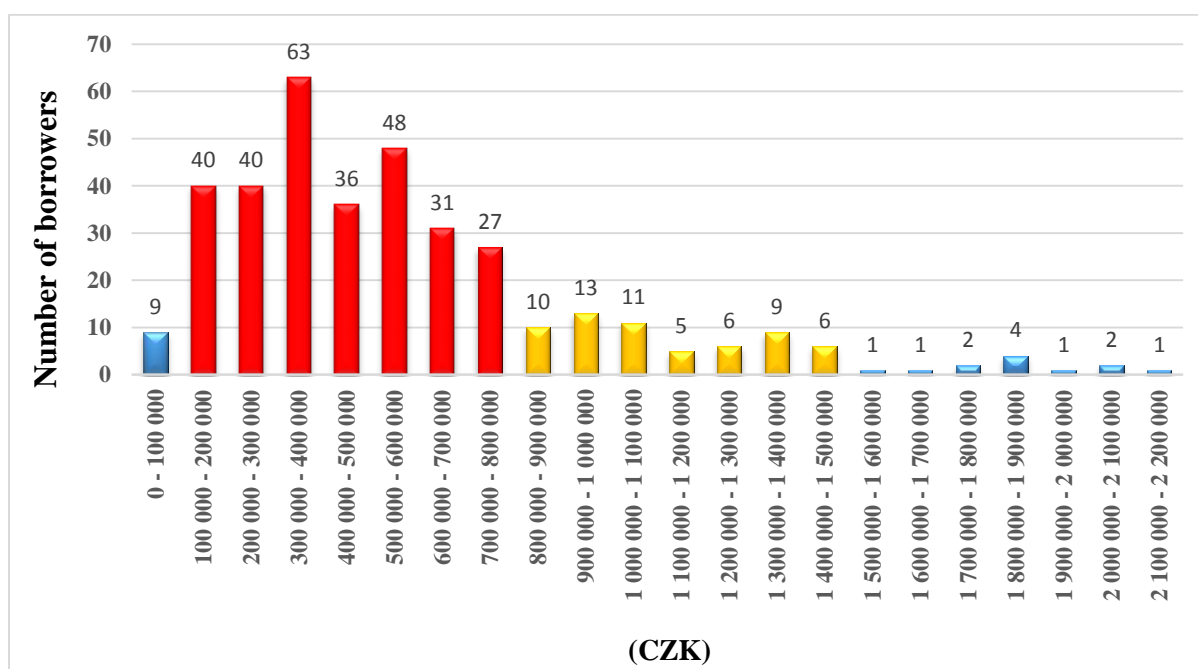


Fig. 2: The number of individual borrowers according to their total debts in debt relief.  
Source: own research

The research also observed the average borrower in debt relief and his composition of creditors. According to the facts above the average borrower has an obligation in debt relief 573,769 CZK (which is total debts of CZK 210 millions divided by the total number of borrowers in statistical sample - 366). Furthermore, we found out that the average level of satisfaction of creditors at the end of debt relief is about 55.6 % so the average borrower pays



only CZK 319,015 (55.6% of the amount of CZK 573,769). Since the debtor fulfilled the statutory minimum threshold performance of 30% the rest of owed amount is forgiven by the court in the context of debt relief at the end of rescheduling. The average borrower has monthly payments to creditors CZK 5,677 (CZK 319,015 divided by average number of months in debt relief - 56.19; calculation are without the influence of extra installments or changes in performance in different months) and monthly remuneration of the insolvency administrator in the amount of 1,089 CZK (legal basis 900 + 21% value added tax if the insolvency administrator is taxpayer).

The average borrower is shown in figure 3 (which already partially modifies figure 1). As we can see, the composition of creditors is the same as in figure 1. The only change is in recalculation of value per borrower reduced to the value of the average fulfillment, thus 55.6 % (which represent the blue columns while the red represents the fulfillment of 100 %). The value of all red columns is abovementioned amount 573,769 CZK, but since the average borrower has lower performance indicated by blue column the total amount is only CZK 319,015.

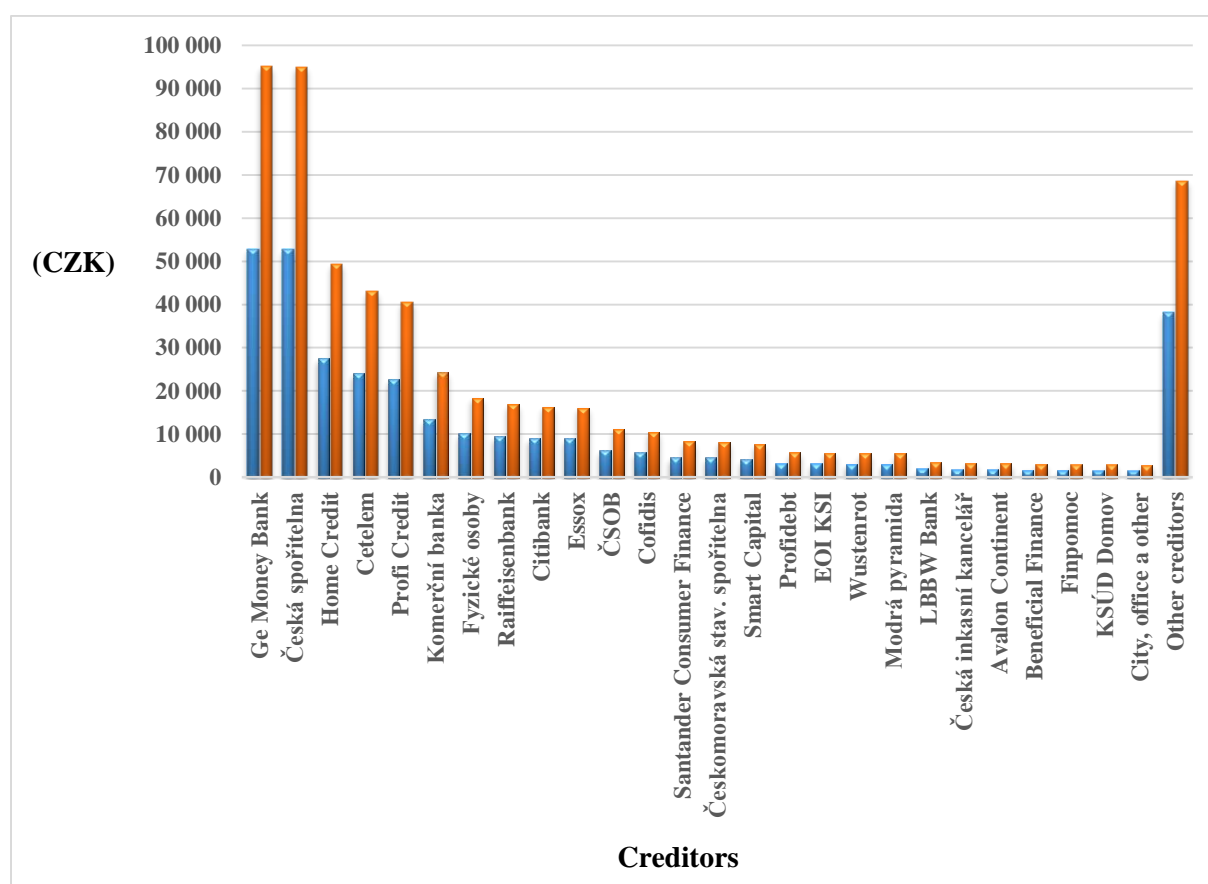


Fig. 3: The most common creditors of the average borrower with average fulfillment 55.6%.  
Source: own research

In terms of composition of creditors on banking, non-banking and public sector we can see that dominant institutions belong to the banking sector. It is mostly represented by GE Money Bank, Česká spořitelna and Komerční banka. Dominant institutions from non-banking sector are Home Credit, Cetelem and Profi Credit. Most creditors from public sector is among individuals (primarily members from the family, as well as judges, bailiffs), public institutions

(liabilities to municipalities - fees for waste, financial and customs authorities) and the owed amounts for gas or electricity (it is not shown in the figure because the total amount did not reach CZK 1 million).

## 4 CONCLUSION

Personal bankruptcy or solution of debtor's bankruptcy in the form of debt relief is the most common way how can an ordinary person get rid of his debts and start a new life "from scratch". This process has become increasingly popular. Number of those who use debt relief grows every year. As the debt relief can be used already since 2008 (so most of the first debtors ended their repayment schedules after 5 years in 2013) it is possible to infer some conclusions about the application of this "process" in practice.

In his research of statistical sample we concluded that the majority of borrowers fulfills their obligations roughly over half of their total debt. They are also trying to meet the statutory minimum as quickly as possible in order to be exempted from the remaining debt at the end of the performance rescheduling. From the perspective of lenders the most common are stakeholders from the banking sector that forms most of the identified claims.

It will be interesting to follow this development further and watch borrowers who entered into debt relief in 2010 and 2011 so they end their five-year performance of rescheduling now or in the near future.

### Acknowledgment

This paper is one of the research outputs of SGS 'Quantification of the economic and social impact of personal bankruptcy and its evaluation of the position of the creditor and the debtor' project identification code SP2014/50.

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## **SELECTED ASPECTS OF QUALITY OF BUSINESS ENVIRONMENT IN SEGMENT SME. A CASE STUDY FROM SLOVAKIA.**

*Jaroslav Belás, Yuriy Bilan, Petr Novák, Juraj Sipko*

### **Abstract**

SMEs play an important role in the economic system of Slovakia. In this context it is considered to be important to examine the factors that create the quality of the business environment. The aim of this article is to define, quantify and compare the significant attributes of quality of the business environment for small and medium-sized enterprises (SMEs) in selected regions of Slovakia. Within this stated objective, relevant factors and business relationships between entrepreneurs and the socio-economic system were analysed. The entrepreneurs' perception of their environment (motivation to start a business, the most important characteristics of entrepreneur, society, state, universities, etc.) was evaluated. The data was collected through a questionnaire. We compared important factors of business environment in the most economically developed region of the Slovak capital to the average regions of Trenčín and Zilina. On the basis of the results of our research, we can conclude that the most important motive for starting a business in all these regions of Slovakia was money. It was found that there were no differences between the individual regions. In the entrepreneurs' point of view, the most important characteristic of an entrepreneur is not being afraid to take risks. Other frequently chosen qualities were expertise, responsibility and persistence. We found no statistically significant differences in the perception of the importance of not being afraid to take risks among the selected regions. Only 6.70% of entrepreneurs in the Zilina region think that society perceives them positively. The numbers in the other regions were even lower. Since more than 60% of entrepreneurs in all the selected regions stated that the State should support them financially. Our research confirmed that entrepreneurs evaluate the level of higher education rather primly.

*Keywords: Small and Medium-Sized Enterprises, regional differences, motives for entrepreneurship, characteristics of entrepreneurs, government business support, the use of theoretical knowledge*

JEL Classification: L26, R11

## **1 INTRODUCTION**

SMEs play an important role in the economic system of Slovakia as well. In this country, the share of SMEs in the total number of active enterprises was 99.2%; in the total employment it was 59.5%. The share of added value was 55.6% and the share of SMEs in the profit before taxes was 51.6% in 2012. (Národná agentúra pre rozvoj malého a stredného podnikania, 2013)

Despite the fact that 99.2% of enterprises from total number of active ones in Slovakia are represented by SMEs, there is no clear understanding of the aspects of quality of business environment in their segment. And it is not just the case of Slovakia, there is a similar situation in each country of the world, but still there are some common features for SMEs mentioned in the literature.

One of the basic common features of SMEs which is a prerequisite to almost all other features is the smallness of the enterprises, resulting in low complexity of their structure. Therefore, management structure is plain and simple, allowing the managers to easily control all

operations of the enterprise, which in its turn results in flexibility of SMEs and creates coordination advantages. SMEs management has a personalized nature, since they are influenced by the owners (natural-persons entrepreneurs) to a large extent. Simple structure of SMEs is their advantage, because almost all organization may be controlled by a single persons simplifying, for instance, planning and decision-making processes. They do not mean that there are no formal procedures or planning itself, they mean that they are used more implicitly, leading to higher effectiveness compared to larger companies.

For the successful development of a company it is necessary to create favourable conditions for the growth of business awareness and shape a good quality of business environment and effective relationships between firms and their environment, i.e. society, the state, politicians, banks, etc.

In this article, significant attributes of the creation and development of the business environment of the SME segment in the selected regions of Slovak Republic were examined.

## **2 PROBLEM FORMULATION**

Current research papers intensively deal with entrepreneurship and business environment from many points of view, such as economic, institutional or cultural context, influence of gender and age on entrepreneurship, business orientation, customer orientation, financial risks, etc. We can also mention researches (Bernat et al. 2012) provided us with interesting insights into the entrepreneurship traits of the young generation of entrepreneurs.

According to Cumming, Johan, and Zhang (2014), entrepreneurship has a significantly positive impact on the GDP/capita, exports/GDP and the number of patents per population, and a negative impact on unemployment rates. Their findings point to institutional and cultural impediments to the effectiveness of entrepreneurship. Institutional/legal barriers are likely to have a negative impact on entrepreneurship. These barriers influence the decision to become an entrepreneur.

In recent times, we are facing more complex and global challenges. Enterprises, especially SMEs, have to work hard in order to keep the competitiveness and to sustainably develop, as outlined by Bernat and Bartkowiak (2012).

Entrepreneurial orientation represents a key element for the success of SME (Brockman, Jones, Becherer, 2012, Boso, Story, Cadogan, 2013). Soininen, Martikainen, Puumalainen, Kyläheiko (2012) consider the following characteristics of entrepreneurial orientation to be an essential for making business: innovation, risk acceptance and proactive approach. Lumpkin and Dess (1996) added the other features to the abobe characteristics: aggressive approach to competition and autonomy of the entrepreneur.

Entrepreneurial orientation is also in question nowadays as it is considered to be an essential driver of the high financial performance of companies. For instance, Alegre and Chiva (2013) discovered a positive relation between entrepreneurial orientation and innovation levels. Besides, a positive relation between innovation levels and a company performance was found. The direct influence of entrepreneurial orientation on a company performance is low and not significant. Similarly, Soininen, Martikainen, Puumalainen and Kyläheiko (2012) consider innovativeness, risk-taking and proactivity as essential characteristics of entrepreneurial orientation. The results of their studies do not support the assumption that entrepreneurial orientation is positively related to the profitability of small firms. On the other hand, there is a positive relationship between the entrepreneurial orientation of a firm and a firm's pace of growth. According to Eggers, Kraus, Hughes, Laraway and Snyckerski (2013), to drive itself to grow, a firm needs to deploy a strategy centered on entrepreneurial orientation or else risk

stagnation occurs. In this regard, Lasagni (2012) indicates that innovation performance is higher in the SMEs that are proactive in strengthening their relationships with innovative suppliers, users and customers. Boso, Story and Cadogan (2013) argue that a high degree of entrepreneurial orientation maximalises company performance when operating in less developed countries.

Furthermore, customer orientation is considered to be an essential element for small firm success. (Brockman, Jones and Becherer, 2012). Their results support the overall positive influence of customer orientation on performance and indicate that the influence is stronger as risk-taking, innovativeness and opportunity focus increase.

Nonetheless, there are only a few studies dealing with regional aspects. One of them is a study by Stuetzer, Obschonka, Brixy, Sternberg and Cantner (2014) that examines connections between regional characteristics and individual entrepreneurship. They found no empirical evidence for a direct effect of the regional characteristics on an individual's start-up intentions and engagement in the start-up activity. Their findings point to relevance of the indirect effects of the regional characteristics on individual entrepreneurship. Individual opportunity perception might play an important role in the cascading-down process of regional characteristics towards the individual. However, even inhabitants of one region can differ in their perceptions of business opportunities. This could be caused by several personal and social influences. Secondly, Simon-Moya, Revuelto-Taboada, Guerrero, Hack and Cantner (2014) point out there are significant differences among business environments of various countries and even regions. The authors suggest that politicians in every single country have to adjust the trade laws to conditions of the respective country. The same laws in countries or regions with different economies can lead to totally different results.

Business activities are significantly determined by the environment of a company, which forces it to use a particular method of behaviour, to use the choice of particular business goals and ways of achieving them. In this context, a crucial role is played by social environment and political and legal environment that is created by state authorities. Governing bodies on all levels attempt to foster entrepreneurship by setting up different strategies (Greibeníček et al., 2013), national governments often act with the help of larger schemes such as cohesion policy which are also heavily focused on entrepreneurial environment (Hájek et al., 2014).

According to Hájek, Grebeníček, Novosák (2011) the concept of innovation has become a development mantra in the fierce global competition. Competition is not limited to firms; it is also relevant for territories. An observed trend which is not surprising is the number of support tools that have been developed to reinforce the position of territories and their actors in the innovation processes. Clusters and regional innovation systems are the most important of them.

As far as we know, there exist no papers examining regional aspects of the business environment creation in Slovakia. Exactly this is the reason why we decided to carry out our research.

The aim of this article was to define, quantify and compare the significant attributes of quality of the business environment for SMEs in the selected regions of Slovakia. Within this objective, relevant factors and business relationships between entrepreneurs and socio-economic system were analysed.

In our research we compared important factors of business environment in the most economically developed region of the Slovak capital to the average regions of Trencin and Zilina. Our aim was to measure the regional differences of business environment in Slovakia.

### **3 METHODOLOGY AND DATA**

The research on business environment was conducted in 2013 in the selected regions of Slovakia through a questionnaire survey. In the Bratislava region (BA), 102 SMEs have been reached; in the Zilina region (ZA), 164 SMEs have been reached and in the Trencin region (TN), 105 SMEs have been reached. Companies' data was provided by their owners.

The composition of these regions has been chosen because it enables us to compare business environment in the most economically developed region to the averagely developed regions. Our aim was to measure the differences among these regions and to define their significance.

The Bratislava region is the region with the best economic performance and creates 26% of the total Slovak GDP. It has an area of 2,053 km<sup>2</sup> which means it is the smallest region of Slovakia. The number of inhabitants was 628,686 and the unemployment rate was 5.4 % in 2011. According to the data of Eurostat, the Bratislava region was the fifth richest region in the EU concerning GDP per capita in 2011. With 1.86 times the EU average, it overtook such regions as Stockholm, Prague or Vienna. The economy of the Bratislava region contains all the economic sectors based on the traditional industrial production of goods. The most important industrial sectors are the chemical, automotive, electronic and food industry and mechanical engineering. Over the last few years, the Bratislava region has become a European centre of automotive industry representing 30% of the overall Slovak export. (Bratislavský samosprávny kraj, 2014)

The Trencin region has an area of 4,502 km<sup>2</sup>, has about 600,000 inhabitants, GDP per capita reached 10,744 EUR in 2010 and the registered unemployment rate was at 10.89% in 2012 (significantly below the overall Slovak average of 14.44%).

The Zilina region has an area of 6,800 km<sup>2</sup>, total population is up to 700,000 and the population density is 102 inhabitants per km<sup>2</sup>. The unemployment rate was raised to 11.91% in 2011. The GDP per capita was 10,794 EUR in 2011.

In our research in the Bratislava region, the largest share of surveyed companies was comprised of SMEs operating in trade activities (33%), followed by construction firms (12%), manufacturing companies (7%), transport companies (1%) and agricultural enterprises (1%). The remaining share was formed by companies operating in other sectors.

In the Trencin region, the structure of companies was as follows: manufacturing companies (21%), trade companies (21%), construction companies (18%), transport companies (4%) and agricultural firms (5%). The largest portion of companies operated in other sectors (31%).

In the Zilina region, the structure of companies was as follows: 17% of companies operated in the manufacturing sector, 21% in the trade sector, 17% in the construction sector, 6% in the transport sector and 1% in the agricultural sector. The largest portion of companies operated in other sectors (38%).

From the total number of 102 surveyed firms in the Bratislava region, 54% of them were doing business for more than 10 years, 19% of them between 5 and 10 years, 27% of them between 1 and 5 years. Therefore, it can be stated that the research was examining quite experienced entrepreneurs from this region. The size structure of companies was as follow: 83% were micro-enterprises, 12% were small enterprises and 5% were medium-sized companies.

From the total number of 105 surveyed companies in the Trencin region, 54% of companies do their business more than 10 years, 25% do their business from 5 to 10 years and 21% do their business from 1 to 5 years. The size structure of the companies was as follows: 62% were micro-enterprises, 31% were small enterprises and 7% were medium-sized enterprises.

In the Zilina region, of 164 surveyed companies 38% do business more than 10 years, 32% represents firms which do their businesses from 5 to 10 years and 30% of surveyed companies do businesses from 1 to 5 years. Thus companies surveyed in this region were equally distributed from the perspective of business duration. As for the size structure, 66% was represented by micro enterprises, 20% were small companies and 14% were medium-sized enterprises.

It can be assumed that there are numbers of motives for starting a business. The main reasons for starting a business in Slovakia are: the need for self-fulfillment, autonomy and independence, achieving higher income, time flexibility and the need to bring something new (Podnikajte.sk, 2010). Within the survey of Iuventa (2012), in which respondents could choose more than one answer, 59% of young entrepreneurs stated they wanted to be independent in their economic decisions, 55% wanted to realise their dreams or business ideas, 27% declared their employment did not satisfy them, 27% started a business because of money, 20% were not satisfied with their working hours as employees, 19% declared they did not have any other option and 6% of respondents took over a family business.

Therefore, we hypothesize the following:

H1: The most important motive for starting a business is money.

H1a: There are significant differences in the perception of the most important motive to start a business among the selected regions of Slovakia. We assume entrepreneurs in the Bratislava region stated more often than entrepreneurs in the Trencin and Zilina regions that the most important motive to start their business was that they perceived it as a mission.

The business environment is also determined by personal characteristics of individual entrepreneurs. Creativity, risk taking and independence increase the probability of becoming an entrepreneur and decrease the probability of becoming an employee (Knórr, Alvarez, and Urbano, 2013). Almeida, Ahmetoglu and Chamorro-Premuzic (2014) show that META model (Awareness, Vision, Creativity and Opportunism) is the strongest and most consistent predictor of entrepreneurial activity. Entrepreneurial individuals are characterised primarily as enterprising and creative, and to some degree as social and investigative.

As entrepreneurs have to perform various tasks, they do not need only knowledge, competence and expertise, but also a complex of skills and abilities influenced by their personality. These are for example risk tolerance, emotional stability or an internal control helping them to trust their decisions (Caliendo, Fossen and Kritikos, 2014). In this context, Ilouga, Mouloungni and Sahut (2014) point out that the commitment to the profession of an entrepreneur is considered as long, complicated, loaded with obstacles, difficult to achieve, and requires the vocational skills that will enable the person to protect his or her goal from distractions, to persevere and to optimise the plausibility of achieving it. Entrepreneurs must demonstrate some resistance against the uncertainty concerning the future through their self-motivation, self-determination and initiative so as to overcome their fears and worries.

According to Deáková, Drážovská, Grznárik and Kondášová (2010), the most important personal qualities for an entrepreneur are: courage, self-reliance, responsibility, determination, perseverance, proactiveness, creativity and scholarship in the particular area in which this businessman intends to do business.

Kvietok (2013) adds that a decision to take on business risks is symptomatic for a certain type of people, in more detail for individuals who are more risk tolerant are more likely to start up firms (Hvide, and Panos, 2014).

In line with the findings of previous research, we hypothesize the following:



H2: The most important feature of an entrepreneur is not being afraid of taking risks.

H2a: The differences in the perception of the above mentioned key characteristics of an entrepreneur are not significant within the selected regions.

Various surveys show that the perception of entrepreneurship by society is still relatively negative in Slovakia. For instance, according to the survey of National Agency for Development of Small and Medium Enterprises, 69.9% of respondents think entrepreneurs in Slovakia try to quickly achieve as high profits as possible and 78.2% believe entrepreneurs are getting rich by taking advantage of ordinary people and are abusing their employees (Národná agentúra pre rozvoj malého a stredného podnikania, 2010).

As a result, we hypothesize the following:

H3: Less than 20% of entrepreneurs think society perceives them positively.

H3a: There are no significant variations in the opinions of entrepreneurs regarding this issue among the selected regions.

Generally, Slovak entrepreneurs evaluate the approach of the State to their needs and interests negatively. For instance, the Business Environment Index in relation to Slovakia, which is prepared by the Business Alliance of Slovakia, fell in 2011 to the historically lowest level since 2001 (Podnikateľská aliancia Slovenska, 2012).

In this context, it was interesting how entrepreneurs assess the state financial support of business and the following hypotheses have been set:

Therefore, we hypothesize the following:

H4: More than 60% of entrepreneurs think it is right that the State supports them financially.

H4a: There are no regional differences in the assessment of the State's financial support.

At present, more and more words of criticism of the educational system in Slovakia are being published even though there are no relevant objective findings and information concerning this issue. For example, Czech entrepreneurs have a highly critical attitude towards their school system. The vast majority (79%) of them believe that the Czech educational system is not adapted to the needs of the economy and business (Společnost g82, 2013). Such critical convictions are spread in Slovakia as well. There is a surplus of college students and a deficit of expert professionals (who would perform manual work for instance).

Therefore, we hypothesize the following:

H5: Less than 20% of entrepreneurs utilise many theoretical findings of academics.

H5a: The assessment of the academic work is the same in all the selected regions of Slovakia.

The associations in contingency tables were analysed by Pearson statistics for count data. P-value was being compared with standard a 5% confidence level. P-value which is lower than this confidence level leads to the rejection of the null hypothesis. The null claims there is no association between variables. The calculations were performed in the statistical packages XL Statistics and R. The instruments of descriptive statistics, namely percentages and means were also used.

#### 4 RESEARCH RESULTS AND DISCUSSION

Table 1 presents the results of our research regarding the entrepreneurs' motives for starting a business.

Tab. 1 – Motivation to start a Business in the Selected Regions of Slovakia. Source: own research.

<i>What was your motive for starting a business?</i>	BA in %	TN in %	ZA in %	p-value: BA:TN/BA:ZA/TN:ZA
1. Money	<b>41.18</b>	<b>38.10</b>	<b>48.78</b>	0.6527/0.2263/0.0854
2. I perceive it as a mission	29.41	12.38	10.98	<b>0.0025/0.0001/0.7263</b>
3. I want to have a job	11.76	26.66	21.95	<b>0.0067/0.0357/0.3735</b>
4. I had no choice	3.92	11.43	7.92	<b>0.0434/0.1936/0.3371</b>
5. Other reasons (independence, flexibility, etc.).	13.73	11.43	10.37	0.6171/0.4065/0.7872
p-value* BA:TN/ BA:ZA/TN:ZA			<b>0.0017/0.0010/0.5156</b>	

Notes: \*this p-value compares the structure of all responses, i.e. it examines if there are significant differences within the regions concerning all answers

As it is obvious from Table 1, our research has confirmed the validity of H1. The most important motive for starting a business in the selected regions of Slovakia was money.

H1a was also confirmed. There are no significant variations in the perception of the most important motive among the selected regions (p-value = 0.6527/0.2263/0.0854). At the same time, our research showed entrepreneurs in the Bratislava region stated more often than entrepreneurs in the Trencin and Zilina regions that they had started their own business because they perceive it as a mission (p-value = 0.0025/0.0001).

Our results, however, refuted some findings of for example Podnikajte.Sk (2010) and Iuventa (2012). Nevertheless, we are of the opinion that money as a motivation to start a business is natural and logical and should be given high priority as it supports the main objective of a company. Therefore, we find our results relevant.

The results of research by Belás, Bilan, Demjan, and Sipko (2015) show that the major motive for starting one's own business in the region of Zlin (Czech Republic) is the wish to have a job.

Table 2 contains crucial personal features, skills and abilities of an entrepreneur according to entrepreneurs themselves.

Tab. 2 – The Most Important Characteristics of an Entrepreneur. Source: own reearch.

<i>What qualities and skills must an entrepreneur have? (Please give a maximum of up to three answers.)</i>	BA in %	TN in %	ZA in %	p-value: BA:TN/BA:ZA/TN:ZA
1. undeterred by risk	<b>53.92</b>	<b>59.05</b>	<b>51.83</b>	0.4593/0.7414/0.4593
2. persistence	44.12	40.00	38.41	0.5485/0.3576/0.7949
3. creativity	18.63	18.10	27.44	0.9203/0.1031/0.0784
4. imagination	3.92	5.71	7.32	0.5485/0.2585/0.6101
5. expertise	36.27	53.33	50.00	<b>0.0135/0.0285/0.5961</b>
6. quality of education	5.88	4.76	3.66	0.7188/0.3953/0.6527
7. intelligence	9.80	7.62	12.20	0.5755/0.5485/0.2301

8. responsibility	34.31	43.81	46.95	0.1615/ <b>0.0424</b> /0.6171
9. intuition	19.61	12.38	7.93	0.1556/ <b>0.0050</b> /0.2263
10. decisiveness	23.53	21.90	17.68	0.7795/0.2460/0.3898
11. patience	19.61	19.05	17.68	0.9203/0.6965/0.7795
12. optimism	18.63	8.57	8.54	<b>0.0349/0.0151</b> /0.9920
13. other	2.94	1.90	0.61	0.6241/0.1285/0.3222
p-value BA:TN/BA:ZA/TN:ZA				0.2511/0.2372/0.2420

The results of our research confirmed H2. In the entrepreneurs' point of view, the most important characteristic of an entrepreneur is not being afraid to take risks. Other frequently chosen qualities were expertise, responsibility and persistence.

H2a was confirmed as well. We found no statistically significant differences in the perception of the importance of not being afraid to take risks among the selected regions.

The findings within our research are compatible with the conclusions of the presented studies, such as: Knórr, Alvarez and Urbano (2013), Caliendo, Fossen and Kritikos (2014), Ilouga, Mouloungni and Sahut (2014), Deáková, Drážovská, Grznárik and Kondášová (2012), and Soiminen, Martikainen, Puumalainen and Kyläheiko (2012).

We introduce how entrepreneurs think society perceives them in Table 3 below.

Tab. 3 – How Entrepreneurs Think They Are Perceived By Society in the Selected Regions of Slovakia. Source: own research.

<i>Do you think that our society (politicians, public opinion, media etc.) perceives the position and activities of entrepreneurs correctly?</i>	BA in %	TN in %	ZA in %	p-value: BA:TN/BA:ZA/TN:ZA
1. No, our society perceives us negatively	22.55	20.95	15.85	0.7795/0.1707/0.2846
2. Society perceives us incorrectly	41.18	55.24	43.30	<b>0.0434</b> /0.7279/0.0561
3. Society perceives us positively	<b>4.90</b>	<b>1.90</b>	<b>6.70</b>	0.2340/0.5485/0.0735
4. I am not considered it	29.41	21.91	34.15	0.1615/0.4237/ <b>0.0198</b>
p-value BA:TN/BA:ZA/TN:ZA				0.1702/0.5011/ <b>0.0208</b>

It can be argued that H3 was confirmed. Only 6.70% of entrepreneurs in the Zilina region think that society perceives them positively. The numbers in the other regions were even lower, namely 4.90% in the Bratislava region and 1.90% in the Trencin region.

On the contrary, H3a was not confirmed. Whereas the structure of all responses was not different for the Bratislava and Zilina region (p-value=0.1702) and the Bratislava and Trencin region (p-value=0.5011), the calculated p-value (0.0208) implies significant variations in the structure of all responses between the Trencin and Zilina region.

To complement the information it could be stated also that in the Czech Republic (Zlin Region) the entrepreneurs felt their perception by the society on an approximately the same level as businessmen in Slovakia. (Belás, Bilan, Demjan, and Sipko, 2015)

Table 4 is dealing further with the entrepreneurs' assessment of the State's approach, namely of the financial support from the State.

Tab. 4 – The Assessment of the Financial Support of Entrepreneurs by the State. Source: own research.

<i>Do you think the State should</i>	BA	TN	ZA	p-value:
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<i>support entrepreneurs financially?</i>	in %	in %	in %	BA:TN/BA:ZA/TN:ZA
1. Yes	<b>65.69</b>	<b>67.62</b>	<b>74.39</b>	0.7718/0.1285/0.2301
2. No	22.55	25.71	17.07	0.5961/0.2713/0.0873
3. I don't know	11.76	6.67	8.54	0.2041/0.3898/0.5755
p-value:BA:TN/BA:ZA/TN:ZA			0.4256/0.3128/0.2194	

Since more than 60% of entrepreneurs in all the selected regions stated that the State should support them financially, the validity of H4 was confirmed.

H4a was also confirmed. The calculated test criteria (p-value=0.4256/0.3128/0.2194) indicate no significant differences among the regions regarding this issue. Entrepreneurs in all the selected regions share about the same opinion on whether the State should support them financially or not.

To conclude, we present the opinions of entrepreneurs on the academic sector in Table 5 below.

Tab. 5 – The Application of Theoretical Findings to Real Business. Source: own source.

<i>Do you think the academic sector brings useful solutions for real business?</i>	BA in %	TN in %	ZA in %	p-value: BA:TN/BA:ZA/TN:ZA
1. No, these are far from the real world	43.14	43.81	31.71	0.9203/0.0588/ <b>0.0444</b>
2. Some of the findings are helpful for us	46.08	48.57	56.71	0.7188/0.0910/0.1902
3. We use many theoretical findings in our business	<b>10.78</b>	<b>7.62</b>	<b>11.59</b>	0.4295/0.8415/0.2891
p-value BA:TN/BA:ZA/TN:ZA			0.7269/0.1602/0.1126	

As it is obvious from Table 5, the conducted research confirmed H5. Only 10.78% of the Bratislava region entrepreneurs, 7.62% of the Trencin region entrepreneurs and 11.59% of the Zilina region entrepreneurs declared they use many theoretical findings in their business.

H5a was found possible to confirm as well. The overall structures of all responses were not significantly different among the selected regions (p-values=0.7269/0.1602/0.1126). There was only a partial variation between the Trencin and Zilina region in the first response. Statistically, more entrepreneurs from the Zilina region are convinced that the findings of the academic sector are far from reality.

Generally, entrepreneurs of all the selected regions assess the level of university education relatively negatively. It can be stated that these opinions are based on their own experience because 50% of the Bratislava region entrepreneurs, 51% of the Trencin region entrepreneurs and 47% of the Zilina region entrepreneurs had a university degree within our research.

Consequently, the above mentioned results could be an inspiration to improve the quality of the university education in Slovakia.

## 5 CONCLUSION

The aim of this article was to define, quantify and compare significant attributes of quality of the business environment for SMEs in the selected regions of Slovakia.

Our research showed there are certain regional variations in the assessment of important attributes of the SME segment in Slovakia. Comparing the Bratislava region as the most

economically developed to the other selected regions, we found significant differences in the motivation for starting a business and in identifying vital personal features and skills of an entrepreneur. Certain variations were discovered also in how entrepreneurs think society perceives them and in the entrepreneurs' utilisation of State financial support.

At the same time, there are several factors not significantly influenced by regional characteristics. These is the general State approach towards entrepreneurs, for example the application of theoretical knowledge to business.

The most important finding is that whereas in the most developed region, the region of Bratislava, people usually start a business because they are willing to, in less developed regions, the level of "forced" entrepreneurship is higher.

It also has to be pointed out that entrepreneurs in the Bratislava region stated optimism as a vital quality of an entrepreneur more often than entrepreneurs in the other regions. At the same time, they declared expertise less often than entrepreneurs in the other regions.

Moreover, entrepreneurs assess the State's role in creating business environment rather negatively. They also often believe society perceives them incorrectly. Thus, the research results imply the need to improve the State's approach to entrepreneurship, to create a better image of business activities in the eyes of society and to awaken public interest in conducting business.

Although it is clear that there are certain limitations to our research (e.g. the number of companies involved in the research), we believe that our article has inferred significant incentives for the formation of a more appropriate business environment for SMEs in Slovakia.

Our future research will focus on the examination of the relationships among personal characteristics of entrepreneurs, the propensity to take risks and their financial performance.

### **Acknowledgement:**

This paper was supported by Project No. FaME/2015/RO: The quality of bussiness environment in Small and medium enterprise in Czech Republic.

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## **CREATIVE INDUSTRIES AND THE EU REGIONAL POLICY: A SPATIAL ANALYSIS OF USING STRUCTURAL FUNDS**

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### **Abstract**

The creative industries are gaining recognition among countries of the EU, where the regional policy plays a key role in the economic development. However, the relationship between the EU Structural funds and the creative industries is limited specifically to culture, while the concept itself has not been assessed yet. The aim of this paper is to analyse the use of the Structural funds in the creative industries for the programming period 2007-2013. Regression unstandardized residuals were depicted by choropleth maps and multidimensional scaling for spatial analysis of the largest cities by population in the Czech Republic. The findings proved that dominant use of the Structural funds is in the culture sector, while the cultural and creative industries were not specifically supported. Moreover, particular differences were identified in spatial distribution of the creative industries. The results provide a methodological basis for evaluation and further research in conjunction with changing objectives and themes of support from the EU Structural funds in upcoming programming period. Particular focus is put on increasing the proportion of support towards the creative industries and awareness of policy-makers in reduction of spatial disparities in the use of public funds.

*Keywords: creative and culture industries, Czech Republic, European Union, municipalities, regional policy, structural funds*

JEL Classification: H50, L82, R51, Z10

### **1 INTRODUCTION**

Currently, the further development of the knowledge intensive society in the Central and Eastern countries (CEEs) is the result of transformation processes of past two decades. The overall process of catching up with Western countries is also reflected in the recognition of the creative industries among CEEs nations. However, in respect both to the European commission and Higgs et al (1998) the concept of culture and creative industries (CCI) was applied for delimitation of object of the paper. These industries are preferably defined (Bakhshi et al, 2013) according to Higgs et al (1998) as “*those industries which have their origin in individual creativity, skill and talent and which have a potential for wealth and job creation through the generation and exploitation of intellectual property*”. Furthermore, development of communities that are attractive to creative individuals provides opportunity for regions to capitalize on diversity and creativity (Acs and Megyesi, 2009). Therefore, regions across Europe are implementing Smart strategies to ensure sustainable development as the result of transforming European regional policies. Encouraging the use of creativity and talent in strategic planning is one of the tools to enhance regional competitiveness. Creative milieu is essential for enhancing regional competitiveness because of their role as the knowledge hubs. Furthermore, it has already become potential catalysts for the development of the CCI and the creative tourism (Kostopoulou, 2013). Production of the CCI is concentrated in particular areas. From a geographical perspective the focus is put on localised production systems that benefit from proximity for communication and exchange (Dahlström

and Hermelin, 2007). However, there is a minimal insight into production processes of the CCI in the Czech Republic. This is due to the fact that the potential of the CCI and culture is often neglected, even though the products of the CCI are a significant part of contemporary economies (Power, 2003; Power, 2010). Mapping of the CCI is essential for further development of this concept. Therefore, it has been acknowledged the assessment of the Creative Indexes by Kloudová and Stehliková (2010) and regional perspectives of performance by Bednář and Grebeníček (2012); Slach (2013); and Danko and Bednář (2013). Furthermore, Bednář (2013) carried out data analysis of tri-sector CCI classification. The support for the CCI is despite previous steps defined rather generally without specific objectives. Thus the aim of the paper is to analyse the impact of the public support on the CCI, based on the ability to receive financial resources of the structural funds in the Czech Republic.

## **2 THEORETICAL BACKGROUND**

The concept of the CCI was identified in 1998 by the Department of Culture, Media and Sport. Specifically, the CCI have their origin in individual creativity, skill and talent (DCMS, 1998). The CCI comprise design, architecture, advertising, games, film, music, publishing, art, performing arts, crafts and toys (Howkins, 2001). Furthermore, the initial definition of the CCI was enlarged with traditional arts industries, design-led industries and branches of new media (O'Connor et al, 2011). Representatives of the CCI are mostly micro and small companies and their products differ, not only on the basis of objective criteria of quality, but also on intangible criteria defined by aesthetics, symbolism, atmosphere and style associated with the product (Puchta, 2010). Place-related production and consumption of the CCI are strongly interconnected (Stryjakiewicz et al, 2014). Furthermore, some areas of production are under control of oligopolies (movies, television and broadcasting), large share of the CCI is represented by micro and small companies (Parkman, Holloway and Sebastiao, 2012). Thus they dispose of potential for job creation through the use of intellectual property. Their economic importance resides in the role as the innovation system (Florida, 2002). The innovative notion of creative individuals provided the basis for formation a new phenomenon called creative class.

The creative class is represented by individuals employed in the CCI. According to Florida (2002) it is not only about the employment itself, but also about the lifestyle of creative individuals in a creative milieu and natural creative clusters. Hence natural clusters have been considered as a spontaneously grown geographical concentration of particular industry, i.e. as a result of economies of agglomeration (Martin, 2008; Yoshino, 2010). Furthermore, Florida (2002) developed the Creative Index (CI), which consists of three particular factors: technology, talent, and tolerance. The CI was used to measure the creative economy in the USA and Canada. Therefore, it was necessary to adjust the CI to measure the creative economy in Europe. Kloudová (2011) unified the previous concept and added measurable index for all European countries with data of the Eurostat with the New Creative Index (NCI). On the contrary, Banks and O'Connor (2009) stress that the economic importance of the creative industries is reflected also in contribution to employment and wealth creation as specific industries. Sharing ideas and information within the creative class are vital factors for further development of social networking (Champion, 2010). These networks work on an informal basis, which empower the access to information (Chapain & Comunian, 2010). However, Peck (2005) and Markusen (2006) assume employees should not be divided into creative and non-creative, because creativity works mostly on non-standardized basis. Moreover, it is a human characteristic, which individuals can apply their unique ideas. Runco

(2007) stress it is related, but distinct from intelligence, imagination, innovation and health. Nowadays creativity appears as a phenomenon based on non-standardized processes.

Non-standardized production of the CCI is often considered as “fuzzy concept”, although it forms a part of local and regional economies. Bell and Jayne (2003) argue there is still lack of compliance between particular CCI and policy to support this concept as an element of competitiveness in cities and regions. Furthermore, they defined urban regeneration, which is connected with economically affected areas (Liverpool, Manchester and Dundee). Competitiveness of regions has recently shifted from traditional hard location factors (infrastructure, taxes) to soft location factors, represented by tolerance and alternative lifestyles (Florida, 2002). The CCI were incorporated into urban planning in communities and works as an element to create cities with artistic background (Phillips, 2004). In particular regions it subsequently led to the creation and development of attractive neighbourhoods, where representatives of production and consumption as the core of the creative economy (Bell and Jayne, 2003). From a geographical perspective, this provides a basis for developing mutual relations of the creative class in urban centres and creative districts. Furthermore, companies in the area learn from each other and benefit from knowledge spillover, which also result in formation of spin-off companies (Wenting, 2008). These areas increase an interaction between market and sharing ideas, which eventually lead into more sophisticated basis for innovation (Turok, 2004). Furthermore, the ability of micro and small companies to persist on turbulent market depends on their capability to come up with new ideas and products. The concept of innovation is currently diversified due to the progressive development of open and non-technological innovation (Caves, 2003). The ability of the CCI (EU) to adapt and develop often depends on targeted public support. The EU introduced the MEDIA programme 2007-2013 with a budget of 755 million EUR to specifically support the audio-visual sector. The programme covered specific areas of production, distribution, training, festivals, promotion, new technologies and international activities.

This paper, however, focuses on a large scale grant schemes of the cohesion policy administered in the Czech Republic through the European Regional Development Fund, European Social Fund and Cohesion Fund. The 2007-2013 programming period officially ended, nevertheless the grant schemes in the Czech Republic are still in the process of drawing. Substantial amount of total Czech allocation has already been claimed by the beneficiaries therefore the first evaluation efforts are appropriate. The cohesion policy in the Czech Republic in the observed period was implemented through number of operational programmes in all three European Union objectives Convergence, Regional Employment and Competitiveness and European Territorial Cooperation. This paper focuses on the first and second named in which 17 individual operational programmes were implemented. The primary sources for support of entrepreneurs at large represented the regional operational programmes of the individual NUTS 2 Convergence regions and most prominently the Operational Programme Entrepreneurship and Innovation also territorially aimed at the Converge regions. The capital Prague as sole region belonging under the Regional Employment and Competitiveness objective implemented two programmes – the Operational Programme Prague – Competitiveness and Prague – Adaptability. Apart from the entrepreneurial support the CCI may have benefited predominantly from Integrated Operational Programme whose projects were used in connection with national institutions focusing on arts and literature.

The efficiency, its measuring, and necessity of public support in general and of cohesion policy in particular are still a keen object of studies focused on both the Czech Republic (Šipikal et al, 2013) and abroad (Marchante and Ortega, 2010; Gómez-García et al, 2010; Dall’erba and Le Gallo, 2007). While there were other studies focused on absorption of public

support in the Czech regions (e.g. Blažek and Macešková, 2010; Hájek et al, 2014), absorption of the EU Structural funds in particular sector of the economy (Smékalová, 2012; Felixová, 2012) and impact of the Structural funds on culture (Žáková, 2013), this paper focuses on impact of the cohesion policy on the whole concept of CCI which is a relatively novel area of research. Furthermore, the aim follows the findings of Žáková (2013) stressing “*There are no overall robust data concerning the financial volume of co-financing by EU Structural Funds in the cultural and creative sectors in the Czech Republic. The number of projects is unknown either. No studies and analyses mapping the use of the Structural Funds for the support of culture have been commissioned by the state or regional authorities*”.

### **3 METHODOLOGY**

The secondary database Bisnode (2014) provided the dataset for quantitative analysis of the CCI. This database offers a comprehensive overview of commercial, non-profit and public entities from publicly available sources for example the Czech Statistical Office and the Ministry of Finance of the Czech Republic. However, it supposed to be noted that the CCIs are assigned to their headquarters because the Bisnode (2014) database does not provide economic indicators for branch entities. An identification of such data would require specific survey of each entity individually. This process requires a long-term efforts and willingness of entities to provide such data.

Furthermore, the dataset excluded those entities, which did not register any turnover or number of employees. These entities were considered inactive as they did not report any activity in last two years. Another step in reducing the final dataset was the ‘bankrupt’ label. The selection procedure of variables from the Bisnode (2014) database for the purposes of quantitative analysis was carried out according to the following steps:

1. Selection of the entity according to the predominant activity within the subgroups of economic activity classification CZ NACE (e.g. the activity accounting for major of the company’s turnover, activities of non-profit or public entities).
2. Registered address of the entity and its identification to the town and region, therefore the administrative level NUTS 3 and LAU 2.

Subsequently, culture sector, cultural industries and creative industries were identified as three major categories of the CCI based on CSO and NIPOS (2014). Furthermore, these categories were divided in specific areas of the CCI with respect to the number of subjects in different subgroups of CZ NACE. However, crafts were excluded from the selection due to difficulties to determine whether products are handicrafts or standardized production without their own creative contribution and innovation. Following tables (1-3) provide an overview of selected predominant subgroups CZ NACE for quantitative analysis:

Tab. 1 - Culture sector. Source: Own elaboration based on Bednář and Danko (2014)

	Predominant subgroup CZ NACE
Photography	74.20
Cultural heritage	47.78, 47.79, 91.03, 91.02, 91.01
Performing arts	90.01, 90.02, 90.04,
Artistic creation	90.03
Arts education	85.52

Tab. 2 - Cultural industries. Source: Own elaboration based on Bednář and Danko (2014)

	Predominant subgroup CZ NACE
Film, television and broadcasting	47.63, 59.11, 59.12, 59.13, 59.14, 60.10, 60.20, 77.22
Music	47.63, 59.20
Publishing	47.61, 47.62, 58.11, 58.12, 58.13, 58.14, 58.21, 63.91,

Tab. 3 - Creative industries. Source: Own elaboration based on Bednář and Danko (2014)

	Predominant subgroup CZ NACE
Architecture	71.11
Design	73.11
Advertising	74.10

Based on findings in Bednář and Danko (2014) a total of 51,929 entities of the CCI were identified based on above defined selection process for quantitative analysis. The culture sector accounted for 21.9%, i.e. 11,395 enterprises, while the cultural industries represent the major part of the CCI with 63.5% (32,999) enterprises and the creative industries with the least representation with 14.5% (7,535).

Ordinary linear regression was employed as the next step of quantitative analysis to determine the relationship between independent variable represented by total/particular number of the CCI/creative entities in municipalities (where condition was city has at least one entity of the CCI) and dependent variable represented by the total/CCI particular category amount of subsidies received from the Structural funds. Municipalities without any entities of the CCI were excluded from the analysis. Hence this paper uses the unstandardized regression residuals, which are successful in excluding very small municipalities by population with high relative concentration of subsidies from the Structural funds (see Faser, Sweeney and Renski, 2005). Eventually, the residuals were portrayed via choropleth maps, where intervals were determined by standard deviation due their normal distribution.

Subsequently, cities over 50,000 inhabitants (including Chomutov with population of 49,784) were selected from the dataset. These respective cities were analysed with multidimensional scaling method that provides the opportunity to reveal distances between objects. Therefore, its role is to reduce dimensions and identify those variables that are crucial for the variability between individual objects in our case selected cities. Simultaneously, its graphical representation allows the user to identify clusters of units based on their similarity represented by values of variables. Furthermore, it also presents perceptual map of individual objects and their distribution in the scatter plot with one to three dimensions, where mutual distances determine not only the position in relation to others, but also presents the relationship to key variables in terms of their variance. These have a major impact on the location of the individual objects in the perceptual map. Multidimensional scaling uses multiple ways of data representation, but the paper focused solely on ALSCAL method, which portrays the distribution of objects (see Hout et al, 2013). From a practical and user point of view it belongs to simple variants of the data representation. Furthermore, this method does not require testing of assumptions such as the normal distribution of values. Even though the method has no special requirements on the used values, it is possible to use factor analysis to eliminate the variables that do not contribute to the differentiation of individual objects. On the other hand, the multidimensional scaling provides this information itself (Jaworska and Chupetlovska-Anastasova, 2009).

## **4 RESULTS AND DISCUSSION**

According to the database the support for the CCI during the programming period 2007-2013 accounted for 4.9 billion CZK as of January 2015, specifically in 101 municipalities out of total 2,987, where the presence of the CCI industries was revealed (i.e. 3.5%). Culture sector absorbed the major part of support, i.e. about of 3.8 billion CZK (76.8%), while cultural industries 0.6 billion CZK (11.9%) and the least amount was present in creative industries 0.6 billion CZK (11.3 %).

Dominance of culture sector is evident, even though its share in the total number of entities in the CCI accounted for 18.2%, i.e. 5838. On contrary, cultural industries accounted for 58.5% on total number (18,806) and creative industries for 23.4% (7,535). Prague achieved the major success in receiving support with 2.6 billion CZK, i.e. 52.6%, followed by Pilsen with 0.6 billion CZK and Brno 0.5 billion CZK. The ranking in second and third place doesn't correspond with neither the number of inhabitants nor number of enterprises in the CCI. Moreover, Prague exhibits its position as the economic centre of the Czech Republic with 11,102 (34.5% of 32,119) active enterprises on its territory. These enterprises received more than half the support. Further analysis revealed that the culture sector reflects dominance of Prague, which is not only the residence of national central institutions in terms of management and development of culture, but also the most important museums, theatres, operas, libraries to name a few. These entities are attractive for both domestic and foreign cultural tourism. Prague contributed in this particular with 0.6%, i.e. 2.4 billion CZK which confirms its position as a centre of cultural life in the Czech Republic. Thus, it is assumed that Prague rather shows characteristics of divergence in terms of support from the Structural funds in the field of culture during the programming period 2007-2013. Furthermore, received support contributed to its increasing cultural importance within the Czech Republic. Culture industries also dominated in the case of Prague, with the share of 21.2% (0.12 billion CZK) from total support in this respective category. Even though Prague is a major centre of film production, broadcasting, music and publishing with nationwide scope, the capital did not achieve the dominant position in this category. Ostrava was ranked second with the share of 17.7% (0.10 billion CZK) and third Mníšek pod Brdy with the share of 12.0% (0.07 billion CZK). In this case it can be deduced that the reason consists in relation to Prague with both proximity and commuter time as this municipality can be considered as a suburban zone of the national metropolitan area. Prague was ranked third in case of creative industries with the share of 14.0% (0.008 billion CZK), while Brno achieved second place with the share of 17.0% (0.09 billion CZK) and Ostrava with the first place with the share of 26.5% (0.15 billion CZK). This ranking is in reverse order compared to the number of inhabitants and the number of enterprises. Ostrava has only 4.0% (237) enterprises in creative industries, while Brno has 8.6% (503) and Prague 30.9% (1808). In this respect, enterprises in Prague remain far behind assumptions.

Another part consist of the spatial analysis of allocations, firstly all CCI together and then in particular categories (see Fig. 1). The values of unstandardized regression residuals were divided into intervals based on multiples of the standard deviation and showed following findings. In case of the sum of allocations in relation to the number of enterprises, the values beyond expectations (>1.5 Std. Dev.) were identified in Prague and its hinterland in the Central Bohemian Region (Mníšek pod Brdy, Tetín) together with the municipality of Dobruška in the proximity to Mladá Boleslav. Other municipalities in this respect are Pilsen, Litoměřice, Rychnov nad Kněžnou that exhibit concentration of animate and inanimate culture. In case of Pilsen there is also the presence of enterprises of the CCI depending on both population and higher art education. These values in case of Ostrava, Opava, Frýdek-Místek where centres of higher art education are present like in Pilsen except the Frýdek-

Místek. Moreover, based on Bednář and Danko (2014) a natural cluster in advertising was identified in the Moravian-Silesian Region. Two cases where both represent centres of Moravian-Wallachian ethnographic region were identified in the Zlín Region – Rožnov pod Radhoštěm and Vsetín respectively. Specific case can be observed in Kralice na Hané nearby Prostějov in the Olomouc Region, where Prostějov was until recently the centre of garment industry with links to design. On the contrary, negative finding of standard deviation ( $<2.5$ ) was identified in the second largest city by population in the Czech Republic – Brno (South Moravian Region) in spite of fact that the city is considered to be a traditional residence of higher art education, cultural institutions including television and radio production and architecture with supra-regional importance. The same results were revealed in other regional capitals such as České Budějovice, Karlovy Vary, Liberec, Hradec Králové, Olomouc and Zlín albeit their importance in the national settlement system. Conversely, the relationship between long-term unemployment rates, decline of traditional industries and low level of support for the CCI from the Structural funds was confirmed in case of municipalities in the Ústí nad Labem Region (see Smékalová, 2012).

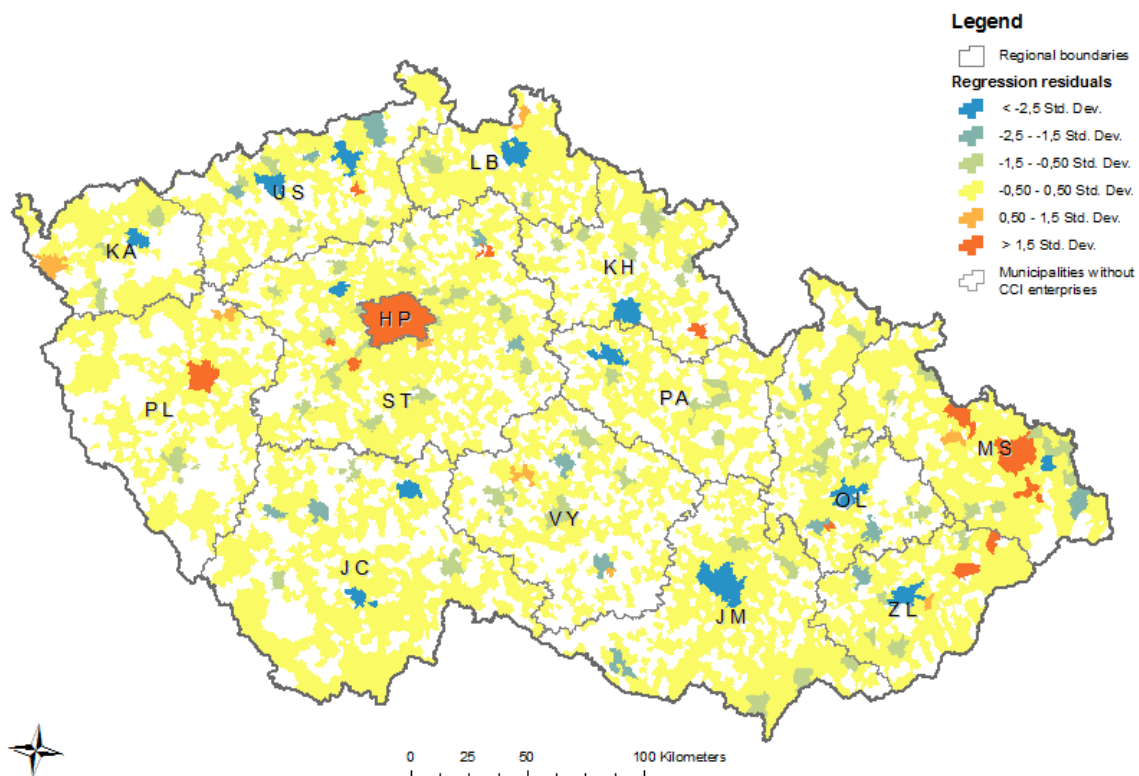


Fig. 1 – Standard deviation of unstandardized regression residuals of number the CCI enterprises and the total amount of subsidies in the Czech municipalities (2015)  
Source: Authors' elaboration based on Regional Information Service and Bisnode (2014)

Notes:

<sup>a</sup> Regions of the Czech Republic: HP -Prague, ST – Central Bohemia, JC – South Bohemia, PL – Pilsen, KA – Karlovy Vary, US- Ústí nad Labem, LB – Liberec, KH – Hradec Králové, PA – Pardubice, VY – Vysočina, JM – South Moravia, OL – Olomouc, MS – Moravia-Silesia, ZL - Zlín

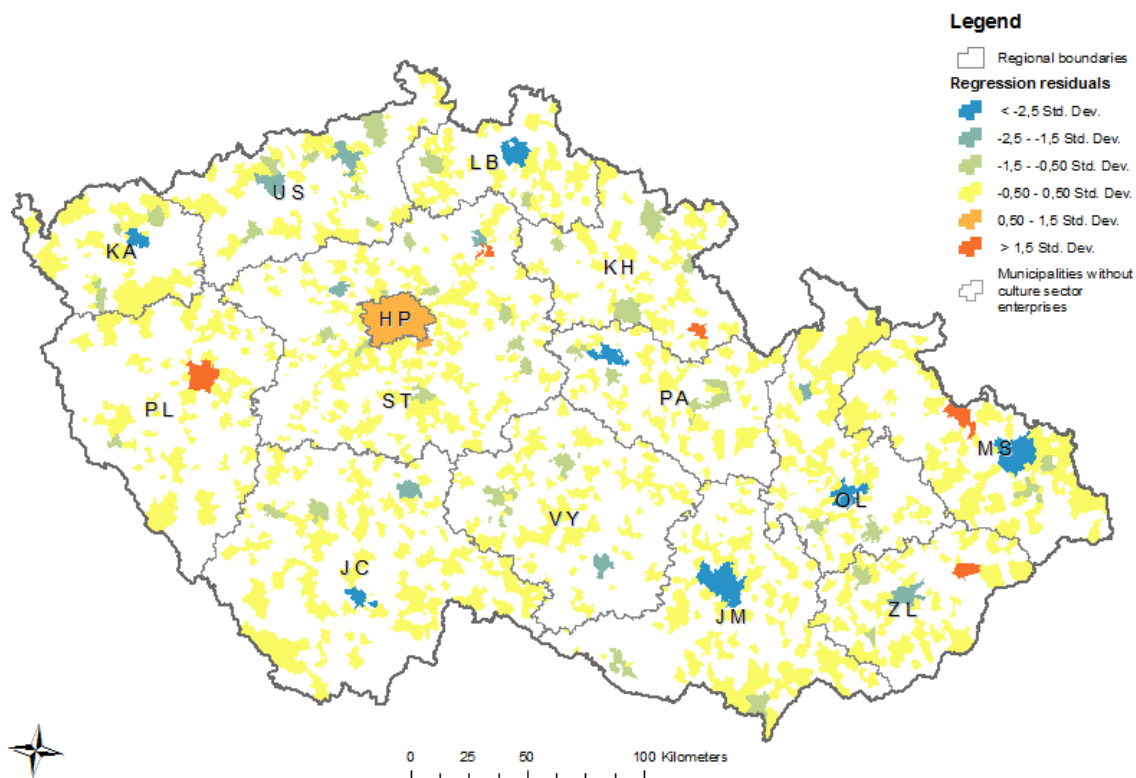


Fig. 2 – Standard deviation of unstandardized regression residuals of number culture sector enterprises and the particular amount of subsidies in the Czech municipalities (2015)

Source: Authors' elaboration based on Regional Information Service and Bisnode

Notes:

<sup>a</sup> Regions of the Czech Republic: HP -Prague, ST – Central Bohemia, JC – South Bohemia, PL – Pilsen, KA – Karlovy Vary, US- Ústí nad Labem, LB – Liberec, KH – Hradec Králové, PA – Pardubice, VY – Vysočina, JM – South Moravia, OL – Olomouc, MS – Moravia-Silesia, ZL – Zlín

Support from the EU Structural funds in the case of culture sector (see Figure 2) results above expectations ( $>1.5$  Std. Dev.) are present in Pilsen, in which the motivation to receive support was mainly associated with achieving the status of European Capital of Culture 2015. Other example of municipality being above expectations is Dobruška in the proximity to Mladá Boleslav in the Central Bohemian Region due to restoration of local monuments, primarily the Sugar Museum owned by one of the largest producers of sugar in the Czech Republic. Links to local monuments are also reflected in the case of Rychnov nad Kněžnou in the Hradec Králové Region, Rožnov pod Radhoštěm (Zlín Region) due to renovation of several historical sites of the Wallachian Open Air Museum and in Opava (Moravian-Silesian Region). Value between 0.5-1.5 Std. Dev. was identified in Prague, where similar result with previously mentioned municipalities was expected compared to its importance. Nonetheless, regional centres with significant historical cultural heritage fell behind expectations, namely České Budějovice, Brno and Olomouc.



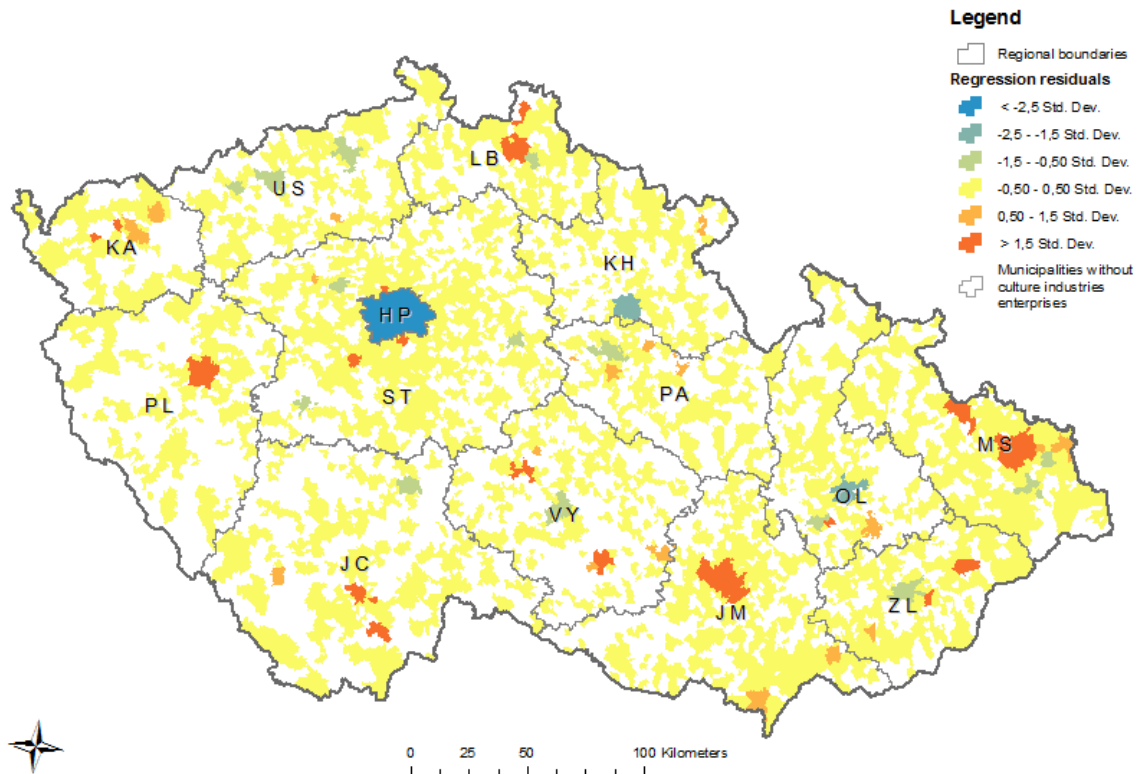


Fig. 3 – Standard deviation of unstandardized regression residuals of number culture industries enterprises and the particular amount of subsidies in the Czech municipalities (2015)

Source: Authors' elaboration based on Regional Information Service and Bisnode

Notes:

<sup>a</sup> Regions of the Czech Republic: HP -Prague, ST – Central Bohemia, JC – South Bohemia, PL – Pilsen, KA – Karlovy Vary, US- Ústí nad Labem, LB – Liberec, KH – Hradec Králové, PA – Pardubice, VY – Vysočina, JM – South Moravia, OL – Olomouc, MS – Moravia-Silesia, ZL – Zlín

Figure 3 represents the culture industries reported the highest number of municipalities reaching  $>1.5$  Std. Dev., compared to other categories of the CCI. The distribution of these values is relatively even in almost all regions (except Prague, Ústí nad Labem, and Hradec Králové Region) even though the culture industries did not receive the highest proportion of support from the EU Structural funds. Subsidies were primarily used by enterprises in publishing in accordance with their amount in relation to other subgroups of CZ NACE in this category. Exceptional values are also evident among municipalities in Prague's hinterland. These municipalities undergo a transformation of suburbanization associated with doing business in the culture industries of wealthy newcomers having higher social status. Thus their activities lead also to commercial suburbanization.

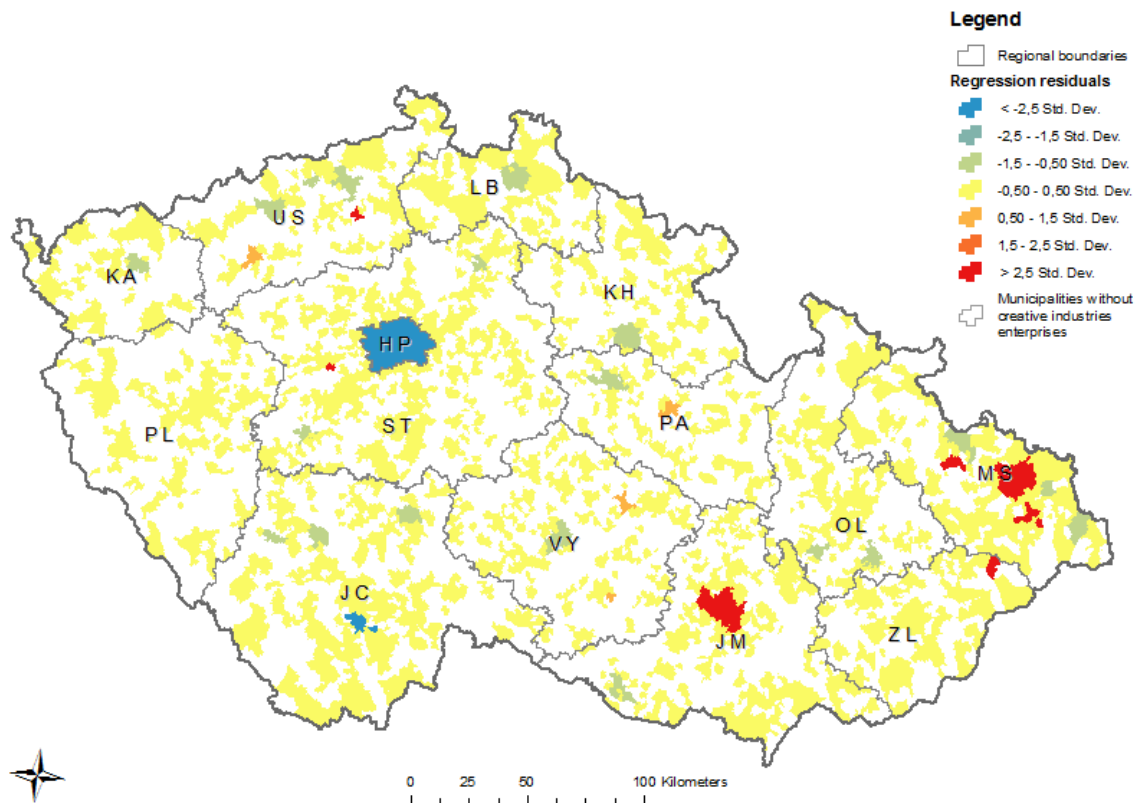


Fig. 4 – Standard deviation of unstandardized regression residuals of number creative industries enterprises and the particular amount of subsidies in the Czech municipalities (2015)

Source: Authors' elaboration based on Regional Information Service and Bisnode

Notes:

<sup>a</sup> Regions of the Czech Republic: HP -Prague, ST – Central Bohemia, JC – South Bohemia, PL – Pilsen, KA – Karlovy Vary, US- Ústí nad Labem, LB – Liberec, KH – Hradec Králové, PA – Pardubice, VY – Vysočina, JM – South Moravia, OL – Olomouc, MS – Moravia-Silesia, ZL – Zlín

Figure 4 depicts the spatial distribution of support in the creative industries, where several values  $> 2.5 \text{ Std. Dev.}$  were revealed. This occurred particularly in Brno (South Moravian Region) and Ostrava metropolitan area (Moravian-Silesian Region). In the first case, this indicator is linked to design and architecture due to presence of university education (see Bednář and Danko, 2014). The second case represents the concentration of advertising as it was mentioned previously (see Figure 1). The relation to architecture was revealed in Rožnov pod Radhoštěm (Zlín Region), which is associated with traditions of the municipality to preserve traditional folk architecture.

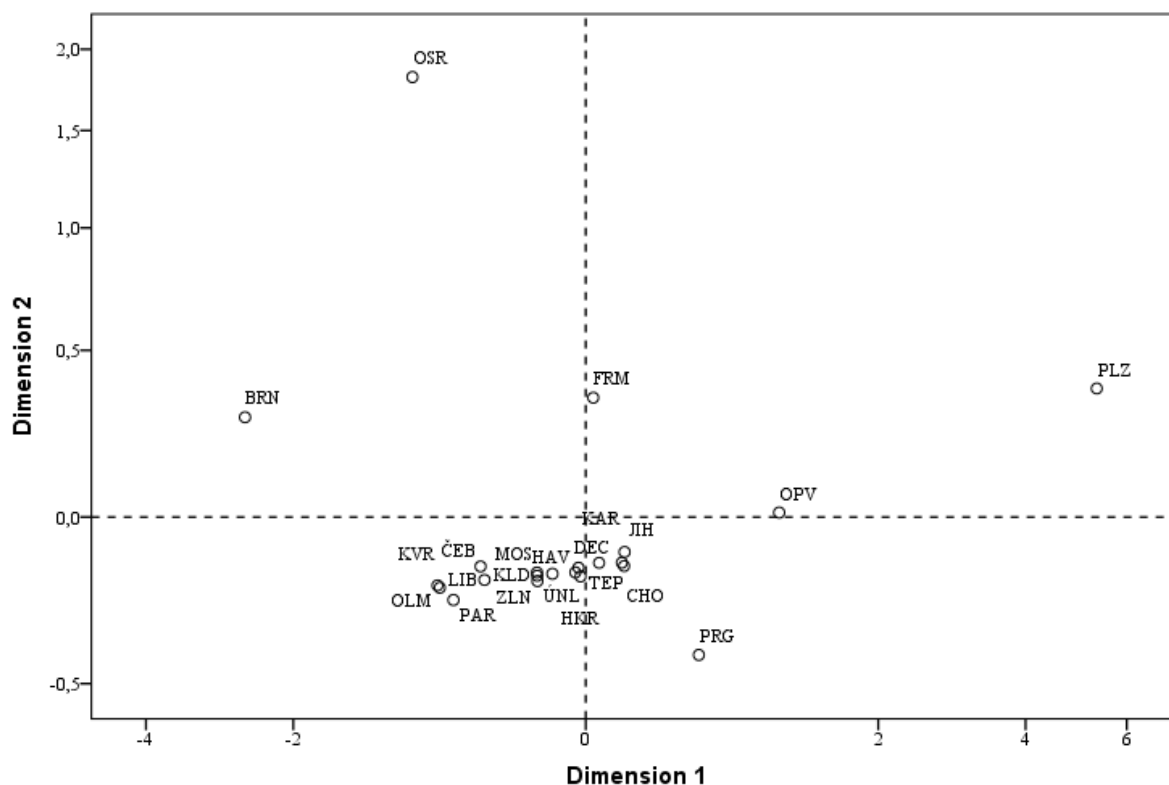


Fig. 5 – Optimal distances between the Czech municipalities with population > 50,000 in the two-dimensional stimulus space (2015)

Source: Authors' elaboration based on Regional Information Service and Bisnode

<sup>a</sup> List of municipalities according to population: PRG – Prague, BRN – Brno, OSR – Ostrava, PLZ – Pilsen, LIB – Liberec, OLM – Olomouc, UNL – Ústí nad Labem, HKR – Hradec Králové, ČEB – České Budějovice, PAR – Pardubice, HAV – Havířov, ZLN – Zlín, KLD – Kladno, MOS – Most, KAR – Karviná, OPV – Opava, FRM – Frýdek Místek, KVR – Karlovy Vary, JIH – Jihlava, TEP – Teplice, DEC – Děčín, CHO – Chomutov

Figure 5 represents an analysis of similarity of regression residuals in the CCI among municipalities over 50,000 inhabitants in the Czech Republic. Two dimensions were chosen in the final stage using Euclidean distance due to the value of the S-Stress (0.017). Thus, achieving excellent model's goodness of fit (see Jaworska and Chupetlovska-Anastasova, 2009). Safe power measure to take the square root of the data was used for better readability of the graphic representation in clustering values ranging from -2.0 to 0.0 in dimension 1 and -0.5 to 0.0 in dimension 2. Based on the analysis, values in dimension 1 are determined by the cultural sector. This means that higher values in dimension 1 lead to higher unstandardized residuals in the culture sector. Dimension 2 is formed by values of both remaining categories, i.e. cultural and creative industries. Distribution of selected municipalities provides findings about differences in the four largest cities in the Czech Republic (see Figure 5). Ostrava and Brno dominate mainly in two categories, i.e. in culture sector and creative industries, however, Ostrava demonstrates the highest positive values of regression residuals in both cases. Pilsen differs by significant positive values of residuals in cultural sector, like in the case of Opava. Prague shows similar result, but the values are lower nevertheless. On the contrary, the capital proves the lowest values in culture sector and the creative industries regarding Czech municipalities with particular categories of the CCI.

## **5 CONCLUSION**

In terms of spatial distribution of support towards the CCI from the EU Structural funds in the Czech Republic, the higher concentration in municipalities was discovered compared to identification of their natural clusters (see Bednář and Danko, 2014). Nonetheless, Prague as the capital dominated regarding received support in absolute values. Hence there is a repetitive call for posing a question whether the use of the EU Structural funds contributes to convergence of regions or not. On the contrary, there was a lack of systemic support towards the CCI by the central government during 2007-2013 in each category. These findings correspond with conclusions of Bell and Jane (2003) and Žáková (2013). Consequently, the forceful support of the cultural sector prevails, namely cultural heritage, traditional arts (dance, theatre) and arts educational institutions. The remaining two categories, i.e. cultural and creative industries, are predominately focused on commercial activities, and thus are undervalued. However, they represent key aspects of increasing competitiveness in terms of product or marketing innovations respectively both in the secondary and tertiary sector of the economy. This provides the basis for posing the second question, whether the support of activities in these respective categories of the CCI in Prague is sufficient or not. This is due to the fact that the creativity has been set as one of the objectives within the Strategic plan of Prague. In this regard, the findings endorse a statement that current support towards the culture and creative industries from specialized funds for regions over 125% GDP of the EU average is insufficient. Conversely, it is necessary to admit that many enterprises in culture sector represent traditional national institutions that are accustomed to receive state aid and they have specific staff for project administration. These conditions are often not met in case of private enterprises, which in most cases adopt the status of freelancers and micro enterprises (see Bednář and Danko, 2014).

Regarding added value for the contemporary research the contribution constitutes one of the methods for evaluating the absorption of public support from the EU Structural funds in the realm of the CCI. The paper therefore depicted the spatial distribution of that support. Hence the conducted research provides not only description and explanation of the preceding absorption but also an opportunity to compare the results with data in upcoming programming period. The main reason of such comparison is due to the fact that members of the EU can benefit from large scale programs such as Creative Europe 2014-2020. Simultaneously the EU has introduced Horizon 2020 and Central Europe frameworks that address the issues of cultural heritage and access to cultural goods and services.

The findings also set the basis for subsequent discussion of approaches to the use of these funds to overcome limited systematic attention to the CCI in the Czech Republic during the 2007-2013 programming period. Thus the contribution serves as a stimulus for national and regional policy makers to realize the role of the CCI in the economy. Last but not least, it responds to the request in Žáková (2013) in relation to the project of the Arts and Theatre Institute – Mapping cultural and creative industries (2011-2015), which focuses on the comprehensive analysis and sets procedures for evaluating the CCI in the Czech Republic.

### **Acknowledgement**

Authors are thankful to the Internal Grant Agency of FaME TBU No. IGA/FaME/2015/026 “Návrh modelu vzniku klášterní organizace v oblasti zemědělství v podmínkách České republiky a v oblasti designu na Slovensku” for financial support to carry out this research. The authors are also thankful to the Operational Programme Education for Competitiveness co-funded by the European Social Fund (ESF) and national budget of the Czech Republic for the grant No. CZ.1.07/2.3.00/20.0147 - “Human Resources Development in the Field

of Measurement and Management of Companies, Clusters and Regions Performance”, which provided financial support for this research.

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## **COMPETITIVENESS OF BANKING INSTITUTIONS IN THE CONTEXT OF HUMAN RESOURCE MANAGEMENT AND THE CONCEPT OF CORPORATE SOCIAL RESPONSIBILITY**

*Jiří Bejtkovský, Janka Vydrová*

### **Abstract**

The current management concept of human resource management views employees as one of the most significant components of functioning of the entire corporation. Without interested employees, processes and activities cannot be fulfilled, (bank) products or services cannot be provided to clients or customers, performance and competitiveness cannot be achieved. Management has to be cautious in the area of human resource management especially at present times characterized by population ageing. From a long-term perspective, not only 50-employees but also 50+ employees need to be in the centre of attention. However, the idea has not been widely implemented so far.

The aim of this article to reflect this indisputable fact and provoke a debate over the change of perception of the 50+ employees not only in the banking institutions involved which perception is still burdened by myths, stereotypes, and prejudices. Due to the fact that personal know-how of the 50+ employees is not perceived positively and therefore is not duly appreciated, not only a banking institution may lose its image, performance, and competitiveness.

The article presents some of the results of quantitative and qualitative research conducted in banking institutions in the Czech Republic. The discovered facts suggest that the position of the 50+ employees is not positive in the banking institutions involved. This segment of employees is still viewed stereotypically. One of possibilities on how to change this approach seems to be the philosophy of Age Management in direct association with the concept of Corporate Social Responsibility. It approaches every employee not only of a banking institution individually while taking into consideration his/her biological age and changing capabilities.

*Keywords: age diversity of employees, age management, commercial banks, competitiveness, corporate social responsibility, employee 50+*

JEL Classification: G21, J24, M14

### **1 INTRODUCTION**

If any corporation wants to be competitive and profitable, it has to offer or produce such services or products in which clients, customers or stakeholders are interested. This thesis applies to all areas of business activity, i.e. also for banking and banking institutions.

A banking institution can be understood as a type of a financial mediator whose main activity is the mediation of the movement of funds between individual economical entities that usually simultaneously participate in active, passive and off-balance sheet operations of a banking institution. In this context, a complex care of a client represents a significant manner of increasing performance of a banking institution. (Belás a kol., 2010)

One of the components that affect the client's satisfaction and therefore loyalty and ultimately also the performance and competitiveness of a specific banking institution is employees with

their level of proficiency, willingness and a proactive approach to clients. Management of a banking institution therefore, within the process of HR management, needs to seek to have the right personnel in the right strategic positions, thus aligning personnel and customer satisfaction and loyalty.

This may help to at least partially mitigate the tendency of decreasing loyalty of clients of large, brick-and-mortar banking institutions towards new, no-fee and low-cost banking institutions. (Nacher, 2014; Urbánek, 2015)

Another fact is that the current world can be characterized as the ageing world full of population tendencies, reversals, and changes. Average life expectancy is getting longer but on the other hand fewer children are born. The number of people of the 50+ age category in the society will soon exceed the number of new-born babies. This will lead to a sharp decline in the labour force. (Eos-llp.eu, 2012; Moseley & Dessinger 2007; Reidl, 2012)

Management and HR managers not only of banking institutions need to take this fact into consideration and create strategic personnel concepts, plans and approaches in the field of human resources management to ensure their corporate processes and activities by skilled, experienced and qualified personnel regardless of their biological age. The aim is to prevent loss of their performance, productivity, competitiveness, and intellectual property, and therefore potential negative impact on economic results of their corporations or banking institutions.

These concepts need to move away from stereotypical perception of the employees of the 50+ group and see them as employees who possess ample working and life experience and may use them in their everyday work when solving their working tasks and obligations.

However Henski (2011) argues that it is more efficient to invest in education, training and development of the 50- employees.

The article focuses especially on social area within the concept of Corporate Social Responsibility because it comprises, besides other things, also care of employees not only of a banking institution. The care should also take into consideration the philosophy of the Age Management – human resource management that takes account of age and changing skills of employees not only of a banking institution, supports age diversity and individuality of every employee not only of a banking institution. Besides other things, the aim of the article is to provoke discussion leading to the elimination of the traditional (classical) approach, i.e. stereotype perception of the 50+ employees which still prevails in the society. This approach emphasizes especially health and social aspects of the 50+ employees in the labour market whereby this age category of employees becomes uninteresting or little perspective for the management not only of banking institutions and the 50- employees are given priority, i.e. employees that are younger, more creative and more flexible. A specific aspect that is not sufficiently appreciated in the traditional approach is the aspect of qualification. The 50+ employees carry personal know-how because they are both personally and professionally mature and have a potential not only for the banking institution that the management should properly appreciate not only e.g. in the process of knowledge sharing but should also seek to ensure that the personal know-how of any the 50+ employee will remain not only in the banking institution also when he/she leaves it.

Within human resource management not only in a banking institution, three basic pillars of personnel work with the 50+ employees could be considered in relation to modern philosophy of the Age Management, concept of Corporate Social Responsibility and as a result of strengthening and increasing performance and competitiveness of a banking institution: the

area of work organization, stimuli of work motivation, and the area of education and development of qualification of the employees. (Bejtkovský, 2013)

## **2 THEORETICAL BACKGROUND**

According to Charouzová (2009), the current concept of human resource management emphasizes especially the following factors: talent management; workforce mobility and flexibility of the labour market; intercultural cooperation; requirements for measurement of all areas of human resource management; new forms in the systems of motivation and benefits; strengthening loyalty and responsibility of employees for their work; outsourcing of some HR activities; use of modern technologies and modern forms of communication; the importance of the Internet labour market; health as an organizational value.

According to Ready et al. (2009) or Guthridge & Lawon (2009), the aim of talent management is to find especially young employees with a high development potential and group them into a team of employees that supports organizational structure and honours personal commitment to the corporate mission. The aim of the process of working with talents is to ensure a required number of young talented employees not only for a banking institution that may fulfil key professional or managerial roles in the future, thus leading to prosperity, performance and competitiveness not only of a banking institution.

Nevertheless, Chulik (2011) in this respect states that the current active workforce is getting old. Children born in 2010 will live at least 10 years longer than those born in 1950. It means that the number of elderly people approaching retirement age will be increasing.

Population ageing and the entire demographic development are facts that need to be specifically regarded, accounted for, and reflected not only in the area of HR management both in the macroeconomic and microeconomic level and without stereotyping. (Hansen Čechová, 2012; Kutschera, Vodešilová, Fialová & Kubešová, 2012; Žnidaršič, 2010)

Anyway, most Czech and Slovak organizations still prefer 50- employees and hesitate about employing 50+ employees. (Čopjaková, 2012)

Broderick (2009) focuses on the organization's approach to the 50+ employees in Australia and states that there is age discrimination in employment of illegal, yet it is quite common.

According to Brandon (2011), the share of the 50+ employees is in some organizations greater, in others organizations less. The proportion depends on the type of work that the 50+ employee performs.

Whereas the generation of the 50+ employees (Baby Boomers) can be characterized as employees who have strong work ethic; know-how in work procedures and processes; they are loyal not only to the banking institution; they have strong personal responsibility; they analyse from a long-term perspective; risk less; are slower when fulfilling their work tasks; use formal communication more than the 50- employees. (Hawley, 2009)

The 50+ employees strive for the same goals, values and things like the 50- employees. (James, McKechnie & Swanberg, 2011; Rothwell, Sterns, Spokus & Reaser, 2008; Shea & Haasen, 2006)

The above-mentioned facts imply that the current philosophy of talent management cannot focus especially on young employees in a long-term perspective but should target employees of all age groups who work not only in the banking institution. To ensure strategic fulfilment and successful implementation of the idea not only into banking practice, the management of corporations should understand the benefits of Age Management which may have a positive

effect on and strengthen performance, image and competitiveness not only of a banking institution thanks to, besides other things, age diversity and acceptance of personality of every employee.

If the management not only of a banking institution endorses and honours the principles of the CSR concept, the Age Management philosophy can be found in a certain form in social area that focuses its activities especially on the area of human resource management.

Regard to the fact that Corporate Social Responsibility is an abstract concept in a certain extent; no one could accurately define its borders yet. It does not exist any uniform definition. (Burianová & Paulík, 2014)

In general, key areas of the CSR concept can be divided into three basic pillars: economic area (principles of good management; code of ethics; transparency; rejection of corruption; behaviour to customers, suppliers, investors; relations with shareholders; intellectual property protection; ethics of marketing and advertising), social area (health and safety of employees; development of human capital and education of employees; work-life balance; corporate philanthropy and volunteering; equal work opportunities; diversity in the workplace; outplacement and retraining; listening to and dialogue with various target groups – e.g. stakeholders), environmental area (environmental corporate policy; environmental management; protection of natural resources; mitigation of negative impacts on the environment; investments in clean technologies). Responsible business in various forms is commonplace nowadays to many not only banking institutions. (Pavlík & Bělčík, 2010; Petříková, Hofbruckerová, Lešingrová & Hercík, 2008)

The article will further refer to social area of the CSR concept that is in direct relation to human resource management not only in a specific banking institution.

### **3 OBJECTIVE AND METHODS**

The aim of the article is to highlight the importance and non-underestimation of the process of population ageing, and thought-forming in the area of strategic management of human resources not only in banking institutions that will be free of prevailing stereotypes and prejudices towards the 50+ employees so as to prevent decrease of their performance and competitiveness.

Partial objectives of the article include:

- Verification of hypotheses (H1, H2) and answering research questions (RQ1, RQ2, RQ3) associated with the area of strategic management of human resources in banking institutions.

The article presents a view of some of the results of quantitative and qualitative research conducted in banking institutions in the Czech Republic. The aim of the researches includes without limitation:

- Identification of what activities the banking institutions performs in social area within the concept of Corporate Social Responsibility.
- Identification of basic characteristics of the 50+ employees from perspective of management of a banking institution as well as the 50+ employees themselves.
- Verification to what extent the banking institution cares of age diversity of employees and individuality of every employee.

- Identification of the fact whether the banking institution cares about maintaining knowledge and experience of the 50+ employees (their personal know-how) in the banking institution even after they leave it.

On grounds of an analysis of domestic and foreign expert resources, two hypotheses and three research questions have been formulated:

- H1: The perception of selected characteristics of the 50+ employees is consistent in respondents – the 50+ employees and HR managers of banking institutions.
- H2: Perception of the effort of the management of banking institutions to maintain the personal know-how of the 50+ employees even after they leave the banking institution is not identical in the respondents – employees 50+ and HR managers.
- RQ1: Why is the amount of job opportunities for the 50+ employees smaller than for the 50- employees?
- RQ2: How can the philosophy of Age Management contribute to the increase in performance and competitiveness of banking institutions?
- RQ3: Can it be stated that the improvement of perception (image) of banking institutions can be due to the CSR concept in direct relation to the implementation of the philosophy of Age Management?

Employees of banking institutions that are active in and responsible for the area of human resources (HR managers, specialists or leaders) and employees of banking institutions from the 50+ age category were confronted with these hypotheses and research questions.

When choosing appropriate research methods for the implementation of the defined objectives, several aspects were taken into consideration. It was considered whether the selected methods will ensure truthfulness of respondents' answers and contribute to the achievement of the objectives defined. From research methods, questionnaire survey and observation were used. These methods were further supplemented with a semi-structured interview with the employees of banking institutions.

Within the performed quantitative and qualitative research, five banking institutions were addressed: Česká spořitelna, a.s.; Československá obchodní banka, a.s. (including Era – Poštovní spořitelna); Komerční banka, a.s.; GE Money Bank, a.s. and Raiffeisenbank a.s.

The respondents were employees of headquarters in the Czech Republic, branches and client centres. The research group of the questionnaire survey included in total 180 employees of banking institutions working in and responsible for the area of human resources management (82 females and 98 males) and 282 employees of the 50+ age category (128 females and 154 males). The respondents age structure (the 50+ employees) is presented in a table (Tab. 1).

Tab. 1 – The respondents' age structure (the 50+ employees). Source: own source

<b>The employees age 50+ (interval)</b>	<b>The absolute frequency</b>	<b>The relative frequency</b>
50 – 54	208	73.76 %
55 – 59	54	19.15 %
60 – 65	20	7.09 %

Verification of the validity of hypotheses was performed by using the McNemar test of symmetry and Stuart test of homogeneity of marginal probabilities. The research group of the

semi-structured interview included 20 employees of banking institutions working in and responsible for the area of human resources management. By means of the interview, more general categories were defined that covered statements of the addressed employees and consequently it was identified what claims were repeated in their responses. At the end, summary and interpretation of the identified facts was performed.

## 4 RESULTS

Loyalty and satisfaction of clients with the banking institution is, besides other things, expressed also by the willingness to purchase and use their products. (Belás, Holec & Homolka, 2013)

So, to have a satisfied and loyal client, a banking institution needs to have experienced, educated, willing employees with information and communication skills. It is because this is the place of a direct contact of the employee and the client. In association with the process of population ageing and stereotype perception of the 50+ group of employees, twelve characteristics of the 50+ employees were identified in which the level of consistency of the responses of employees of banking institutions working in and responsible for human resource management (HR managers) and of the 50+ employees was investigated. The responses of the 50+ employees are expected to be the same as those of their HR managers. Verification of validity of the H1 hypothesis was performed by using the McNemar symmetry test.

H0: responses to selected characteristics of the 50+ employees from respondents are symmetrical.

HA: responses to selected characteristics of the 50+ employees from respondents are unsymmetrical.

The calculation was made using the following equation:

$$\chi^2 = \sum_{i < j} \sum \frac{(n_{ij} - n_{ji})^2}{n_{ij} + n_{ji}} \quad (1)$$

If the p-value is  $< \alpha$ , the H0 hypothesis is rejected in favour of the HA hypothesis and on these grounds, the H1 hypothesis is rejected. Value  $\alpha = 0.05$ . Results of selected characteristics of the 50+ employees in banking institutions by means of the McNemar symmetry test are specified in a table (Tab. 2).

Tab. 2 – Verification of the H1 hypothesis by means of the McNemar symmetry test. Source: own source

Characteristics	p-value	Verification
Reliability	0.480e-08	The H0 hypothesis is rejected in favour of the HA hypothesis and on these grounds the H1 hypothesis is rejected.
Experience	0.003820	The H0 hypothesis is rejected

		in favour of the HA hypothesis and on these grounds the H1 hypothesis is rejected.
Loyalty	1.282e-04	The H0 hypothesis is rejected in favour of the HA hypothesis and on these grounds the H1 hypothesis is rejected.
Willingness to share his/her acquired experience (personal know-how)	0.528e-08	The H0 hypothesis is rejected in favour of the HA hypothesis and on these grounds the H1 hypothesis is rejected.
Ability to use his/her intuition in a greater extent	0.00840	The H0 hypothesis is rejected in favour of the HA hypothesis and on these grounds the H1 hypothesis is rejected.
Willingness to further education	6.210e-06	The H0 hypothesis is rejected in favour of the HA hypothesis and on these grounds the H1 hypothesis is rejected.
Ability to work with a computer in order to fulfil the required tasks	1.322e-12	The H0 hypothesis is rejected in favour of the HA hypothesis and on these grounds the H1 hypothesis is rejected.
Language skills required to perform a job	4.012e-08	The H0 hypothesis is rejected in favour of the HA hypothesis and on these grounds the H1 hypothesis is rejected.
Slower pace of work	2.800e-06	The H0 hypothesis is rejected in favour of the HA hypothesis and on these grounds the H1 hypothesis is rejected.
Adaptability to technological changes	8.022e-14	The H0 hypothesis is rejected in favour of the HA hypothesis and on these grounds the H1 hypothesis is rejected.
Lower self-esteem and self-confidence	0.02466	The H0 hypothesis is rejected in favour of the HA

		hypothesis and on these grounds the H1 hypothesis is rejected.
The tendency to stereotyping and the selection of his/her proven solution	6.628e-02	The H0 hypothesis is rejected in favour of the HA hypothesis and on these grounds the H1 hypothesis is rejected.

In all selected characteristics of the 50+ employees the level of consistency of the answers of the HR managers and of the 50+ employees involved differed. The H1 hypothesis has therefore been rejected on grounds of the evidence obtained. It can be generally stated that the data obtained from the respondents are unsymmetrical.

The concept of Corporate Social Responsibility can be understood as a program to maximize profits not only of a banking institution and at the same time increase satisfaction of all participating entities. (Belás, Burianová, Cipovová & Červenka, 2013)

To maximize profits of corporations, it is necessary to align and put in interaction all resources that the banking institution has. It means financial, information and material resources. The mutual interaction can be ensured in a targeted and efficient manner only by employees that have ample working and life experience, which are namely the 50+ employees. That is why the management not only of banking institutions should seek to maintain the personal know-how of the key employees in their company in a certain form also after they leave the corporation. This assumption was part of the H2 hypothesis. The hypothesis was verified on grounds of the homogeneity test of marginal probabilities (Stuart test). Data were organized in matrices same as in the case of the H1 hypothesis. Since the requirements for the symmetry test analysis were not fulfilled, the Stuart test of homogeneity of marginal probabilities was used.

H0: marginal probability of lines and columns are the same.

HA: marginal probability of lines and columns are not the same.

Results of the verification of the H2 hypothesis are provided in a table (Tab. 3).

Tab. 3 – Verification of the H2 hypothesis by means of the Stuart homogeneity test of marginal probabilities. Source: own source

Statistics of the Stuart test	Q – statistics = 102.8082
Critical value	8.4420
Lines (marginal frequency)	42 68 98 52 22
Columns (marginal frequency)	58 132 58 20 14

$Q \geq \chi^2_{1-\alpha}(k-1) \Rightarrow H_0$  is rejected. On grounds of the Stuart test of homogeneity of marginal probabilities, the H0 hypothesis is rejected on the 5% significance level in favour of the HA hypothesis. This is the evidence that supports the H2 hypothesis. It can be generally stated that the perception of the efforts of the management of banking institutions to maintain the



personal know-how of the 50+ employees even after they leave the banking institution is not identical in the respondents – employees 50+ and HR managers.

According to the addressed employees of banking institutions working in and responsible for the area of human resource management, the amount of job opportunities for the 50+ employees can be generally characterized as lower due to their lower pace of work and performance, increased difficulty in dealing with changing requirements for professional knowledge, sometimes worsening health condition, or lower interest of corporate management in this group of employees in the labour market especially due to preferring the 50- employees.

The philosophy of Age Management could contribute to increase of performance and competitiveness of banking institutions thanks to its approach that takes into consideration age, changing capabilities, potential, and individuality of every employee not only of a banking institution. Implementation of Age Management is broad and covers all age groups of employees from graduates to retirement age employees who work in the banking institution. Nevertheless to perceive the philosophy as efficient and targeted, elimination of stereotype perception not only towards the 50+ employees is required. In direct association with the social area within the CSR concept, equal opportunities for all age groups of employees in banking institutions can be considered within education and professional development along with care of health of all employees, flexible working time (shift management according to employee's suggestions), work-life balance or development of the working environment and ergonomics of work for all employees of banking institutions.

Performance and effective work style in this respect are also supported by the development of intergenerational cooperation. Working teams not only on the level of headquarters but also branches and client centres seem to be beneficial if there is heterogeneity in age. Employees learn from each other, share professional experience, knowledge, develop soft-skills and stimulate each other to more efficient performance of work assignments.

According to the addressed employees of banking institutions working in and responsible for human resource management, the philosophy of Age Management as well as the concept of Corporate Social Responsibility may to a certain extent improve perception and image of the banking institution. It also depends on what working position needs to be occupied at that moment. Nevertheless it cannot be stated it is thanks to the two concepts. There is a varied range of internal and external entities actuating on every banking institution that strengthen or weaken the overall perception. Potential employees decide on the possibility of seeking employment at a banking institution concerned having taken into account complex perception of all the effects.

## **5 DISCUSSION**

One could expect that the perception of selected characteristics of the 50+ employees of banking institutions will be identical among the employees and HR managers, specialists or leaders. Nevertheless, the assumption has not been confirmed by the qualitative research. Inconsistency and variability of respondent's answers can be presented especially through prejudices and stereotype perception mainly of HR managers. Since the questionnaire survey was completely anonymous, the 50+ employees did not have a reason to positively improve their responses. The qualitative research revealed that the 50+ managers are less burdened by stereotypes or prejudices. This is also obvious due to the fact that they are in everyday contact and there is immediate feedback. Therefore, a question arises whether every potential employee is really approached on an individual basis according to the scope of a job analysis within an admission procedure in a banking institution?

Some 50+ employees are worried to share their personal know-how because of a potential loss of their current working position which may be one of the reasons of the different perception among respondents. Here, a mistake could be sought not only in banking institutions but also in the labour market itself. Another reason for different perception is the fact that the personal know-how can be shared within teamwork which is not realized by some of the respondent. Some banking institutions use experienced employees 50+ at the position of a lecturer, mentor or coach for the development of the 50- employees. On the other hand, the 50+ employees often feel lack of interest or non-appreciation of their personal know-how. So where to find inspiration on how to work in efficient and targeted manner with the 50+ employees and their personal know-how not only in banking institutions?

In association with the process of population ageing, the management not only of banking institutions will have to understand and accept the 50+ employees despite their weaknesses if they want to ensure processes, activities and services for their clients also in the future. Therefore, a question arises whether the amount of job opportunities for the 50+ employees will be on a satisfactory level in the next years.

To ensure positive perception of the implementation of the philosophy of Age Management not only in a banking institution, all employees need to be informed on the entire concept and associated benefits. Then, every employee should feel their personal contribution for the banking institution that will be appreciated in a specific way and should not feel discrimination tendencies. An advantage for a banking institution may manifest itself in increase of performance and competitiveness since it will have employees that are loyal, satisfied and motivated. Despite undoubted benefits of the Age Management concept, why hasn't it been implemented in all banking institutions so far?

If not only banking institutions want to make use of the external labour market within the process of hiring employees, the fact that they implement the CSR concept in direct relation to the Age Management philosophy is very positive. Nevertheless, strategy based on addressing new employees will not do with mere two variables. The management not only of a banking institution therefore needs to think in a broader context.

Employers believe that their corporate policy, culture and practice are neutral in respect of age (non-discriminating). They perceive it as a laudable approach. At the same time they admitted that they preferred the 50- employees when recruiting employees in a team and that they ensured not to dismiss an employee just before the retirement age. Employers are not well informed on the usefulness of work with the 50+ employees and on appropriateness of investments in them. At the same time they think that they have sufficient access to information and do not see connection between profitability and Age Management. (Bosničová, 2012)

## **6 CONCLUSION**

The article was focused on a certain manner of evaluating and working with the 50+ employees in banking institutions. The issue becomes increasingly important especially in association with the process of population ageing and later retirement. If the management not only of banking institutions will prefer the 50- employees, performance and competitiveness of a business entity cannot be ensured from long-term perspective. Due to stereotype perception of the 50+ employees, lower interest prevails in such employees not only in banking institutions. This fact is mentioned in the article not only as theory but has also been confirmed by the research part.

The comparing studies focusing to the 50+ employees in banking institutions have not been realized yet. That's why the results of our research were compared to generally published researches to the topic of 50+ employees.

Two hypotheses have been formulated and three research questions were determined by means of the analysis of expert resources. On grounds of verification of the validity of hypotheses it can be said that the view of HR managers addressed by the banking institution differs from perception of the 50+ employees of themselves. Compliance within selected characteristics of the 50+ employees is higher when comparing an immediate superior and the 50+ employee. In some banking institutions, personal know-how of the 50+ employees is shared by means of mentoring, coaching, or project-based work. Not all the 50- employees consider this form of knowledge and experience sharing to be beneficial. On the other hand, the 50+ employees worry about the loss of their job if they share their personal know-how.

To eliminate stereotype perception and prejudices towards the 50+ employees not only in the addressed banking institutions, the ability to work with every employee in efficient and targeted manner is required. To see every person as an individuality with different biological age and changing skills. This thesis is an assumption of the Age Management concept. An advantage of the philosophy is the fact that the concept considers the same approach to all age categories of employees. This should prevent positive discrimination of some employees. Within the process of recruiting, it is positive if a corporation implements the Age Management philosophy in direct association with the CSR concept. Nevertheless, the cooperation needs to be perceived deeper and also other variables need to be taken into consideration that influence perception of the banking institution in the area of HR activities.

The philosophy and selected principles of management by Tomas Bata are also worth mentioning that enable increase of corporation performance and satisfaction of employees. (Culík, Končítiková & Staňková, 2014)

If not only a banking institution has experienced, motivated, satisfied, loyal employees of heterogeneous age, it has a potential that all activities, processes or services for bank clients will work efficiently, which in turn will be reflected in overall performance and competitiveness of the banking institution in short-term as well as long-term perspective.

### **Acknowledgment**

This paper was supported by Project No. RO/2013/01: The Financial Performance of Commercial Bank (Finančná výkonnosť komerčnej banky).

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## **STUDENTS' ATTITUDE TOWARDS TAKING RISK AND STARTING UP BUSINESS WITHIN THE CONTEXT OF THE SOURCE OF RECEIVED INCOME**

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Małgorzata Zakrzewska*

### **Abstract**

Considering the issue of students' sources of income it is worth noticing that it is considerably easier, more comfortable and better for the youth to educate until they reach the age of majority – from the youth's viewpoint, rather than after the age of eighteen. Yet, it is not so easy in case of people who are over 18 years of age and have made a decision to continue their education. Completion of compulsory schooling gives an opportunity to study at the university. However, sources of income at the young person's disposal might allow further education or, on the contrary, limit the access to it. Therefore, a young adult needs resources which may allow him to live out of the family home, often in the place where the costs of living are higher than by the parents. In addition, there are privately-run educational facilities, where one has to pay fees even for full-time courses. A lot of questions related to this issue arise.

How do the youth, beside the major source of income being the parents, finance their education at the university? Are there any impulses stimulating the youth to start their own businesses? What risk is the possible entrepreneurship of students starting their own businesses burdened with?

The authors will do their best to give an answer to the questions raised above, in the article below which contains theoretical aspects. Moreover, the answers will be supported by the outcome of research done with using poll and experimental methodology.

*Keywords: entrepreneurship, incomes, students*

JEL Classification: D81, L26, D01

## **1 INTRODUCTION**

Considering the issue of students' sources of income it is worth noticing that it is considerably easier, more comfortable and better for the youth to educate until they reach the age of majority – from the youth's viewpoint, rather than after the age of eighteen. Article 70 of the Constitution of the Republic of Poland guarantees the rights to education, where it is compulsory till 18 years of age. The fact that education in public school is free of charge, which allows any young person to receive secondary education, is an advantage of the Polish system. It is worth noting that Poland abandoning the socialist system after 1989 allowed the option of providing educational services which are also payable. It should be remembered, however, that the form of education (free of charge or not) chosen for the children is the parents' personal choice. It should also be noted that in random cases, which caused difficulties for the child to 18 years of age to acquire knowledge The Polish State has numerous mechanisms which might be implemented to help the minor to educate.

Yet, it is not so easy in case of people who are over 18 years of age and have made a decision to continue their education. Completion of compulsory schooling gives an opportunity to

study at the university. However, sources of income at the young person's disposal might allow further education or, on the contrary, limit the access to it. In spite of the fact that education at State universities on full-time courses is free of charge (part-time programs are payable), it is often connected with leaving the family home and moving to larger cities. Therefore, a young adult needs resources which may allow him to live out of the family home, often in the place where the costs of living are higher than by the parents. In addition, there are privately-run educational facilities, where one has to pay fees even for full-time courses. A lot of questions related to this issue arise.

How do the youth, beside the major source of income being the parents, finance their education at the university? Are there any impulses stimulating the youth to start their own businesses? What risk is the possible entrepreneurship of students starting their own businesses burdened with?

The authors will do their best to give an answer to the questions raised above, in the article below which contains theoretical aspects. Moreover, the answers will be supported by the outcome of research done by scientists from Faculty of Economics and Management of Szczecin University.

## **2 DEFINITION OF ENTREPRENEURSHIP**

It is worth noting that "economic historians claim that from time to time we deal with waves of entrepreneurship in the world economy (e.g. in the second half of the XIXth century in Europe and North America.)The 80s.and 90s. may also be such a wave. It caused the renaissance of entrepreneur and entrepreneurship in the economic theory. A number of papers on the subject appeared which went beyond traditional economics" (Gruszecki, 1994) It follows that entrepreneurship has its ups and periods of stagnation, as far as an interest in it is concerned. However, we cannot fail to point out the authors who took a challenge of creating their original definition of entrepreneurship. J. Reykowski(Reykowski, 1986) may be enumerated as one of the first authors who focused on entrepreneurship in the 80s. He claimed that entrepreneurship is a set of characteristics which particularly define actions of: teams of people, institutions and the entire economy as well. E. Otoliński defined entrepreneurship in a similar way (Otoliński, 1996). M. Bratnicki is another author who may be enumerated. He presents it as a process linking opportunities and actions for socially responsible wealth within the context of mutual evolution of people together with its environment (Bratnicki, 2004). According to K. Jaremczuk entrepreneurship is "a certain social-economic force, the force not only of economic dimension, but also individual, social, cultural" (Jaremczuk, 2003).

The definition of entrepreneurship varies from the fields of study. Kirzner (1979) defined entrepreneurship as the process of creating something new with value by giving the necessary time and effort assuming financial, psychic and social risks and receiving the resulting rewards of monetary and personal satisfaction and independence. For others, entrepreneurship works like an engine in for economic development, job creation and social adjustment for developing countries (Alam, 2009). Furthermore, entrepreneurship is a process of opportunity identification and the creation of an organization to exploit the opportunity (Nandamuri, Gowthami 2013). Therefore, entrepreneurship contributes income, jobs, R&D innovations, generating economic benefits that are often larger than the private benefits reaped by the entrepreneurs themselves (Van Praag and Versloot, 2007). Consequently, entrepreneurship is perceived as a method to achieve a superior position by utilizing a high level of creativity (Bulut, 2010).

It is worth adding that entrepreneurship is treated not only as an attitude, but also as a process. entrepreneurship considered a process consists in creating and developing companies (Kapusta, 2006). However, it is important that different approaches of authors indicate that entrepreneurship cannot be separated and related only to the organization or only to the man. There are nearly as many definitions characterizing entrepreneurship as authors dealing with this issue. Nevertheless, it may be stated that entrepreneurship always means some sort of creative restlessness, which prevents being satisfied with the current state of affairs and leads to change (Jacher, 1999). However, discussions on the search of the most universal definition of entrepreneurship focus on the following aspects (Borowiecki and Siuta-Tokarska, 2008):

- searching for new ideas,
- transforming an idea into a market effect,
- looking for new forms of allocating resources,
- activating motivations among the participants,
- superiority of the personality of the company founder,
- building a network of dependences with the environment,
- taking people and process into consideration,
- setting new values,
- tendency for risk.

Tendency for risk referred to above, as one of the aspects the authors on the subject discuss, will also be one of the factors that will be analyzed in the research presented in the article below.

### **3 ENTREPRENEURIAL INTENTIONS**

Entrepreneurship can be studied from different perspectives. Researchers have identified different kinds of factors that influence entrepreneurship. Prior to Bowen and Clercq these can be economic freedom, regulatory environment, quality of government, political stability (Bowen and Clercq, 2006). Entrepreneurship has its roots in intentions. For Bird (Bird, 1998) entrepreneurial intentions are a *state of mind*, which guides and gives direction to individuals towards formulation of new business concepts. Analysis conducted on determinants of entrepreneurial intentions exposed that a few factors, identified to individual characteristics and grouped into 3 categories: self-efficacy, personality, and family background of individuals. The first two categories are often specified as internal entrepreneurial intentions. They consist of e.g. personality dimensions (Akanbi, 2013) (Gartner 1988), gender differences (Marlow and Patton 2005), planned behavior (Markan, Balkin& Baron, 2002)(Souitariset 2007), personal entrepreneurial experiences (Rajiman 2001). The last one – family factor- is seen as an external one and should be took into detailed consideration when discussing the aim of this paper.

According to familial factors one should focus on family history of entrepreneurial activities, where family business constitutes important impact on entrepreneurship (Carr and Sequira, 2007). Consequently, children who were grown up by entrepreneurial parents have a bigger chance for entrepreneurial career (McElwee, Al Riyami (2003). Taking into account the aim of this article, one should notice that one of the direct factors that influences the entrepreneurial intentions are the financial resources in the family. Entrepreneurial family members can become a symbol of entrepreneur and source of financial and non-financial help (Ahmed, 2010), often needed to start-up a new business. Consequently what affects the entrepreneurial intentions are parental occupation and family financial status.



On the contrary, as it goes with self-employment, it is directly correlated with student's own entrepreneurial attitude. One can distinguish two different types of individual's entrepreneurial attitudes in motivation to start ventures. One becomes an entrepreneur<sup>3</sup> as consequence of its necessity (*necessity entrepreneur*) (Bulut, 2010). The other (*opportunity entrepreneur*) starts its business in order to pursue possibility (Block, Wagner 2010). These attitudes can be often correlated with personal income and financial status.

#### **4 STUDENTS' INCOME IN THE CONTEXT OF THEIR ENTREPRENEURIAL INTENSIONS**

As written above, one of the external factors of entrepreneurial intentions is the financial support, mainly given by the family members of potential entrepreneur. Taking into account students as a research group of this paper, their income can be divided into three categories: family support, state/ university/company support and own income.

Family support, as presented before is included in external entrepreneurship factors. Second category – from the point of view of state support - includes e.g. a) council tax that it is set by local councils to help pay for local services. In general full-time undergraduate or postgraduate students, whether they live in private property or University residences, are exempt from council tax; b) housing benefit, which helps pay rent whether one reside in private, housing association, student or local authority accommodation. It is mostly eligible for part-time students; c) income support - is a benefit intended for people who cannot normally work (or who work fewer than 16 hours a week), and who are on a low income and fall into one of the categories. It is mainly eligible for part – time students and d) maternity benefits for students that become pregnant during their studies.

Universities make various payments to students for tuition and fees, teaching, research, and other education-related activities. This policy addresses types of payments made to both graduate and undergraduate students, including scholarships, fellowships, stipends, prizes and awards, compensation for services, drawings, refunds and reimbursements.

For example, according to the *Basic Rules of Entitlement*, to qualify for Income Support students must meet following requirements: be in the relevant group who can claim for the supports; be in not paid work, be not entitled to Job Seekers Allowance or Employment Support Allowance ; their income is sufficiently low. As seen above, university rules are coherent with those given by the State and students to receive one must fulfill the requirements.

In a number of universities, students are cooperating with different kinds of businesses, industries, research organizations, and governmental agencies located all over the countries, winning accolades (and frequently future jobs) from employers everywhere. Students, while on the job, are supervised by the employer and are subject to all regulations of the company by which they are employed and all applicable labor laws. Cooperating students gain experience with many of the most successful corporations in the country. E.g. companies like Procter & Gamble, Boston Scientific, and Dow are among cooperating employers. Additionally, there are offered programs with an international option that enables students to cooperate abroad in great countries in Europe and Asia. With this program, engineers can complete the same 5-year curriculum and gain valuable experience in the global marketplace.

There are also scholarships given by different kinds of companies. The most popular are those developed by companies from bank and industry sector. They consist both of financial support and internships programs The most popular students paid activities during their

studies are e.g. campus brand manager. Big companies – including Apple, Reckitt Benckiser, banks, and law and accountancy businesses – pay a few students to represent their brand at universities. This usually means putting up posters, running events and talking up the firm to fellow students.

Giving an example of self-employment activities the most popular are private tutoring, when students advertise their skills at a local school or community center and consider themselves teaching pupils for different kinds of exams and foreign language certificates. Other example is online PR activities. Internet access gives a wide range of *Web* work opportunities. Students with their web-savvy abilities gives support to companies PR activities on different kinds of social media and website IT management. A lot of interest is also paid to “manual labor”. Students advertised themselves e.g.as a cleaner, painter, gardener, heavy-goods mover etc.

These kinds of work on one side are not very well paid, on the other side can be also seen as a first steps of entrepreneurial activities.

One of the intentions which may be considered a motivator to accept the challenge of creating a company are sources of income. Characterizing the Polish conditions, among students’ sources of income, parents (family e.g. grandparents (LIT), godparents older siblings) ought to be enumerated in the first place. However, if the relatives are not able to sustain the student, there are other possibilities which are offered by the State institutions or private sector.

Considerations relating to the sources of income should be started from the possibilities offered by the very public universities. Regulations which each unit is obliged to present formally in its provisions are an example. Taking University of Szczecin (UniwersytetSzczecinski) as an example, all information concerning granting material support is included in the “Rules of Procedure and criteria of granting material support to the students of University of Szczecin” which is announced annually. The following possibilities offered by the State institutions may be found in it:

- accommodation grant
- a special grant for disabled persons
- Rector’s scholarship for the best students
- minister’s scholarship for outstanding achievements
- financial aid

It means that the public authorities make every effort to create and support systems of individual financial and organizational support for students. An interesting study was done by students from Koło Naukowe Ekonomistów at Szkoła Główna HandlowainWarsaw. They conducted a research on “Students’ income sources and an assessment of the system of granting financial support at WydziałNaukEkonomicznych SGGW in Warsaw (Świtlińska and Roman, 2011). It shows that 60% of students become gainfully employed during studies, but also  $\frac{3}{4}$  of the studied population were regularly financed by the family, 16% responded that they receive financial aid from the family from time to time, and there is a group of 14% who did not get any financial help from the relatives.

Nonetheless, it is not the only way the students can select. Private sector has a wide array of job offers for students of full time courses. Thereby, students start work during the academic year but also accept seasonal work in Summer. There are also individuals who start up business and simultaneously study on full time courses. There are also students who are business partners in family businesses and study on full time courses as well. It should also be borne in mind that it is not only the unfavorable material situation that forces the students to work during studies. Every so often, through their entrepreneurial actions, the students in a

conscious and controlled way shape their career path and experience. There are also studies that present findings on the factors influencing the intention to start up business among students (Banerji et al, 2009). They show that the level of intention concerning starting up business, dependent on or independent (in this case) of the university, is rather low.

Access of young entrepreneurs to finances can be also facilitated through grant financing, debt financing (among which one can distinguish soft loans, microloans and guaranteed loans), equity financing and angel investors. Debt financing are increasingly replacing traditional grant schemes (Curtain 2001). Soft loans generally have zero or low interest rate. The only requirement is to demonstrate commitment, ability to repay the loans and being able to present a business plan. Microloans are particularly interesting for young, as they require limited business experience and generally little collateral. Equity financing is related to the personal savings or family resources. Another way to link young entrepreneurs with sources of financing are angel investors, who provide management advice and important contacts essential for start-ups. (Deeb 2013).

There can be also seen an increasing role of crowd-funding. Instead of traditional investors, crowd-funding campaigns are funded by the general public. Most successful projects receive about 25-40% of their revenue from their first, second and third degree of connections. This could include friends, family, work acquaintances, or anyone that the owner is connected to, including their second and third degree connections. The approach of crowd-funding is attractive to entrepreneurs, because it not only allows raising capital for small businesses, but also serves as a tool for testing marketability. Individuals enjoy the possibility to contribute to the ideas they believe in, even if they can invest only small amounts (Valanciene and Jegeleviciute 2013).

Finally, in concluding the considerations regarding students' sources of income, one cannot leave unnoticed such duties of parents as for instance paying maintenance which will allow students to cover all costs during studying.

The types of students' maintenance solutions during university education described above are not devoid of risk. The risk exists at every moment of submitting documents for financial support to a public institution - the negative decision concerning the application has to be always taken into account. On the other hand, the obstacles in the process of acquiring the source of support, sometimes multiplying in front of the student might stimulate them to start up business, which will be presented in the study on willingness to take risk (Bernat et al, 2014).

## **5 RESEARCH METHODOLOGY**

The subject of research included in the article is the assessment of tendency for risk and intention to start a business in the context of sources of students' acquired income. The study was conducted among 275 students of the University of Szczecin divided into two groups: students of economics and non-economic studies. The period of research was May-June 2014.

The study consisted of two parts. In the first, the survey method was used, the second was conducted with experimental economics methodology. The paper of questionnaire contained socio-demographic questions, which were used to determine the profile of the respondent and the survey questions (5 general and 14 specific questions). The aim of the survey part was to determine the level of the tendency to take risk and to entrepreneurial activities.

According to the aim of the paper, among other things stated willingness to take risk was examined by means of responding to a question concerning the risk connected with starting a business. Thanks to it, thinking to take a risk by respondents was examined. In the study it was assumed that people who stated that starting up business is connected with low risk are the people with high or very high tendency for risk (they are not afraid of risky actions). However, the people who claimed that that starting up business is connected with high or very high risk are the people low tendency for risk. It is based on the fact that in Poland two thirds of companies bankrupt before reaching five-year "maturity". The first year is most critical for newly created firms. According to the data of Polish Central Statistical Office (GUS), before 2007, 62–67% of companies survived this period, the rest being just closed (GUS, 2013). Out of the companies created in years 2007-2011, 71-77% stayed on the market for at least a year. But when a longer-term perspective, i.e. 5 years is taken into consideration, unfortunately less than one third of companies manage to survive. It is significantly less than the EU average where nearly a half of all companies reached the age of 5 years of operating. The second part of the study, based on which the data was obtained and the analysis in the article was performed was based on an economic experiment, which was supposed to indicate the actual tendency for risk (Bernat et al, 2014). The experiment included two issues namely: the willingness to take a risk and usability. It has been designed so that, with higher the risk of choice, the utility of such choice was increasing (the student had a chance to win higher value of prize). There were no time limits at decision making. The experiment did not allow the possibility of a group make decisions. Individual choice options are presented below:

**Choice option 1:**

Stage 1 – 100% guarantee of winning at stage 1. Prize: a candy.

Stage 2 – possibility of playing for a bigger prize. Two options: gamble for a bar of chocolate at lower risk level (50% chance of winning) at a risk of losing the prize from the first stage or a gamble for 2 bars of chocolate with a guaranteed win from the first stage (33,3% chance of winning).

**Choice option 2:**

Stage 1 – 50% chance of winning a bar of chocolate, 50% risk of losing.

Stage 2 – possibility of playing for a bigger prize. Two options: gamble for a small coffee and a bar of chocolate at lower risk level (50% chance of winning), or a gamble for a big coffee and a bar of chocolate at higher risk level (33,3% chance of winning).

**Choice option 3:**

Stage 1 – 33.3% chance of winning a small coffee

Stage 2 - possibility of winning a prize of higher value at a guarantee of receiving a bar of chocolate. Two options: gamble for a medium coffee at lower risk level (50% chance of winning), or a gamble for a small and big coffee at higher risk level (33.3% chance of winning).

The description of the experiment shows that it consisted of two stages - two levels. The first of them, the player has three choice options. The higher the risk in the decision making, the student has the opportunity to win a prize of higher value. Thus, the utility of such choice grew. Each of the participants have the opportunity to finish the game at the first stage or to continue if won in the first stage. However, the choice made in the first stage determined the selection of variants in the second stage. In the event of losing the student received a certificate of participation in the study.

## 6 RESULTS

As outlined in the research methodology its goal became, among other things, to identify the source of income acquired by students. The research showed various sources of students' income, which was represented on Figure 1.

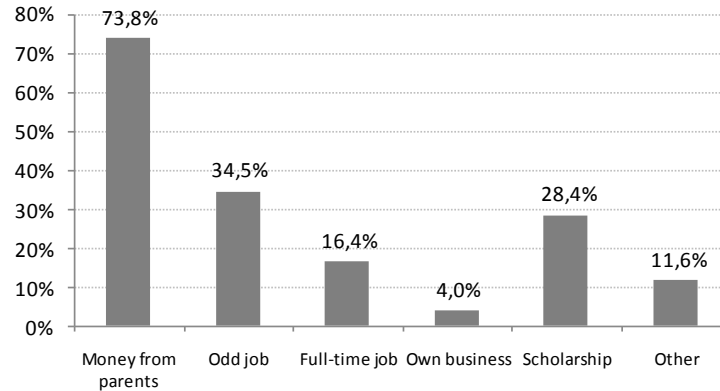


Fig. 1 -Mainsource of income acquired by students.Source: own study.

The data in Figure 1 indicates that the money received from parents was the majority in the students' income. It amounted to 73.8% of the studied population. The incomes from odd jobs and scholarships (34.5% and 28.4%) were of equally significant importance. In the studied group the incomes acquired from full-time job or from other sources played a lesser role. Merely 4.0% of the students obtained incomes from running their own business.

The research shows that the students presented different stated and actual tendency for risk in relation to the acquired income. The students who indicated money from parents as the main source of income, claimed in the survey, that starting business is connected with moderate and average risk (figure 2). Only 14.9% of students claimed that such an action is connected with high and very high risk, and only 5% with low risk. However, the experimental research showed that the analyzed students group expressed in heaping majority high and very high (61.6% of the surveyed) and moderate and average (38.4%) tendency for risk. It was contradictory to the attitude to risk stated in the survey, where moderate and average attitudes dominated (80.2%).

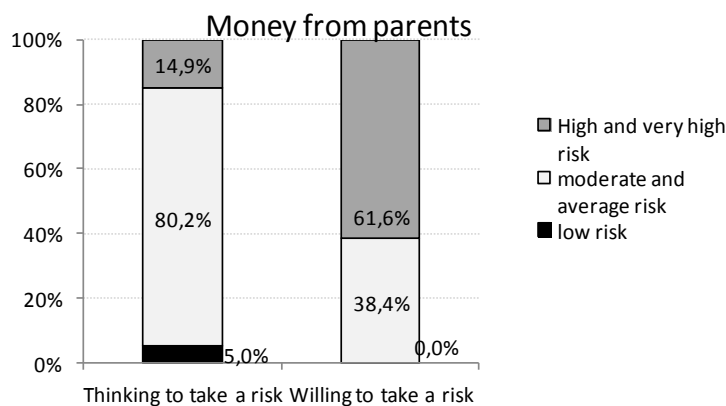


Fig. 2 -Statedand actualtendency for risk among students whose source of income is money from parents.Source: own study.

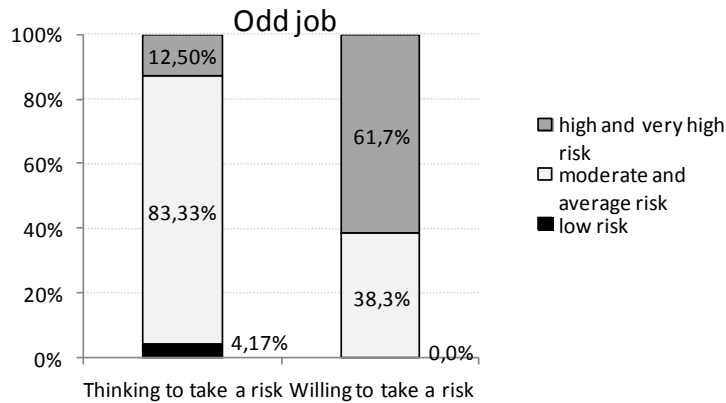


Fig. 3 -Stated and actual tendency for risk among students whose source of income is odd job.  
 Source: own study.

The students who indicated odd job as the main source of income was another studied group. According to the data they were characterized by a similar tendency for risk (stated and actual) as the students whose main source of income was money from parents (figure 3). However, the students whose main source of income during the research was a full-time job (figure 4) were characterized by lower actual tendency for risk than they expressed in the survey. Thus possessing their own job post and the income acquired on this basis resulted in this group avoiding taking risky actions.

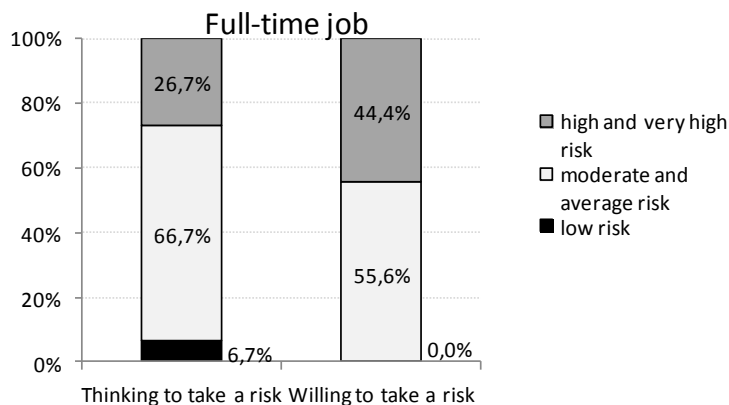


Fig. 4 -Stated and actual tendency for risk among students whose source of income is full-time job. Source: own study.

In the group of students for whom their own company was the main source of income (figure 5) people of moderate and average stated attitude to risk (63.6%) dominated.

The percentage of people who indicated low tendency for risk was relatively high in relation to the other groups, but the people of high and very high tendency for risk were the smallest group. However, the experiment allowed to determine that in practice, this group had lower than stated tendency for moderate and average risk, but the percentage of people of high and very high tendency for taking risk was substantially higher.

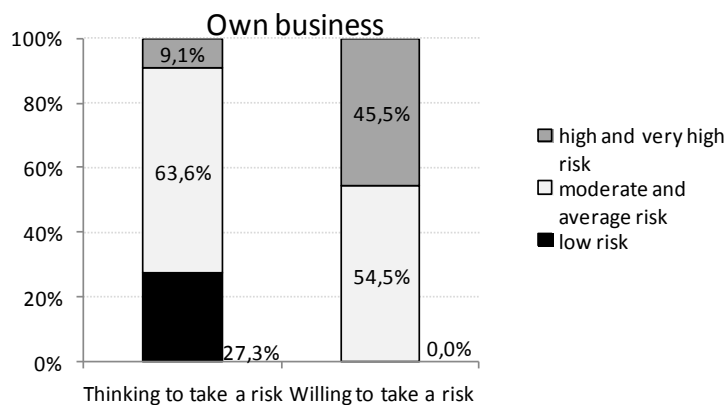


Fig. 5 - (Thinking to take a risk and willing to take a risk among students) Stated and actual tendency for risk among students whose source of income is own company. Source: own study.

The students who indicated scholarship as the main source of income were another studied group (figure 6). According to the survey data, they had moderate and average tendency for risk. Such tendency was shown by 84.6% of the participants. However, high and very high tendency for risk was expressed by only 12.8% of the analyzed students, and small tendency by mere 2.6%. Other conclusions are a result of the experimental data analysis. They show that these proportions are radically different. People of high and very high tendency for risk (62.8%) were the biggest group, whereas nearly half smaller group were the people of moderate and average tendency for risk (37.2%). None of the members of the studied group was of low tendency for risk.

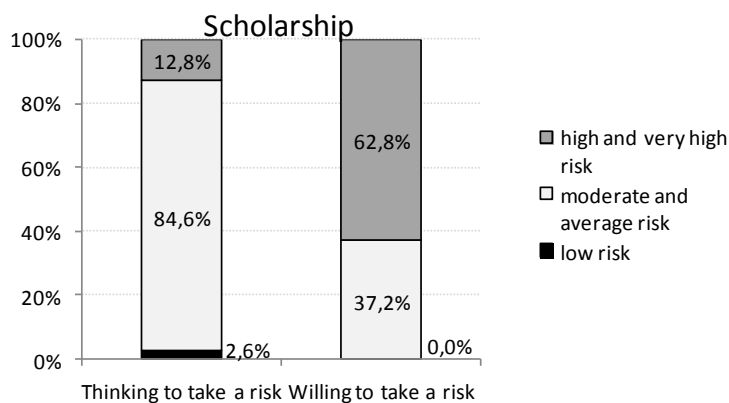


Fig. 6 - Stated and actual tendency for risk among students whose source of income is scholarship. Source: own study.

The students who indicated other sources of income were the last group (figure 7). The survey data allows to state that in vast majority the students from this group had also shown moderate and average tendency for risk (75.0%). 21.9% of students had high and very high tendency for risk, and 3.1% of them – small tendency. Similarly to the previous group, the experimental data showed that the biggest percentage of participants were the people of high and very high tendency for risk (56.3%) and of moderate and average 43.8%. Also nobody in the experimental study was of low tendency for risk.

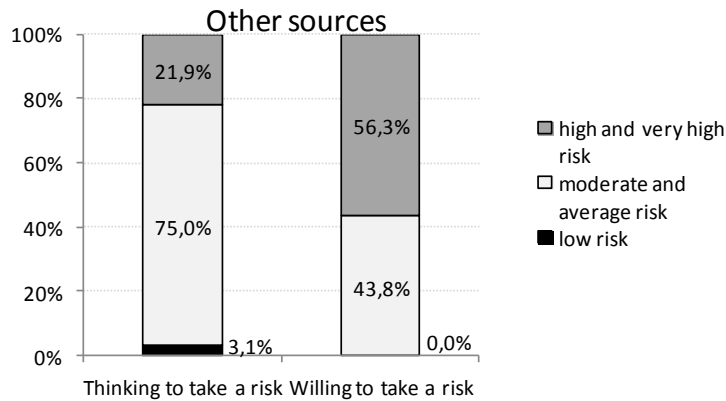


Fig. 7 -Stated and actual tendency for risk among students whose source of income are other sources. Source: own study.

Individual groups of students were also classified according to the participation of high and very high tendency for risk in survey and experimental research (table 1). It was assumed that 1 means the biggest share and 6 the lowest.

Tab. 1 -The classification of individual students groups showing high and very high tendency for risk. Source: own study.

Rank	1	2	3	4	5	6
<b>Thinking to take a risk</b>						
Source of income	Full-time job 26,7%	Other sources 21,9%	Money from parents 14,9%	Scholarship 12,8%	Odd job 12,5%	Own business 9,1%
<b>Willing to take a risk</b>						
Source of income	Scholarship 62,8%	Odd job 61,7%	Money from parents 61,6%	Other sources 56,3%	Own business 45,5%	Full-time job 44,4%

The conducted research showed that there are significant discrepancies for all students groups, concerning stated and actual tendency for risk. It also influences the classification of individual students groups according to, for instance, high and very high tendency for risk. The biggest share within the stated risk was observed among the people getting their income from full-time job (26.7%) and other sources (21.9%), whereas the lowest, nearly threefold lower, among the people having income from their own company(9.1%). However, within the actual risk, the biggest shares occurred among the people acquiring income from scholarship (62.8%), odd job (61.7%) and from parents (61.6%). The lowest shares, in turn, occurred in case of people acquiring income from their own business and full-time work. The differentiation between stated and actual tendency for risk causes big changes in the rank of individual group (the students who live on money from parents are an exception). By way of illustration, people who have full-time job, were highest ranked among all groups with stated high tendency for risk, whereas lowest ranked with actual tendency for risk.



## 7 CONCLUSIONS

The studies concerning entrepreneurial attitudes and tendency for risk are an important contribution to knowing the motivations of decision making concerning starting up business. Certainty or uncertainty of acquiring own incomes together with their influence on making risky decisions is one of the elements of this system. In that sense the studies presented in this paper were undertaken. Their **outcomes partially confirm the hypothesis**, that the ease of acquiring incomes by students facilitates passive entrepreneurial attitudes. Therefore, it confirms the considerations presented in the theoretical part regarding taking up work by students – where taking up work during studies (and thus additional risk) is one of the elements shaping entrepreneurship. It is also consistent with the aforementioned outcomes of the research activities concerning risk as a determinant of decision making and simultaneously individual entrepreneurship. However, the second part of the hypothesis that the ease of acquiring incomes by students facilitates limiting the risk taking. The conducted research point out big discrepancies between stated and actual tendency for risk. It is interesting, since such big differences may prove low awareness of the problem or lack of skill to assess risk subjectively.

The conducted data analysis together with the conclusions formulated on its basis, obviously need further research. It will allow their further verification. The authors of this paper express hope that it will be the beginning of further studies in this field.

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## **THE ANALYSIS OF DEPENDENCE FDI FLOWS ON THE SIZE OF CORPORATE INCOME TAX RATES IN EU COUNTRIES**

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### **Abstract**

As part of international investment flows, foreign direct investment (FDI) has gained much attention by researchers on globalization and tax competition. The use of tax incentives as a means to attract FDI was analyzed in a situation where the removal of barriers to international investment led countries to compete for mobile capital. Currently, there is a relatively strong empirical support for the view that FDI flows respond to tax rates. The interest in the issue of tax competition within the EU has increased in the context of EU enlargement. Considering the relatively low tax rates in the new EU member states, the political debate in Europe focuses also on the effect of taxes on FDI flows. It resulted in some of the old member countries the raising demand for tax harmonization. However, how the lower tax rates in new member countries influence the FDI flows within the EU it is still not entirely clear. In fact, the empirical studies focused on this issue provide different results, what casts doubt the fears of the old member countries from the growth of tax competition. This article therefore aims at analyzing how FDI in the EU are affected by corporate tax rates. For this purpose, it compares the evolution of FDI in the EU in the period among 2004 - 2012, with the development of statutory and effective corporate income tax rates. The dependency ratio of FDI on the tax rates is here determined using the comparative and correlation analysis. Based on the results of this analysis is then assessed the significance of the corporate income tax rates impact on the amount of FDI in the EU.

*Keywords: foreign direct investment, statutory corporate income tax rates, effective corporate income tax rate, macro-backward looking methods, tax competition, comparative analysis, correlation analysis.*

JEL Classification: F15, F21, H20, K34, O16, P19, P29

## **1 INTRODUCTION**

In general, the investments are an important factor of economic growth in any country. FDI reflects the objective of obtaining a lasting interest by a resident entity in one economy (direct investor) in an entity resident in an economy other than that of the investor (direct investment enterprise). The lasting interest implies the existence of a long-term relationship between the direct investor and also the enterprise and a significant degree of influence on the management of the enterprise. Direct investment involves both the initial transaction between the two entities and all subsequent capital transactions between them and among affiliated enterprises, both incorporated and unincorporated.

A foreign direct investor is an individual, an incorporated or unincorporated public or private enterprise, a government, a group of related individuals, or a group of related incorporated and/or unincorporated enterprises which has a direct investment enterprise, that is an incorporated enterprise (a subsidiary or associate company), or an unincorporated enterprise (branch) operating in a country other than the country or countries of residence of the foreign direct investor or investors. OECD recommends that a direct investment enterprise be defined as an incorporated or unincorporated enterprise in which a foreign investor owns 10% or more

of the ordinary shares or voting power of an incorporated enterprise or the equivalent of an unincorporated enterprise.

FDI plays an important role especially in developing countries and in countries in transition from centrally planned economies to market-based economies. As reported (Kubicova, 2013) in addition to capital and investment inflows, FDI also brings other important benefits, including, among others, spillover effects, the import of new technology, know-how, training of the host country workforce, networking with home country producers who supply products to them, and job creation. Due to the great importance of FDI for economies, the politicians and researchers endeavour to identify, which factors determine FDI inflows to countries.

FDI are of increasing importance also in the EU. FDI flows among the old EU states (EU15) have substantially increased, but also investments into the new member states (EU13) have significantly increased. Recently, the EU13 have also started to invest abroad. Building on the efforts of countries to compete for mobile capital through removing barriers to international investment is therefore also analyzed the use of tax incentives as a means to attract FDI.

The evaluation of the importance of taxes as a determinant for FDI has changed markedly over time. So, e.g. (Markusen 1995) in his exploration of motives, which act on multinational firms to invest abroad concluded, that here is little support for the idea, that risk diversification or tax avoidance are important motives for direct foreign investment. Meanwhile, following the extensive theoretical research on tax competition for internationally mobile capital has appeared a number of empirical studies, which almost unanimously concluded that high corporate income tax rates (CITR) have a significantly negative effect on the probability of the FDI successful attracting to the stated country. Several of the empirical contributions have explored the factors influencing the FDI outward and inward in EU (see, e.g. Feld & Heckemeyer, 2009).

However, what impact the lower CITR on FDI in the EU is not yet clear. While for example Hartman (1984) reports significant negative impact of CITR on FDI, Wheeler and Moody (1992), among others, found no significant effect of CITR on FDI, and Swenson (1994) even reports its positive impact. The different results of lower CITR effect in the EU13 countries, contained in various empirical studies, thus cast doubt on fears of the EU15 countries from increasing tax competition. Also the theoretical development of the traditional tax literature has pointed out on other factors, which are equally important to attracting FDI. In particular, as suggested for example (Baldwin & Krugman, 2004), the existence of agglomeration economies may tend to “lock in” firms and capital in certain regions which, in turn, enables countries that benefit from these agglomeration economies to retain high taxes.

The increasing political interest about the connection between the amount of CITR and the results of FDI is also influenced by the relatively high unemployment in Europe, which the government hopes to alleviate by attracting the sufficiently large FDI inflows. Moreover, as stated (Görg and Strobl 2001), it is widely believed that FDI inflows into a country have positive productivity spillovers on domestic firms, and this proposition is generally supported by the existing econometric evidences.

Taken together these presumably positive effects of FDI are able to explain the increasing willingness of potential host countries to grant tax breaks or outright subsidies to the multinational firms that open up a new plant in their jurisdiction. However, at the same time there are increasing concerns both among academics and policymakers that multinational firms will illegally avoid taxes through strategic tax planning and profit shifting to low-tax countries (Blechová, Janoušková, Sobotovičová 2013).

Despite the continuing political interest in the usefulness of tax competition and tax coordination or even tax harmonization, as well as the amount of published theoretical analyzes in this area, the impact of CITR differences on the multinationals' decisions is analyzed still insufficiently. So the question, of whether and when is the tax competition in the area of the CITR harmful, has not yet been unambiguously answered.

## **2 METHODOLOGY**

The main objective of this paper is to examine whether CITR play a statistically significant role in attracting FDI into the old and new EU Member States. At first there is done a comparative analysis of the evolution of FDI between countries within the EU and also the development of both statutory (SCITR) and effective corporate income tax rate (ECITR) in these countries.

The advantage of the SCITR is that these data are readily available, both over time and across countries. However, SCITR does not include the effects of different specifics of national tax laws, especially methods for determining the tax base and are therefore very incomplete measure of tax incentives, faced with multinational companies. More preferred tax rates are therefore ECITR, which takes into account differences between the theoretical concept of net economic gains and taxable income that is actually taxed at companies under the tax law in a given country. In the presence of special tax breaks, accelerated depreciation schemes and similar tax incentives, taxable profits may be substantially lower than pure economic profits, leading to diverging measures for SCITR on the one hand and ECITR on the other.

The effective tax rate can be divided into three categories, according to the method used for their determination, i.e. macro backward looking, micro backward looking and micro forward looking methods. In this work they are used the ECITR set by one of the macro looking methods, namely as a percentage of total annual revenues of corporate income tax in a given country to its GDP.

Further to comparative analysis of the FDI flows and CITR evolution, there is then used a method of correlation analysis to verify the veracity of the hypothesis that between the evolution of FDI flows and evolution of CITR there is a direct linear relation.

In the final part of the work is then to carried out an assessment of results of performed analyzes and using the method of deduction are here derived conclusions about the validity of this hypothesis.

## **3 COMPARATIVE ANALYSIS OF FDI FLOWS AND CITR IN THE EU COUNTRIES AMONG 2004-2012**

### **3.1 The analysis of FDI flows**

The data taken from the Eurostat materials contained the absolute values of inflows and outflows of FDI in mil. euro, the ratios of FDI shares to GDP, and the values of the statutory and effective CITR across 28 EU countries in years 2004 - 2012. Due to the vast extent of the basic data taken over, there are presented here only the aggregate or average values in the individual EU Member States for the reporting period.

Table no. 1 (see Annexes) contains the aggregated data on inflows and outflows of FDI in million of euro across 28 states of the EU in the monitored period, including their differences and share. The table shows that the FDI inflow was greater than FDI outflow in 18 EU countries in the monitored period. It occurs in all EU13 countries and in 5 of EU15 countries, namely in Belgium, Greece, Portugal, Sweden and the UK. The largest percentage ratio

between the total inflow and outflow of FDI in the monitored period show Romania (5216%), Bulgaria (3739%), Croatia (2974%), Latvia (1312%) and Slovenia (1175%). On the contrary, the smallest ratio exhibits the Netherlands (78%), France (69%), Italy (49%), Denmark (45%) and Germany (39%). The ratio of total inflows and outflows of FDI is greater than the median (its value is 213%) in 14 countries, and it concerns all EU13 countries and moreover Greece from the EU15 countries. All other EU15 countries show the value of this ratio lower than the median. Czech Republic occupies 7th place with a value of 537%. The average value amounted 1357% for EU13 countries and 106% for EU15 countries.

It is also interesting the comparison of the situation in individual EU member countries by the average value of the ratio  $FDI_{infl.}/GDP$  and  $FDI_{outfl.}/GDP$  presented in Table no. 2. The highest value of the ratio  $FDI_{infl.}/GDP$  shows Luxembourg (387.33), which is about two orders of magnitude larger than at most of other Member States. The next highest values of this ratio show Belgium (14.32), Bulgaria (12.92), Malta (9.78) and Estonia (9.47). The smallest values are then reported by Denmark (1.59), Germany (1.08), Italy (0.96), Greece (0.80) and Czech Republic (0.68). For the 14 member states, the value of this ratio is greater than the median value, which amounts to 3.75. This concerns 9 EU13 countries and 5 EU15 countries (Luxembourg, Belgium, Ireland, Netherlands and United Kingdom). The value lower than median show the 14 countries, including 4 countries from the EU13 group (Lithuania, Poland, Slovenia and the Czech Republic), and 10 countries from the EU15 group. The average value for EU13 countries amounts to 5.50, and for EU15 countries then 28.93, which is significantly influenced by Luxembourg. After its exclusion the average ratio for EU15 countries would be amounted to only 3.38, suggesting a greater FDI inflow into the EU13 countries from the EU15 countries than vice versa.

When considering the ranking of EU countries from the average value of the ratio  $FDI_{outfl.}/GDP$  during the reporting period, then the situation is as follows. The highest values show Luxembourg (400.16 - which is again 2 to 3 orders of magnitude greater than in other EU countries), Belgium (11.35), Ireland (7.76), the Netherlands (7.61) and Sweden (6.34). On the contrary the lowest values occur in Latvia (0.59), Slovakia (0.58), Bulgaria (0.48), Croatia (0.44) and Romania (0.05). Czech Republic occupies the 23rd position with a value of 0.70. Due to the median value which amounts to 2.54, the half of EU countries shows the value of this ratio greater than the median, wherein 11 countries of which are from the EU15 group and 3 countries are from EU13 group (Cyprus, Estonia and Hungary). Values lower than the median shows the remaining 10 countries from the EU13 group and 4 countries from the EU15 group (Germany, Finland, Italy, Portugal and Greece). Germany's inclusion in this group is somewhat surprising. The average value of this indicator is 1.39 for EU13 countries and 30.9 for EU15 countries. After Luxembourg excluding is then just 4.52. The results thus confirm that the FDI outflow from the EU15 to EU13 countries was greater than in the opposite direction in the monitored period.

Extremely high values of both these ratios for Luxemburg are influenced by the fact that up to 340 multinational companies entered into a secret agreement with Luxembourg in order to pay the less taxes. These include e.g. such companies as Apple, Amazon, Ikea, Pepsi or Axa. Informed about it the European media, which refer to the documents of the International Association of Investigative Journalists (ICIJ), based in Washington. Luxembourg agreements from 2002 to 2010 represented by ICIJ the loss of billions of euro. According to the journalists that proves, that large companies are taking advantage of the looser tax laws in Luxembourg to the transfers of their profits into this European country. This is due to the fact that their profits are there not at all or only very little taxed, although the official SCITR in Luxembourg ranged from 30.4% to 28.8% during this period. As reported by the important European media, Luxembourg retains its tax treaty in secret, shall not divulge it to their

European partners, although knows from these international companies, that their strategy is to avoid taxes. This affects the massive inflow of profitable capital into Luxembourg from abroad, including EU countries. In Luxembourg, the capital is taxed only minimally and is then used to re-invest abroad, including again EU countries. Therefore the FDI outflow from Luxembourg is also much higher than in other EU countries. The inclusion of Luxembourg to the comparative analysis of FDI flows in the EU countries therefore causes a distortion of the actual conditions within the EU.

### **3.2 The analysis of CITR data**

As regards the CITR, the average values of these indicators in the EU countries during the reporting period are presented also in Table no. 2 in the Annexes.

These data indicate that the highest average values of SCITR for the reporting period show Malta (35.00%), France (34.77%), Italy (34.02%), Belgium (34.00%) and Denmark (33.93%). On the contrary the lowest values show Lithuania (13.33%), Cyprus (10.56%), Latvia (15.00%), Ireland (12.50%) and Bulgaria (12.17%). Czech Republic and Germany shared the 16th place with (22.22%). The median value, which amounted 26.09%, there exceeded half the EU countries, including 12 from the EU15 group and 2 from the EU13 group (Malta and Estonia). The second half of the EU countries, which showed values lower than the median, involved 11 countries from the EU13 group and 3 countries from the EU15 group (Austria, Germany and Ireland). The average value of this indicator amounted then 19.62% for the EU13 countries and 28.33% for EU15 countries. These facts confirm the existence of lower SCITR values in most EU13 countries compared to the values of this tax rates in the EU15.

In the reporting period there was a decline of SCITR at 17 EU states, while in 6 EU states this decline was fluctuating. The largest decline occurred in Bulgaria and the Netherlands (-9.5 percentage points) and the Czech Republic, Austria and Romania (-9 p.p.). At the 7 states the value of SCITR was unchanged during the reporting period (Belgium, Ireland, Croatia, Latvia, Malta, Poland and Slovakia). At Lithuania this value has changed, but at the end of the reporting period it was as large as at the beginning. On the contrary at 3 countries the SCITR has increased, namely in Portugal (+4 p.p.), Hungary (+3 p.p.) and France (+0.7 p.p.). Maximum values in 2012 showed France (36.1%), Belgium (34.0%), Portugal (31.5%), Italy (31.4%) and Germany (30.2%), the lowest value then the Czech Republic (19.0%), Lithuania (15.0%), Ireland (12.5%), Bulgaria and Cyprus (10%).

In the case of ECITR the situation developed as follows. The highest average value of this tax rate for the reporting period occurred in Hungary (6.58%), Cyprus (5.97%), Luxembourg (5.48%), Malta (5.36%) and the Czech Republic (3.98%), the smallest value then in Lithuania (1.89%), Estonia and France (1.51%), Spain (0.79%) and Croatia (0.50%). A value greater than the median, which amounted to 2.76%, showed half of the EU countries, including 9 from EU15 group and 5 from EU13 group (Hungary, Cyprus, Malta, the Czech Republic and Romania). A value lower than the median then showed 8 countries from EU13 group, and 6 from EU15 group (Italy, Germany, Greece, Austria, France and Spain). The average for the EU13 group was 3.09% and was higher than in EU15 group, where it reached the value of 2.63%. Their ratio was therefore opposite to that in the case SCITR. The above mentioned data indicate a much smaller differences in the level of ECITR values between old and new EU Member States, than in the case of SCITR.

In the reporting period, the ECITR value decreased in 19 Member States, in 4 of them did not change (Belgium, Croatia, Austria and Sweden) and in 5 states has increased (Germany, France, Cyprus, Malta and the UK). The maximum of ECITR value change between the beginning and the end of the reporting period showed Malta (+2.7 p.p.), Cyprus (+2.4 p.p.),



Greece (-1.9 p.p.), Ireland and Finland (-1.3 p.p.). At the end of the reporting period, i.e. in 2012, the highest values of ECITR reached Malta and Cyprus (6.3%), Hungary (5.4%), Luxembourg (5.3%) and the Czech Republic (3.3%), the lowest values then Slovenia and Lithuania (1.3%), Greece (1.1%), Spain (0.7%) and Croatia (0.4%).

#### **4 CORRELATION ANALYSIS OF THE DEPENDENCE BETWEEN FDI FLOWS AND THE SIZE OF CITR IN THE EU**

Already a mere optical comparison of the FDI flows development in the period among 2004 - 2012 with the development of CITR across EU member countries in this period points to very little direct dependence between those random variables. For more exact assessment of whether there is a certain degree of linear dependence between the random variables, there was used here a statistical method of correlation analysis.

In this work it is analyzed the degree of correlation between selected files of random variables X and Y in individual EU Member States. X files are represented by selected files of SCITR and ECITR, which relating to the years 2004 - 2012 (i.e. the parameter  $n = 9$ ). Files Y then represent the temporally corresponding selected file of random variables representing the absolute value of the inflows and outflows of FDI, and also proportions these inflows and outflows to GDP. The results of calculations of selected correlation coefficients  $r$  at the individual EU countries are listed in Table no. 3. To determine whether the values of these coefficients indicate the existence of a linear dependence between researched files of random variables X and Y, these values were compared with the critical value of  $r_p$ , which was found in the tables for the parameter  $\nu = n - 2 = 9 - 2 = 7$  and for selected significance level of  $p = 0.05$ . Critical value in this case is  $r_p = 0.6664$ . In the case that the calculated selective correlation coefficient  $r$  satisfies the condition  $|r| > 0.6664$  we can consider the analyzed dependence between selected files of random variables X and Y as linear with the probability  $P = 100(1 - 0.05) = 95\%$ .

The dependence between data files containing data on FDI inflows and data files containing information about CITR should be inversely proportional, i.e. the selective correlation coefficient  $r$  should be negative, because with the rising tax rates in the home country should inflow of FDI into this country to fall. On the contrary, in the case of depending of data file containing information about FDI outflow, and of data file containing information about CITR should be a direct proportion, i.e. the correlation coefficient  $r$  should be positive, because with the rising tax rates in the home country should inflow of FDI into this country also growth.

From Table no. 3 then it follows that dependence of the data file  $FDI_{infl.}$  on the data file SCITR does not show a linear relationship at the any EU Member State. Similarly it is with depending of data file  $FDI_{infl.}/GDP$  on the data file SCITR. For datasets  $FDI_{outfl.}$ , and SCITR can infer on the linear relationship between them only for Spain ( $r = 0.6857$ ), and for data files  $FDI_{outfl.}/GDP$ , and SCITR, only for Slovenia ( $r = 0.6792$ ).

The situation looks to be better at the depending of data files containing information about FDI flows, and data fail ECITR. In case of the files relating to the data  $FDI_{infl.}$ , it can be assumed a linear dependence only at Ireland ( $r = -0.8268$ ), for the files with the data  $FDI_{outfl.}$  then at the Estonia ( $r = 0.7152$ ), Spain ( $r = 0.7234$ ) Italy ( $r = 0.7242$ ), the Netherlands ( $r = 0.8239$ ), Austria ( $r = 0.9318$ ) and Slovenia ( $r = 0.8227$ ). Similar looks the situation at data files containing information about FDI flows in relation to GDP. For data files containing  $FDI_{infl.}/GDP$  values can be a linear dependence on ECITR considered also only at Ireland ( $r = -0.7025$ ), while for data files containing  $FDI_{outfl.}/GDP$  values it comes into consideration

again in Estonia ( $r = 0.6989$ ), Spain ( $r = 0.7928$ ), Austria ( $r = 0.6967$ ) and Slovenia ( $r = 0.9501$ ), and also in Lithuania ( $r = 0.6967$ ).

If we used a significance level of  $p = 0.01$  to determine the critical value of  $r_p$ , the  $r_p$  value would have been  $r_p = 0.7977$ . In this case the condition  $|r| > r_p$  would be met in only four cases, namely at the depending  $FDI_{infl.}$  on the ECITR in Ireland, at the depending  $FDI_{outfl.}$  on the ECITR in the Netherlands and Austria, and at the depending  $FDI_{outfl.} / GDP$  in Slovenia.

Having the regard to the above information, the linear relationship between FDI flows and SCITR can be completely excluded. The situation seems to be similar at the dependency  $FDI_{infl.}$ , and  $FDI_{infl.} / GDP$  on ECITR. The dependence of the  $FDI_{outfl.}$ , and  $FDI_{outfl.} / GDP$  on ECITR exhibits the linear character for  $p = 0.05$  at the 6 EU countries, and for  $p = 0.01$  only at the 4 EU countries. This is the insufficient number, so that we could consider the determined existence of a linear relationship between the size of FDI flows and the size of the CITR in EU countries to be statistically significant.

In the case when the files of random variables X or Y comprises the elements of the same value, i.e. that  $x_i = \text{const.}$  or  $y_i = \text{const.}$ , then the value of the denominator in the formula for calculating of the selective correlation coefficient  $r$  equals zero. In this case this factor can not be calculated and in the appropriate cell of Table no. 2 is the note # DIV / 0!

## **5 CONCLUSION**

FDI plays an important role in the economy of each state. They contribute primarily to an increase in GDP, employment, for attracting respectively invocation secondary investments, access to advanced technologies and to developed managerial experience, to greater access on the developed markets and to the increase of the state budget revenues from taxing profits generated by them. Therefore the states that do not have sufficient volume of own investments, endeavor to attract investment from abroad. For this purpose, they are trying to create more favorable conditions for business of potential foreign investors in their countries than they have in home countries. And because the main goal of business is the making a profit, the host states trying to create more favorable conditions for it. An important factor affecting the amount of corporations profit is the rate of its taxation. Therefore, the host states are trying to reduce the tax rate compared to the home countries of potential foreign investors, which can cause origin of tax competition between states.

The rate of corporate profits taxation can be assessed in different ways. Most often they are used for this purpose SCITR because they are readily ascertainable. Therefore, the tax competition focuses mostly on their reducing. We can observe this even in the EU, where the average value of this tax indicator for the period 2004 - 2012 amounted to 19.62% in the EU13 new Member States, while in the old EU15 Member States achieved the value 28,33% (the difference was 8.71 p.p.). The value of this difference between the beginning and the end of the reporting period decreased from 9.9% to 8.4% (in 2004 was the  $\emptyset$  SCITR in the EU13 countries 21.5%, and in the EU15 countries 31.4%, in 2012 these values amounted to 19.0% and 27.4%). These lower values of SCITR in the EU13 countries, compared to EU15 countries, correspond to a significant difference in the percentage ratio of the FDI inflow and outflow in these countries within the EU throughout the reporting period, when at the EU13 countries it amounted to 1357%, whereas at the EU15 countries only 106%. The EU15 countries consider this competition at SCITR as harmful, and therefore are making efforts for the introduction of its harmonization within the EU, similarly as it was performed at VAT rates.

However, SCITR expresses only the degree of theoretical corporation tax burden in the respective country. The effective tax burden may be substantially less, because next SCITR it is influenced by other factors. They are mainly the rules for determining the amount of the tax base, contained in tax legislation, and various tax relief provided by states to foreign investors in order to attract them. These tax relief measures can include:

- Tax holidays
- Investment deductions and investment offsetting
- Disposable depreciation, time freely chosen amortization or faster depreciation
- Repayment of customs duties
- Lower income tax rates than SCITR for foreign investment
- The mutual links between the taxation of income in the host and home country, advantageous for foreign investors

In addition to these tax factors, the investors make decisions about the direction of their foreign investments also according to other non-tax factors such as: qualification and wage levels of staff, level of infrastructure, market size and purchasing power of the population in the country, guarantee against a possible expropriation, liberal regulation of national and foreign currencies exchange, consent with international arbitration of the disputable cases or state financial aid in the form of preferential loans, of the share in capital in newly founded companies or of direct financial subsidies to foreign investors.

From the above reasons it follows, that the mere level of SCITR in individual EU countries can only minimally influence the volume of FDI flows in these countries. It unambiguously demonstrates the correlation analysis presented here, the results of which showed, that there is no linear dependence between volumes of FDI flows and the size of SCITR in individual countries, even at a significance level of  $p = 0.05$ . Graphical form of evolution of these indicators in the monitored period optically does not reflect nor their other than a continuous linear relationship.

The actual amount of the tax burden better express the ECITR than SCITR. In case of the ECITR, which were determined by some of the macro or micro backward looking methods, it is influenced by the fact, that for the expression of the corporations tax burden they use the values of overall actually paid corporate income tax, either at the macro (i.e. national) level or at the micro (i.e. corporate) level. In this work was analyzed the dependence of FDI flows on ECITR, where the ECITR values were determined using macro backward looking method, namely as a proportion of total revenue from corporate income taxes to GDP. The average value thus determined ECITR in the group of member states EU13 during the reporting period amounted to 3.09%, which was higher than in EU15 group, where amounted to 2.83%. Their ratio was therefore opposite to that in case of SCITR, which does not confirm the claim that lower SCITR in countries EU13, compared to the EU15 countries, reduce the corporation tax burden in the EU13 countries, and thus causes the harmful tax competition between old and new EU Member States.

Correlation analysis aimed at finding out, whether exist a linear dependence between the size of FDI flows and the ECITR values showed, that at the chosen significance level of  $p = 0.01$ , such dependence exist only in four cases, namely: at the  $FDI_{infl.}$  dependency on the ECITR in Ireland, at the  $FDI_{outfl.}$  dependency on ECITR in the Netherlands and Austria, and at the  $FDI_{outfl.} / GDP$  dependency on ECITR in Slovenia. On the basis of this result a linear relationship between the values of FDI flows and the ECITR values in EU countries can not be considered as statistically significant. Similarly to the case of SCITR here also applies that optical assessment of the graphical representation of development FDI flows, and of the

ECITR values development in the reporting period does not reflect nor the non-linear dependence of these random variables.

So it can be concluded, that the analysis of the dependency FDI flows on the size of CIRT in the EU countries, does not confirm the hypothesis laid down at the beginning of this article, that between evolution of FDI flows and CIRT exist a linear relationship. But it is also necessary to state, that the results of this analysis could be to some extent influenced by effects of the global financial and economic crisis in 2008.

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**Appendexes:**

- Tab. 1 - Summary data on the amount of absolute FDI flows in EU countries for the period 2004 – 2012
- Tab. 2 - Average values of the FDI /GDP proportion to CITER in EU countries for the period 2004 – 2012
- Tab. 3 - The assessment of the correlation degree between FDI flows and CITER in EU countries between the years 2004 – 2012

Appendix no. 1

Tab. 1- Summary data on the amount of absolute FDI flows in EU countries for the period  
2004 – 2012. Source: Eurostat database and own calculation

<b>EU state</b>	<b>ΣFDI infl. 2004÷2012 (mil. euro)</b>	<b>ΣFDI outfl. 2004÷2012 ( mil. euro)</b>	<b>ΣFDI infl. – ΣFDI outfl. ( mil. euro)</b>	<b>ΣFDI infl. / ΣFDI outfl. (%)</b>	<b>R a n k</b>
Belgium	420 523	233 972	186 551	178	15
Bulgaria	27 819	744	27 075	3 739	2
Czech Republik	40 512	7 540	32 972	537	7
Denmark	17 435	38 867	-21 432	45	27
Germany	162 476	421 238	-258 762	39	28
Estonia	10 106	4 082	6 024	248	14
Ireland	63 572	76 384	-12 812	83	22
Greece	13 450	4 690	8 760	287	12
Spain	169 110	175 992	-6 882	96	19
France	307 014	442 587	-135 573	69	25
Croatia	17 187	578	16 609	2 974	3
Italy	82 754	168 363	-85 609	49	2 6
Cyprus	4 598	1 848	2 750	249	13
Latvia	5 457	416	5 041	1 312	4
Lithuania	6 063	1 253	4 810	484	8
Luxembourg	624 673	725 940	-101 267	086	21
Hungary	29 404	9 261	20 143	318	11
Malta	1 715	441	1 274	389	9
Netherlands	85 273	109 654	-24 381	78	24
Austria	49 695	52 355	- 2 660	93	20
Poland	93 671	26 004	67 667	360	10
Portugal	32 383	23 855	8 528	136	17
Romania	38 079	73	38 006	5 216	1
Slovenia	3 678	313	3 365	1 175	5
Slovakia	17 697	2 779	14 918	637	6
Finland	28 633	35 150	-6517	81	23
Sweden	71 990	69 611	2 379	103	18
United Kingdom	324 763	197 524	127 239	164	16
Ø EU15				106	
Ø EU13				1357	

EU15 – Old Member States,  
EU13 – New Member States,

FDI infl. – Foreign Direct Investment – inflow  
FDI outfl. – Foreign Direct Investment – outflow

Appendix no. 2

Tab. 2 - Average values of the FDI /GDP proportion and CITER in EU countries for the period 2004 – 2012. Source: Eurostat database and own calculation

EU state	Ø FDI infl. / GDP	Rank	Ø FDI outfl. / GDP	Rank	Ø SCITR (%)	Rank	Ø ECITR (%)	Rank
Belgium	14,32	2	11,35	2	34,00	4	3,08	9
Bulgaria	12,92	3	0,48	26	12,17	28	2,49	18
Czech Republik	0,68	28	0,70	23	22,22	16,17	3,98	5
Denmark	1,59	24	3,51	12	33,93	5	3,28	6
Germany	1,08	25	2,66	14	22,22	16,17	2,52	17
Estonia	9,47	5	3,67	11	26,57	13	1,51	25,26
Ireland	4,43	10	7,76	3	12,50	27	3,01	11,12
Greece	0,80	27	0,77	22	29,00	8	2,48	19
Spain	2,64	19	4,21	9	31,94	6	0,79	27
France	2,16	21	3,90	10	34,77	2	1,51	25,26
Croatia	4,36	11,12	0,44	27	20,00	19	0,50	28
Italy	0,96	26	2,13	16	34,02	3	2,60	16
Cyprus	8,11	6	4,58	7	10,56	25	5,97	2
Latvia	4,48	9	0,59	24	15,00	26	1,96	23
Lithuania	3,28	16	0,80	21	16,33	24	1,89	24
Luxembourg	387,33	1	400,16	1	29,38	7	5,48	3
Hungary	4,84	8	2,81	13	19,81	20	6,58	1
Malta	9,78	4	0,87	20	35,00	1	5,36	4
Netherlands	3,68	15	7,61	4	27,51	11	2,91	13
Austria	2,68	17,18	4,74	6	26,00	15	2,31	21
Poland	2,68	17,18	1,18	19	19,00	21,22	2,34	20
Portugal	2,54	20	1,74	17	27,94	10	3,06	10
Romania	4,94	7	0,05	28	17,00	23	2,71	14
Slovenia	1,64	23	1,37	18	22,11	18	2,23	22
Slovakia	4,36	11,12	0,58	25	19,00	21,22	2,69	15
Finland	1,98	22	2,43	15	26,17	14	3,01	11,12
Sweden	3,83	14	6,34	5	27,24	12	3,26	7
United Kingdom	4,01	13	4,24	8	28,44	9	3,20	8
Ø EU15	3,38 <sup>1)</sup>		4,52 <sup>1)</sup>		28,33		2,63	
Ø EU13	5,50		1,39		19,62		3,09	

<sup>1)</sup> without Luxembourg

EU15 – Old Member States,

EU13 – New Member States,

FDI infl. – Foreign Direct Investment - inflow

FDI outfl. – Foreign Direct Investment – outflow

SCITR – Statutory Corporate Income Tax Rate

ECITR – Effective Corporate Income Tax Rate

GDP – Gross Domestic Product

Appendix no. 3

Tab. 3 - The assessment of the correlation degree between FDI flows and CITR in EU countries between the years 2004 – 2012. Source: own calculation

EU state	Corel.coef. FDI infl. ↔ SCITR	Corel.coef. FDI outfl. ↔ SCITR	Corel.coef. FDI infl. ↔ ECITR	Corel.coef. FDI outfl. ↔ ECITR	Corel.coef. FDIin/GDP ↔ SCITR	Corel. coef. FDIout/GDP ↔ SCITR	Corel.coef. FDIin/GDP ↔ ECITR	Corel. coef. FDIout/GDP ↔ ECITR
Belgium	#DIV/0!	#DIV/0!	0,1568	0,5185	#DIV/0!	#DIV/0!	0,4403	0,6128
Bulgaria	-0,0123	-0,3921	0,8247	0,0880	0,2282	-0,4711	0,7189	0,1284
Czech Republ.	0,2818	-0,1231	0,2445	0,2476	0,5867	0,0972	0,4606	0,4077
Denmark	0,4762	-0,0315	0,5491	-0,0237	0,3201	0,3212	0,3374	0,5695
Germany	0,3594	0,0628	0,2861	0,5995	0,3456	0,3751	0,3996	0,4717
Estonia	0,2091	-0,0197	0,2424	<b>0,7152</b>	0,4269	0,1055	0,1754	<b>0,6989</b>
Ireland	#DIV/0!	#DIV/0!	<b>-0,8268</b>	-0,4985	#DIV/0!	#DIV/0!	<b>-0,7025</b>	0,0967
Greece	0,4318	0,0335	0,6797	-0,2520	0,3884	-0,1650	0,0636	0,2656
Spain	0,1285	<b>0,6857</b>	0,7401	<b>0,7234</b>	0,0188	0,6241	0,6176	<b>0,7298</b>
France	-0,3406	-0,4757	-0,3461	-0,4957	-0,2398	-0,5129	-0,3995	-0,6151
Croatia	#DIV/0!	#DIV/0!	-0,4001	-0,2514	#DIV/0!	#DIV/0!	-0,4402	0,0174
Italy	0,6562	0,5739	0,1588	<b>0,7242</b>	0,6247	0,2769	0,1555	0,2769
Cyprus	#DIV/0!	#DIV/0!	0,1037	0,2572	-0,1218	-0,0184	0,1582	0,3051
Latvia	#DIV/0!	#DIV/0!	0,7835	0,6574	#DIV/0!	#DIV/0!	0,5079	0,6605
Lithuania	0,0940	0,2967	0,5685	0,6036	-0,0011	0,4721	0,6161	<b>0,6967</b>
Luxembourg	-0,3012	-0,4946	-0,2695	-0,2608	-0,6805	-0,6224	-0,2912	-0,2529
Hungary	-0,3116	0,0112	-0,4649	-0,4588	-0,3583	0,1120	-0,4777	-0,5903
Malta	#DIV/0!	#DIV/0!	0,2605	0,4633	#DIV/0!	#DIV/0!	-0,3924	0,3003
Netherlands	0,2185	0,5631	0,4625	<b>0,8239</b>	-0,0809	0,4198	0,3293	0,5923
Austria	#DIV/0!	#DIV/0!	0,6483	0,9318	-0,2223	-0,2840	0,4524	<b>0,7453</b>
Poland	#DIV/0!	#DIV/0!	0,1435	-0,3488	#DIV/0!	#DIV/0!	0,7193	0,0917
Portugal	0,6144	-0,0042	-0,1274	0,2188	0,4869	-0,1409	-0,1317	0,2619
Romania	#DIV/0!	#DIV/0!	0,8699	0,4313	0,4350	#DIV/0!	0,8148	0,6524
Slovenia	0,5432	0,5731	0,7483	<b>0,8227</b>	0,4803	<b>0,6792</b>	0,6665	<b>0,9051</b>
Slovakia	#DIV/0!	#DIV/0!	0,6109	-0,1567	#DIV/0!	#DIV/0!	0,5400	0,2181
Finland	0,0082	-0,9108	0,5471	-0,2691	-0,0352	-0,7959	0,4773	-0,2566
Sweden	0,5448	-0,0714	-0,1099	-0,4053	0,6786	0,7511	0,1494	0,5241
Unit.Kingdom	0,5740	0,5539	0,5318	0,4252	0,6126	0,4943	0,6167	0,4434

SCITR – Statutory Corporate Income Tax Rate  
FDI infl. – Foreign Direct Investment - inflow  
GDP – Gross Domestic Product

ECITR – Effective Corporate Income Tax Rate  
FDI outfl. – Foreign Direct Investment – outflow  
#DIV/0! - the denominator of the formula for the  
*r* coefficient calculation is equal to zero



## **CUSTOMER AUDIT AS AN IMPORTANT TOOL STIMULATING COMPANY GROWTH**

*Petr Briš, Petr Klímek*

### **Abstract**

Customer audit is being used for screening the supplier if he is able continuously supply products or services according to our needs. Such audits shall be helpful in permanent improvement of supplier-customer relationship and to simplify new business deals. Customer audit added value shall be viewed in clarification of all specified demands and expectations leading to the continuous product improvements for both sides. But in reality it is not often the case, especially when customer audit is performed formally, without any conception or by outsourcing. This paper is analyzing the results of quantitative research in customer audits sector related to Czech corporations and steps are proposed which can lead to the valuable businesses management.

*Keywords: Audit, Customer Audit, Quality Control, Quality Management, Process Quality, Customer – Supplier Relationship.*

JEL Classification: M20

### **1 INTRODUCTION**

Audits are very important tools leading to development and growth of a company. This article focuses mainly on a customer audit. From a previous research it was discovered that these audits are conducted merely formally. Auditors often concentrate only on performance standards set by ISO 9001 norm. However, if audits are being done to add value and to stimulate growth and beneficial customer-supplier relationships, they should be oriented on other important aspects like work safety, corporate culture, financial health, CSR, level of innovation, environmental impact, stakeholder satisfaction etc. The results are known from external audits of other management areas, for example from environmental management indicate that for improving environmental quality is needed to put forth the greater efforts in environmental audits (Huang et al., 2014). It was also found that the empirical tests concern the combined effect of external audit of quality and institutional property has effect on earnings management (Kouaib & Jarboui, 2014).

### **2 THEORETICAL BACKGROUN)D**

In current business environment a vast number of companies ranging from small to large ones use a well-established quality management system (QMS) certified under ISO 9000 series. QMS help businesses sustain a stable quality level by checking primary and support processes. The ISO 9000 family identifies eight quality principles leading to better performance. These are:

- customer focus,
- leadership,
- involvement of people,
- process approach,

- system approach,
- continuous improvement,
- factual approach to decision making,
- beneficial supplier relationships.

As Khan (2001) says the cycle of accreditation to ISO 9000 involves a review of system documentation, a physical audit, an audit report review, and, if successful, periodic surveillance audits. A company claiming to have a good quality system must be able to prove it by systematic quality checks, reviews or audits.

The international audit standard ISO 19011 defines a quality audit as an evidence gathering process which assesses whether set criteria are being met. This standard also differentiates three types of audits:

- First party audits which are internal audits used by companies to review themselves.
- Second party audits which are external audits usually performed by external auditors, companies or customers.
- Third party audits are done by independent regulatory bodies.

In general, ISO 9000 quality audits assure that:

- Processes are stable and in accordance with a documentation.
- Quality system is integrated into the company.
- Products or services are suitable for use.
- Rules, regulations and laws are obeyed.
- Information is not biased or misrepresented.
- Customers are satisfied.

However, when the ISO 9001 certificate is awarded a significant number of businesses fail to go beyond the scope of this certificate. Although many researches conducted before 2000 (Bart, 1994; Pfeiffer 1996) showed that companies certified with ISO 9001 improved their efficiency and quality, researches done after 2000 argued that these standards do not guarantee business success and satisfaction of all stakeholders (Wilson, 2000). In addition, in first years after certification, the impact of ISO 9000 is greater and within five years it decreases if no further targets are set (Ismail & Hashmi, 1999).

The perception of ISO 9000 series reflects audits as well. Very often audits are performed only in compliance with set standards of ISO 9000. Auditors usually simply report whether the audit findings agree with the audit criteria or not. According to Pivka (2004) ISO 9000 requirements do not ensure businesses a better quality of products, a greater competitiveness, customer satisfaction or business goals realization. He points out that it is necessary to extend audits to all areas that effect companies. Focusing only on ISO 9000 standards does not stimulate growth and innovation but it can drain resources.

Audits that search for improvements are known as audits that add value (Alič & Rusjan, 2009). In order to serve as a managerial tool helping with further decision making process and growth, auditors should investigate areas of the business that cover wider range of processes. In other terms, companies' quality objectives (set by ISO 9000) should relate to the strategic objectives set by managers, and therefore such audits should investigate e.g. work safety, corporate culture, financial health, level of innovation, environmental impact, stakeholder

satisfaction etc. If we state that audits performed within ISO 9000 limits are formal, further inspections can then be called informal audits.

An example, supporting the claim that audits should be perceived as a management tool for improvements of standardized quality management systems (Alič & Rusjan, 2009), can be seen in a performed Slovenian survey in which 89.9% of questioned companies agreed that internal audits contribute to further business development and grow (Piskar, 2003).

Our research is mainly focused on a specific type of audit known as customer audit. This audit is designed for companies that want to control their suppliers and want to ensure that supplied products or services are in accordance with their input. These audits help to improve existing customer-supplier relationships, or facilitate new ones, between all stakeholders. Again all previously mentioned statements regarding ISO 9000 apply to this type of audit as well (Gong, 2004). To have the best use of customer audits, managers should outreach the norms, have clear communication channel, moreover they need to help customer audit to be a value-adding activity.

A case study by Nenadal (2006) shows how DOMOV s.r.o. company dealt with customer audit of its suppliers. Managers created a list of criteria by which they assess suppliers. These are:

- strategic management,
- environment,
- processes,
- quality assurance,
- logistics,
- employees satisfaction,
- financial health and stability,
- product innovation,
- resources,
- customer – supplier relationship.

They decided not to perform customer audits formally in accordance with ISO 9000 but to go beyond the formality and examine other important factors with DOMOV values.

According to Bris and Pavlova (2013) customer audit:

- Leads to quality assurance of purchased goods.
- Provides a guarantee of partner's reliability.
- Is a starting point for continuous improvement and optimization of supplies.

Goals of customer audits:

- To foster mutual trust between customers and suppliers.
- To develop and sustain clear communication channels.
- To improve and endure a long-lasting partnership.

In principle it would be natural to expect that second party audit results would correlate more closely with achieved quality performance. This is because the customer would have access to

the supplier's quality data and first hand experience of the problems that the supplier had experienced in the supply of their product. This 'insider knowledge' should provide key clues for the auditor to focus on during the audit.

Case studies demonstrated that the second and third party assessment approach is not a reliable indicator of a supplier's quality performance and therefore it can be concluded that an alternative approach to supplier evaluation is required, replacing the need for a third party certification standard to approve the quality capability of suppliers.

The literature review and case studies were described earlier, indicated that final results of traditional audit processes were not effective at determining the quality capability of a supplier organisation and hence another method had to be established. The literature review suggested that there were other certification schemes that had developed from the basis of ISO 9001 and had introduced several enhancements to take account of some of the problems identified with second and third party certification. These are:

- Establishing minimum performance standards.
- Producing transparency for key metrics through public reporting.
- Engaging key stakeholders to verify the organisation's performance /claims.

Therefore, these would be considered in the development of a supplier evaluation process. The supplier evaluation process is designed to:

- Evaluate the quality performance of new / unknown suppliers to the organisation using minimum performance standards
- Enable the comparison of performance data to that already available for the organisation's existing approved suppliers
- To be verified without the need for second or third party assessment
- To take into account the specific requirements of different commodity suppliers i. e. It shall utilise a contingency approach to enable the process to be adapted to the specific needs of the supplier group under evaluation. The attention shall concentrate on quality performance evaluation but recognises that the process may benefit from further expansion to include other criteria such as operational, financial and environmental performance indicators (Riggs, 2004).

Based on the theoretical research, one main question was raised:

- Customer audits in the Czech companies are conducted only in formal way.

### **3 METHODOLOGY**

Data were collected during the year 2013. Heterogeneity of respondents was achieved from the geographical perspective, company size (27 companies with less than 50 employees, 53 companies within 50-100 employees and 13 larger companies), 57 Ltd companies, 32 corporations and 4 other legal forms. Data sampling process was not random, though. Convenience sampling was used for part of the sample to gather information from companies with relevant experiences and history. Moreover, 22 companies from 71 valid responses have never undergone customer audit. These companies are therefore omitted from the following analysis. There were 17 small companies (<50 employees) in the omitted list.

Questions were recorder on dichotomous scale. Reliability of question cannot be assessed analytically (e.g., using Cronbach alpha) because of the design of the questionnaire. However,

questionnaire was designed by two experts with several years of business history. We shall therefore consider questions as reasonably reliable and valid.

We have selected test based on Pearson's  $\chi^2$  statistics to test our qualitative data. These tests test difference between empirical data and expected results. If some conditions were not met (such a small number of observation in combination of responses) and asymptotical estimates of p-value would be incorrect, exact Fisher test were used instead. The special case of  $\chi^2$  test of contingency table analysis is one or two sample proportion test when dimension of contingency table is 1 by 2. Results will be described in terms of achieved test statistics and corresponding p-value. We will compare this p-value to usual  $\alpha$  level of 5%, which represents the probability of committing I type mistake.

We consider formal audit as such an audit which is not exceeding scope of general framework, e.g., ISO 9001.

## 4 RESULTS

First question related to formal auditing practices asked whether the auditing process was guided by questions adopted from ISO 9001 standard. Number of positive answers was 54 which represent 76 % of all companies. Confidence interval for true proportion of formally audited companies ranges from 0.64 to 0.85. This brings strong evidence that more than the halves of the companies which undergo customer audit are audited only formally.

To support our claim we analyse relation between questions related to the presence of top managers during customer audits and question which asks whether company usually receive the program of audit in advance (at least two weeks). All companies claim that they receive program in advance, but only 39.4 % of them are asked for the presence of top management during the audit. Confidence interval of this proportion estimate crosses 0.5 (95% CI = 0.282–0.518) so we don't find an evidence for a claim that the presence of top managers is not wanted by majority of customers. Although all respondents received audit plan in advance, only 30.9 of them usually receive self-assessment questionnaire which they are asked to fill in advance (with upper limit of confidence interval of 0.432). On overall, 93 % of companies do confirms that the program was completely met during the audit.

In the next set of questions we compare responses on question which asks whether technical details and specific requirements on goods and service were discussed during consumer audit (hereafter Q1). We assume that audits which are formal will have smaller proportion of positive response on this question. Firstly, we analyse relation of Q1 to answers on question in Table 1, whether audit was guided by question adopted from ISO standards.

Tab. 1 – Contingency table of Related Questions. Source: Own

		Question related to ISO	
		No	Yes
Technical questions (Q1)	No	0	26
	Yes	17	28

Contingency table summarises responses on Q1 and ISO-oriented customer audit (answers in second columns refer to ISO-like oriented audit). Fisher exact test revealed that association between questions is conclusive (p-value < 0.01). The link between ISO oriented audit and audits discussing technical aspects is direct. Reading from the residuals, if there were no

relation between variables we would expect more answers in combination No-No. This table suggests that ISO-related audits tend to be less technical.

In the next Table 2, analysis Q1 was set against question related to Occupational Health and Safety.

Tab. 2 – Contingency table of Related Questions. Source: Own

		Audit concerned by Occupational Health and Safety	
		No	Yes
Technical questions (Q1)	No	5	21
	Yes	12	33

Contingency table does not reveal any tendency in answers. Based on the contingency table in Table 2 we cannot claim that audits oriented on technical question usually do not focus on issues related to Occupational Health and Safety. We have not found any evidence in formal test, too ( $\chi^2 = 0.1753$ , p-value = 0.675).

In this paragraph we will discuss corporate culture and its relations to other questions. First, let's consider relation to formal-like audit style. Corporate culture is an important dimension of company growth not discussed thoroughly in ISO standards. It would be expected that companies which consider customer audits as formal would also answered that auditors were not concerned about the corporate culture. Responses can be read from the Table 3. As contingency test show, there is no statistically significant association found in our data ( $\chi^2 = 0.6106$ , p-value = 0.4346).

Tab. 3 – Contingency table of Related Questions. Source: Own

		Corporate culture was considered	
		No	Yes
ISO guided customer audit	No	6	11
	Yes	27	27

No evidence for association can be read from the contingency table (Table 3). Following the discussion from previous paragraph about the corporate culture, we identify combination of answers on Q1 and corporate culture, too.

Tab. 4 – Contingency table of Related Questions. Source: Own

		Audit was concerned about corporate culture	
		No	Yes
Technical questions (Q1)	No	10	16
	Yes	23	22

Contingency table does not suggest any association between variables as the cell counts are very similar to each other. We cannot claim from Table 4 that during technically oriented

audits corporate culture is discussed in higher or smaller extent than during the non-technically oriented customer audits ( $\chi^2 = 0.6125$ , p-value = 0.4339).

The next set of questions relates to the presence of discussion about financial health. It might be expected that audits during which financial position of the company is discussed is more detailed and informative. From the responses we can read that 46.5 % of respondents have discussed financial position during the audit. Furthermore, we were interested whether customer is also interested in discussing his/her own problems which weakens the strength of relationship between business partners (Table 5).

Tab. 5 – Contingency table of Related Questions. Source: Own

		Customer's interests in our mistakes and demerits.	
		No	Yes
Customer was interested about financial health.	No	16	22
	Yes	12	21

Structure of contingency table does not suggest presence of association between variables. This is confirmed by formal analysis of Table 5 do not reject null hypothesis about non existing association ( $\chi^2 = 0.0626$ , p-value = 0.8024).

One question was designed to gauge interest of customer in helping to the audited company with identification of threats and opportunities to strengthen good prospects of company growth. Company were asked whether they were offered by customers to receive some analysis during the audit (such a SWOT analysis). However only 6 companies responded positively which means that this practice is only rare and we cannot utilise it as an indicator of non-formal audit.

The last question is related to the quality agreement between companies – whether such agreement exists or not. We have combined this answer with finance perspective as in Table 5.

Tab. 6 – Contingency table of Related Questions. Source: Own

		Is quality agreement signed?	
		No	Yes
Customer was interested about financial health.	No	23	15
	Yes	10	23

Combination of answers does not suggest presence of association between customer's interest about financial conditions of audited company and existence of quality agreement in Table 6. Results obtained in Table 6 were tested by Pearson contingency test which find evidence for presence of association ( $\chi^2 = 5.3274$ , p-value = 0.02099). In situations when quality agreement is signed/not signed, customers tend to be more/less cautious about financial conditions of the audited company.

## 5 DISCUSSION AND CONCLUSION

The quality management system of a producing company secures that a product meets the determined quality requirements. The effectiveness of the quality management system and the processes are inspected and corrected on announced audits and other inspecting actions. The good quality management system depends on the actions and the given profession as well. The audit is a systematic checking of an institution which checks the goals, the aptitude and the efficiency of the system. The purpose of the revision made by the customer is to check that the requirements described in contract were granted. On the basis of result of the audit on the field made by the deliverer we take cognizance that if the company can grant a factual order in pursuance of the needs and expectations of the client. According to the high quality expectations of the products the costumer expects a high-toned and excellence product and supply standard from deliverer.

If the corporation is healthy, with highest profit, efficiency, good will and image, it shall form a good corporate strategy as well. Part of such strategy is decisively a partnership with its suppliers. Prerequisite for a positive partnership development is work on its weak and/or strong parts, as they can be recognized by a supplier audit.

Based on questionnaire survey performed within Czech companies it was confirmed, that the approach toward customer audit is often formal and thus not used with its great potential for company performance growth. Many times they concentrate on supplier screening such as the criteria included in system standards only one chance to improve such situation can be the use of self-assessing check lists, which can include other questions than the system standards.

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## **DO INVESTORS HERD IN FRONTIER STOCK MARKETS? EMPIRICAL EVIDENCE FROM VIETNAMESE STOCK MARKET**

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### **Abstract**

This paper provides further evidence on herd behavior in the Vietnamese stock market – a frontier stock market. By modifying and employing the non-linear regression models proposed by Chang et al. (2000), the study found evidence of strong herd behavior in all industrial sectors, Hochiminh, and Hanoi stock exchange. Besides, we use a modified model to capture any impact of international stock markets on investor behavior in the Vietnamese market. The results show that herd behavior found in all market portfolios are affected by the U.S stock market. Alternatively, events in Hong Kong stock market only have a relatively effect on Hochiminh and Hanoi stock exchange. However, no evidence of herding was reported. Finally, the results strongly suggest that investors tend to herd in both up and down market scenarios.

*Keywords: herd behavior, individual investors, efficient market*

JEL Classification: G11, G14

## **1 INTRODUCTION**

Since initially defined by Christie and Huang (1995), investor herd behavior has received extensive interest from academic research. Herding behavior is simply defined as an investment strategy based on mimicking other investors' actions. From financial perspective, herd behavior can be either irrational or rational. As defined by Christie and Huang (1995), irrational herding is a tendency where investors make their investment choices solely on the actions of the market and irrationally disregard their own beliefs and analytical skills, even when they perceive the market's prediction to be wrong. On the other hand, rational view of herding indicates the scenario where herding is a result of principal-agent problem in which managers replicate the actions of others, completely ignoring their own private information to maintain their reputation in the market (Scharfstein and Stein, 1990; Rajan, 1994). The rational herding may also occur among individual investors when they rationally follow the actions of others to whom they believe may be better informed and their performance hence would not be below the market average (Demirer and Kutan, 2006).

Motivated by such important implications of herd behavior, numerous works have been conducted. However, most of studies examine herding in developed and emerging financial markets, leaving a loophole of herding literature on frontier markets. To our best knowledge, only a study of Chen (2013) provides a full investigation on herding of 26 frontier markets which are classified based on the MSCI Market Classification Framework. The study consistently found evidence of herding in most of the frontier markets. Although successfully giving a broader view of herd behavior in the frontier markets, the study of Chen (2013) is limited in providing further confirmation of herding in industry context, which is a new growing strand of herding literature. So far, there are only three recent papers of Yao and He (2014), Cakan and Blagoyzian (2013), and Derimer et al. (2010) extend their study of herding in industry perspective.

Therefore, in this paper, we again perform herding tests to Vietnamese stock market – a frontier financial market. However, the study is different to the prior works of Chen (2013), Tran and Truong (2011) and Kallinterakis (2007) who solely investigated the existence of herding in Vietnamese stock market. Particularly, our study further focuses on investigating herding evidence on industry (sector). Hence, result of this study expectedly provides additional contribution to the recent literature that examines herd behavior in an industry context. Besides, the study attempt to investigate if developed stock markets such as the U.S and Hong Kong affect investor behavior in Vietnamese stock market.

The remainder of the study is organized as follows. Section two briefly summarizes the literature on the tests of herding behavior. Section three provides the description of the data and testing methodology while empirical findings and discussion are focused in section four. Section five presents a conclusion of paper.

## **2 LITERATURE REVIEW**

Investigations on the existence of herding behavior in the global financial market are numerous but the results are mixed. Christie and Huang (1995) employed the cross-sectional standard deviation of returns to capture herding behavior and found no evidence of herding in US markets as shares' return dispersion increases instead of decreasing during periods of extreme price movement. In a study of Chang et al. (2000), no significant degree of herding was observed in developed financial markets such as US, Hong Kong and Japan. In contrast, Nofsinger and Sias (1999) reported that high level of herding behavior actually exists in the US market, particularly among institutional investors. Contributed to the positive evidence of herding behavior, Iihara et al. (2001) concluded that Japanese individual and institutional investors are more likely to herd, but foreign investors' investment decisions were made based on available information in the market. Especially, in a recent study of Chiang et al. (2010), daily data from May 25, 1988 to April 24, 2009 was employed and significant evidence of herding was found in many markets including Australia, France, Germany, Hong Kong, Japan, the UK, Argentina, Brazil, Chile, Mexico and other Asian markets such as China, South Korea, Taiwan, Indonesia, Malaysia, Singapore and Thailand. The results challenge the earlier literature which shows no herding in those developed markets.

Empirical researches investigated in emerging markets report higher level of herding, especially in Asian markets. An explanation for this observation is laid on the market inefficiencies in these countries which were characterized by weak market regulation, high degree of government intervention, less-educated investors and lower requirements regarding listed companies' information disclosure. Besides the finding of Chiang et al. (2010) mentioned above, there were other studies also found herding behavior in emerging markets. Chang et al. (2000) strongly found existence of herding in South Korea and Taiwan. They observed that there are incomplete information disclosure and greater impact of macroeconomic information on investment decision-making. As a result, investors have tendency to herd around the market consensus. Chianget al. (2010) used a least squares method to investigate the herding behavior in Chinese stock market and found that both Shanghai and Shenzhen A-share market display herding behavior, but B-share investors do not show such behavior. They explain that B-share investors, mostly composed of foreign and institutional investors, have diverse information to access and more technique and hence are more rational in making investment decisions. However, the test results also show that B-share investors tend to herd in a down market due to their uncertainty regarding Chinese government frequent interventions. Lao and Singh (2011) provided the findings suggesting that herding behavior presence in both Chinese and Indian markets with difference herding

patterns. A recent study of Bhaduri and Mahapatra (2013) also discovered consistent findings of herd behavior in Indian equity markets. Presence of herding behavior in Asian equity market was also reported in recent works of Yao et al. (2009), Demier et al. (2010), Laih and Liao (2013).

In contrast to developed and emerging financial markets where literature of herding is plentiful, very few studies have been conducted in frontier markets. Chen (2013) performed investigation of herd behavior in 69 financial markets over 10 years using daily returns of 35,528 listed stocks. Based on the MSCI Market Classification Framework, 69 countries are classified into three groups: 23 developed markets, 20 emerging markets, and 26 frontier markets. The study employed different methods to examine the presence of herding including cross-sectional standard deviation developed by Christie and Huang (1995), cross-sectional absolute deviation suggested by Chang et al. (2000), and standard state-space model proposed by Hwang and Salmon (2004). The result shows mixed evidence of herding in different markets. To frontier markets, the evidence of herding is different with different methods and scenarios. With cross-sectional absolute deviation method, herding is found in most countries, except for Argentina, Bahrain, Bulgaria, Estonia, Kenya, Lebanon, Serbia, and Slovenia. However, the conclusion of herding is different under consideration of market scenarios.

Another trend of research on herding is to examine evidence of herd behavior within industry context. Demirer et al. (2010) argued that understanding herd behavior in industry framework is motivating because most of investment decisions and recommendations are taken place at the industry level. Bikhchandani and Sharma (2001) additionally proposed that herd behavior is likely to occur in industry level where market participants face similar problems and can easily observe the others' trade movement. In the study of Derimer et al. (2010), two testing methods namely return dispersion-based models and state space model are respectively employed to seek for the presence of herd behavior in industry context in Taiwanese stock market. Daily returns for 689 Taiwanese stocks traded on the Taiwan Stock Exchange over the January 1995–December 2006 period are classified into 18 different sectors. The results from the non-linear model and state space model consistently provide support of herding in all sectors. This is contrast to the results from linear model which indicates absence of herding in most sectors, with an exception of Electronics sector. Yao et al. (2014) also pay attention on investigating herd behavior at industry level. Based on the industry classification guidelines issued by the China Securities Regulatory Commission, 1314 stocks listed on Shanghai stock exchange and Shenzhen stock exchange are divided into 21 sectors. The regression results indicate strong presence of herding in most of sectors, except for agriculture, mining, machinery, financials, information technology, and conglomerate sectors. Different to the two mentioned studies, a recent study of Cakan and Balagyozyan (2013) only takes a look for evidence of herding in the Turkish banking sector. Using herding test proposed by Changet al. (2000) and daily stock turns from 2007 to 2012, they found the presence of herd behavior only in rising markets but also concluded that the herding in Turkish exhibits asymmetric effects.

### **3 DATA AND METHODOLOGY**

#### **3.1 Data**

Daily and weekly closing price of all listed companies on both HOSE (Hochiminh stock exchange) and HNX (Hanoi stock exchange) are collected during the period from 01/01/2007 to 17/10/2014. Return of stock  $i$  is computed as follow:

$$r_{i,t} = \log(P_{i,t}/P_{i,t-1}), \quad P_{i,t} \text{ closing price of stock } i \text{ at time } t$$

During the examined period, 772 companies are listed on both HOSE and HNX. Those companies are divided into 17 different industries. Oil industry only includes 4 listed companies which fail in representing the industry, and thus be eliminated from the study. Construction – material industry is comprised by the most listed companies with 207 companies, whereas retail industry has minimum listed companies at 10 companies. It is noted that from 01/01/2007 to 31/12/2010, the retail industry has fewer listed companies. Therefore, historical data for the Retail sector is only collected during the period from 01/01/2011 to 17/10/2014.

### 3.2 Methodology

Popular model used to examine herding behavior was proposed by Chang et al. (2000). This methodology basically utilizes cross-sectional dispersion of individual stock returns measured by the Cross-sectional Absolute Deviation (CSAD) which statistically defined as:

$$CSAD_t = \frac{1}{n} |r_{i,t} - r_{m,t}| \quad (1)$$

Where  $r_{i,t}$  is the daily logarithmic return for underlying asset  $i$ ,  $r_{m,t}$  is the return on the market portfolio for period  $t$ , and  $n$  is the number of stocks in the portfolio.

According to Chang et al. (2000), the rational asset pricing models implies that the level of equity return dispersions will increase when the absolute value of overall market returns increase since the volatility increases. In other words, there is a positive linear relationship between CSAD and market returns. However, if investors try to follow whole market behavior and ignore their own preferences during periods of large price movements, then the relationship between dispersion and market returns can increase in a decrease rate, or even decreasing if herding is severe.

To conduct a test for detecting herding behavior, Chang et al. (2000) adopt the following regression model:

$$CSAD_t = \alpha + \beta_1 |R_{m,t}| + \beta_2 (R_{m,t})^2 + \varepsilon_t \quad (2)$$

$$CSAD_t^{UP} = \alpha + \beta_1^{UP} |R_{m,t}^{UP}| + \beta_2^{UP} (R_{m,t}^{UP})^2 + \varepsilon_t \quad \text{if } R_{m,t} > 0 \quad (2a)$$

$$CSAD_t^{DOWN} = \alpha + \beta_1^{DOWN} |R_{m,t}^{DOWN}| + \beta_2^{DOWN} (R_{m,t}^{DOWN})^2 + \varepsilon_t \quad \text{if } R_{m,t} < 0 \quad (2b)$$

Where  $|R_{m,t}^{UP}|$  and  $|R_{m,t}^{DOWN}|$  are the absolute value of an equally-weighted realized return of all available securities on day  $t$  when the market is up or down and  $(R_{m,t}^{DOWN})^2$  is the squared value of this term. Under this model, if no herding activity exists in the market and the rational asset pricing models exist, the regression should demonstrate linearity, implying that  $\beta_2 = 0$ . Whereas a non-linear equation with a statistically significant negative  $\beta_2$  indicates a presence of herding.

Since a high level of serial autocorrelation is likely to exist in high frequency time-series market data, the failure to exactly address this problem will result in biased estimates of the parameters. Consequently, in addition to employ the heteroscedasticity and autocorrelation consistent standard errors suggested by Newey and West (1987) to estimate the regression coefficients, Yao et al.. (2014) suggest a modified model as follows:

$$CSAD_t = \alpha + \beta_1 |R_{m,t}| + \beta_2 \left( R_{m,t} - \bar{R}_m \right)^2 + \beta_3 CSAD_{t-1} + \varepsilon_t \quad (2c)$$

Where  $\bar{R}_m$  is the arithmetic mean  $R_{m,t}$ . The procedure  $(R_{m,t} - \bar{R}_m)$  will remove a small proportion of the multicollinearity between the explanatory variables in the regression equation, and thus will reduce the standard errors associated with the regression coefficients and increase the strength of the model. However, model of Chang et al. (2000) may cause structural multicollinearity between  $|R_{m,t}|$  and  $(R_{m,t})^2$  quadratic regression model. Therefore, we propose a modified model as below:

$$CSAD_t = \alpha + \beta_1 |R_{m,t}| + \beta_2 \left( |R_{m,t}| - \bar{R}_m \right)^2 + \beta_3 CSAD_{t-1} + \varepsilon_t \quad (3)$$

where  $\bar{R}_m = (1/n) \sum_{t=1}^n |R_{m,t}|$ . The procedure  $(|R_{m,t}| - \bar{R}_m)$  will remove a large proportion of the multicollinearity between the explanatory variables in the regression equation, and thus will reduce the standard errors associated with the regression coefficients and increase the strength of the model. In this model, the existence of herding behavior can be confirmed if  $\beta_2$  is statistically significant and negative.

Tan et al. (2008), besides examining herding behavior in Chinese stock market, additionally investigates whether actions of A-share investors have impact on B-share investors investment decisions, and vice versa. Hence, in this study, it is also interesting to test the existence of cross-exchange effects on herd behavior between HOSE and HNX. Particularly, we construct modified regression models based on the original models of Tan (2008) as below:

$$CSAD_{HOSE,t} = \alpha + \beta_1 |R_{HOSE,t}| + \beta_2 \left( |R_{HOSE,t}| - \bar{R}_{HOSE,t} \right)^2 + \beta_3 CSAD_{HOSE,t} + \beta_4 (R_{HNX,m,t})^2 + \varepsilon_t \quad (4a)$$

$$CSAD_{HNX,t} = \alpha + \beta_1 |R_{HNX,t}| + \beta_2 \left( |R_{HNX,t}| - \bar{R}_{HNX,t} \right)^2 + \beta_3 CSAD_{HNX,t} + \beta_4 (R_{HOSE,m,t})^2 + \varepsilon_t \quad (4b)$$

It is more evidences proving that developed market volatility may lead other markets. The impact is even stronger on developing markets. In a study of Chiang and Zeheng (2010), they found that events in the US market have noticeable effects, and to some extent help to explain herding in other markets. Therefore, the study further investigates for any impact of the developed markets, particularly U.S and Hong Kong stock markets, on Vietnamese stock markets and investors' herd behavior. Particularly, we adjust the models suggested by Chiang and Zeheng (2010) by simultaneously including squared market returns for the U.S and Hong Kong market in the regression model. S&P 500 index (SP500) is representative for the U.S market, whereas Hang Seng index (HSI) is chosen for Hong Kong market. Since the U.S stock market is traded haft day later than Vietnamese market, a one-lag variable for S&P 500 index is used as follows:

$$CSAD_t = \alpha + \beta_1 |R_{m,t}| + \beta_2 \left( |R_{m,t}| - \bar{R}_m \right)^2 + \beta_3 CSAD_{t-1} + \beta_4 (R_{US,t-1})^2 + \beta_5 (R_{CH,t})^2 + \varepsilon_t \quad (5)$$

where  $R_{US,t-1}$  and  $R_{CH,t}$  are the return on the SP500 and HSI for period  $t$ , respectively.

According to the model, statistically significant negative coefficients of  $\beta_4$  and  $\beta_5$  will strongly indicate an existence of herding in Vietnamese market causing by developed markets. If  $\beta_4$  and/or  $\beta_5$  are statistically significant positive, movements from the U.S and/or Hong Kong stock markets affect investor behavior in Vietnamese stock market. Whereas positive values of the coefficients reject the impact of developed markets and herd behavior.

Chang (2000) indicates that the existence of herding is different in up and down markets. Therefore, we estimate the regressions for detecting herding both market scenarios as shown below:

$$CSAD_t^{DOWN} = \alpha + \beta_1^{DOWN} |R_{m,t}^{DOWN}| + \beta_2^{DOWN} \left( |R_{m,t}^{DOWN}| - \bar{R}_m^{DOWN} \right)^2 + CSAD_{t-1}^{DOWN} + \varepsilon_t \text{ If } R_{m,t} > 0 \quad (6a)$$

$$CSAD_t^{UP} = \alpha + \beta_1^{UP} |R_{m,t}^{UP}| + \beta_2^{UP} \left( |R_{m,t}^{UP}| - \bar{R}_m^{UP} \right)^2 + CSAD_{t-1}^{UP} + \varepsilon_t \text{ If } R_{m,t} < 0 \quad (6b)$$

Klien (2013) argues that time varying affect herd behavior in stock market. For this reason, to investigate the power of research results, sample period is divided into two sub-periods, from 01/01/2007 to 12/31/2010 for the first period and from 01/01/2011 to 10/17/2014 for second period.

## 4 EMPIRICAL RESULTS

### 4.1 Statistical Descriptions

Tab.1 presents descriptive statistic of  $CSAD_t$  and  $R_{m,t}$  of each industry in the two stock exchanges. Maximum values of  $CSAD_t$  and  $R_{m,t}$  are found in Communication and Health industry, respectively 17% and 10%. Information technology industry has a minimum value of  $R_m$  at -7.81%. The Jarque-Bera test statistics are significant at 1% for both  $CSAD_t$  and  $R_{m,t}$  with an exception of Financial service industry. This leads to rejection of null hypothesis of a normal distribution both time series. The Augmented Dickey-Fuller (ADF) test statistics are significant at 1% for both  $CSAD_t$  and  $R_{m,t}$  cross all industries, indicating that the null hypothesis of a unit root can be rejected. On the other hand, both time series are stationary.

The coefficient of  $CSAD_t$  is higher than  $R_{m,t}$  in all industries with lag length respectively at 1, 2, 3, 15 and 20. To  $R_{m,t}$ , the coefficient declines with an increase of lag value up 20. With 1-lag,  $CSAD_t$  has a relative high coefficient value. The maximum value is 0.577 for Construction - material sector, whereas minimum value is observed in case of Car parts - accessories at 0.288. When lag length is increased from 1 to 20, coefficient of  $CSAD_t$  slightly decreases.

### 4.2 Empirical Results

Regressive results of Equ.(2) for all industries are provided in Tab.2. Except for Communication and Medical sectors, estimated coefficient  $\beta_2$  in other sectors is statistically significant negative, indicating that investors intend to herd in these sectors. Foods-Beverages and Tourist-Entertainment sectors have strongest and weakest degree of herding, with  $\beta_2$  of -9.4129 and -1.7883 respectively. However, Durbin –Watson results of all industries are smaller than 1.5, implying the possibility of bias in estimating parameters. Beside, all adjusted Rsquare values are less than 10%.

Tab.3 presents regression results for Equ.(3) of all sectors, and the three market portfolios. Results for three sectors include Tourist-Entertainment, Communication, and Medical show the absence of herding with insignificant coefficients. Other sectors yield a significantly negative  $\beta_2$  and estimates at 1% level. Foods-Beverages has the strongest degree of herding with  $\beta_2$  of -9.1168, whereas the weakest degree of herding is observed in Financial services sector. With modified model, Durbin –Watson values of all sectors are far greater than 1.8. Value of adjusted  $R^2$  is also higher, implying appropriateness of the model. Additionally, estimating results for HOSE, HNX, and all-stocks portfolio exhibit strong evidence of herding. The finding is in line with those found in the study of Chen (2013).

The results of the study indicate that herd behavior exists in both industry and market context. The finding hence strongly supports the conclusion of Bikhchandani and Sharma (2000) that herding behavior tends to arise at the industry level. The finding is also a strong evidence of

herding in industry level in a frontier market, which is completely different to the previous finding of Yao et al. (2014) and Demirer et al. (2010) who found herding in emerging markets.

Tab. 1 - Summary statistics of cross-sectional absolute deviation (CSAD) and the market return ( $R_{m,t}$ ).

Industry	N of firms	Var.	Mean	Max	Min	Std.Dev	Skew	Kurt	Jarque-Bera	ADF	Serial correlation at lags				
											1	2	3	15	20
Real estates	71	CSAD	0.0204	0.05	0.00	0.0065	0.16	4.12	109.4***	-7.85***	0.492	0.352	0.332	0.222	0.127
		RM	(0.0002)	0.06	(0.06)	0.0199	(0.09)	3.21	6.33***	-17.04***	0.286	0.086	0.102	0.019	0.031
Retail	10	CSAD	0.0205	0.08	0.00	0.0102	0.83	5.34	325.15***	-13.32***	0.239	0.162	0.157	0.106	0.088
		RM	0.0010	0.08	-0.05	0.0158	0.12	4.08	48.51***	-32.68***	-0.064	0.003	-0.023	0.060	0.007
Information technology	26	CSAD	0.0233	0.06	0.00	0.0075	0.20	3.57	39.07***	-6.34***	0.403	0.328	0.318	0.211	0.217
		RM	(0.0004)	0.07	(0.08)	0.0206	(0.12)	3.55	28.89***	-34.35***	0.242	0.061	0.077	0.006	0.012
Tourist - entertainment	17	CSAD	0.0211	0.14	-	0.0103	1.57	16.25	14947.67***	-13.28***	0.359	0.262	0.179	0.159	0.141
		RM	0.0005	0.08	(0.07)	0.0202	0.03	3.44	16.22***	-24.53***	0.258	0.148	0.102	0.006	0.046
Financial service	37	CSAD	0.0178	0.07	0.00	0.0071	0.81	5.75	824.63***	-7.36***	0.429	0.356	0.351	0.222	0.161
		RM	(0.0005)	0.07	(0.08)	0.0234	0.01	3.20	3.31	-17.55***	0.217	0.086	0.113	0.005	(0.005)
Electricity, water, petrol, gas	33	CSAD	0.0183	0.05	0.00	0.0059	0.58	4.13	210.07***	-11.17***	0.413	0.351	0.293	0.163	0.155
		RM	0.0002	0.06	(0.06)	0.0179	(0.17)	3.91	75.9***	-34.91***	0.226	0.006	0.042	(0.008)	(0.005)
Chemical	26	CSAD	0.0185	0.06	0.00	0.0066	0.68	4.87	432.89***	-12.18***	0.372	0.280	0.252	0.155	0.133
		RM	(0.0001)	0.07	(0.07)	0.0181	(0.11)	4.14	108.93***	-35.97***	0.199	0.028	0.021	0.014	0.021
Goods - industry services	113	CSAD	0.0240	0.05	0.00	0.0057	(0.30)	4.40	187.76***	-8.44***	0.572	0.476	0.452	0.340	0.290
		RM	0.0001	0.06	(0.06)	0.0175	(0.22)	4.23	138.26***	-17.39***	0.291	0.082	0.091	0.015	0.020
Personal - household goods	23	CSAD	0.0210	0.05	0.00	0.0069	0.24	3.68	57.09***	-8.38***	0.354	0.232	0.239	0.161	0.112
		RM	0.0002	0.07	(0.06)	0.0186	(0.19)	3.67	47.91***	-34.02***	0.251	0.059	0.071	0.013	0.021
Banking - insurance	17	CSAD	0.0151	0.06	0.002	0.0074	1.37	6.19	1437.21***	-11.38***	0.357	0.313	0.272	0.151	0.115
		RM	(0.0001)	0.08	(0.08)	0.0200	(0.02)	5.66	414.51***	-35.07***	0.224	0.051	0.053	-0.004	0.006
Car parts - accessories	11	CSAD	0.0204	0.06	-	0.0096	0.51	3.64	116.17***	-12.07***	0.288	0.203	0.178	0.099	0.106
		RM	0.0004	0.07	(0.07)	0.0230	(0.07)	3.21	4.91*	-17.23***	0.249	0.108	0.102	0.028	0.053
Communications	24	CSAD	0.0261	0.17	0.00	0.0094	2.28	35.17	85106.59***	-14.57***	0.336	0.248	0.242	0.138	0.075
		RM	0.0007	0.08	(0.13)	0.0223	(0.16)	4.93	307.89***	-33.31***	0.270	0.121	0.073	0.026	(0.002)
Essential resources	66	CSAD	0.0223	0.05	0.00	0.0065	0.47	4.34	215.46***	-9.35***	0.425	0.375	0.341	0.155	0.129
		RM	(0.0002)	0.06	(0.07)	0.0201	(0.11)	3.40	16.99***	-17.15***	0.280	0.105	0.107	0.017	0.044



Tab. 1 - Summary statistics of cross-sectional absolute deviation (CSAD) and the market return ( $R_{m,t}$ ) (Cont.)

Industry	N.of firms	Var.	Mean	Max	Min	StdDev	Skew	Kurt	Jarque-Bera	ADF	Serial correlation at lags					
											1	2	3	15	20	
Foods – beverage	66	CSAD	0.0210	0.05	0.00	0.0057	(0.02)	4.46	171.16***	-7.4***	0.496	0.410	0.386	0.274	0.266	
		RM	(0.0000)	0.05	(0.05)	0.0160	(0.13)	4.09	101.51***	-32.45***	0.295	0.043	0.045	0.009	0.007	
Construction s – material	207	CSAD	0.0254	0.06	0.00	0.0060	0.12	5.16	380.29***	-7.87***	0.577	0.502	0.455	0.301	0.269	
		RM	0.0000	0.08	(0.08)	0.0213	(0.12)	3.91	70.98***	-16.91***	0.302	0.108	0.108	0.028	0.008	
Medical	20	CSAD	0.0189	0.14	-	0.0085	1.75	26.90	47045.31***	-5.68***	0.386	0.303	0.279	0.249	0.233	
		RM	0.0002	0.10	(0.06)	0.0161	(0.02)	4.73	242.06***	-34.03***	0.251	0.014	(0.047)	(0.015)	0.020	
All-stocks	772	CSAD	0.0231	0.05	0.005	0.0051	0.098	5.53	520.44***	-8.55***	0.585	0.500	0.462	0.299	0.259	
		RM	0.0136	0.06	0.00	0.0122	1.43	5.06	1009.87***	-6.36***	0.361	0.279	0.254	0.216	0.173	
<b>Markets</b>																
HOSE	340	RM	0.0119	0.05	0.00	0.0105	1.31	4.33	699.47***	-6.10***	0.357	0.286	0.271	0.231	0.189	
		CSAD	0.0190	0.04	0.002	0.0049	(0.13)	5.03	339.51***	-5.71***	0.517	0.434	0.410	0.300	0.283	
HNX	432	RM	0.0157	0.08	0.00	0.0142	1.53	5.74	1367.58***	-7.10***	0.371	0.278	0.244	0.212	0.166	
		CSAD	0.0265	0.059	0.003	0.0059	0.036	5.70	589.65***	-8.77***	0.595	0.512	0.481	0.324	0.289	
HANG SENG		RM	(0.0001)	0.13	(0.31)	0.0188	(2.28)	48.47	168390.7***	-49.47***	(0.040)	0.031	(0.041)	0.015	0.034	
		RM	0.0001	0.11	(0.09)	0.0143	(0.30)	12.17	6802.55***	-50.16***	(0.132)	(0.033)	0.025	(0.057)	0.025	

This table reports the mean, standard deviation, skewness, kurtosis of the Cross-sectional Absolute Deviation (CSAD) and the market return ( $R_m$ ) over sample period for all industries in market Vietnam and HOSE, HNX, HANGSENG, S&P 500 stock markets. In addition, serial correlation of CSAD and  $R_m$  is represented for lags 1, 2, 3, 15 and 20 along with the test statistics of the Jarque-Bera test for normality and the Augmented Dickey-Fuller (ADF) test for stationarity. (\*\*\*) represent statistical significance 1%.

Sectors/ Markets	Const.	$R_{m,t}$	$R^2_{m,t}$	Adj.R <sup>2</sup>	DW
Real estates	0.0198***	0.2005***	(6.2945)***	0.0560	0.88
Retails	0.0147***	0.3612***	(9.9699)***	0.0510	1.16
Information technology	0.0231***	0.1127***	(3.7699)***	0.0289	1.12
Tourist – entertainment	0.0219***	(0.0058)	(1.7883)*	0.0126	1.28

Financial services	0.0159***	0.1644***	(1.9272) ***	0.0229	1.21
Electricity, water, petrol,gas	0.0167***	0.2545***	(5.6552) ***	0.0325	1.14
Chemical	0.0171***	0.2458***	(5.6680) ***	0.0292	1.21
Goods -industry services	0.0239***	0.1042***	(4.0491) ***	0.0408	0.74
Personal - household goods	0.0203***	0.1532***	(4.3411) ***	0.0194	1.22
Banking – insurance	0.0125***	0.2772***	(3.3334) ***	0.0522	1.38
Car parts – accessories	0.0210***	0.0376	(2.4487) **	0.0207	1.38
Communications	0.0265***	(0.1005) **	2.5655***	0.0185	1.34
Essential resources	0.0216***	0.1719***	(4.8258) ***	0.0341	1.00
Foods – beverage	0.0201***	0.2844***	(9.4129) ***	0.0914	0.82
Constructions – material	0.0248***	0.0995***	(2.3086) ***	0.0127	0.79
Medical	0.0207***	(0.239) ***	3.9116***	0.0182	1.24
HOSE	0.0177***	0.3683***	(12.092) ***	0.1561	0.63
HNX	0.0256***	0.1421***	(2.7233) ***	0.0196	0.76
ALL-stocks	0.0220***	0.1854***	(4.3664) ***	0.0318	0.74

*This table reports the estimated coefficients, t-statistics, adjusted R<sup>2</sup> and Durbin-Waston of the Equ. (2). \*\*\*, \*\*, and\* represent statistical significance at the 1%, 5%, and 10% levels, respectively.*

Tab. 3 - Regression results of the daily CSAD on Equ. (3)for period from 01/01/2007 to 10/17/2014

<b>Sectors/ Markets</b>	<b>Const.</b>	<b>R<sub>m,t</sub></b>	<b>(R<sub>m,t</sub> - R<sub>m</sub>)<sup>2</sup></b>	<b>CSAD<sub>m,t-1</sub></b>	<b>Adj.R2</b>	<b>DW</b>
Real estates	0.0113***	0.0027	(6.0258) ***	0.4896***	0.2954	1.98
Retails	0.0104***	0.0352	(8.0001) ***	0.4042***	0.2119	2.16
Information technology	0.0146***	(0.0038)	(3.7739) ***	0.4012***	0.1897	2.08
Tourist – entertainment	0.0148***	(0.0667)***	(1.0953)	0.3561***	0.1388	2.10
Financial services	0.0096***	0.0642***	(1.8050) ***	0.4181***	0.1940	2.19
Electricity, water, petrol, gas	0.0104***	0.0787***	(5.3819) ***	0.4104***	0.1992	2.12
Chemical	0.0114***	0.0690***	(5.3807) ***	0.3729***	0.1664	2.05
Goods- industry services	0.0107***	0.0126	(4.3297) ***	0.5699***	0.3660	2.10
Personal - household goods	0.0136***	0.0213	(4.8467) ***	0.3665***	0.1524	2.02
Banking – insurance	0.0087***	0.1408***	(3.1652) ***	0.3317***	0.1570	2.15
Car parts – accessories	0.0159***	(0.0573) ***	(2.2081) ***	0.2890***	0.1045	2.04
Communications	0.0174***	(0.0283)	2.4052***	0.3293***	0.1268	2.10
Essential resources	0.0131***	0.0088	(5.2375) ***	0.4427***	0.2283	2.03
Foods – beverage	0.0110***	0.0608***	(9.1183) ***	0.4889***	0.3300	1.98
Constructions – material	0.0108***	0.0167	(2.4781) ***	0.5825***	0.3517	2.21
Medical	0.0125***	(0.1145) ***	4.3514***	0.3827***	0.1618	2.13
All-stocks	0.0094***	0.0494***	(4.3616) ***	0.5890***	0.3782	2.13
HOSE	0.0096***	0.0773***	(11.873) ***	0.5124***	0.4191	1.81

<b>HNX</b>	0.0106***	0.0401***	(2.7230) ***	0.5979***	0.3769	2.21
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*This table reports the estimated coefficients, t-statistics, adjusted R<sup>2</sup> and Durbin-Waston of the Equ. (3).  
\*\*\*, \*\*, and \* represent statistical significance at the 1%, 5%, and 10% levels respectively.*

Tab.4 and Tab.5 presents regression results for both sub-periods respectively. In the first sub-period, herd behavior is absent in three sectors including Financial services, Car Parts-Accessories, and Communications. Results for other sectors show strong evidence of herding with significant negative coefficients  $\beta_2$  at 1% level in most cases. It is noticeable that Medical sector only exhibits presence of herding in the first sub-period.

Tab. 4 -Regression results of the daily CSAD on Equ. (3)for the period from 01/01/2007 to 12/31/2010

<b>Sectors/ Markets</b>	<b>Const.</b>	<b> R<sub>m,t</sub> </b>	<b>( R<sub>m,t</sub>  -R<sub>m</sub>)<sup>2</sup></b>	<b>CSAD<sub>m,t-1</sub></b>	<b>Adj.R2</b>	<b>DW</b>
Real estates	0.0123***	(0.0613) ***	(4.8576) ***	0.4449***	0.2467	1.88
Information technology	0.0152***	(0.1257) ***	(4.5765) ***	0.3759***	0.1995	2.02
Tourist – entertainment	0.0094***	0.0563***	(1.0121)	0.3480***	0.1385	2.13
Financial services	0.0115***	(0.0268)	(3.0124) ***	0.4237***	0.1936	2.08
Electricity, water, petrol,gas	0.0133***	(0.0455) **	(3.0985) ***	0.3561***	0.1496	1.97
Chemical	0.0109***	(0.0298) *	(3.5681) ***	0.5625***	0.3431	2.05
Goods - industry services	0.0146***	(0.0909) ***	(2.1139) **	0.3858***	0.1718	1.98
Personal - household goods	0.0095***	0.0696***	(1.8646) ***	0.3308***	0.1239	2.16
Banking- insurance	0.0157***	(0.1244) ***	1.0614	0.2844***	0.1021	2.01
Car parts – accessories	0.0186***	(0.0900) ***	4.5353***	0.3092***	0.1472	2.06
Communications	0.0145***	(0.0977) ***	(2.8689) ***	0.4508***	0.2410	1.98
Essential resources	0.0119***	(0.0293)	(7.9221) ***	0.4760***	0.3228	1.85
Foods and beverage	0.0108***	(0.0293)*	(1.2547) **	0.5877***	0.3429	2.18
Constructions – material	0.0115***	(0.0173) ***	(10.4739) ***	0.4125***	0.2717	2.01
<b>All-stocks</b>	0.0100***	(0.0353) **	(2.3698) ***	0.6007***	0.3723	2.09
<b>HOSE</b>	0.0109***	(0.0273)*	(11.0860) ***	0.5027***	0.4077	1.69
<b>HNX</b>	0.0108***	(0.0189)	(1.5773) ***	0.6078***	0.3719	2.18

*This table reports the estimated coefficients, t-statistics, adjusted R square and Durbin-Waston of the Equ. (3).  
\*\*\*, \*\*, and \* represent statistical significance at the 1%, 5%, and 10% levels respectively.*

Tab.5 -Regression results of the daily CSAD on Equ. (3)for the period from 01/01/2011 to 10/17/2014

Sectors/ Markets	Const.	R <sub>m,t</sub>	( R <sub>m,t</sub>  -R <sub>m</sub> ) <sup>2</sup>	CSAD <sub>m,t-1</sub>	Adj.R2	DW
Real estates	0.0106***	0.0993***	(4.5943) ***	0.4896***	0.2822	2.21
Retails	0.0130***	0.2344***	3.1128**	0.2068***	0.1330	2.08
Information technology	0.0171***	0.1474***	(6.3057) ***	0.2828***	0.1200	2.12
Tourist – entertainment	0.0160***	0.0409	15.3433***	0.2337***	0.2375	1.97
Financial services	0.0113***	0.116***	(2.6233) ***	0.3649***	0.2156	2.27
Electricity, water, petrol,gas	0.0099***	0.2385***	(6.5455) ***	0.3567***	0.2662	2.18
Chemical	0.0097***	0.2138***	(4.7525) ***	0.3831***	0.2567	2.16
Goods - industry services	0.0129***	0.1205***	(4.5377) ***	0.4641***	0.2598	2.16
Personal - household goods	0.0133***	0.191***	(5.2514) ***	0.3032***	0.1579	2.07
Banking – insurance	0.0075***	0.3226***	(8.0421) ***	0.3208***	0.2987	2.14
Car parts – accessories	0.0166***	0.1216***	(8.4504) ***	0.2208***	0.0742	2.01
Communications	0.0150***	0.1953***	(6.5680) ***	0.3577***	0.1611	2.11
Essential resources	0.0119***	0.1434***	(6.6678) ***	0.4195***	0.2534	2.16
Foods – beverage	0.0117***	0.1913***	(3.4904) **	0.4171***	0.2686	2.18
Constructions – material	0.0127***	0.1322***	(5.4787) ***	0.4829***	0.3184	2.24
Medical	0.0157***	0.1269***	10.4719***	0.183***	0.3296	1.89
<b>All-stocks</b>	0.0108***	0.1943***	(5.8691) ***	0.4827***	0.4514	2.23
<b>HOSE</b>	0.0091***	0.1955***	(7.3087) ***	0.4813***	0.4081	2.21
<b>HNX</b>	0.0126***	0.1589***	(3.9913) ***	0.4913***	0.3857	2.25

*This table reports the estimated coefficients, t-statistics, adjusted R square and Durbin-Waston of the Equ. (3).\*\*\*, \*\*, and \* represent statistical significance at the 1%, 5%, and 10% levels respectively.*

In the later sub-period, evidence of herding is not found in Retails, Medical, Tourist, and Entertainment with statistically significant positive  $\beta_2$  at 1% level. The others exhibit strong evidence of herding with negative  $\beta_2$  and statistically significant at 1%. In this sub-period, the degree of herding is very strong with all coefficient  $\beta_2$  smaller than -2.5. The herding is strongest in Car Parts-Accessories and smallest in Financial services with  $\beta_2$  of -8.4504 and -2.6233 respectively.

Due to the strong degree of herding found in the second sub-period, we further investigate investors' herding by dividing the second sub-period into two more sub-periods. Particularly, the first sub-period is from 01/01/2011 to 12/31/2012 and the second sub-period is from 01/01/2013 to 10/17/2014. Equ.(3) is estimated for the two sub-period and the results are respectively shown in Tab.6 and Tab. 7. In the first sub-period, strong herding is found in all sectors with high significantly negative  $\beta_2$  coefficients. However, the result indicates dissimilar findings in the second sub-period. According to the results disclosed in Tab.7, there are only seven sectors in which herd behavior is disclosed, including Real estates, Information technology, Financial services, Banking-Insurance, Car Parts-Accessories, Essential resources, and Construction-Materials. It is also worth noting that Tourist-

Entertainment exhibits no evidence of herding in both sub-periods. Banking- insurances, and Car Parts-Accessories show an existence of herding only in the second sub-period. Conversely, herd behavior is only found in the first sub-period in the case of Medical sector. Other sectors yield strong significantly positive  $\beta_2$  coefficients in the two sub-periods, indicating a presence of herd behavior.

Tab. 6 - Regression results of the daily CSAD on Equ. (3) for period from 01/01/2011 to 12/31/2012

Sectors/ Markets	Const.	R <sub>m,t</sub>	(   R <sub>m,t</sub>   -R <sub>m</sub> ) <sup>2</sup>	CSAD <sub>m,t-1</sub>	Adj.R2	DW
Real estates	0.0110***	0.0731***	(8.5422) ***	0.4757***	0.3169	2.16
Retails	0.0128***	0.1516***	(10.4551) ***	0.2514***	0.0833	2.04
Information technology	0.0195***	0.0935***	(8.9834) ***	0.1906***	0.0708	2.07
Tourist – entertainment	0.0157***	0.0699**	(9.3783) ***	0.2514***	0.0791	1.99
Financial services	0.0145***	0.0537***	(7.9771) ***	0.3154***	0.1767	2.09
Electricity, water, petrol,gas	0.0109***	0.1941***	(9.8464) ***	0.3582***	0.2283	2.12
Chemical	0.0096***	0.1539***	(6.5213) ***	0.4498***	0.2785	2.22
Goods - industry services	0.0129***	0.1130***	(9.6332) ***	0.4608***	0.2948	2.02
Personal - household goods	0.0140***	0.1316***	(9.2026) ***	0.3066***	0.1328	2.04
Banking – insurance	0.0083***	0.2440***	(8.4539) ***	0.3338***	0.2372	2.09
Car parts – accessories	0.0199***	0.0097	(11.8431) ***	0.1590***	0.1012	1.90
Communications	0.0158***	0.0962**	(10.1677) ***	0.3639***	0.1572	2.03
Essential resources	0.0152***	0.0891***	(9.3149) ***	0.2911***	0.1776	1.97
Foods – beverage	0.0108***	0.1430***	(9.4665) ***	0.4830***	0.2846	2.26
Constructions – materials	0.0146***	0.0855***	(7.8060) ***	0.4217***	0.2761	2.12
Medical	0.0147***	0.1713***	(10.8108) ***	0.2942***	0.1174	2.02
<b>All-stocks</b>	0.0100***	0.1485***	(9.2964) ***	0.5311***	0.4703	2.24
<b>HOSE</b>	0.0076***	0.1462***	(12.0662) ***	0.5753***	0.4924	2.16
<b>HNX</b>	0.0132***	0.1143***	(6.3707) ***	0.4762***	0.3502	2.23

*This table reports the estimated coefficients, t-statistics, adjusted R square and Durbin-Waston of the Equ. (3). \*\*\*, \*\*, and \* represent statistical significance at the 1%, 5%, and 10% levels respectively.*

Chang et al. (2000) discussed that the existence of herding may be a result of either a strong intervention of government relating to monetary policy or the impact of company's information disclosure on the financial market. In frontier markets such as Vietnamese market, the presence of inefficient information disclosure may provide market participants with lack of fundamental information. As a result, they tend to make their investment decisions based on other information, especially information relevant to industry. It is noticeable that, during the period from 01/01/2011 to 31/12/2012, evidence of herd behavior is strongly found in all sectors. A possible reason for this observation is that Vietnamese government announced much macroeconomic related information which has significant

impact on all sectors during this period. In other periods, macroeconomic information may affect some of the sectors only, causing the inconsistency of herding among the sub-periods.

Besides, in the study of Chang et al. (2000), adjusted  $R^2$  values were used to evaluate the impact of macroeconomic information and firm-specific information on investor behavior. They also argued that portfolio with higher adjusted  $R^2$  value indicates a higher influence of macroeconomic information compared to firm-specific information. Adapting to this dispute, the study further examines if macroeconomic information plays a relative important role than sector-specific information in Vietnamese stock markets. It is interesting that the results estimated from the modified models of the three market portfolios (all-stocks, HOSE, and HNX portfolio) indicate a higher value of adjusted  $R^2$  compared to adjusted  $R^2$  value obtained from all sectors. This implies that macroeconomic information may have a greater impact on investor behavior in Vietnamese stock market.

Tab. 7 - Regression results of the daily CSAD on Equ. (3) for period from 01/01/2013 to 10/17/2014

Sectors/ Markets	Const.	$R_{m,t}$	$( R_{m,t} - R_m )^2$	$CSAD_{m,t-1}$	Adj.R2	DW
Real estates	0.0126***	0.1769***	(3.9890) ***	0.3924***	0.2731	2.16
Retails	0.0141***	0.3384***	2.4128***	0.1615***	0.1619	2.05
Information technology	0.0162***	0.2628***	(5.2492) ***	0.2980***	0.1879	2.13
Tourist – entertainment	0.0177***	0.1801***	16.2144***	0.1646***	0.3621	1.92
Financial services	0.0095***	0.2131***	(3.0032) ***	0.3679***	0.3682	2.22
Electricity, water, petrol, gas	0.0096***	0.2940***	(2.5285)	0.3135***	0.3192	2.17
Chemical	0.0106***	0.2628***	(0.2249)	0.2705***	0.2068	2.05
Goods - industry services	0.0149***	0.1966***	(1.3045)	0.3818***	0.2747	2.13
Personal - household goods	0.0125***	0.2977***	(2.5164)	0.2961***	0.2261	2.05
Banking – insurance	0.0069***	0.4361***	(7.5918) ***	0.2868***	0.3645	2.17
Car parts – accessories	0.0141***	0.2655***	(4.6793) *	0.2392***	0.1394	2.02
Communications	0.0138***	0.3491***	(2.7794)	0.3542***	0.2142	2.09
Essential resources	0.0101***	0.2344***	(3.5472) ***	0.4696***	0.4048	2.18
Foods – beverage	0.0122***	0.2551***	3.5236	0.3702***	0.3412	2.09
Constructions – material	0.0140***	0.2469***	(3.3867) ***	0.4155***	0.4408	2.27
Medical	0.0146***	0.2983***	9.5150***	0.1204***	0.4930	1.81
<b>All-stocks</b>	0.0131***	0.3077***	(3.6564) ***	0.3645***	0.5875	2.18
<b>HOSE</b>	0.0114***	0.2960***	(4.8860) ***	0.3431***	0.4935	2.18
<b>HNX</b>	0.0151***	0.3030***	(2.5293) ***	0.3784***	0.5527	2.13

*This table reports the estimated coefficients, t-statistics, adjusted R square and Durbin-Waston of the Equ. (3). \*\*\*, \*\*, and \* represent statistical significance at the 1%, 5%, and 10% levels respectively.*

Tab.8 provides results for the existence of cross herding between HOSE and HNX during the studied period. HOSE is affected by HNX information but no conclusion on herd behavior can be drawn. On the other hand,  $\beta_4$  coefficient is equal to 0.9455 and statistically significant

at 1% level. It is interesting that herd behavior is very strong within HOSE market with statistically negative  $\beta_2$  coefficient of -13.7819. Conversely, HOSE market significantly affects herd behavior in HNX market with significant coefficient  $\beta_4$  of -3.6813. However, internal herding in this market is relatively low with  $\beta_2$  coefficient of -1.6288.

Tab.8 - Regression results of the daily CSAD on Equ. (4a) and (4b) for period from 01/01/2007 to 10/17/2014

Markets	Const.	$\beta_1$	$\beta_2$	$\beta_3$	$\beta_4$	Adj.R <sup>2</sup>	DW
HOSE	0.0097***	0.0456***	-13.7819***	0.5192***	0.9445***	0.4249	1.81
HNX	0.0102***	0.1087***	-1.6288***	0.5981***	-3.6813***	0.3928	2.18

*This table reports the estimated coefficients, t-statistics, adjusted R<sup>2</sup> and Durbin-Waston of the Equ.(4a) and (4b).\*\*\* represents statistical significance at the 1%.*

Tab.9 shows regressive result for Equ.(5). The result indicates the impact of other markets' information on herd behavior found in Vietnamese stock market. A negative and insignificant coefficient of -0.63 is observed in HOSE, indicating that SP500 has no impact on HOSE. In the case of Hong Kong market with HSI,  $\beta_4$  coefficient is 0.3594 and statistically significant at 1% level. The positive coefficient  $\beta_4$  implies that information from Hong Kong stock market have an effect on HOSE. Alternatively, SP 500 distresses HNX and all-stocks portfolios with  $\beta_4$  are -0.4856 and -0.3929, respectively. The two portfolios are also affected by information of HSI with statistically significant positive  $\beta_5$  at 1% level.

Tab.9 - Regression results of the daily CSAD on Equ. (5)for period from 01/01/2007 to 10/17/2014

Markets	Const.	$ R_{m,t} $	$( R_{m,t}  - R_m)^2$	CSAD <sub>m,t-1</sub>	SP500(-1) <sup>2</sup> <sub>m,t-1</sub>	HSI <sup>2</sup> <sub>m,t</sub>
HOSE	0.0095***	0.0735***	-12.0206***	0.5159***	-0.04000	0.3361***
HNX	0.0104***	0.0410***	-2.7543***	0.6022***	-0.4856***	0.2993***
All-stocks	0.0093***	0.0484***	-4.4002***	0.5946***	-0.3929***	0.3661***

*This table reports the estimated coefficients, t-statistics, adjusted R<sup>2</sup> and Durbin-Waston of the Equ. (5). \*\*\* represents statistical significance at the 1%.*

Tab. 10 - Regression results of the Daily CSAD on Equ. (6a) and (6b) for the period from 01/01/2007 to 10/17/2014

Markets	Conditions	Const.	$ R_{m,t} $	$( R_{m,t}  - R_m)^2$	CSAD <sub>m,t-1</sub>	Adj.R2	DW
All-stocks	UP (R <sub>m,t</sub> >0)	0.0108***	0.0526***	(5.3542) ***	0.5305***	0.3334	2.09
HOSE		0.0109***	0.0852***	(13.6632) ***	0.4456***	0.4115	1.74
HNX		0.0115***	0.0392**	(3.8018) ***	0.5696***	0.3612	2.12
All-stocks	DOWN (R <sub>m,t</sub> <0)	0.0084***	0.0522***	(3.7550) ***	0.6305***	0.4148	2.19
HOSE		0.0078***	0.0784***	(10.5577) ***	0.6030***	0.4822	1.91
HNX		0.0107***	0.0410***	(2.0114) ***	0.5891***	0.3563	2.23

*This table reports the estimated coefficients, t-statistics, adjusted R<sup>2</sup> and Durbin-Waston of the Equ. (6a) and (6b).\*\*\* represents statistical significance at the 1%.*

Tab.10 discloses regression results for Equ.(6a) and Equ.(6b) in both up and down market scenario for HOSE, HNX and all-stocks portfolio. The results indicate that herd behavior

exists in all market portfolios under both up and down markets. All  $\beta_2$  coefficients are statistically significant negative at 1% level. This implies that market participants react to both up and down market. By comparing the coefficients value of  $\beta_2$ , it is worth noting that herding tend to be stronger in the up market. Besides, HOSE portfolio exhibits stronger degree of herding compared to other two market portfolios. The finding is inconsistent to the study of Chen (2013) which indicates that there is no evidence of herding in both up and down market using CSAD method. However, Chen (2013) conducted the study during the period from 01/01/2007 to 31/12/2009 with the usage of original herding testing model suggested by Chang et al. (2000). Therefore, the inconsistency in findings may be caused by the difference in studied period and model employed.

## **5 CONCLUSIONS**

This study investigates behavior of investors in Vietnamese stock market during the period from 01/01/2006 to 17/10/2014. The original models proposed by Chang et al. (2000) were used to test herd behavior in 16 sectors and two market portfolio namely HOSE and HNX. Besides, modified models were also employed to remove multicollinearity and autocorrelation problems in estimating regression models.

By estimating the modified models and dividing the studied period into sub-periods, the study's results indicate an existence of herding in all sectors in Vietnamese stock market. Especially, five sectors which exhibit herding in all periods including Real estates, Information technology, Financial services, Essential resources, and Construction-Materials. When further testing the herding in a shorter period from 01/01/2011 to 31/12/2012, strong degree of herding is found in all sectors. Besides, the estimating results for all market portfolios specify the presence of herding in all periods.

Additionally, we use a modified model to capture any impact of international stock markets on investor behavior in Vietnamese market. The results show that herd behavior found in HNX and all-stocks portfolios are affected by the U.S stock market. In the case of HOSE portfolio, investor behavior is also affected by the U.S stock market but no conclusion of herding could be confirmed. Events in Hong Kong stock market have a relatively effect on HOSE, HNX and all-stocks portfolio but no evidence of herding was reported. In the other words, market participants in Vietnam always observe the market movement of U.S and Hong Kong. However, their investment decisions are likely to make based on the U.S movement.

Finally, investor behavior is driven by market scenarios. The study show that investors tend to herd in both up and down markets. This finding is consistent in all market portfolios. Besides, the study provides strong evidence showing that investors in HNX market are likely to herd based on the information from HOSE market. Conversely, movements from HOSE market do not lead investors to herd in HNX.

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## **THE ECONOMIC VALUE ADDED ALGORITHM RISKS IN THE CONTEXT OF CORPORATE PERFORMANCE MEASUREMENT SYSTEM**

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### **Abstract**

The paper presents the results of a partial research in the area of corporate performance measurement performed within the project SGS-2015-021 Development of financial management approaches as a tool of company value growth. It analyzes, evaluates and summarizes the advantages and limitations of the Value-Based Management concept (further just VBM) – a modern management approach that offers a rich potential for companies all around the world and across business areas about how to strengthen and keep their competitiveness. The risk analysis results are presented – the problems connected to the economic value added (further just EVA) algorithm, the obstacles for a clear EVA indicator quantification. Business entities should not neglect these problems, obstacles and risks if the set targets, for which the approach was introduced in the enterprise, are to be completed by the means of implemented VBM concept. In the context of corporate performance measurement risk management, the most attention in this paper is devoted to the topic of corporate capital costs determination. It is one of the most urgent problems during the implementation of VBM concept principles in corporate practice. At the end selected methodical processes (pricing models) which are used for corporate capital costs determination are discussed and critically evaluated. The main outputs of the performed qualitative research present the generalized recommendations and methodology support in the area of capital profitability evaluation and economic value added with a special focus on risk identification and analysis in the process of their quantification.

*Keywords: corporate performance measurement system, Economic Value Added, interest rate, risk, Value-Based Management*

JEL Classification: G32

### **1 INTRODUCTION**

It is possible to quantify the impacts of the planned (future) or the realized economic decisions of an enterprise by application of suitable methods and tools for corporate financial performance measurement. In the short time horizon (period of approximately until one year) the effectiveness of an enterprise as a whole (on the basis of the legally enshrined obligation of data in the financial statements publication) is researched. On the other hand (also in the short time horizon) the effectiveness of corporate parts, levels to the level of processes, operations and activities are researched as well; it happens on the basis of corporate sub-reports compared with budgets and forecasts and supporting managerial decision making. In the medium-term (period of 1 to 5 years) the business success and in the long-term outlook the competitiveness of the enterprise is researched, which is confirmed by the tendencies in the corporate practice development and also the conclusions of academic debates.

The topics of corporate value creation and management (in the optimization meaning) are still more getting in the corporate limelight. For an enterprise it is essential not only to achieve short-term performance (effectiveness the most often measured in conditions of the Czech

Republic by the financial analysis ratio indicators) but also the necessity to assure a sufficient reward for the current investors for their risk of investing their free capital in the enterprise, which they presume and demand to valorize at the best (as high as possible and as fast as possible) (IMA). Therefore the researched topic of this paper is the Value-Based Management (further just VBM) concept, namely the selected problems associated with the economic value added (further just EVA) concept - one criterion for corporate performance measurement of the VBM concept use in the short-term in corporate practice.

The corporate VBM concept together with the EVA indicator represents the major breakpoint in the view on corporate financial performance (Stewart, 1991, Venanzi, 2012, Mařík & Maříková, 2005). The meaning of VBM concept based management is to help the made managerial decisions to always have positive influence and impacts on the corporate value by a lot of instruments. As Ittner and Larcker (2001) present, in the current corporate practice the value management is ideally perceived as a complex system which integrates strategy, processes, corporate culture and also the analytic techniques for performance measurement (Knápková, Pavelková, 2005).

Out of the whole complex area of VBM this paper is specifically focused on the corporate performance measurement based on the quantification of the corporate EVA. For now let's forget the fact that the idea of economic value added is already used in the current corporate practice not only in the form of a „mere“ EVA indicator but also as a benchmarking tool, motivational element, for appraisal of the enterprise etc., thus as a comprehensive concept of economic value added produced by the enterprise. The theoretical basis of EVA indicator and its application beginning in the corporate practice in accordance with the main idea of VBM reflect the investors' effort to find such business entities by which there is the highest probability that their potential investment of these investors will lead to the growth of their wealth. Furthermore, the value of EVA indicator provides the enterprise for which is the EVA indicator calculated, the information, whether transaction of business sufficiently contributes to reward the existing owners and shareholders considering their expectations and possible investment alternatives.

In the first part of the paper a so-called one-scenario approach is presumed. The one-scenario approach is a very often feature in the corporate practice of the business entities in the Czech Republic. In corporate practice there is often worked with just one version of future development. Not only the small pro-export oriented economy of the Czech Republic is affected by the globalization tendencies, as some like to point out by turbulences and rapid development.

The EVA indicator value quantification is connected to a few problems which are analyzed in detail in this paper. The methodical processes (appraising models) how to quantify the risk as accurately as possibly are discussed and critically analyzed. They are the risks which the investors take by inserting their sources in a firm and thereby also the profitability necessary for the corporate value creation. How to minimize the risks associated with the EVA indicator algorithm, the indicator which appears to be an effective managerial tool for performance and effectiveness growth of a firm and for value creation for owners (shareholders)?

Some authors consider the financial performance and the economic performance to be synonyms; others strictly distinguish these two terms (Burešová & Dvořáková, 2013, 2014). The authors associate the financial performance with the traditional methods and tools for corporate performance measurement while the economic performance with modern concepts, methods and tools for corporate performance measurement.

## **2 THE RESEARCH PROBLEM SPECIFICATION, TARGETS OF THE PAPER AND USED RESEARCH METHODS**

The main target of the paper is to point out the pitfalls and problems associated with the economic value added calculation in the context of the reported values accuracy and correctness of this indicator in corporate practice. The risk analysis of EVA indicator algorithm is often neglected. A wide range of partial solutions versions exists within the EVA indicator calculation; it determines a high level of subjectivity in the financial decision-making and difficulties in benchmarking realization. Furthermore EVA indicator calculation procedure is not harmonized at the national level or in the worldwide context. That's why the problems associated with EVA indicator algorithm should be researched and discussed.

At first the benefits and the limitations of the VBM approach and EVA indicator will be summarized. The results of risk analysis will be presented. These risks should be taken into account by the business entity in management according to the VBM concept (approach), specifically according to EVA system regardless the subject (area) of business, product portfolio, corporate culture etc. It will be analyzed the problems associated with the calculation method of the EVA indicator, looked for a solution for identified problems and after various possible solutions will be discussed. Because one of the most urgent problems connected with EVA implementation into the corporate practice is the capital costs determination, also the usability of the methodical processes known in the financial theory (pricing models) for invested corporate capital costs determination in the conditions of the business entities in the Czech Republic will be evaluated.

On the basis of the problem definition the following basic **research questions** can be specified:

**Research question 1:** Does the methodology for the EVA indicator calculation provide accurate information about the corporate financial performance?

**Research question 2:** What kind of the valuation model for the own capital costs determining is for the EVA indicator calculation for the medium-sized enterprises in the Czech Republic the most suitable?

The outputs presented in this paper – the results of the partial research of a qualitative manner in the area of corporate performance measurement by the EVA indicator are achieved on the basis of critical literary search of local and foreign sources (book publications, professional journals, conference proceedings, research studies and information on websites, and mainly of available scientific and professional databases). Then the pair methods analysis-synthesis, the technique of analysis and comparison of scientific knowledge in the selected topic were used.

## **3 THEORETICAL BASES**

### **3.1 The comparison of the value-based indicators of the VBM concept with the traditional financial analysis tools**

The previously published international studies and performed researches (e.g. Bain & Company, 2011, Rigby & Bilodeau, 2013) show the results that economic value added (EVA indicator) and traditional financial analysis tools are the most famous and in the long-term steadily most often used in the corporate practice in the world context for corporate performance measurement in its financial management.

Although the small and medium enterprises (further just SME) in the Czech Republic are mostly aware of the clear advantages which the VBM concept and its subsequent methods and tools bring, a lot of them still use the traditional approaches – financial analysis methods and

tools – for the corporate performance measurement in spite of the increasing pressure and growing emphasis on competitiveness maintaining and strengthening. Within the financial analysis the most used is the ratio analysis (ratio indicators of rentability, activity, solvency/liquidity, indebtedness; or indicators of the capital market and productivity). Most of these indicators are monitored in a one year horizon (most often once a year), the selected indicators are then evaluated in time in terms of trend or within benchmarking (e.g. rentability and liquidity indicators).

The criticism of traditional indicators of corporate economy results from the conception barrier between the performance measured on the accounting data basis and market perception of the enterprise. The accounting results do not always correspond with the economic view on an enterprise.

As a result of weaknesses and limitations of the traditional financial performance measurement methods and tools in financial management there is an evident effort to find, enforce and introduce such indicators which could overcome objections to (mainly ratio) indicators of financial analysis (accounting indicators reflecting the financial effectiveness) – especially by including the time and risk factors into the corporate practice. The beneficial indicators with a high potential seem to be:

- indicators showing a close link to the shares value which should be statistically verifiable;
- indicators which enable to use as much potential hiding in the compulsory published accounting statements/annual reports of accounting units as possible – as large volume of information and data from the compulsory information subsystem of the enterprise (financial accounting) as possible;
- management accounting indicators measuring the managerial performance of the enterprise and enabling the streamline of the management of corporate activities, operations and processes.

Indicators which enable performance evaluation and corporate appraising at the same time also have an undeniable advantage.

The following advantages are associated with the modern indicators of economic performance compared with classical indicators of corporate financial performance (specifically e.g. EVA indicator):

- They provide more realistic information about corporate performance to the corporate management and at the same time they motivate the management to make decisions which would lead to firm's market value growth (EVA indicator works as a management tool);
- They evaluate the performance and effectiveness of corporate activities more accurately; the managers' interest in manipulating indicators decreases – e.g. EPS type (Earnings per Share), ROA (Return on Assets) or ROI (Return on Investment);
- They interconnect the interests of owners and managers better; involvement of the management in the economic value added growth simultaneously indirectly fulfils the interest of the firm owners. Thus the critical areas between the owners and the management are smoothed this way. Thus they contribute to removing the conflict of interest between the owners and the managers;
- They reduce the probability and impacts of intentional or unintentional manipulation with the reported level of economic result in accounting;
- They enable to reflect different risk level of corporate activities (financial and business risk, risk of corporate management etc.);
- They enable performance evaluation and also enterprise appraisal (EVA indicator has a strong link to the shares value, resp. the enterprise value, there is a close link between

EVA and MVA indicators);

- They can serve as the basis of the incentive systems for employees and for at least a rough inter-enterprise comparison.

The detractors often point out the following weaknesses of the VBM concept:

- The EVA indicator proceeds from the information and data of the corporate information subsystem – financial accounting (similarly to the traditional ratio indicators of financial analysis based on the retrospective evaluation of corporate performance). However data acquired out of the financial accounting subsystem are required too. Quantifying the result indicator value moreover requires a number of input data adaptations (accounting quantity of profit and invested capital) – to transform the accounting model to the economic model (Anderson, 2004, Venanzi, 2012).
- Apart from the difficult demands on data needed for the indicator calculation there is a large space for indicator result manipulation because it is necessary to be subjective while making the appraisal – especially of the capital costs and possibility of future expectations manipulations.
- The calculation of the own capital costs does not give a clear result even if more models are used.
- EVA does not work with the market values of corporate assets – thus does not express the real value creation, but again an accounting reality, however adapted.
- It is usually true that the higher EVA indicator value is the higher value the enterprise creates for the owners. However there are cases when the increasing EVA does not necessarily have to lead to corporate value rise. For example it happens in case when EVA increase at present was achieved at the expense of future super profits. It means that at corporate evaluation it is not possible to take into account just the EVA value at the present time (at the monitored and analyzed period) but it is necessary to predict the future development and the EVA indicator values. It is known and proved the dependence of the EVA indicator value on the corporate life cycle.

## **4 RESEARCH RESULTS**

### **4.1 Problems associated with EVA indicator algorithm**

Regardless in which form it is decided to quantify the EVA indicator value and to monitor its development, it is always necessary to remember the problems which come with the effort to quantify two values – NOPAT and WACC. Just these two quantities determine the result value of EVA indicator and the informative ability and accuracy of the calculated EVA depend on them.

Problematic points at the EVA indicator calculation can be summing up into these main categories:

1. NOPAT quantification
  - a) Operating economic result quantification.
  - b) Legal entities income tax rate determination.
2. WACC quantification
  - a) Other capital costs quantification.
  - b) Own capital costs quantification.
  - c) Own capital value determination.
  - d) Other capital value determination.
  - e) Legal entities income tax rate determination (t-tax(es)).
  - f) Determination of risk-free level profitability.

NOPAT is the profit from operation activity. However Czech accounting regulations (specifically the accounting law, implementing decrees, Czech accounting standards) do not know it in an explicit form. It is not possible to correctly identify NOPAT with any exact output of financial accounting – operating economic result (e.g. EBIT, EBDIT etc.) or an economic result in a common period (e.g. EAT). The reason is that EBIT, EBT or EAT and others can contain components which are not related to operation assets. The EBIT, EBT or EAT values can be influenced by not only the operation revenues and costs but also the costs or revenues from financial operations and transactions or special events impacts. As Kislingerová (2001) states in a contrast NOPAT is a quantity which reflects the real economic benefit of the enterprise for its owners from the main (operating) activities. The capital is the assets related to the corporate operation activity. The operation activity of an enterprise depends on the exact conditions and situation in which the company operates (it usually is the main activity/business area). In this context Mařík (2003) points out the necessity to keep the relations between operation assets and the economic result achieved by the operation activity.

The size of Weighted Average Cost of Capital (WACC) - an actual minimum required rate of return that must be achieved minimally in an enterprise, is influenced by the costs of individual (partial) kinds of capital which the main corporate (operation) activities are financed by and the share of these individual capital kinds on the total volume (value) of capital. The result WACC value is a weighted arithmetic average of costs on individual items of corporate capital; when the scales are these capital items' shares on the total capital.

#### **Risk-free level of profitability determination ( $r_f$ )**

One of the first problems which is brought by the quantification of invested capital costs (discount level) is the risk-free level of profitability determination. Although the pricing models/methodical procedures of quantification of problematic own capital costs work with the risk-free revenue rate in various forms, they use various „risk-free“ assets or assets burdened with minimal (the limit is near zero) risk level, in fact there is nothing like entirely risk-free assets (in other words assets whose profitability is burdened by zero risk) (Gavřáková, Kormanáková & Rypáková, 2014, Mařík & Maříková, 2007). It is difficult to find an asset, whose rate of return is burdened with zero risk - therefore there is no risk of default, minimum risk of non-liquidity, the minimum risk arising from their subsequent reinvestment after the time of maturity. But still the risk-free assets and also the risk-free level of profitability are valuable tools and instruments at certain presumptions (Pratt, 2008).

The financial theory offers a few ways how to proceed during the risk-free rate determination, what basis to choose for the follow-up EVA indicator quantification calculations. However, it is always necessary to observe the symmetry from the point of view of time, at which the funds are to be invested. For the risk-free rate it is always necessary to find such assets, whose maturities would correspond to the "life" of the enterprise. In the case of business incomes it is considered with generating revenues for the stage, on which the financial plan is drawn up (the so-called first phase), or to which the maturity of the corporate bonds is added and for the follow-up, time no longer unlimited horizon (so-called the second phase or perpetuity). In the ideal case, the risk-free rate of return should be set separately for each year of the first phase and for the second stage. In practice, however, companies have not applied it so far.

#### **Other capital costs determination ( $r_d$ )**

Other capital costs are determined as a weighted average of the effective interest payments (rates) which the enterprise pays from various forms of other capital (Mařík, 2003, Mařík & Maříková, 2007, Pratt, 2008). It is necessary to avoid a few pitfalls.

1. It is necessary to calculate just the costs of interest-bearing other capital which was



used for operation assets financing (e.g. loans, obligations, leasing financing etc.).

2. The assets which take part at the main operation activity have to be appropriately matched with the financial sources and then they have to be correctly appraised. Therefore the other capital costs need to be matched with the implicit interest rate contained in the leasing payments if the enterprise uses the leasing services.
3. On the contrary the other capital value is reduced by the interest earning liabilities (obligations to suppliers) because it is presumed that these obligations payments are included in the operation cash flows.
4. The values of individual capital items are transferred from corporate accounting reports – balance sheets, in accounting values. Thanks to the not very developed capital market in the Czech Republic compared to the capital markets in the Anglo-Saxon countries, it is very difficult to find out their market prices.

To determine the payments for other capital is thoroughly easy because they are generally strictly determined during making the relevant agreements. Therefore it is usually easier to determine the other capital costs than it is to estimate the own capital costs. However the data contained in the loan agreements (interest rate) needn't correspond with the market data. Hawawini (2002) recommends the enterprises which have issued obligations to calculate the revenues until the maturity date, which detects the other capital costs for the eminent. If the enterprise did not issue obligations, it is possible to approximate its other capital cost by the revenue of bonds traded on the market by an enterprise with the same rating (Mařík & Maříková, 2007). It is quite easy to find out the average interest by bank loans if the concluded loan agreements where the enterprise agreed on fixed interest rates are known. Then it is the weighted arithmetic average. However if it is an interest bound to an announced rate PRIBOR (Prague Interbank Offer Rate) or LIBOR (London Interbank Offer Rate) with a fixed percent surcharge, it is necessary to know the rating evaluation of the enterprise with the prognosis of the basic macro-economic indicators.

### **Own capital costs estimation ( $r_e$ )**

Although a lot of business entities behave as if the own capital was provided free of charge, it is not correct and it is necessary to calculate the own capital costs on the basis of the most credible method and to estimate them as accurately as possible. The own capital costs  $r_e$  are determined by the revenue expectations of the enterprise owners while their objective nature is the use of opportunity costs category. It is necessary to consider the revenue from other (unused) investment opportunity with the same level of risk for the own capital. But how to find one? And how to elaborately work with profitability and missed opportunities of investors when each has different preferences?

The value indicators take the risk factor into account. The risk is calculated until the appraisal either by adaptations/determination of risk surcharge into the discount level which is the more common version in corporate practice (and therefore it will be preferred in this paper), or by projected revenues adaptation – by the income reduction or as the case may be by the increase in expenditure components of cash flows due to the most likely estimates (so-called assurance coefficients). The use of a specific method depends especially on the availability of needed data. Before the data filling of the model itself it is necessary to find true answers to these types of questions:

- What are the markets conditions like? How developed are the markets where the researched enterprise operates?
- Is it possible to use and insert the data and information into appropriate models without problems and additional adaptations? If not, why and how will it be necessary to adapt the

data?

The choice of method for the own capital costs determination depends also on the legal form of business. If a joint-stock company is evaluated, to choose an appropriate method the essential fact is whether the shares of this business entity are traded on the capital market or not, which brings us back to the previous questions. In other words the nature and character of the market are the determiners of suitable methods for e.g. enterprise appraisal or corporate performance quantification.

The financial theory (e.g. Pratt, 2008, Dluhošová, 2004, Hawawini, 2002, Kislingerová, 2001, Copeland, 2000, Brealy & Myers, 2000, Ross, 1976) presents following ways for the own capital costs calculation, if we work with the risk surcharge as an indirect way to appraise the risks. The first group of models consists of approaches based on market data and taking into account only the systematic component of risk.

- CAPM Model (Capital Asset Pricing Model) – in the Czech Republic specifically e.g. CAPM-SML model beta version;
- APM model (arbitrage pricing model)/APT model (Arbitrage Pricing Theory);
- Dividend model DDM (Dividend Discount Model) also called the model of discounted dividends/Gordon's growth model (Gordon's model for stable growth).

The other group of models (so-called the build-up models) is based on the expert method of the cost of capital or the risk premium determining. The surveyed company's risk is evaluated by the use of a wider set of financial and non-financial risk factors. The build-up models take into account these types of corporate risks – the financial and business risks, not only systematic, they calculate the unsystematic (specific) risks as well. Thus they try to reach a higher level of objectivity in the determination of the cost of equity, the discount rate and ultimately the final value of the EVA indicator.

- Methodics of Garnett&Hill Company.
- Build-up method – In the Czech Republic specifically e.g. modular way/model according to Neumaierová et al (methodics of Ministry of Industry and Trade of the Czech Republic).

#### **4.2 Comparison of selected pricing models for the own capital costs determination ( $r_e$ )**

For the Anglo-Saxon countries and other economies with developed capital markets it is typical to use the capital asset pricing model CAPM (Sharpe, 1964, Lintner, 1965) or the APT model for the own capital costs estimation. Compared to the build-up approach within the surcharge method these models are connected to the market value of the enterprise. The Gordon's dividend model is appropriate for the enterprises which issue dividends to their shares. However for its weaknesses and too narrow use (Mařík & Maříková, 2007) it is not the topic of this paper.

##### **CAPM Model**

The capital asset pricing model (further just CAPM) in its general shape and form is based on a few assumptions (Kislingerová, 2001) which do not reflect the current capital market state, as is often reproached to the model authors. Although this model is often described as highly theoretical and detached from practice, as a result of these points of view – paradoxically – a lot of studies and empiric researches confirm this model to be a reliable tool for investors.

CAPM is based on the objectively observable inputs obtained from market data and, therefore, the market valuation of the risk. CAPM is based on inputs from highly developed and liquid capital market(s).

The risk of the model is quantified by a standard deviation of securities profitability from the average revenues. For the practical application of CAPM the least problematic seems to be the use of the expected long-term average of short-term treasury bills. But still the corporate practice clearly confirms that the long-term government bonds are a suitable basis for its use. The result value of CAPM can be significantly influenced also by:

- The risk-free rate value of profitability ( $r_f$ ).
- The value of the expected revenue of all market ( $r_m$ ) – can be determined on basis of the global index PX50 value or also by the country rating evaluation. The second possibility seems to be more suitable in view of the insufficient maturity of the capital market in the Czech Republic.
- The value of the market risk bonus (RMP) which is influenced by following factors:
  - Average revenues determination at the representative market index (e.g. PX50).
  - Risk-free asset revenue.
  - The security character.
  - The length of researched period.
  - The variability of revenues entering the calculation – calculation by arithmetic or geometric average.

The CAPM concept requires the difference ( $r_m - r_f$ ) to be expressed in expected values. However, a direct estimation of a future bonus is not possible and therefore the estimation of a future bonus (RMP) is often performed on the basis of the past value results achieved on capital markets. We assume that the past offers sufficient/appropriate estimation for the future development.

- The value of coefficient  $\beta$  – market risk  $\beta$  which is the scale of systematic risk. Mařík (2003) presents three basic ways how to estimate the  $\beta$  coefficient:
  - Procedure I usability – based on the past results (so-called historical  $\beta$ ) in corporate practice it is limited. We implicitly assume that the future, calculated  $\beta$  will not much differ from the historical value  $\beta$ .
  - Procedure II – analogy method is based on using the known value of coefficient  $\beta$  of similar business entities which are traded and whose activity is defined as non-diversified by an appraiser. Although there are searched the most similar business entities to the analyzed enterprise, we always have to count with certain differences. There are no two absolutely identical enterprises, enterprises with the same characteristics – business and financial risk. Therefore it is necessary, based on the expert estimation, to estimate/calculate the influence of these possible differences in business risk and financial risk which depend on the capital structure and take this into account in further calculations. Another version of the stated procedure which can also be used in practice are the average data about  $\beta$  for a certain business field or sector where the firm operates. The requirement to respect eventual differences between the analyzed business entity and the prevailing tendencies in the sector and their consideration in the calculations is also valid here. The average coefficients are presented either as indebted or as non-indebted. It is recommended to recalculate them in a specific capital structure of the researched enterprise.
  - Procedure III – estimation by independent prognosis is preferred in the corporate practice of Anglo-Saxon countries, in American firms practice.

This model has to be suitably adapted to the conditions of the concrete economy if it is made an effort to use the CAPM in enterprises' environment in the Czech Republic or in another economy with underdeveloped capital market. This is realized e.g. applications in the risk premium of the country in which the analyzed business entity operates. Further, it is

appropriate to take into account following situations and associated risks - the limited marketability of shares and stocks, the size of the enterprise, where appropriate, specific risks. The CAPM does not take into account the greater risk (rate of return) for companies that are smaller than big corporations. Therefore, it is necessary to take into consideration these differences that the CAPM fails to affect and to adjust the surcharge for market capitalization.

The risk premium of the country relies on the rating valuation of the country, which is through the difference of return of corporate bonds with the same rating as the country and the return of U.S. premium bonds factored into the risk premium of the market. This difference already involves a greater risk of investing in smaller Czech enterprises in comparison to larger U.S. evaluated companies. Risk and expected return associated with the incomparably smaller market capitalization of companies of the Czech economy compared to the companies in the U.S. it is therefore included in the margin for the risk of the country.

### **The APM model (the arbitrage pricing model) ~ the APT model (APT model – the arbitrage pricing theory model)**

The arbitrage pricing model APT is a more modern alternative of the CAPM model which brings the similarity of the advantages and weaknesses to the CAPM model. The ATP method is based on the three following assumptions (Kislingerová, 2001):

- it is possible to identify a limited number of macroeconomic factors,
- it is possible to measure the bonus for the expected risk for individual factors,
- it is possible to measure the sensitivity of each share to specific factors

The expected shareholder's revenue depends on the risk level coming from the general economic phenomena, not only from a unique specific risk. The APT theory is based on the same idea; in this aspect the APM model is similar to the CAPM model. However, in the CAPM model theory the bonus for risk depends on just one factor (coefficient)  $\beta$ , whereas in the ATP theory this bonus depends on a few macroeconomic factors – e.g. the inflation level, the economic activity level in the sector. Not only this applies that the APT theory requires a relatively wide information base which is one of the significant weaknesses.

### **The build-up model**

The build-up models are based on considering the risk in the form of risk surcharge, similarly to CAPM, APT, DDM models and others. The basis for discount rate calculation is again the risk-free level of profitability ( $r_f$ ). A specific feature of the build-up models is the fact that the risk bonus is the sum of specific items depending on the nature and level of risk of the researched/appraised enterprise.

In the conditions of little developed, insufficiently liquid and allocation inefficient capital market (this state is e.g. in the Czech Republic and other countries of the Visegrad system), the exact use of the capital assets pricing model (CAPM) and other methods based on the capital market (APT, DDM etc.) seems complicated. Therefore the Ministry of Industry and Trade of the Czech Republic created the INFA model which also belongs to the build-up models group of the own capital costs estimation and which is adapted for the specific conditions of a capital market of a small open economy of the Czech Republic. The own capital costs (calculated interest rate) according to the INFA model are calculated similarly to the classical build-up method, thus as a sum of the risk-free revenue level ( $r_f$ ) and the risk bonus (risk surcharges).

The main obstacle of the build-up model use for the own capital costs estimation ( $r_e$ ) is that the risk surcharges (RP) are often estimated from the accounting data but the EVA indicator is built on „economic“ quantities.

### The EVA factor model

The EVA factor model is built on the principles and the main ideas like e.g. the CAPM model. We can say that it is its wide-spread version. The EVA factor model develops the CAPM model in the sense that it attributes a lower level of the own capital costs ( $r_e$ ) to the enterprises with the stable positive value of EVA indicator than to the enterprises with volatile economic value added.

EVA factor model was created by authors Grant and Abate (Abate & Grant, 2001) with the target not to build the inputs on traditional accounting data (Grant, 2003, str. 223-231). The EVA factor model contains the systematic market risk (included in  $\beta$  from the CAPM model) as well as three systematic non-market factors (see formula 1):

$$r_e = CAPM + b_1 Size + b_2 NPV / Capital + b_3 SD_{EVA} \quad (1)$$

The factor *Size* corresponds to the market capitalization, the *NPV/Capital* ratio indicates the ability (or inability) of the enterprise to invest in value creation projects, *SDEVA* is a standard deviation of the economic value added (EVA). *SDEVA* indicates the stability in economic profits achievement. The  $b_i$  coefficients represent the risk bonuses related to specific factors.

It is true that the risk enterprises should be penalized by higher costs of the own capital ( $r_e$ ) for their inability to create value (the value of *NPV/Capital* ratio is negative) and a high volatility during economic profit creation (*SDEVA* is positive).

A great weakness of this model is the insufficient amount of empiric researches which would specify how to exactly determine the  $b_i$  coefficient. It is necessary to know the level of the statistic dependence among individual factors, especially between *SDEVA* and *NPV/Capital*. Because it is a question what would the model informative ability be like if the model did not contain the *SDEVA* factor?

## 5 DISCUSSION

The paper summarizes the main knowledge in the current corporate practice which is related to the best known and most used pricing models (methodical approaches) for the discount level quantification as a reward to the investors for the risk they take by investing their free finances and concurrently the capital costs from the enterprise point of view. The authors specifically focus on the advantages and limitations of the researched models. The capital costs quantification is one of the important problems which we have to face if we want to quantify the EVA indicator level.

The first problem is the choice of the appropriate risk-free asset and on this basis, the derivation of the risk-free rate. It is usually recommended to start with the use of either long-term state treasuries with 10-year or 30-year time horizon (as long-term financial instruments) or state treasury bills (as short-term financial instruments). During the use of the long-term instruments revenue rate there is a problem to estimate the purchasing power of these securities in the maturity period of the treasuries. Also in the case of the other possibility application – the use as the risk-free revenue value of the state treasury bills profitability, which are issued by the state apart from the long-term securities, there is a problem with the time perspective. The short-term risk-free rates significantly determine the corporate value because they form the major part of capital costs; this value is then very sensitive about the movements of short-term interest rates and macroeconomic quantities (gross domestic product etc.).

In spite of a lot of differences the demonstrated models are connected by the way how they

integrate the risk and the uncertainty into the corporate performance measurement system or corporate pricing (Fotr & Kislingerová, 2009). Respecting the risk factor has various forms of risk bonuses (RP).

It is clear, that all the assumptions for non-problematic quantification of specific CAPM and APT models components have not been achieved on the capital markets of the post-communist countries of the Central Europe (Visegrad group countries). Nevertheless, we can claim that after some adaptations also these models using and based on the data from developed capital markets can be used in economies with less developed market.

The one-scenario approach is a very often feature in the corporate practice of the business entities in the Czech Republic. In other words, they often work with just one version of future development in corporate practice. Not only the small pro-export oriented economy of the Czech Republic is „affected“ by the globalization tendencies, as some like to point out by turbulences and rapid development. All this determines the high level of uncertainty and also risks. Therefore it is more than adequate to think in the dimensions of a several-scenarios approach, work with versions of future development (Špaček, 2012). To know how the enterprise can develop on its best and how it can fall in terms of performance at the worst. And to be ready for these eventual versions. It is necessary to move away enough (in corporate managers' case) from excessive optimism, imaginary pink glasses by which the management workers see their enterprise (Fotr & Švecová). To define what we already know about the future development (i.e. trends) and to define and to describe what we know (i.e. the key uncertainties). Because this is the foundation and bases for scenarios creation (Fotr, Špaček, Souček, Vacík, 2015). However, the nature of risk factors matters too. It is sometimes appropriate to use the technique of simulations instead of the scenario approach. The simulation approaches are suitable in case there are a lot of risk factors of related or discreet nature, while we cannot presume significantly different possibilities of these factors development.

Whether the enterprise chooses the way of simulations or scenarios of the future development, the positive result is always the deeper reflection, more detailed analysis of possibilities which the enterprise has, the threats which can endanger the business entity potentially and the ways how to deal with it and to face the turbulent times with the target to achieve permanent competitiveness in the global competition.

## **6 CONCLUSION, RESEARCH BENEFITS NAD LIMITATIONS**

Based on the comparison of traditional and modern principles of corporate performance measurement, the paper summarizes the most essential reasons why the business entities (not only the Visegrad group but in global context) should implement modern indicators (e.g. EVA indicator of the Value-Based-Management approach) apart from the classical (traditional) indicators in their performance measurement system.

The next key output of the paper is the thorough analysis of risks and pitfalls related to the EVA indicator algorithm. The problems at quantification of NOPAT and WACC values were researched in details. Unfortunately for now the financial theory nor the professionals from corporate practice have not found the one universally used solution, or a few potentially optimal solution ways which would make the whole process of economic value added quantification easier and clearer – especially the WACC quantification.

The attention was further focused on the summary of advantages and limitations of the most often applied pricing models and methodical approaches in the corporate practice, how to determine the own capital costs value. The determination (estimation) of the own capital costs value represents one of the biggest problems at EVA indicator calculation for business

entities.

The build-up method approach is based on the investment value of a selected enterprise, when the calculated risk is bound to accounting, not market data and values. The INFA method (or the complex build-up method) belongs in this category. This approach and methods within its frame are suitable for countries which do not have a developed capital market. The methods based on developed capital market data (e.g. CAPM, ATP etc.) have a high future potential. Therefore we can presume that they will find their solid position also in the countries with not so advanced capital market in the next few years. In the corporate practice in the Czech Republic it is proved by modifications of models adapted for the Czech business environment.

The EVA factor model, which was also mentioned in the paper, tries to solve the limitations offered by the fact that in majority of the models inputs are built on the traditional accounting data. The Czech Republic does not abound in sufficiently liquid, effectively functioning capital market. There is the question how sufficient is the usability and reliability of the data obtained from such capital market. We can recommend for the basic CAPM equation to use the USA market bonus as the capital market risk bonus and to adjust the CAPM model with the current country risk. Then the formula determining the quantification would have the following structure:

$$r_e = r_f + \beta \cdot RMP + r_{země} + b_1 Size + b_2 NPV / Capital + b_3 SD_{EVA} \quad (2)$$

The factor *Size* corresponds to the market capitalization, the *NPV/Capital* ratio indicates the ability (or inability) of the enterprise to invest in value creation projects, *SDEVA* is a standard deviation of the economic value added (EVA). *SDEVA* indicates the stability in economic profits achievement. The  $b_i$  coefficients represent the risk bonuses related to specific factors.

As a follow up to the results of this qualitative research **the quantitative part of the research** will be subsequently realized. Its aim is to verify the use of the above mentioned valuation methods in practice in the environment of medium-sized manufacturing companies in the Czech Republic. The research sample of companies amounts to 87 enterprises (43 respondents were from the Karlovy Vary Region and 44 respondents were from the Pilsen Region). The questionnaire survey was selected as the most suitable form how to obtain data within the quantitative part of the research. With regard to the nature of the solved problem in the field of entrepreneurship in the Czech Republic, cooperation was established with the willing staff of corporate finance department; in particular, with employees of the financial accounting or controlling department and with the executive management (chief executive officers, chief financial officers) as well.

The electronic form of questionnaires was selected; the questionnaires were sent to the e-mail inbox of respondents; the completed questionnaires were sent by e-mail back to the e-mail address of the researchers. One of the biggest advantages of sending out the questionnaires is the fact that questionnaire survey is one of the fastest and most economic forms of data collection. On the contrary, a few problems can be also identified – i.e. the need to ensure the access to technologies enabling convenient filling in the questionnaire. Another (and much more significant) limitation is linked to the target group of respondents - a longer feedback period in comparison with other research forms of data collection (e.g. interviews, where feedback is immediate).

### Acknowledgement

The paper was made within the project SGS-2015-021 Development of Financial Management Approaches as a Tool for Corporate Value Growth.

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## **MODELS PREDICTING FINANCIAL DISTRESS AND THEIR ACCURACY IN THE CASE OF CONSTRUCTION INDUSTRY IN THE CZECH REPUBLIC**

*Dagmar Čámská*

### **Abstract**

Corporate financial distress and risk of bankruptcy may not lead only to a market exit of an ailing company but it can seriously influence also business related entities or counterparties. This reason raises the need to have tools which can help predict future environment and decision making process. Models predicting corporate financial distress as well as called bankruptcy models are an example of these tools and methods. Last global economic crisis has again renewed the scientific debate about appropriate accuracy of bankruptcy models. This paper is focused on an explanatory power of models predicting financial distress created in the past. Dozens of models are tested in the case of construction industry which has been highly affected by the last crisis. The paper should answer several questions. The question 1 is if the explanatory power of bankruptcy models created in the past is sufficient for decision making process. The question 2 is which models have the highest accuracy and which should be recommended for practical use. According to results connected with previous questions we can answer if there is a need of a new predicting tool. Statistically significant data sample is used for this research. Dozens of models predicting financial distress are verified by tools as Type I Error, Type II Error, ROC Curves and related AuROC coefficients.

*Keywords: financial distress, bankruptcy models, construction industry, Czech Republic*

JEL Classification: G30, G33 and M20

### **1 IMPORTANCE OF MODELS PREDICTING FINANCIAL DISTRESS**

Prediction of corporate financial distress is a research topic which has inspired economists as Altman (1968) or Beaver (1966) since 1960's. Corporate financial distress is a serious risk which can lead to a corporate bankruptcy which influences also many other related entities. If the entity regularly monitors its own performance and development there is no need for special tools as models predicting financial distress providing a quick and inexpensive answer. These models are designed especially for other related entities as suppliers, customers, banks or another financial institutions, government etc. These partners use these tools for predicting future development of evaluated companies. It supports their decision making process and choosing right strategy how to achieve their own goals. It need not be emphasized that business with an ailing partner can lead to the threat of own viability.

There have been created plenty of models and tools predicting financial distress since 1960's. It is not possible to cover all of them because many methods were not published because they are part of entities' know-how in the case of banks and other financial institutions. The scientific debate about appropriate accuracy of models predicting financial distress is usually renewed by serious shocks and changes which is the case of the last global economic crisis. This paper introduces dozens of models predicting financial distress. Second it seeks to answer the question if there are models with appropriate accuracy and explanatory power which can be used nowadays for evaluating performance and development of the related entities.

## **2 THEORETICAL BASIS**

The financial viability as a key issue for every company because the company is not possible to survive in a long run in the case of its poor financial performance. In the long run the poor financial standing results in a bankruptcy. Kapliński (2008) summarizes components on which financial standing depends – the company's financial structure, financial liquidity, solvency, the company's capability to adapt, economic sources, capability to generate profit, capability to maximize the company's market value. Models predicting financial distress are created on the base which can be characterized as follows. It is possible to separate companies with high and low risk of the bankruptcy according to their financial performance displayed in financial statements. As it is mentioned above there has been created plenty methods predicting risk of the corporate bankruptcy. This paper uses as a theoretical basis dozens models predicting financial distress which have been created since 1960's. These models can be generally characterized as follows. They are tools using for prediction the data from the financial statements. The models were created using data samples and statistical methods such as linear discriminant analysis or logistic regression. Most verified models use for evaluation two or three zones (healthy, gray and unhealthy but there are also exceptions using more than three zones for final evaluation. The used models come from different historical, economical, political and geographical background how it is discussed immediately.

The paper is focused on the Czech Republic and therefore the Czech approaches form the core of verified models. The Czech Republic is represented by the family indices IN – IN99, IN01 (Neumaierová and Neumaier, 2002) and IN05 (Neumaierová and Neumaier, 2005), followed by Grünwald Bonita Index (Grünwald, 2001) and Balance Analysis System by Rudolf Doucha (Doucha, 1996). In recent years new models have been developed as Karas & Režňáková (2013) or Hálek (2013) approaches. These models are not verified in this paper because of reasons mentioned in Čámská (2014). The developed economies are represented by the models which are widely used in the Czech Republic as Altman Z-Score (Altman, 1993), Bonita Index (in the German original Bonitätsanalyse, Wöber and Siebenlist, 2009) or Kralicek (Kralicek, 2007). The developed economies have had a different economic and historic development compared with the Czech Republic which has on the other hand the comparable political and economic development as other transition economies. Transition economies are represented by Poland and Hungary as members of Visegrád Group and Baltic states (Latvia, Lithuania and Estonia) in this paper. In the concrete words the Polish models are Hadasik (Hamrol and Chodakowski, 2008), Holda (Pociecha, 2005 and Hamrol and Chodakowski, 2008), Gajdka & Stoda (Kisielinska and Waszkowski, 2010 and Hamrol and Chodakowski, 2008), Prusak (Kisielinska and Waszkowski, 2010), PAN-C, PAN-D, PAN-E, PAN-F, PAN-G, Wierzba, Poznanski, D1, D2, D3, D4 (all previous discussed in Kisielinska and Waszkowski, 2010), Apenzeller & Szarzec, Pogodzinska & Sojak, Sojak & Stawicki (all previous discussed Hamrol and Chodakowski, 2008). The Hungarian models are created by Hajdu & Virág by the discriminant analysis as well as the logit model (Hajdu a Virág, 2001). The Baltic models are Šorins & Voronova (Jansone, Nespors and Voronova, 2010), Merkevicus (Merkevicus et al, 2006), two factor model (Koleda and Lace, 2009), Stoškus (Stoškus et al, 2007), Genriha & Voronova (Genriha, Pettere and Voronova, 2011) and R model (Davidova, 1999). According to the literature some transition models are known in more versions and therefore all known versions are verified. The models' formulas are not displayed in this paper because it is not possible due to its page range. The model's formulas could be found in the related literature which is mentioned.

### **3 OBJECTIVES AND METHODOLOGY**

This chapter is focused on the paper's objectives and used research methodology and therefore it would be divided in the following subchapters as Paper's objectives, Research methods, Analyzed industry branch and last chapter will be dedicated to a definition of the surveyed companies. The paper should answer several questions which will be discussed in the subchapter Paper's objectives. The subchapter Research methods described the methods which are used for fulfilling the paper's objective as type I error, type II error, ROC curves and related AuROC coefficients. The verification is done on one chosen industry branch. The reasons and importance of this industry branch are discussed in the third subchapter. For the fulfilling Paper's objectives there have to be chosen appropriate companies which can be distinguished as companies with low and high risk of bankruptcy. The definition of the surveyed companies is included in the subchapter number 4.

#### **3.1 Paper's objectives**

The paper should answer several questions. The question 1 is if the explanatory power of the bankruptcy models created in the past is sufficient for the decision making process nowadays. The concrete verified models are displayed in the previous chapter. There are 40 different models' formulas. The question 2 is narrowly connected with the previous question because the questions finds which models have the highest accuracy and which should be recommended for practical use. According to results connected with the questions 1 and 2 we can answer if there is a need of a new predicting tool or we are satisfied with the results provided by the already created models predicting financial distress.

#### **3.2 Research methods**

This paper verifies accuracy and explanatory power of the different model predicting financial distress. The models' quality and performance can be measured and compared by several metrics. Sobehart, Keenen and Stein (2000) provide following tools:

- Cumulative Accuracy Profiles (CAPs),
- Accuracy Ratios (ARs),
- Conditional Information Entropy Ratio (CIER),
- Mutual Information Entropy (MIE).

On the other hand Basel Committee on Banking Supervision (2005) mentions according to the literature review and popularity in the financial industry its list of tools:

- Cumulative Accuracy Profile (CAP) and its summary index, the Accuracy Ratio (AR),
- Receiver Operating Characteristic (ROC) and its summary indices, the ROC measure and the Pietra coefficient,
- Bayesian error rate,
- Conditional entropy, Kullback-Leibler distance, and Conditional Information Entropy Ratio (CIER),
- Information value (divergence, stability index),
- Kendall's  $\tau$  and Somers' D (for shadow ratings), and
- Brier score.

This paper uses tools as Type I Error, Type II Error, ROC curve and its coefficient AuROC which are detail characterized. Measures of Type I Error and Type II Error are indispensable for models' verification. Their advantages are simple calculation not requiring difficult statistic software and easy interpretability and clearness for people without additional mathematical and statistical knowledge. It sets up bases for using Type I and II Error because almost all studies focused on the creation or verification of scoring models predicting financial distress use them. Type I Error and Type II Error are introduced in Table 1.

Tab. 1 – Type I Error and Type II Error. Source: Fernandes (2005)

		Estimated	
		Non-Default	Default
Observed	Non-Default	True	False Alarm (Type II Error)
	Default	Miss (Type I Error)	True

Type I Error occurs when a defaulted entity is classified by the models as a non-defaulted entity and Type II Error occurs when a non-defaulted entity is classified by the models as a defaulted entity. The absolute value of errors depends also on the size sample and therefore it is better to use relative measures. In the case of Type I Error the number of all defaulted entities classified as non-defaulted is divided by the number of all defaulted entities. In the case of Type II Error the number of all non-defaulted entities classified as defaulted is divided by the number of all non-defaulted entities. Models are never able to classify all entities correctly because they function only as a simplification of reality. The general consensus works on the assumption that the error of a high quality model should not exceed 20% when the error is expressed in a relative term.

Another tool is the ROC curve (Receiver Operating Characteristic) which works as a graphical tool which needs classified score of evaluated companies. The ROC curve compared with the CAP curve is more complex and it does not require the same composition of the tested sample as represented in the real world. It is a main advantage because it makes the work with models' verification easier. The ROC curve is constructed as follows. The quantities HR (C) and FAR (C) are computed for the whole range of classified scores. The ROC curve is a figure of HR (C) versus FAR (C). Further information could be found in Basel Committee on Banking Supervision (2005). The ROC is displayed by Figure 1 where the ROC curve is displayed as the Rating Model, Perfect model is a curve without any false classifications and the Random model responds to a coin flip. The index indicator ROC (also called in the literature as A, AuROC or AUC) can be presented graphically as the area under the ROC curve. The greater the area under the curve ROC is the explanatory power of the model is higher. The ROC curve is used in this paper as an additional tool.

First the models are evaluated according to Type I Error and Type II Error. After the ROC curve is displayed for models whose error rate does not exceed 20%. Type I Error and Type II Error work with original cut off points designed by models' authors. On the other hand the ROC curve does not work with original cut off points and it studies only if different cut off points are able to distinguish between defaulted and non-defaulted entities.

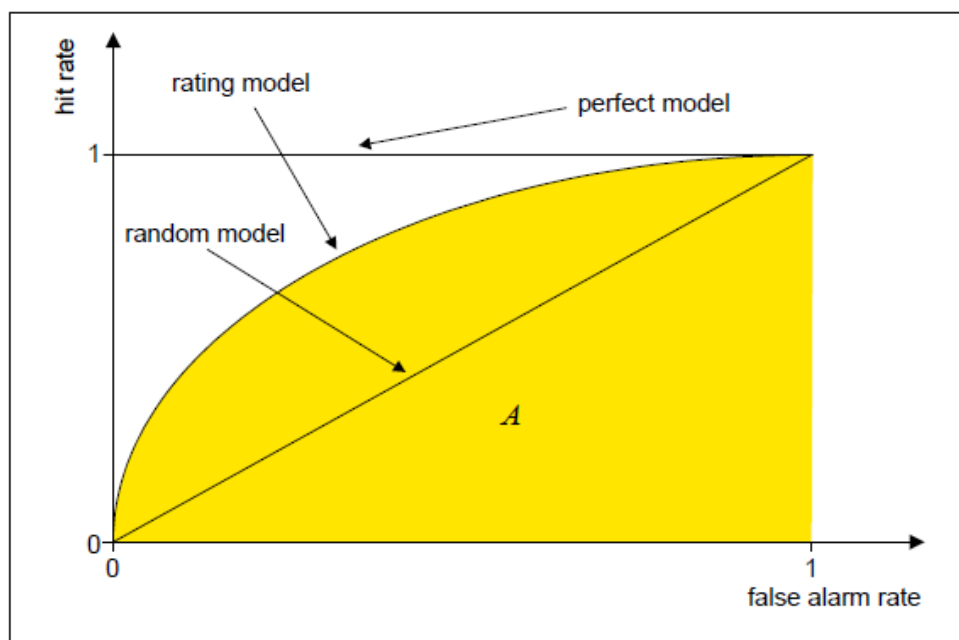


Fig. 1 – Receiver Operating Characteristic Curves. Source: Basel Committee on Banking Supervision (2005)

### 3.3 Selected industry branch

The models predicting financial distress are verified on the data sample which covers one industry branch. Companies related to different industry branches can have different performance, financial results as well as composition of assets or financial sources. These differences are omitted when companies related to the same industry are evaluated. The chosen industry branch is the construction industry. The construction industry has been heavily affected during the last economic crisis. This statement is proved by Ministry of Industry and Trade of the Czech Republic (2014) because since 2008 the construction industry has decreased annually. Researches done by Čámská (2013) or by Creditreform (Tisková informace - Vývoj insolvenčí v České republice v roce 2013, 2014) confirm that the number of defaulted entities in the construction industry is one of the highest in the Czech economy. The construction industry is generally important for the Czech economy because it has created more than 8% of annual GDP in the time period 2000 – 2010 (Czech Statistical Office, 2012).

### 3.4 Definitions of surveyed companies

The models predicting financial distress are constructed with two data samples one includes companies defined as non-defaulted (or healthy, with low risk of bankruptcy etc.) and the other one includes companies defined as defaulted (unhealthy, with high risk of bankruptcy, already bankrupt etc.). These data samples are usually used also for models' verification and therefore it is necessary to define which entities are classified as non-defaulted and defaulted.

The non-defaulted entities are defined in this paper as companies creating economic value added in years 2010, 2011 and 2012. Although the measure economic value added has its disadvantage because of the computation based on accounting values (Jordan, Westerfield and Ross, 2011) the measure economic value added can be accepted as an adequate measure of an achieving entrepreneurship goals. The achieving entrepreneurship goals is defined by Veber

and Srpová (2005) as well as by Synek and Kislingerová (2010) as the increase of the originally invested capital value.

The definition of defaulted entities is more tricky. Merton (1974) sees the default as a situation when the value of defaults exceeds the value of company. Other definitions talk about the situation when the evaluated entity does not repay its liabilities and it cannot do that. This paper works only with the data which are publicly available and therefore it is necessary to use a legal term as an insolvency proposal according to the Czech legal framework, concretely Act No. 186/2006 Coll., Bankruptcy and Settlement (the Insolvency Act). The defaulted entities are defined in this paper as companies to which the insolvency court declared the insolvency proposal. This paper works with the comparable time period and therefore the insolvency proposal had to be declared in 2012, 2013 and first months of 2014. This condition is not the only one. The second requirement is based on the availability of entities' financial statements at least three years before bankruptcy has occurred. Although all companies should publish their financial statements they do not fulfill this legal requirement (Czech Credit Bureau, 2013).

According to above mentioned criteria the entities were extracted from the corporate database Albertina. The number of entities is shown in Table 2.

Tab. 2 – Size of data sample. Source: author

	Original exported data sample Number of entities	Final data sample Number of entities
Non-defaulted	1615	237
Defaulted	172	46

## 4 RESULTS

Companies included in the final data sample are evaluated by the selected models predicting financial distress. The data sample of the non-defaulted companies is evaluated on the base of the financial statements created in the year 2012. The data sample of the defaulted companies is evaluated on the base of the financial statements created one or two years before the insolvency proposal. The z-scores are computed for all companies and after evaluated according cut off points which were suggested by their authors. Companies are divided into evaluating zones. Most models have two and three evaluating zones but there are also exceptions with more zones. Rates of Type I Error and Type II Error are computed as it is mentioned in the chapter 3.2 Research methods. The measure reliability means number of companies classified correctly divided by all companies in the related group. The sum of the rate of Type I or II Error and the measure reliability is not equal to one because some models use grey zones or some statistic units (companies) were not evaluated because some data were not available for computation.

Results of the rates Type I Error and Type II Error are included in Table 3 for all verified models except the Polish models in Table 4 for the Polish models. Errors higher than 50% and reliabilities lower than 50 % are indicated as red numbers. Orange numbers occur when the 50% boundary is almost hit.

Tab. 3 – Explaining power of the verified models except the Polish models. Source: author

Model	Defaulted entities		Non-defaulted entities	
	Reliability	Type I Error	Reliability	Type II Error
Altman	0.652	0.109	0.608	0.034
IN99	0.717	0.109	0.270	0.046
IN01	0.717	0.043	0.451	0.013
IN05	0.804	0.043	0.527	0.042
Doucha	0.370	0.304	0.456	0.139
Grünwald	0.750	0.000	0.788	0.000
Kralicek	0.848	0.022	0.502	0.110
Bonita index	0.750	0.167	0.879	0.000
Hajdu & Virág	0.109	0.891	0.970	0.025
Hajdu & Virág-logit	0.739	0.217	0.688	0.291
Šorins & Voronova	0.891	0.109	0.823	0.173
Merkevicius	0.935	0.065	0.565	0.430
2factor_1	0.087	0.913	0.975	0.021
2factor_2	0.609	0.065	0.004	0.979
2factor_3	0.043	0.652	0.992	0.004
Stoškus	0.326	0.630	0.160	0.827
Genriha & Voronova	0.261	0.739	0.979	0.017
R model	0.750	0.250	0.818	0.152

False classification in the case of defaulted entities is connected with models Holda 1, Gajdka & Stoda 1, Hajdu a& Virág, two factor model in the versions 1 and 3, Stoškus, Genriha & Voronova. Low reliability in the case of defaulted entities is connected not only with the models already mentioned but also with Doucha, Gajdka & Stoda 2, Appenzeller & Szarec, Pogodzinka & Sojak and Sojak & Stawicki. The detailed analysis using ROC curves can be applied to the models Altman, IN99, IN01, IN 05, Kralicek Quick Test, Hadasik, Holda 2, Prusak in the both versions, from the PAN family approaches C, D, E, F, G, both Wierzba models, Poznanski, D1, D2, D3, D4, Hajdu & Virág in logit version, Šorins & Voronova, Merkevicius, two factor model in the version 2, Bonita index and R model.

False classification in the case of non-defaulted entities is connected with the models D1, D4, two factor model in the version 2 and Stoškus. Also Merkevicius touches the critical number. Low reliability in the case of non-defaulted entities is connected with the models IN99, IN01, Doucha, partly Kralick Quick Test, Prusak in versions 1 and 2.

The results for the data samples of defaulted and non-defaulted companies can be sum it up that for further evaluation are appropriate the following models – Altman, IN05, Hadasik, Holda 2, from the family PAN models PAN-C, PAN-D, PAN-E, PAN-F and PAN-G, both



versions of Wierzba, Poznanski, D2, D3, Hajdu & Virág in logit version, Šorins & Voronova, Merkevicius, R model, Grünwald and Bonita index.

Tab. 4 – Explaining power of the verified Polish models. Source: author

Model	Defaulted entities		Non-defaulted entities	
	Reliability	Type I Error	Reliability	Type II Error
Hadasik	0.652	0.304	0.844	0.143
Holda1	0.022	0.957	0.992	0.004
Holda2	0.543	0.304	0.899	0.017
Gajdka & Stoda 1	0.391	0.565	0.945	0.046
Gajdka & Stoda 2	0.239	0.435	0.738	0.139
Prusak 1	0.848	0.043	0.506	0.215
Prusak 2	0.913	0.043	0.418	0.304
PAN-C	0.348	0.348	0.970	0.004
PAN-D	0.304	0.413	0.970	0.004
PAN-E	0.565	0.196	0.958	0.021
PAN-F	0.804	0.196	0.962	0.034
PAN-G	0.870	0.130	0.890	0.105
Wierzba 1	0.500	0.457	0.987	0.000
Wierzba 2	0.457	0.500	0.987	0.000
Poznanski	0.783	0.174	0.734	0.253
D1	1.000	0.000	0.312	0.688
D2	0.717	0.239	0.886	0.105
D3	0.870	0.087	0.705	0.283
D4	0.891	0.065	0.346	0.637
Appenzeller & Szarzec	0.261	0.261	0.890	0.017
Pogodzinka & Sojak	0.152	0.065	0.983	0.004
Sojak & Stawicki	0.370	0.109	0.772	0.097

The models selected according results in Table 3 and 4 are evaluated by the tool of the ROC Curve and its AuROC coefficient. The ROC Curves and their AuROC coefficients are determined by the statistical program SPSS. The results are displayed in Table 5 and the models are arranged in the order from the largest area to the smallest area. All verified models fulfilled the requirement that the area should be larger than 0.5. In the case of Doucha approach the requirement is almost not fulfilled. For the other models the value of AuROC

coefficient exceeds 0.8 and their explaining power is high. They provide better results than random results as throwing the coin.

Tab. 5 – AuROC values for models with low Type I and II Error. Source: author

Results Models	Area	Std. Error <sup>a</sup>	Asymptotic Sig. <sup>b</sup>	95% Confidence Interval	
				Lower	Upper
D3	0.956	0.019	0	0.919	0.994
Kralicek	0.947	0.02	0	0.907	0.987
PAN-G	0.942	0.046	0	0.851	1
Bonita	0.939	0.054	0	0.832	1
Poznanski	0.931	0.029	0	0.874	0.987
Wierzba 1	0.925	0.046	0	0.834	1
Holda 2	0.92	0.038	0	0.845	0.994
R model	0.918	0.027	0	0.866	0.971
Prusak 1	0.914	0.055	0	0.807	1
D2	0.911	0.056	0	0.801	1
Šorins	0.911	0.046	0	0.821	1
PAN-C	0.909	0.046	0	0.82	0.999
Wierzba 2	0.897	0.056	0	0.787	1
Prusak 2	0.896	0.058	0	0.781	1
PAN-E	0.894	0.058	0	0.78	1
IN01	0.893	0.061	0	0.773	1
IN05	0.893	0.061	0	0.774	1
PAN-F	0.886	0.061	0	0.767	1
Hadasik	0.883	0.038	0	0.809	0.957
Merkevicius	0.872	0.065	0	0.745	0.999
PAN-D	0.855	0.064	0	0.729	0.981
Hajdu & Virág	0.844	0.027	0	0.791	0.897
Altman	0.814	0.081	0	0.656	0.973
IN99	0.805	0.084	0	0.642	0.969
Grünwald	0.803	0.081	0	0.644	0.963
Doucha	0.535	0.109	0.632	0.322	0.748

The critical boundary should be higher than 0.8 because the data samples includes strictly polarized companies. If we take as the critical boundary 0.9 then the models Wierzba 2,

Prusak 2, PAN-E, PAN-F, PAN-D, IN01, IN05, IN99, Hadasik, Merkevicus, Altman, Hajdu & Virág in logit version and Grünwald have a lower discriminatory power. The questions included in the chapter 3.1 can be answered now. The question 1 was if the explanatory power of the bankruptcy models created in the past is sufficient for the decision making process nowadays. The results confirm that there are several models which have appropriate explanatory power and they can be used for the sufficient decision making process. The question 2 was which models have the highest accuracy and which should be recommended for practical use. These models are included in Table 5 and their AuROC coefficient is higher than 0.9.

## **5 DISCUSSION**

The research questions have been answered. The question 1 investigated if there are models predicting corporate financial distress with appropriate explanatory power. The research confirmed that there are plenty of models and tools which can be used for prediction financial distress and therefore they can be used for the sufficient decision making process. Specifically, the models are D3, Kralicek Quick test, PAN-G, Bonita Analysis, Poznanski model, Wierzba 1, Holda 2, R model, Prusak 1, D2, Šorins formula and PAN-C. The models do not have the same point of origin because they come from different European countries. There are German, Polish as well as Baltic approaches. The country of origin is not the necessary condition for a high quality model. These models had AuROC coefficient higher than 0.9 for the evaluated data sample. Sum it up these models were able to explain at least 90% of studied cases. The question 2 is connected with the question 1 and refers to the hypothesis if there is a need of a new predicting tool. The new predicting tool can be constructed but there is no necessity because the research confirmed that there are enough already existing models which have high accuracy for our purposes.

Although the research questions and hypotheses were answered it opens many other issues. There can exist better models than the verified models in this paper. Many models predicting financial distress were not published and plenty of them were not discovered in the literature review phase. It can be caused by different reasons as a publication of models in national languages or insignificant sources. The analysis also focused on one geographical area. The Czech Republic in the heart and foreign approaches used here supplemented by the models created in the transition economies as Poland, Hungary and Baltic states. The transition economies have the comparable political, historical and economic development as the Czech Republic and therefore they were verified.

The models predicting financial distress are usually based on the manufacturing industry data. The verified models could have different results for other industry branches than construction industry because other industry branches have different proportion of assets and sources of capital because they work on the different bases.

## **6 CONCLUSION**

This paper was focused on an explanatory power of models predicting financial distress created in the past. Dozens of models were verified in the case of construction industry which has been highly affected by the last crisis, has significant number of entities under insolvency proposal and is important for creating GDP in the Czech Republic. The paper should have answered several questions connected with models' explanatory power. Statistically significant data samples were tested by tools as Type I Error, Type II Error, ROC Curves and the related AuROC coefficients. The paper proved that there are models which have high

explanatory power and they can be recommended for the practical use. According to the results the question if there is a need of new predicting tool can be answered. There are several models as D3, Kralicek Quick test, PAN-G, Bonita index, Poznanski, Wierzba 1, Holda 2, R model, Prusak 1, D2, Šorins, PAN-C with the adequate explanatory power. It confirms that there is not the higher need of new predicting tool.

It is necessary to bear in mind that model predicting financial distress should provide quick and inexpensive answers. They can support the decision making process and they can help strategy creation but they should not be the only used approach in the evaluation of related business entities. The models generally are only a simplification of the reality and they cannot operate at 100%. The models predicting financial distress will always have some cases which are classified incorrectly. The aim is to decrease the amount of cases which are classified incorrectly.

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## **AN ANALYSIS OF THE SIMILARITY OF SELECTED BANKS IN CENTRAL AND EASTERN EUROPE**

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### **Abstract**

This paper compares analyses banks' performance in three Central and Eastern European countries (the Czech Republic, Hungary and Poland). The aim of the paper is to make a comparison of the chosen banks and bank sectors in each country based on statistic methods. We provide peer analysis on the basis of financial indicators in the chosen banks. Those indicators encompass all key groups of financial indicators (profitability, property and capital, credits, costs and revenues, liquidity and absolute indicators). First, we undertake the peer analysis through the main components and the factor analyses. Second, we provide the cluster analysis. The method of the main components and the factor analysis will be used for the first viewing the data and to investigate the similarity of chosen banks. The cluster analysis will make relatively homogenous clusters (bank groups) that will show certain similarities in chosen indicators. The algorithm of the cluster analysis follows the hierarchical agglomerative clustering. All in all, 25 banks have been selected for the analysis (8 Polish, 8 Hungarian and 9 Czech banks). Clustering was selected based on the cophenetic correlation coefficient. Cophenetic correlation coefficient selected on the basis of achieving value approaching the value of the one furthest neighbour method. Determination of the relevant number of clusters was started from the schedule clustering which identified peace distance of approximately 50%. After the cluster analysis was done, there were six clusters done plus one cluster represented by one bank, which was Equa Bank, a.s., which was similar to the last cluster. The choice of the banks was determined by banks' size in the countries of Central and Eastern Europe, because seven biggest banks of this region reside in these countries. We conclude that Czech and Polish banking sectors are stable unlike the Hungarian one, whose performance has been negatively affected by strengthening government regulation.

*Keywords: bank, banking system, CEE, cluster analysis, the Principal Components Analysis*

JEL Classification: E58, E42, C38

### **1 INTRODUCTION**

The banking system has become an important component in the economic sector of each country. Like other industries, the banking industry has its own unique characteristics and specifics that adapt by internal and external influences economic sector. Each state is required for the proper functioning of the economy needs a reliable a stable banking system, because the problems in the banking sector may have an impact on the entire financial sector. Each banking system of each country has its own specifics that influence global globalization. It operates on banking systems around the world. Each state receives it but in different ways. Some states retain more of their traditional banking features that arose during the development of the system, in turn, take some elements of the globalized economy.

Banks are an inseparable part of life for all economical subjects. The bank stability is an important assumption for function the financial markets (Teplý et al., 2010). The aim of the article is to undertake a peer analysis of chosen banks in the countries of Central and Eastern

Europe (CEE) – especially in Hungary, Poland and in the Czech Republic. The choice of the countries was determined by the biggest banks in CEE, because seven biggest banks of this region are in these countries. In the Czech Republic it is Komerční banka, ČSOB and Česká spořitelna. In Poland it is PKO Bank Polski, Banks PEKAO and mBank. In Hungary it is OTP Bank. In the Czech Republic in the end of year 2013 there were fourteen commercial banks, in Hungary there were 23 banks and in Poland there were 28 banks (without building savings banks, credit banks, specialized banks and foreign bank branches). The peer analysis allows make a comparison of the financial variables according to the tables and graphs. For this peer analysis will used the traditional methods of multiple statistical analysis, especially cluster analysis and principal components analysis. There were 25 banks chosen to do the cluster analysis (8 Polish, 8 Hungarian and 9 Czech banks).

## 2 SELECTED BANK AND FINANCIAL INDICATORS

We can use the access of the Czech National Bank (CNB) to classify the bank sector. CNB divides the banks into groups: “large banks”, “medium-sized banks”, “small banks”. As a “big bank” the CNB classes the banks with a balance sheet more than 250 billion crowns, as a “middle bank” CNB classes the banks with a balance sheet between 50 and 250 billion crowns, group of “small banks” covers banks with a balance sheet up to 50 billion crowns. A Polish central bank (Narodowy Bank Polski, NBP) and a Hungarian central bank (Magyar Nemzetu Bank, MNB) commercial bank classify the bank only as a “large banks” and “small and medium-sized banks”. (Vodová, 2013)

To be able to divide all the banks into 3 groups, there was defined a stake of the total assets of each bank (in 2013) to total assets given by the bank sectors. The banks with the stake of total assets of chosen bank sectors higher than 4 % were classified as a “large banks”. In the “medium-sized banks” group were the banks with the stake from 1 % to 4 % and in the “small banks” group were the banks with stake lower than 1 %. (This classification matches the CNB classification). The amount of banks put into each group shows the Table 1. From all groups there were randomly chosen banks from each bank sector so that banks from “small banks” group, “medium-sized banks” and “large banks” are representing. Chosen criterions were also important while choosing the banks. It is possible to say that if there are for example 5 banks of the same size and they reach the similar values in the chosen criterions, we can choose one bank as a representative for the rest of the banks. According to behaviour of the chosen bank we can assume that the rest of the banks will probably behave the same way.

Tab. 1 – Classification of “large banks”, “medium-sized banks” and “small banks” in Hungary, Poland and in the Czech Republic. Source: own calculation by Bankscope database.

	large banks	medium-sized banks	small banks
Hungary	4	3	16
Poland	6	11	11
Czech Republic	4	5	5



## **2.1 Financial indicators of bank sector**

For an entering analysis we used the data from 2013. It was possible to choose a longer term, where the missing values had been replaced by an average value. Because there were quiet big changes in the entire bank system (either in inland or abroad), we used the year 2013 for finding out the actual bonds and relations in the bank sector. It ensured us the completeness of the data of chosen banks from the view of the chosen criterions. The timing lines of chosen criterion of chosen banks could be used for a deeper analysis in following scientific research. We could see the changes of each criterions and we could point out an important moments (for example financial crisis and its influence on chosen criterions and so on).

It was necessary to choose suitable indicators for the analysis itself. While choosing the suitable indicators we need to come out of the accessibility of the banks data. There are also different accesses for financial bank indicators in the Czech literature (Babouček, 1996; Hrdý, 2005) and foreign one (Golin, 2000; Boot, 2000). The data we needed we got from the database Bankscope and they were chosen in view of the fact of specific bank sectors, international accounting standards and informative banks duty.

The financial indicators were chosen so that all groups of financial indicators were taken in consideration.

The rentability indicators cover: return on average assets (ROAA),

- return on average equity (ROAE),
- net interest margin.

The property and capital indicators cover:

- equity/total assets,
- capital adequacy.

The credit indicators cover:

- net credit/total assets

The proportion credit indicators cover:

- costs/income.

The liquidity indicators cover:

- liquid assets/total deposits.

Next there had been chosen total indicators:

- total assets
- deposits and short-term financing
- equity

## **3 THE METHODS USED**

The primary access for determining the similarity of quantitative variables is the factor analysis. It is based on principal component analysis, which is used to reduce the size of the job (instead of many variables for further calculations determined by a small number of principal components, which can be expressed as linear combinations of the original variables).

The Principal components analysis is computed by the Singular Value Decomposition of  $X$ . The general formula (1) is: (Hastie, 2013)

$$X = UDW^T \quad (1)$$

where

$D$ ...diagonal matrix consisting of the set of all eigenvalues of  $C$  along its principal diagonal, and 0 for all other elements

$U$ ...an  $n$ -by- $n$  matrix, the columns of which are orthogonal unit vectors of length  $n$  called the left singular vectors of  $X$ ;

$W$ ...a  $p$ -by- $p$  whose columns is orthogonal unit vectors of length  $p$  and called the right singular vectors of  $X$ .

In the Principal Components Analysis (PCA), the data are summarized as a linear combination of an orthonormal set of the vectors. The first principal component accounts for as much of the variability in the data as possible, and each successive component represents as much of the remaining variability as possible. (Zou, 2006) Components accounting for maximal variance are retained while other components accounting for a trivial amount of variance are not retained. These techniques are typically used to analyse groups of correlated variables representing one or more common domains. The result of PCA enters into the factor analysis. Its aim is to assess the structure and relationships of selected indicators to see if allowed by their division into groups, in which the indicators chosen from the same groups together more than correlated variables from different groups.

Cluster analysis is a collective term covering a wide variety of techniques for delineating natural groups or clusters in data sets. The article will be used hierarchical agglomerative clustering.

Hierarchical agglomerative clustering starts at the bottom and at each level recursively merges a selected pair of clusters into single clusters. This produces a grouping at the next higher level with one less cluster. Algorithm of hierarchical agglomerative clustering begins with every observation representing a singleton cluster. At each of the  $N-1$  steps the closest two (least dissimilar) clusters are merged into a single cluster, producing one less cluster at the next higher level. (Hastie, 2013)

In the first phase clustering calculates the relative distances of objects and writes them into a matrix. This leads to a square symmetric matrix  $\mathbf{D} = \{d(R, S)\}$  which has zeros on the main diagonal. It is used for calculating the metric distance matrix is normally used and it is called a Euclidean method. It is based on the geometric model. (Klímek, 2005) The objects characterized by  $p$  characters are assigned to the points  $p$ -dimensional Euclidean space  $E_p$ , then two dots  $(R, S)$  it is defined by the Euclidean distance given by general formula (2):

$$d(R, S) = \sqrt{\sum_{i=1}^p (x_{ri} - x_{si})^2} . \quad (2)$$

On the basis of the distance matrix can be launched the second phase calculations, also clustering. Clustering method was used furthest neighbour (called too complete linkage). Complete linkage agglomerative clustering takes the intergroup dissimilarity to be that of the furthest (most dissimilar) pair according to formula (3):

$$d(R, S) = \max_{\substack{O_i \in R \\ O_j \in S}} \{d(O_i, O_j)\} \text{ for } R \neq S \quad (3)$$

where

$R, S$  ...represent two such groups

$d(R, S)$  ...represent dissimilarity between  $R$  and  $S$  in computed from the set of pairwise observation dissimilarities  $d(O_i, O_j)$ , where one member of the pair  $O_i$  is in  $R$ , and the other  $O_j$  is in  $S$ .

Methods of clustering is selected based on the degree of credibility, and it cophenetic correlation coefficient "CC". The higher the value of the correlation coefficient cophenetic (a value close to 1), the greater the credibility and the choice of a suitable model cluster. (Hastie, 2013; Hebák, 2007; Lavine, 2000; Meloun, 2005; Romesburg, 2004)

The result is graphical figure called a dendrogram with provided a highly interpretable complete description of the hierarchical agglomerative clustering.

## 4 ANALYSIS OF SELECTED BANK

### 4.1 Visualization of date using factor analysis

We use the method of principal components and factor analysis for graphical visualization prior to the cluster analysis. (Hastie, 2013; Hebák, 2007; Meloun, 2005)

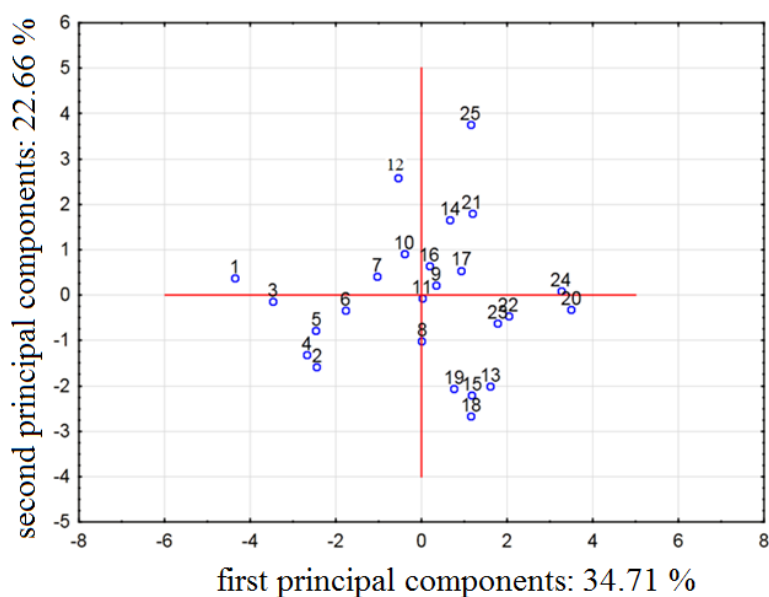
The first principal component depletes approximately 34.71% of the total variability in the data, the second approximately 22.66 %. The results of the factor analysis bring Tab. 2 and Fig. 1. Tab. 2 shows which criteria are important for further exploration in terms of classification into certain objects, respectively clusters (bold face type).

Tab. 2 – The result of the factor analysis – the first two principal components. Source: own calculation by Bankscope database.

	<b>First principal component 1</b>	<b>Second principal component 2</b>
Net interest margin	-0.103488	<b>0.706424</b>
Net credit/total assets	0.114454	<b>0.858046</b>
Costs/revenues	-0.519822	-0.138174
Capital adequacy	-0.537590	0.232883
Equity/total assets	-0.113775	0.659776
Return on average assets (ROAA)	0.521883	0.101157
Return on average equity (ROAE)	0.689154	0.264687
Liquid assets/total deposits	-0.611671	-0.196073

Total assets	<b>0.924784</b>	-0.05947
Deposits and short-term financing	<b>0.922965</b>	-0.010474
Equity	<b>0.899850</b>	0.100069

Allocation of selected banks according to two principal components showed Fig. 1. From the visualization can make a judgment about what banks are similar in defined criteria and therefore on the basis of similarity in all selected request one cluster.



Legend:

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>1 - PKO BP SA</li> <li>2 – ČSOB</li> <li>3 – Bank Pekao SA</li> <li>4 – Česká spořitelna</li> <li>5 – Komerční banka</li> <li>6 – mBank SA</li> <li>7 – Getin Noble Bank SA</li> <li>8 - K&amp;H Bank Zrt</li> <li>9 - CIB Bank Ltd-CIB Bank Zrt</li> <li>10 - Alior Bank Spółka Akcyjna</li> <li>11 - UniCredit Bank Hungary Zrt</li> <li>12 - GE Money Bank as</li> <li>13 - Citibank Zrt</li> </ul> | <ul style="list-style-type: none"> <li>14 – Budapest Bank Nyrt-Budapest Hitel – és Fejlesztési Bank Nyrt</li> <li>15 - PPF banka a.s.</li> <li>16 - Sberbank CZ as</li> <li>17 - Bank Pocztowy SA</li> <li>18 - Fio Banka A.S.</li> <li>19 - FM Bank PBP SA</li> <li>20 - Equa Bank a.s</li> <li>21 - Dominet Bank SA</li> <li>22 - Evropsko-ruská banka As</li> <li>23 - DRB Dél-Dunántúli Regionális Bank</li> <li>24 - Széchenyi Kereskedelmi Bank Zrt</li> <li>25 - Evobank Zrt</li> </ul> |
|---|--|

Fig. 1 – Factor analysis of selected banks. Source: own calculation.

## **4.2 Result of cluster analysis**

The basic condition for performing cluster analysis is rejected claim that the data are affected by multicollinearity. Multicollinearity could very significantly affect the final quality of the clustering and classification of the individual elements in the resulting clusters. It is necessary to establish the correlation matrix. Then eliminate those criteria in assessing the relationship reaching the correlation coefficient higher than 0.7. If left criterion which the correlation coefficient is above 0.7. It is necessary to provide a justification for its further occurrence of cluster analysis.

The presumption was verified using the Spearman correlation coefficient, in our case. Criteria which enter the cluster analysis and multicollinearity meet the condition are:

- net interest margin,
- net credit/total assets,
- costs/revenues,
- capital adequacy,
- equity/total assets,
- return on average assets (ROAA),
- equity.

The following two criteria were multicollinearity affected. To the fact that the correlation coefficient value slightly exceeds the recommended limit of 0.7 (in excess is 10%) and are important criteria. Then still be included in the analysis:

- total assets,
- deposits and short-term financing.

This is followed by a selection of clustering procedures and methods of clustering (furthest neighbours method. resp. Complete the connection using statistical Statistica version 12.1) and the method of calculation of distances (Euclidean distance). Clustering was selected based on the cophenetic correlation coefficient. Cophenetic correlation coefficient selected on the basis of achieving value approaching the value of the one furthest neighbour method.

Determination of the relevant number of clusters was started from the schedule clustering which identified peace distance of approximately 50%. Below this level determine the relevant number of clusters (See Fig. 2).

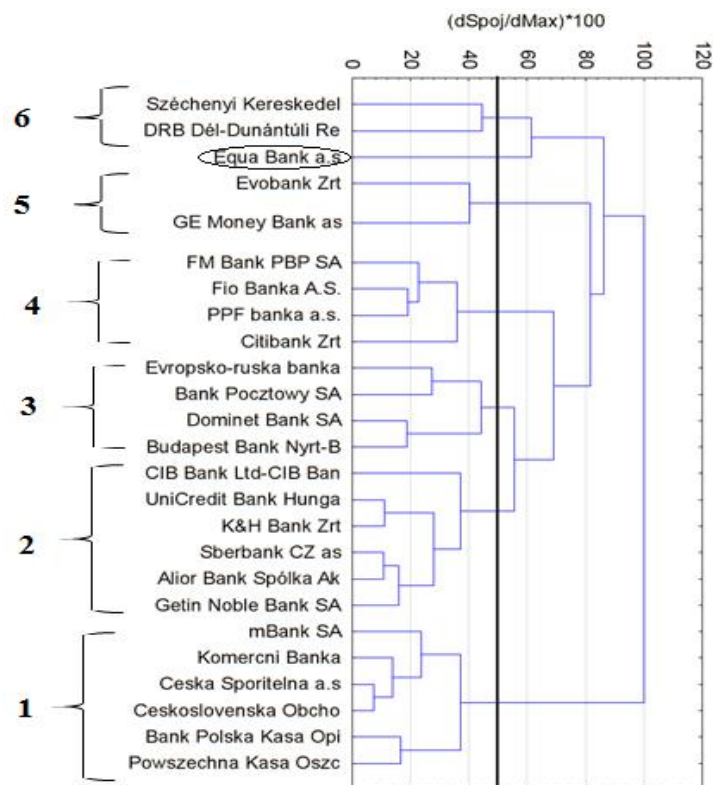


Fig. 2 – Dendrogram. Source: own calculation.

After the cluster analysis was done, there were six clusters done + one cluster represented by one bank, which was Equa Bank, a.s., which was similar to the last cluster (from the bottom).

The first cluster (in the bottom part of dendrogram) is internally divided into two clusters (See Fig. 2). In the first cluster there are two polish banks (PKO Bank SA and Bank Pekao SA), in the second cluster there is one polish bank (mBank SA) together with two Czech banks (ČSOB and ČS). All those banks come from the group of “large banks”, no Hungarian bank from this group is here. Characteristic feature for this cluster is a high value of criterions total assets (average value in this cluster is about EUR 35 732 billion), deposits and short-time financing (average level of this criterion is about 28 529 billion EUR) and the level of own equity (average value of this cluster is about 4 135 billion EUR). The average value of this indicator ROAA for the first cluster is about 1.7 %, which can be considered as a satisfying situation (Tab. 3). The ROAA indicator measures assets payback, which means how much profit can banks generate from available assets. The advantage of this indicator is that it can be measured among the banks in different economic environment and it is not influenced by banks debts. If the level of ROAA indicator is lower than 0.75, it is a weak assets payback. If the level of ROAA indicator is higher than 1, the assets payback is excellent. Recommended value of this indicator is 1.

Second cluster is constituted by one Czech bank (Sberbank CZ), two polish banks (Getin Noble Bank SA, Alior Bank Spólka Akcyjna) and two Hungarian banks (K&H Bank Zrt, Unicredit Bank Hungary). One other Hungarian bank CIB Bank Ltd joined this cluster – CIB Bank is similar to other banks in this group, but in ROAA indicator achieves extreme values (as the only one it achieves even negative values). Only two banks achieve the recommended values (Alior Bank and UniCredit Bank Hungary). The CIB Bank’s negative ROAA value is caused by deterioration assets 'quality of Hungarian banks as a result of a higher credits' stake

after maturity more than 90 days and making higher capital reserves in these banks. The sixth clusters show same low values of ROAA. Two Hungarian banks are in this sixth cluster.

The third cluster formed four banks: one Czech bank (Evropsko-ruská banka), two polish banks (Dominet Banks SA, Bank Pocztowy) and one Hungarian bank. This cluster showed a high level of net interest margin. There were some changes of interest-bearing assets of bank sheets, which caused the high level of this indicator.

The fourth cluster was formed by two Czech banks (Fio Bank and PPF Bank), one polish bank (FM Bank PBP) and one Hungarian bank (Citibank Zrt). Characteristic feature of this cluster was a low value of net credit indicator/total assets in the level of not even 33 %. Bank should set a maximal level of this stake, so that there are no problems with liquidity. According to a low level of this indicator banks in this cluster do not have any problems with liquidity. The average value of this indicator in other cluster is about 60 %, the fifth cluster achieves even higher values (75 %).

The fifth cluster is formed only by one Czech bank (GE Money Bank) and one Hungarian bank (Evobank Zrt). In case of net interest margin indicator this cluster shows extremely high values. It was caused by a decrease of the short-term deposits from clients from public and financial sector.

The sixth cluster is formed by two Hungarian banks (DRB Dél-Dunátúli, Szécheney Kereskedel). Just like the second cluster, the sixth cluster has extremely low values of ROAA indicator. According to negative values of this indicator it is showed that these banks, that were mentioned, have a very low rentability of their assets. The causes of a low ROAA values are explained in the second cluster. Compared to other formed cluster there is also an extremely low value of total assets and deposits.

Tab. 3 – Average values of chosen indicators. Source: own calculation by Bankscope database.

	cluster						
	first	second	third	fourth	fifth	sixth	Equa Bank
<b>Net interest margin</b> [in % ]	3.3	2.9	6.2	2.2	7.37	3.38	1.3
<b>Net credit/Total assets</b> [in % ]	61	67.7	60.3	32.82	75.28	57.69	62.4
<b>Costs/Revenues</b> [in % ]	44	51.5	94.6	69.3	61.59	70.45	1 677.5
<b>Capital adequacy</b> [in % ]	16.1	13.4	12.8	10.9	10.2	11.6	22.6
<b>Equity/Total assets</b> [in % ]	11.4	9.2	9.7	9.8	35.29	8.65	14.42
<b>ROAA</b> [in % ]	1.7	-0.26	0.1	2.5	2.25	-4.19	-5.9
<b>Total assets</b> [in EUR]	35 732	7312	1346.1	1173.8	2721.16	95.77	357.4
<b>Deposits and short-term financing</b> [in EUR]	28 529	5983	1125.1	931.4	1946.84	85.60	298.4
<b>Equity</b> [in EUR]	4 135	659	150.1	97.2	698.00	7.97	51.5

The Equa Bank was separated and formed an individual cluster. It is a new bank working on a Czech market (since 2011) and that is why we can assume improvement of ROAA indicator in the future. In June 2012 it was planned to increase the capital with 753.6 billion crowns, which confirms a long-term interest of stakeholders to equity the bank with an adequate capital, so that the bank can have an ambitious commercial growth. In the first half of the same year there was a 171 % year-to-year growth of credit volume up to 8.4 billion crowns. The clients' deposits grew with 96 % in the first half of the year up to 10.5 billion crowns. (Equa bank, 2013) These facts influenced the extremely high level of the cost/revenues indicator.

From the view of the stability of bank sectors, the indicator of capital adequacy BASEL II is very important. Any of the observed banks, where was this indicator showed, did not have the capital adequacy lower than asked 8 %. In the present no banks from observed bank sectors have the problem with the asked height of the capital.

### **4.3 Discussion and summary analysis**

On the basis of found results we can say that banks associated within the size classification to "large banks", "medium-sized banks" and "small banks" (ČNB, 2003 - 2014). The Hungarian banks are exception, because they are dealing with specific problems that neither Czech nor polish sector does not have to deal with (Vodová, 2013; Dec and Masiukiweicz, 2011). Into the first cluster the "large banks" from Czech and polish bank sector were involved. According to an origin plan we can judge that also the rest of the "large banks" in observed bank sector will behave the same way.

The second cluster involved all "medium-sized banks" from Czech and polish bank sector. One big and one middle bank from Hungarian bank sector are involved here as well. The incorporation of the "big" Hungarian bank (K&H Bank Zrt) into this group is caused by not such high stake of assets to total assets of the Hungarian bank sector (in case of K&H Bank Zrt the stake is 4.44 % while the stake of ČSOB's assets to total assets of Czech bank sector is 19.6 %, the stake of Česká spořitelna is 19.3 % and in Poland PKO BP has a 13 % stake on assets of the polish bank sector. Polish bank Pekao has 10 % stake).

The third cluster formed banks belonging to a "small banks" group. Their stake on assets of relevant bank sectors is between 0.05 % and 0.6 %. The fourth cluster covers banks from "medium-sized banks" as well as "small banks" groups. The fifth cluster is made by a Czech bank with the assets' stake 2.6 % to total assets from the Czech bank sector. Hungarian bank has the stake to total assets of a Hungarian bank sector only 0.03 %. This may be evidence of the negative impact of banking reforms and the fear of losing political independence of Hungary CB on the Hungarian banking sector. This may be evidence of the negative impact of banking reforms and the fear of losing political independence of Central Bank of Hungary on the Hungarian banking sector. (The Economist, 2013)

In the sixth cluster there are only two "small" Hungarian banks. One "small" Czech bank seems to be joining this cluster, but this bank works on a Czech market only for two years and according to dynamic development we can assume, that in the future it would join another cluster.

The results of the analysis can be stated that among the other bank is a group of Hungarian banks and Equa bank. Hungarian banks are faced with the specific situation on the financial market (The Economist, 2013). Equa bank is operating on the Czech banking market from 2011. The new established banks have different values of financial indicators in a comparison with banks operating on the market longer. Newly established banks tend to concentrate on



getting a large number of clients. The same conclusion see also in Jemric, I., Vujcic, B. (2002) or Turnbull, P. W., Gibbs, M. L. (1987).

If a new bank would appear on the bank market (newly arise, transformation from different law form such as credit unions) with the values of criterions similar to some cluster in set average values of criterions, we can suppose that the bank would very likely join that cluster. It would not be necessary to make a new analysis. This research problem (joining newly arise banks into bank system) asks for a deeper investigation to support this argument.

## 5 CONCLUSION

Observed bank sectors in CEE are currently stable based on our analysis, any of the observed banks did not show negative values of chosen indicators. All the legislative measures in European Union have been harmonized (Kalemli-Ozcan, S. et al., 2010). All banks need to comply with the rules of national regulators that contribute to smooth functioning of the bank industry in CEE. The bank privatization and enter of external owners played an important part for each bank sector in the past years (Koutsomanilo-Filippaki, A. et al., 2009). Thanks to that the competitive ability of transitive economic within the global financial markets was available. The only different evinces the Hungarian bank sector that remains unprofitable since 2010 mainly because of implementation of bank tax (Dec and Maiukiewicz, 2011). However, the government of Hungary tries to solve the recovery from public finances this way. In 2013 the tax from financial transactions was imposed. All of this can lead to decreasing support from local branches from foreign parent banks in Hungary (The Economist, 2013).

### Acknowledgements

The paper has been created with the financial support of The Czech Science Foundation (project GACR No. 14-02108S - The nexus between sovereign and bank crises).

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## **STOCK-MARKET EFFICIENCY IN EMERGING MARKETS: EVIDIENCE FROM VIETNAMESE STOCK MARKET**

*Do Thi Thanh Nhan, Le Tuan Bach, Nguyen Thanh Trung*

### **Abstract**

The objective of this study is to find out whether the Vietnamese stock market is weak-form efficient. This paper applies data daily and weekly returns of VN-index and HNX-index in Hochiminh and Hanoi Stock Exchange, respectively from 2000 to 2013. The results obtained from the test indicate significant deviations from the random walk hypothesis of the stock returns in the Vietnamese market, in which the majority of data experience is positive correlations. Furthermore, the nonparametric runs test is used to determine the randomness of a price or a return sequence as an alternative. The test once again confirms that the Vietnamese stock market is not weak-form efficient.

*Keywords: Efficient Market Hypothesis, Fama, autocorrelation, Vietnam*

JEL Classification: G11, G14

### **1 INTRODUCTION**

The Efficient Market Hypothesis (EMH) is one of the most controversial and well-studied proposition in economic and financial theories. According to Fama (1965, pp. 3-4), "An 'efficient' market is defined as a market where there are large numbers of rational, profit-maximizers actively competing, with each trying to predict future market values of individual securities where important current information is almost freely available to all participants. In an efficient market, competition among the many intelligent participants leads to a situation where, at any point in time, actual prices of individual securities already reflect the effects of information based both on events that have already occurred and on events which, as of now, the market expects to take place in the future. In other words, in an efficient market at any point in time the actual price of a security will be a good estimate of its intrinsic value." Fama (1970) synthesizes the existing work and classifies market efficiency into three different forms. The information set is categorized into three subsets depending on the degree of information available.

While tests of semi-strong form and strong form market efficiency are rare, weak-form tests are numerous. The evidence obtained from developed markets (Cheung et al., 2001; Worthington et al., 2004; Kima et al., 2008; etc.) suggests that stock markets in these countries are efficient at least in the weak form. Some stock markets in emerging and developing countries do not exhibit weak-form efficiency whereas others show the inverse. However, as the market is in an early stage and is still developing, market efficiency can change over time as the market evolves. An evidence of weak-form efficient market can affect current strategies of the majority of investors relying on technical analysis in the market. More importantly, on March 1, 2012, the government issued the Decision No. 252-QD-TTg specifying the strategy for the market development for the period 2011-2020, in which the information efficiency is one of requirements toward achieving a developed stock market. Therefore, an updated research is essential to determine the efficiency of the Vietnamese stock market.

## **2 REVIEW OF RELEVANT THEORIES AND EMPIRICAL STUDIES**

The weak form of EMH is the lowest level of efficiency that defines a market in which stock price reflect market trading data including past prices and trading volume. If a market is weak-form efficient, there is no correlation between successive prices, so that excess returns cannot consistently be achieved through the study of past price movements. Therefore, tests of weak-form EMH are usually based on the examination of the relationship between current and past prices.

Regarding developed markets, Worthington and Higgs (2004) examined 16 developed markets from 1987 to 2003 using autocorrelation test, runs test, unit root test and variance ratio test. The result could not reject the random walk hypothesis in the majority of developed markets. Worthington and Higgs (2006) continued to conduct a study to test the weak form market efficiency of five developed stock markets (Australia, Hong Kong, Japan, New Zealand and Singapore). The serial correlation and runs tests concluded that all of the markets were weak-form inefficient, while only the developed markets in Hong Kong, New Zealand and Japan were weak-form efficient according to the variance ratio test. Nisar and Hanif (2012) tested weak form market efficient on developed markets of North America and Europe. The results of runs test and multiple variance ratio tests concluded that two out of six developed stock markets tested did not follow random walk, which meant the remaining NYSE Composite, S&P/TSX Composite, DAX 30 (Germany) and IBEX 35 (Spain) were weak form efficient markets.

Regarding developing markets, Dickinson and Muragu (1994) used the autocorrelation test together with the runs test on weekly price series of 30 individual stocks listed on the Nairobi Stock Exchange for the period of 1979-1989. Moreover, Dickinson and Muragu found that the majority of individual stock price series satisfied the conditions of weak-form EMH. Urrutia (1995) applied the runs test and variance ratio test on monthly data for market indexes in Argentina, Brazil, Chile and Mexico for the period from December 1975 to March 1991. The findings from the runs test could not reject the hypothesis for these markets. Karemera et al. (1999) investigated monthly stock market indexes for 15 emerging stock markets and found Brazil, Hong Kong, Indonesia, Jordan, Korea, Malaysia, Mexico, Thailand and Turkey markets to be weak-form efficient using the runs test. Olowe (1999) applied the autocorrelation test to monthly returns data of 59 individual stocks listed on the Nigerian Stock Market over the period 1981-1992 and failed to reject the null hypothesis of weak-form market efficiency for the Nigerian Stock Market. Mobarek et al. (2000) studied the efficiency of the Bangladesh Security on the Dhaka Stock Exchange by using the autocorrelation and run test for the 1988-1997 period and concluded that the returns of Dhaka stock market did not follow random walks. Abeysekera (2001) indicated that the Colombo Stock Exchange (CSE) in Sri Lanka was weak form inefficient by using the autocorrelation test, runs test and unit root test for the period from 1991 to 1996. The findings of these tests consistently rejected the random walk hypothesis. Wheeler et al. (2002) examined the daily returns series of 16 individual stocks listed on the Warsaw Stock Exchange from 1991 to 1996. The test result failed to support the null hypothesis of weak form of market efficiency for most of the individual stocks. Moustafa (2004) examined stock prices in United Arab Emirate stock market using the runs test. The daily data of 43 stocks for the period from 2001 to 2003 resulted in 40 stocks out of the 43 being random. Thus, this supported the weak-form market efficiency of United Arab Emirate stock market.

A summary of yearly sorted empirical studies is given in the table below.

**Tab. 1 - Summary Of Empirical Studies On Testing Weak-Form EMH**

<b>STUDY</b>	<b>METHODOLOGY</b>	<b>DATA</b>	<b>FINDINGS</b>
Dickinson and Muragu (1994)	- Autocorrelation test - Runs test	Weekly price series of 30 individual stocks listed on the Nairobi Stock Exchange for the period of 1979-1989	The majority of individual stock price series satisfy the conditions of weak-form EMH.
Urrutia (1995)	- Runs test - Variance ratio test	Monthly data for market indexes in Argentina, Brazil, Chile and Mexico for the period from Dec 1975 to Mar 1991	The results can't reject the hypothesis for these markets.
Karemera et al. (1999)	- Variance ratio test - Runs test	Monthly stock market indexes for 15 emerging stock markets (Argentina, Brazil, Chile, Hong Kong, Indonesia, Israel, Jordan, Korea, Malaysia, Mexico, Philippines, Singapore, Taiwan, Thailand and Turkey) during the period from Dec 1987 to May 1997 (11 markets) and from Jan 1986 to Apr 1995 (4 markets)	Brazil, Hong Kong, Indonesia, Jordan, Korea, Malaysia, Mexico, Thailand and Turkey markets are weak-form efficient.
Olowe (1999)	- Autocorrelation test	Monthly returns data of 59 individual stocks listed on the Nigerian Stock Market over the period of 1981-1992	The test fails to reject the null hypothesis of weak-form market efficiency for the Nigerian Stock Market.
Mobarek et al. (2000)	- Autocorrelation test - Runs test	The Bangladesh Security on the Dhaka Stock Exchange for the period of 1988 to 1997	The returns of Dhaka stock market do not follow random walks.
Abeysekera (2001)	- Autocorrelation test - Runs test - Unit root test	Colombo Stock Exchange (CSE) in Sri Lanka for the period from 1991 to 1996	The findings of these tests reject the random walk hypothesis.
Wheeler et al. (2002)	- Autocorrelation test - Runs test	Daily returns series of 16 individual stocks listed on the Warsaw Stock Exchange from 1991 to 1996	The result rejects the null hypothesis of weak form of market efficiency for most of the individual stocks.
Moustafa (2004)	- Runs test	The daily data of 43 stocks on United Arab Emirate stock market for the period from 2001 to 2003	The test results in 40 stocks being random. Thus, this supports weak-form market efficiency.
Worthington et al. (2004)	- Autocorrelation test - Runs test - Unit root test - Variance ratio test	Sixteen developed markets from 1987 to 2003	The result cannot reject the random walk hypothesis in the majority of developed markets.
Worthington et al. (2006)	- Augmented Dickey-Fuller test - Autocorrelation test - Phillips-Perron test - Runs test - Unit root test - Variance ratio test	Five developed stock markets (Australia, Hong Kong, Japan, New Zealand and Singapore) and ten emerging stock markets in Asia (China, India, Indonesia, Korea, Malaysia, Pakistan, the Philippines, Sri Lanka, Taiwan and Thailand) up to May 28, 2003	The serial correlation and runs tests conclude that these markets are weak-form inefficient. While Hong Kong, New Zealand and Japan are weak-form efficient according to the variance ratio test.
Loc et al. (2010)	- Autocorrelation test - Runs test - Variance ratio test	Daily and weekly price series of VN-Index and REE, SAM, HAP, TMS and LAF27 from Jul 28, 2000 to Dec 31, 2004	In general, the study concludes that the Vietnamese stock market is weak-form inefficient.
Vinh et al. (2010)	- Autocorrelation test - Runs test - Variance ratio test - Regression test	Daily and weekly price series of VN-Index and 8 individual stocks (CII, ITA, SJS, TDH, ABT, AGF, TS4, FMC) from	The results from all tests fail to support the hypothesis of weak form efficiency with the daily data. However, with

-	ARCH, GARCH (1,1)	2007 to 2010	weekly data, the results obtained from runs test and autocorrelation test do not completely reject the hypothesis of weak form efficiency.
Nisar and Hanif (2012)	- Runs test - Variance ratio test	Monthly, weekly and daily data of NYSE Composite (USA), S&P TSX Composite (Canada), FTSE 100 Index (UK), CAC 40 (France), DAX 30 (Germany) and IBEX 35 (Spain) for the period from Jul 1997 to Jun 2011	NYSE Composite, S&P/TSX Composite, DAX 30 and IBEX 35 are weak form efficient markets.

### 3 METHODOLOGY

As previous empirical studies, portmanteau test and run test have been the two most widely used methods for investigating the weak form of EMH.

Portmanteau test was derived from the autocorrelation test. Serial correlation, also referred to as autocorrelation in the context of stock market, refers to the tendency for future stock returns to be related to past returns. The test aims at determining whether serial correlation of returns is significantly different than zero or not. If all the serial correlations of returns are statistically equal to zero, returns are independent and prices are random. Otherwise, a positive correlation indicates that a positive (negative) return tends to be followed by a positive (negative) return; and a negative correlation means that a positive (negative) return tends to be followed by a negative (positive) return.

In order to examine serial dependence in stock price changes, researchers have employed different tests to measure their autocorrelations and test whether several autocorrelations of stock returns are simultaneously equal to zero. Such a test, often referred to as Q statistic (Q test), was given by Box and Pierce (1970) who proposed the Portmanteau statistic. Ljung and Box (1978) modified the Q statistic to increase the power of the test in finite samples. Two test hypotheses are

$$H_0: \rho_1 = \rho_2 = \dots = \rho_k = 0,$$

$$H_1: \rho_j \neq 0 \text{ for some } j \in \{1, \dots, k\}$$

where  $\rho_j$  is the  $j^{\text{th}}$  autocorrelation.

## 4 EMPIRICAL RESULTS

### 4.1 Data and descriptive statistics

The data used in this research is the daily closing prices of VN-Index during the period from August 2, 2000 to December 31, 2013 and of HNX-Index during the period from January 4, 2006 to December 31, 2013, together with individual stock prices listed on VN-Index that are available up to December 31, 2013. The data is obtained from the adjusted prices of Hochiminh and Hanoi stock exchange.

From the daily data, weekly prices are extracted. The weekly return series are calculated based on the closing value for Wednesday of each week. If Wednesday value is missing, then

the Tuesday closing price (or Thursday if Tuesday price is also missing) is used instead. In the event that Tuesday, Thursday and Wednesday closing prices are missing, the return for that week is reported as “missing value”. The choice of Wednesday values is suggested by Huber (1997) in an attempt to eliminate the weekend effect, which refers to the tendency of stocks to exhibit relatively large returns on Fridays compared to those on Mondays, and to minimize the number of holidays. The returns are computed as continuously compounded returns.

According to Campbell, Lo and MacKinlay (1997), the purpose of the computation of stock returns using natural logarithm is to stabilize the variance of the price series over time and incorporate their exponential growth behavior.

The values of some main descriptive statistics, including mean, median, maximum, minimum values, standard deviation, measures of skewness and kurtosis of VN-Index and HNX-Index are provided by Stata 12 in Table 1.

Both the means of daily and weekly data, as well as the median of weekly data, are positive, suggesting that VN-Index is expected to increase over time. The parameters skewness and kurtosis are, respectively, the measures of asymmetry and the degree of peak of the probability distributions of the returns. They are used to indicate whether a data set is normally distributed or not. For normal distribution data, the value of skewness and kurtosis are zero and three respectively. Given the value of skewness and kurtosis of the data, it is indicated that both daily and weekly return distributions are characterized as negatively skewed (long left tail) and leptokurtic (having a more acute peak around the mean and fatter tails).

On the other hand, HNX-Index experiences negative means and medians for both daily and weekly data, implying that HNX-Index is expected to decrease over time. The value of skewness and kurtosis indicates that both daily and weekly return distributions are characterized as positively skewed (long right tail) and leptokurtic (having a more acute peak around the mean and fatter tails).

## **4.2 Test results**

- ***Portmanteau test***

For testing the weak-form EMH, the Ljung-Box test is conducted first. If autocorrelation coefficients are significant in the results, stock prices are predictable as future prices can be derived from past prices. Thus, investors can make abnormal profits by establishing a trading strategy on the basis of past information.

The results are shown in Table 2 and Table 3. Regarding VN-Index, the Ljung-Box Q statistics of daily and weekly data reported for eight lags are all significant at 1% level (p-value are all equal to zero). Hence, the null hypothesis of no autocorrelation in the data is rejected, suggesting that autocorrelations exist in both daily and weekly return series of VN-Index. It is worth nothing that there is a presence of positive sign of the autocorrelation coefficients. This indicates that consecutive returns tend to have the same sign, so that a positive (negative) return in the current day tends to be followed by an increase (decrease) of return in the next several days. Such positive autocorrelations tend to exist if the market adjusts slowly to information.

Regarding HNX-Index, the p-values of daily data are close to zero for all lags, implying that the null hypothesis is rejected at 1% level. However, the weekly data shows slightly different results. The null hypothesis is rejected at 5% level for the 1st lag of weekly return, while the 2nd lag result fails to reject the null hypothesis even at 5% level. However, all the results for the 3rd, 4th, 5th, 6th, 7th and 8th lags show that there are correlations at 1% level. Again, the



results for autocorrelation coefficients for HNX-Index are mixed. For daily data, there are positive autocorrelation for all lags except for 6th and 7th lags. For weekly data, only 5th and 8th lags experience negative autocorrelation. This indicates that prices on HNX-Index tend to revert to the mean faster than VN-Index, which still has positive correlation after eight lags.

As Hochiminh stock exchange is currently accounting for 85% of total market capitalization of Vietnamese stock market, it is worth expanding the investigation into the data of 327 stocks listed on the HOSE up to December 31st, 2013. Using the Ljung-Box test daily returns, we obtain the results in Table 4 below.

The results indicate that the majority of stocks show a strong degree of autocorrelation for all the period of lags at 5% significant level.

At 1% significant level, the same is true for the 1st and 2nd lags. However, the stocks that have the highest degree of autocorrelation for the 1st lag are BMC, VIS, VHG, SJS and MCV. All of these stock experience significant positive autocorrelation for the 1st lag. On the other hand, the stocks that show the lowest degree of autocorrelation for the 1st lag are APC, C32, TBC, AGD and ELC. It is also observed that most of the autocorrelation coefficients for the 8<sup>th</sup> lag are positive, implying that prices of one stock tend to move in the same direction up to the 8-day period. The results from testing consolidate the null hypothesis of no autocorrelation of returns, indicating the inefficiency in the Vietnamese stock market.

- ***Runs test***

To test for the weak-form efficiency of the Vietnamese stock market, the nonparametric runs test is also used in this study. The runs test is considered more appropriate than the parametric autocorrelation test since all observed series do not follow the normal distribution.

Results of the runs tests for daily and weekly returns of the indexes are summarized in Table 5. The table shows that the actual number of runs in all the daily data is significantly smaller than the expected value, even at 1% level. This means the null hypothesis is rejected for the daily data. The negative Z-statistic values also indicate a positive serial correlation in the price series.

For the weekly observed returns, the results also indicate that the null hypothesis of independence among stock returns is rejected for both market indexes. Again, positive serial correlation is observed for the weekly data, which is similar to the results of daily returns.

In general, the runs test provides evidence to strongly reject the null hypothesis of random walk for both daily and weekly observed returns of the indexes. This result is similar to the findings in the autocorrelation test.

## **5 DISCUSSION**

The results are rather consistent with previous studies of Loc et al. (2010) and Vinh et al. (2010) whereby they strongly rejected the weak-form EMH of the Vietnamese stock market. The rejection of weak-form EMH indicates that daily and weekly stock prices do follow a trend. Therefore, it is possible to study this trend and predict the stock prices to generate abnormal returns.

In particular, most of the stocks showing the highest level of autocorrelation are in construction and mining industries which have seen stagnant growth in the past few years due to economic conditions. This suggests that it is possible to achieve abnormal returns using technical analysis on these stocks. On the other hand, stocks with lowest degree of autocorrelation belong to agriculture, fishery, technology and energy industries which are key industries for the national economic development and should be expected to exhibit rapid

development in the future. It is realized that chartists would find it difficult to make money from these stocks' patterns.

Furthermore, the results of the Ljung-Box test of individual stocks suggest that the more the market attracts investors, the more the efficiency of the market. One possible explanation is that investors are hesitant to maintain their active trading in these stocks, delaying the process of price adjustments to information. Chartists have a chance to draw their patterns and profit from them.

## **6 CONCLUSION**

The Efficient Market Hypothesis is one of the most controversial and well-studied proposition in economic and financial theories. Throughout the history of the literature, the different levels of efficiency of various markets have long been of great interest to researchers. In developed markets, there are many studies showing support of weak-form efficiency. However, the results for emerging markets are mixed. Vietnam is considered a developing country and stock market possesses many characteristics found in most developing and emerging stock market around the world.

The results obtained from the portmanteau test indicate significant positive autocorrelation coefficients of the stock returns in the Vietnamese market. Further examination of 327 individual stock data up to Dec 31, 2013 yields the similar results, with the majority of data experiencing significant positive correlations. Also, nonparametric runs test once again confirms the existence of positive correlations in the data, hence, rejects the weak-form Efficient Market Hypothesis. The implication of these results is that the Vietnamese stock market is still not weak-form efficient.

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**Appendix:**

Table 1: Descriptive statistics of VN-Index and HNX-Index returns

Statistics	VN-Index		HNX-Index	
	Daily return	Weekly return	Daily return	Weekly return
Observations	3184	686	1946	408
Mean	0.0005084	0.0023107	-0.0001529	-0.0007294
Median	0.0000000	0.0005265	-0.0013803	-0.0026983
Standard deviation	0.0166995	0.0449756	0.0230488	0.0599473
Minimum	-0.0765618	-0.2053893	-0.1288534	-0.1936642
Maximum	0.0774069	0.1935111	0.1803926	0.22888
Variance	0.0002789	0.0020228	0.0005312	0.0035937
Skewness	-0.1919788	-0.2990021	0.2675868	0.3563351
Kurtosis	5.412304	5.470889	7.197322	4.702177

Table 2: Results of Ljung-Box test for VN-Index

Lag	Daily			Weekly		
	AC	Q-statistic	p-value	AC	Q-statistic	p-value
1	0.3110	308.3450	0.0000	0.2102	30.4327	0.0000
2	0.0466	315.2700	0.0000	0.1306	42.2007	0.0000
3	0.0205	316.6111	0.0000	0.0955	48.5020	0.0000
4	0.1032	350.5909	0.0000	0.1305	60.2878	0.0000
5	0.1178	394.8504	0.0000	0.096	66.6720	0.0000
6	0.0916	421.6044	0.0000	0.0521	68.5549	0.0000
7	0.0513	430.0047	0.0000	0.0483	70.1740	0.0000
8	0.0307	433.0095	0.0000	0.0527	72.1040	0.0000

Table 3: Results of Ljung-Box test for HNX-Index

Lag	Daily			Weekly		
	AC	Q-statistic	p-value	AC	Q-statistic	p-value
1	0.1933	72.8557	0.0000	0.1140	5.3446	0.0208
2	0.0294	74.5411	0.0000	0.0314	5.7521	0.0564
3	0.0312	76.4397	0.0000	0.1396	13.8023	0.0032
4	0.0838	90.1344	0.0000	0.1073	18.5665	0.0010
5	0.0665	98.7717	0.0000	-0.0020	18.5681	0.0023
6	-0.0073	98.8758	0.0000	0.0673	20.4524	0.0023
7	-0.0097	99.0595	0.0000	0.0676	22.3559	0.0022
8	0.0278	100.5762	0.0000	-0.0429	23.1268	0.0032

Table 4: Summary of Ljung-Box test for daily data of individual stocks on HOSE up to 31/12/2013

	Number of stocks			
	Lag 1	Lag 2	Lag 4	Lag 8
p-value < 0.05	222	207	192	189
p-value $\geq$ 0.05	105	120	135	138
p-value < 0.01	187	174	153	149
p-value $\geq$ 0.01	140	153	174	178
Autocorrelation $\geq$ 0	264	197	188	211
Autocorrelation < 0	63	130	139	116

Table 5: Results of runs test for VN-Index and HNX-Index

		Obs	Expected runs	Actual runs	Z-statistic	p-value
VN-Index	Daily	3184	1593	1251	-12.12	0.000
	Weekly	686	344	285	-4.5	0.000
HNX-Index	Daily	1946	967	888	-3.6	0.000
	Weekly	408	204	175	-2.91	0.000



## **LIFE INSURANCE AND THE ROLE OF FINANCIAL ARBITRATOR FOR THE RESOLUTION OF DISPUTES WITHIN LIFE INSURANCE**

*Eva Ducháčková, Otakar Schlossberger*

### **Abstract**

Life insurance is a standard tool of the insurance market. Its role, significance and form are changing throughout its development in relation to changing conditions of life insurance. It is characteristic for the recent period that life insurance has been going through modifications, in particular the typical increase in the share of unit linked life insurance. Life insurance and especially unit linked life insurance have been recently facing a few challenges. Some of them resulted from changing financial markets and others were connected with the conclusion of life insurance policies. Effective solutions to those issues are being searched for, among others via the Financial Arbitrator Office. This essay aims to analyse current problems related to life insurance, to indicate possible solutions and to specifically point out the chances of asking the Financial Arbitrator Office to deal with possible disputes within life insurance.

The paper has been prepared under GAČR project entitled “Post-crisis banking regulation and its impact on the economic activity within a small, export-oriented economy”, under reference number 13-08549S, with the University of Finance and Administration (VŠFS) as the grant beneficiary and research project of the Faculty of Finance and Accounting at the University of Economics, Prague, Institutional support of the University (IP 100040).

*Keywords: life insurance, unit linked life insurance, technical provision of life insurance, risk portion of premium, investment portion of premium, financial arbitrator*

JEL Classification: G22, G28

### **1 INTRODUCTION**

Life insurance is intended for life natural events, i.e. demise and the rest of one's life. Its content and concept have been changing throughout its development. The original form connected with covering risks of the family breadwinner's demise and the consequences for the family members has been extended to cover additional risks affecting people's lives, such as injuries, invalidity, illness etc. by the savings portion (rest of one's life). Besides the standard approach to create the technical provision of life insurance, its investment form has recently been developed into the so-called unit linked life insurance. In the true sense of the word, it is a combination of life insurance and investments in shares funds. As a result, in some countries the unit linked life insurance is not included in the insurance products but in investment products (especially in cases where the risk portion of premium is minimal and where it refers to insurance with lump-sum paid insurance premium). In connection with the application of the unit linked life insurance, we observe discrepancies and disputes between insurance companies and the insured. The beneficiary of life insurance is a citizen as the user. Since 2013, the extrajudicial dispute settlement body - the Financial Arbitrator of the Czech Republic has been entitled to deal with disputes between insurance companies and their clients within the life insurance area.

## **2 OBJECTIVE AND METHODS**

The aim of the paper is to analyze the current problems in the area of life insurance, to show the possibilities of their solution and then to specifically demonstrate the possibility to use the financial arbiter authority for solving any disputes arising out of life insurance business. The authors consider by the processing of given theme the following question: It is possible within using the analyzed indicators and implementation the institutions for consumer protection in the financial market (in particular the Financial Arbiter) to contribute to higher transparency of the life insurance and eliminate some of the problems associated with the operation of life insurance (Daňhel, Ducháčková, Radová, 2008, p. 604).

In processing the contribution were used the methods of description, deduction and analytic comparisons.

## **3 THEORETICAL BASIS**

The significance of life insurance has been changing throughout its development, extending its scope from its original main focus to covering the demise risk and the current broad concept. At present, we can define basic areas of life insurance:

- Risk coverage: mainly demise risk to provide for the bereaved or as a tool to cover a loan, and these days in addition to the demise risk the life insurance usually includes the coverage of additional related risks, such as injuries, severe illness, invalidity etc.,
- Savings for old age: the savings portion in life insurance represents production of savings for the old age,
- Investment tool, for the life insurance represents savings with yield, the form and amount of which is modified following a specific type of life insurance,
- From today's macro-economic point of view, life insurance represents a tool to cover needs of people in old age as an alternative to social pension scheme and it is necessary to stress the counter-inflationary effect of life insurance – deferred consumption and savings production by the insured persons in reserves which in connection with investments of insurance companies allow funding of medium- and long-term investments.

In the conditions of ageing population, thus increasing obligations in the area of elderly care, there is growing significance of life insurance as a tool to cover these financial needs. Life insurance in developed countries becomes an integral part of the whole pension scheme system – it represents optional extra protection. Moreover, unlike the obligatory public scheme it is far more flexible in terms of the sum, frequency and methods of contribution payments, (or rather the insurance premium) or to the contrary the payment of insurance benefits (or rather indemnity). Life insurance thus allows people to split the financial flows in the course of the whole life span according to their individual needs and not to rely only on how the state is going to take care of them.

The role played by life insurance when ensuring financial means for the old age is increasingly stronger and more distinct, gradually expanding its traditional function as protection in case of sudden demise of someone close. On the other hand, in the last short period of demise risk coverage, or additional risks (of non-life nature), life insurance enters a new dimension regarding new circumstances in people's lives, especially in relation to bigger responsibility for family life. This refers to the fact that financial markets offer a number of savings tools (in terms of the savings portion of the life insurance of competitive tools) that can be used to cover elderly needs as well as life insurance.

Today's life insurance in reference to its significance of covering people's needs appears in various forms that combine two basic life events, i.e. demise risk and the rest of one's life, or they include additional risks of non-life nature, such as injuries, illness, invalidity etc., which are closely related to life risks. Relevant forms of life insurance are intended to meet people's needs with regard to their significance. The basic forms of life insurance include:

- term life insurance that includes demise risk coverage, or additional risks,
- endowment insurance that includes coverage of demise risk or additional risks as well as the savings portion (the rest of one's life portion), i.e. the insured person receives arranged insurance money at the agreed time (unless he/she dies in the course of the period of insurance) and the insurance in this form basically represents a certain form of savings production with a yield guarantee (by applying a technical interest rate),
- pension insurance which includes payment of the arranged sum of pension, i.e. repeated amount of money, and possibly other pensions, such as survivor's pension, disability pension,
- children's assurance intended to cover children's needs,
- universal life insurance, a variable and flexible form of a mixed life insurance which allows in the course of the insurance period adjusting parameters of the life insurance to the needs and abilities of the insured person – the method and frequency of the insurance payment, adjustments of the insurance period duration, or the possibility of withdrawing (lending) a part of the savings within the life insurance,
- unit linked life insurance where the insurance benefit depends on the development of prices of shares units of the shares fund in which the insurance premium is invested (Daňhel, 2005, p. 203); the amount of the insurance premium fully depends on the yield from investing insurance reserves and when the insured persons themselves choose the strategy for investing their reserves produced as part of the life insurance.

In terms of proper use of the life insurance to cover the demise risk, or other risks (of a non-life nature), it is significant to set the amount of the insured money. An optimal choice of the insured money for the demise risk is based on several approaches. These approaches are related to the purpose for which the life insurance is arranged as well as to the form of the life insurance. The amount of the insurance money should generally correspond to a certain multiple of the annual net income of the insured person (especially if he provides for other persons in the family and the family income depends on this person's income) and to the amount of outstanding financial obligations (unless they are covered in a different way). The sum insured needs not be constant during the whole insurance period. It may be set as increasing with regard to the development of consumer prices index (inflation), which is naturally connected with the increased insurance premium. Or on the contrary, insurance money decreasing during the insurance period may be concluded. Theoretically, it is possible to define following methods to determine the amount of the sum insured (Ducháčková, 2012, p. 199 – 200):

- determining the sum insured depending on the line of credit,
- determining the sum insured depending on the income level,
- determining the sum insured by being derived from the costs.

Given the perception of the life insurance significance, it is typical for developed countries to apply a certain form of tax allowance of the life insurance. Tax allowance may be applied in a different concept, i.e. not imposing a tax on life insurance yield or by applying deduction of the paid premium from the tax base from the income of the insured persons, or of their employers if they cover the cost of life insurance premium for their employees.

## 4 CURRENT ISSUES OF LIFE INSURANCE

The perception of life insurance only as a savings tool is challenging, for life insurance also includes the risk portion of premium. Competitive savings products often bring clients a higher appreciation, which results from the structure of the insurance price. The price consists of an investment portion of premium, risk portion of premium, administrative expenses and the insurance company profit. The insured persons are rarely familiar with the structure of the insurance price (share of relevant price portions), as well as the progress in the sum of settlement (basically the amount of life insurance reserve).

### 4.1 Appreciation of financial means invested in life insurance

Capital life insurance, where the risk connected with the investment of technical provisions of life insurance is carried by the insurance company, applies the regulation of the investment of technical provisions that are created within this insurance. Following this regulation, insurance companies can invest mainly in more conservative investment instruments (e.g. government bonds). The insurance company ensures the appreciation of the financial means invested in life insurance by applying the technical rate of interest. The level of the technical rate of interest is determined by the insurance company. On the one hand, the technical rate of interest means guaranteed minimum appreciation of the financial means invested in life insurance (investment portion of premium) and on the other hand it affects the price of life insurance – by means of discounting. When determining the technical rate of interest, the insurance company has to take into consideration the situation at financial markets (from the perspective of achievable investment yields), the competitiveness of the life insurance product as well as the regulation of this technical rate of interest (since 2000, the technical rate of interest has been regulated by the state). The state regulates the technical rate of interest by determining its maximum level (see Tab. 1).

Tab. 1 – Regulation of the technical rate of interest in the Czech Republic (upper limit). Source: Regulation effecting some provisions of Act on Insurance No. 303/2004 Coll., Regulation effecting some provisions of Act on Insurance No. 434/2009 Coll., ČNB Official Notification, releasing the maximum level of the technical rate of interest dated 11 February 2010, ČNB Official Notification, releasing the maximum level of the technical rate of interest dated 15 January 2013, ČNB Official information releasing the maximum level of the technical rate of interest dated 19. 2. 2015.

Period	2000-2002	2003–2009	2010-2012	2013-2015	1. 7. 2015 -
Limit TÚM	4.0 %	2.4 %	2.5 %	1.9 %	1.3 %

Freedom of investment applies to unit linked life insurance, where the insurant chooses the method of investing technical provision of life insurance, however, at the same time it carries investment risk. The problem in terms of running the unit linked life insurance lies in the approach towards its sale. It is common that the unit linked life insurance is sold to clients who do not understand the way it works, i.e. they expect outlined yield which is not achieved subsequently. Unlike the capital life insurance, the feature of the unit linked life insurance is that the insurance company does not guarantee the payment of the arranged part at the end of the insurance period; the size of the insurance benefit is based on the value of share units. On the other hand, the products of the unit linked life insurance are more transparent.

Insurance companies do not specify the settlement to their clients in advance (the usual practice is that the amount of the settlement is calculated by means of insurance-mathematical

methods depending on the duration of the period of insurance) although the client could obtain information for the respective years of the insurance period related to the paid insurance premium, capital value of reserves with the guaranteed appreciation and capital value of reserves with the expected value of appreciation, including the method used by the insurance company to determine the level of profit-sharing.

#### **4.2 Intermediated sale of life insurance**

Life insurance is commonly arranged through insurance intermediaries or financial advisors. These sellers are remunerated with commissions for the arranged life insurance. As for the life insurance, these commissions are currently set at high values (savings products of life insurance show around 150-200 % of annual premium). Higher commissions are connected with the sale of the unit linked life insurance. Insurance companies pay such high commissions in order to enhance insurance contracts set of life insurance. On the other hand, this fact often results in efforts of the sellers (of several tens of thousands operating on the Czech insurance market) to sell the life insurance products (especially unit linked life insurance) even to clients these products are not suitable for.

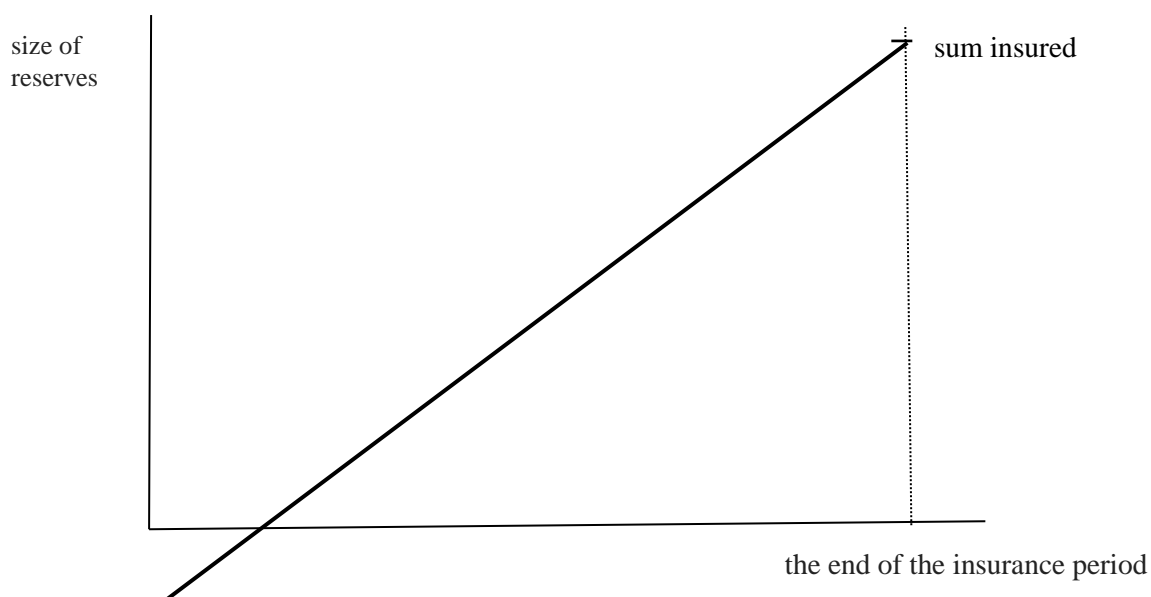


Fig. 1 – Progress of the life insurance reserve (scheme). Source: own processing.

A current problem also related to the sale of life insurance is the so-called „over-insurance“, i.e. sellers of insurance products convince the insurant to cancel the existing life insurance contract giving the reason he does not find it beneficial any more, and to conclude a new contract of an innovated form. This method is certainly profitable for the seller who collects money for the arranged insurance, however, completely disadvantageous for the insured person. Life insurance, especially life insurance with savings portion, has a long-term character and the technical provision of life insurance based on which the insurance company pays the settlement is created only after two or three years after the insurance is arranged, i. e. the client if he cancels the contract prematurely basically pays the cost of arranging the insurance policy and additional cost and the indemnity is not paid to him, or possibly only in a small amount (see Fig. 1).

#### **4.3 Impact of the gender directive on life insurance**

Distribution of life insurance products has been substantially influenced by the so-called gender directive of the European Union (Council Regulation No. 2004/113/ES dated 13

December 2004 effecting the principle of equal opportunities for men and women in terms of providing products and services). Originally, it was to be applied for all contracts starting as at 21 December 2007. The insurance area was granted an exception that allowed departing from this rule if statistical data can confirm diversity in figures related to the occurrence of events for men and women. In March 2011, the European Court of Justice decided that as of 21 December 2012 this exception shall no longer be prolonged. Following this decision the gender cannot be regarded as a factor affecting the probability of demise and the related sum of net premium in life insurance.

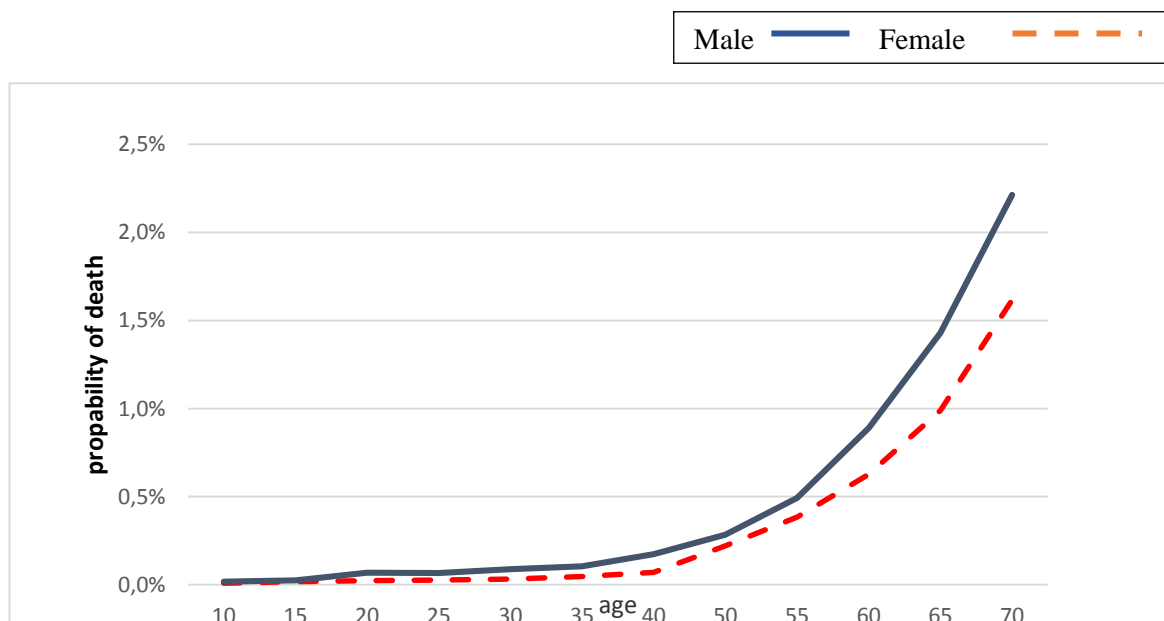


Fig. 2 - Difference in demise probability for men and women Source: <http://www.czso.cz/csu/2014edicniplan.nsf/p/130055-14>.

However, the gender next to age and health represents a significant factor affecting the probability of demise. It refers to an insurance-technical factor and from the perspective of insurance theory the gender consideration as part of determining the price of life insurance cannot be considered discrimination. Another problem might be anti-discrimination efforts claiming that even the price determination based on the age and health is discriminatory (the basics of life insurance would be threatened if these factors were not permitted to be applied in order to assess the demise risk in life insurance). The fact that the gender factor is well-founded is supported by distinct figures about the demise probability of men and women (see Fig. 2) and the medium life expectancy of men and women (based on data <http://www.czso.cz/csu/2014edicniplan.nsf/p/130055-14>):

- Medium man's life expectancy – 74,52 years
- Medium woman's life expectancy – 80,64 years

#### **4.4 Tax advantage of life insurance**

It is a common thing that life insurance is subsidized by the state. The reason lies in the investment nature of life insurance and utilization of life insurance reserves from the macro-economic perspective and recently often in terms of including life insurance in the comprehensive pension scheme. This is the reason why the investment life insurance is subsidized by the state. Life insurance in the Czech Republic has been tax-advantaged since

2001. Tax advantage of life insurance applies to life insurance containing a savings portion, i.e. insurance for the rest of one's life, demise and the rest of one's life, pension scheme. There is a yearly limit of up to CZK 12.000 for the insured persons (if the insured person pays the insurance premium in a lump sum, this whole premium will be proportionally calculated for the whole insurance period due to tax purposes). The employer may include in tax-eligible costs the insurance premium for his employee for life insurance of up to CZK 30.000 per year (alternatively with additional pension scheme) for one employee and this insurance premium is not subject to the income tax of the employer. For this paid insurance premium, neither the employee nor the employer pays the premium for social and health insurance. In terms of the life insurance application, there is great significance in supporting life insurance as well as in the state approach towards the protection of the clients of life insurance companies, especially in terms of the protection of the funds deposited in life insurance. This is the reason for the common investment regulation of technical provisions of life insurance and monitoring the solvency of life insurance companies.

Basic conditions to utilize this subsidy next to the investment character of the insurance are as follows:

- insurance period for the minimum of five years,
- payment of indemnity only after reaching the age of 60 years,
- the insurant is simultaneously the insured person.

Since 2015 another condition to utilize tax advantage has to be met, i.e. life insurance must not allow the possibility of premature withdrawal from the reserve funds. Certain cases showed incorrect utilization of this subsidy, especially when contributions to life insurance were paid by the employers. Employers contributed to life insurance for their employees and the insured person withdrew the insurance amount shortly after having received it. Since the subsidy is intended to create savings for the pension, the possibility of premature withdrawal contradicts this principle. This measure is technically correct given the reasons of tax advantage. To a certain extent (based on existing knowledge), changes connected with the application of another condition to utilize the tax advantage of life insurance shall result in decreased size of the life insurance contracts set.

In terms of the utilization of tax advantage, the sum of the deduction from the income tax base shall correspond to the sum corresponding to the sum which is intended for the savings plan in the relevant year (see Tab. 2). Until then, tax deductions had not been surveyed so strictly.

Tab. 2 - Example case (in CZK) Source: Podávka, 2014 p. 24.

Year	Paid insurance premium	Non-tax risk portion of premium	Reserve related to investment portion of premium (towards the end of the year)	Sum of tax deduction	Payment from reserve
1	10,000	3,000	7,000	7,000	-
2	10,000	5,000	12,000	5,000	-
3	10,000	8,000	14,000	2,000	-
4	10,000	11,000	13,000	0	1,000
5	10,000	13,000	11,000	0	3,000

#### **4.5 Products of lump-sum paid life insurance**

The period after 2000 shows the trend to apply lump-sum paid life insurance products on the life insurance market. They usually represent products with prevailing investment portion and minimal risk portion arranged for four to five years. These characteristics make it clear that it

is actually no longer an insurance product but a savings product. These products basically represent an alternative to some bank products, especially in connection with changes in the area of bank products (e.g. related to the financial crisis) and they are largely offered by bank-insurance institutions. Products of lump-sum paid life insurance substantially influence the indicators of life insurance market (see Fig. 3) although by their nature they are not real insurance products.

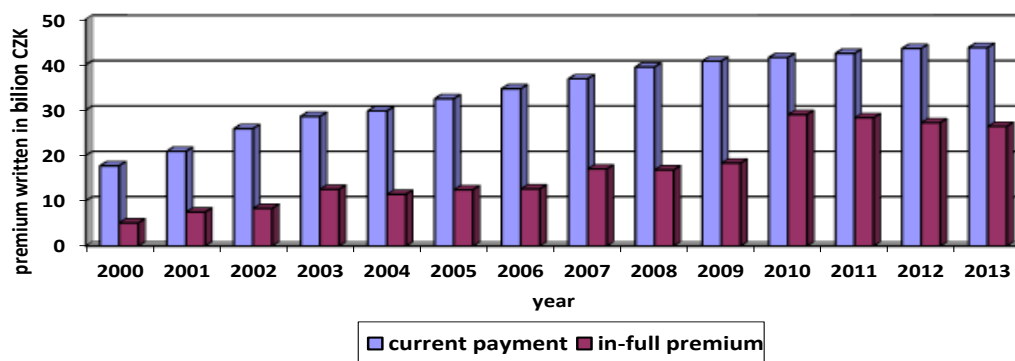


Fig. 3 - Development of the prescribed premium of life insurance in the Czech Republic in billion CZK. Source: <http://www.cap.cz/statisticke-udaje/vyvoj-pojistneho-trhu>.

#### **4.6 Unit linked life insurance**

Another area to deal with is represented by the products of unit linked life insurance. In the past, the unit linked life insurance was considered to be suitable for insurants who already are sufficiently provided with the standard life insurance (Hagelschuer, 1991, p. 44; Ducháčková, Daňhel, 2006, p. 382). Generally speaking, this is suitable for clients with certain knowledge and experience of investments. The significance of the unit linked life insurance was growing fast in the 90's of 20<sup>th</sup> century (Nyfeler, Lehmann, 1995, p. 6). The significance and share of the unit linked life insurance on the Czech insurance market substantially increased after 2000 (see Tab. 3). Increase in the share of the unit linked life insurance in the global prescribed premium has been determined by a number of factors, but mostly by the profitability for the insurants (shift of the investment risk to the insurant), thus resulting approach toward the sale through intermediaries (higher commission compared to other insurance products). The unit linked life insurance puts emphasis on flexibility, state subvention and the possibility of higher appreciation.

A big challenge in relation to clients in life insurance is the issue of transparency and comprehensibility of life insurance products. Life insurance products are often intricately formed and incomprehensible to the client. Standard capital life insurance is viewed by the client as a guaranteed product where the insurance company is obliged to pay the previously arranged capital sum. However, misunderstanding the product by the clients may result in taking wrong steps – e.g. premature termination of the insurance policy (especially shortly after arranging the insurance policy) and wrong ideas about the amount of the so-called settlement.

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Tab. 3 - Indicator of Unit Linked Life Insurance. Source: Basic information on life insurance, available at:

[http://www.cnb.cz/cs/dohled\\_financni\\_trh/souhrnne\\_informace\\_fin\\_trhy/zakladni\\_ukazatele\\_fin\\_trhu/pojistovny/poj\\_ukazatele\\_tab04.html](http://www.cnb.cz/cs/dohled_financni_trh/souhrnne_informace_fin_trhy/zakladni_ukazatele_fin_trhu/pojistovny/poj_ukazatele_tab04.html).

	31.12.2010	31.12.2011	31.12.2012	31.12.2013
Number of contracts	2,024,798	2,618,238	2,867,261	3,029,495
Number of recently concluded contracts	709,748	753,756	729,873	614,011
Prescribed gross premium	33,956,363	36,584,233	37,799,094	34,763,925
lump-sum paid	18,495,718	19,756,620	18,173,544	13,813,301
with recently concluded contracts	19,581,999	19,160,608	18,632,916	12,628,742
Acquisition costs of insurance policies	6,818,930	7,415,447	7,010,366	5,969,490
Cost of commissions for intermediaries	577,270	5,736,525	5,495,480	4,526,489

The unit linked life insurance is connected with the application of a whole range of fees that are intricately formed and often non-transparent. Regular fees of the unit linked life insurance are as follows:

- administrative charges for administrative expenses charged for the whole policy period,
- collection fees covered from each premium payment,
- fees of a certain percentage from the difference between the purchase price and the selling price of share units (bid/offer spread),
- fees to cover initial costs (50 – 70 % of the annual premium of the savings portion for the period of 2-3 years).

Furthermore, the unit linked life insurance is connected with other fees, such as fees for insurance policy cancellation, changes in insurance policies, extra withdrawal of share units.

As a result of the structure of fees, the value of accumulated share units as part of the savings portion of unit linked life insurance at the level of paid premium is achieved only around the tenth year of the policy period (especially due to the fee to cover the initial costs of concluding the insurance policy). It implies that this insurance is suitable only in the long-term perspective.

Considering the long-term nature of unit linked life insurance, an incorrect approach is the termination of the policy after a short time (or concluding a new insurance policy). Also, given the non-transparent structure of the product and the fees, the product is non-transparent.

It is possible to enhance transparency through indicators characterising this product. The client should be provided with more detailed information about the structure of the insurance price (SUN indicator – standardized cost indicator). The price of unit linked life insurance consists of following portions:

- risk portion – intended to cover risks, such as death, injury, invalidity, illness etc.,
- cost portion – intended to cover costs of insurer, such as acquirable commission, collection fee, administrative expenses, claims expenses etc.,
- investment portion – a part of premium intended to purchase share units.

In terms of the product transparency, it is suitable to inform the client about the structure of the insurance premium in the initial phase of the insurance with regard to the basic purpose of the insurance policy and client's expectations (see Fig. 4).

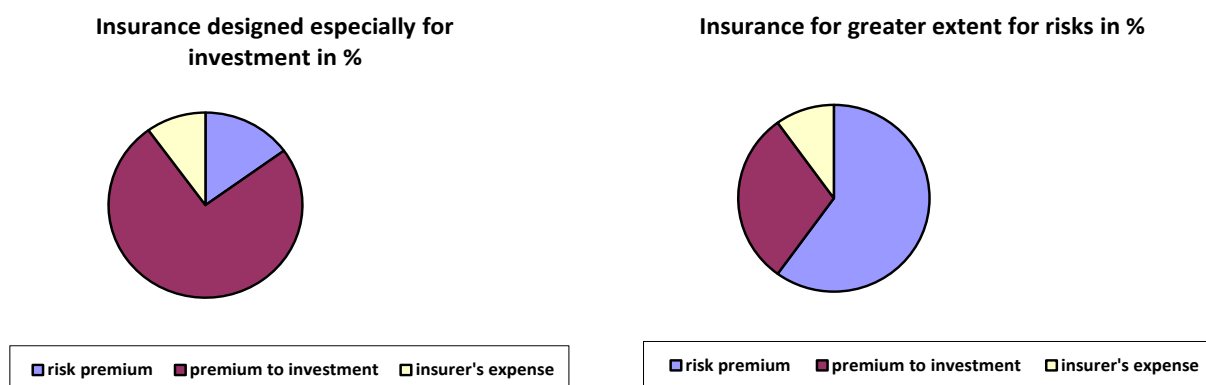


Fig. 4 - Difference in the price structure of unit linked life insurance in % – example. Source: own processing.

To get the picture of the progress of unit linked life insurance, it is advisable to present the insurant with a simulation of the progress of the amount of the life insurance reserve at the start of the insurance. Here, we can see the simulation of the amount of the reserve of a specific life insurance in various variants of the expected appreciation compared with the progress of the paid premium (see Fig. 5).

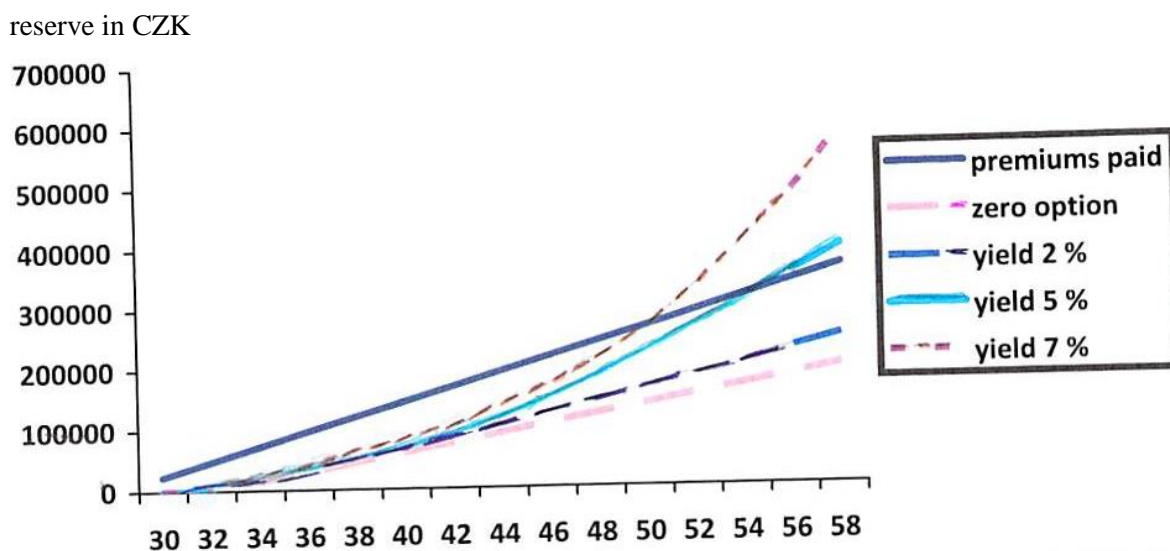


Fig. 5 - Illustration of the progress of the amount of the reserve of life insurance for individual variants of yield and for a specific case: client's age – 30 years, policy period – 30 years, premium CZK 1,000 per month, capital sum for death – CZK 1 Mio. Source: <http://www.cap.cz/odborna-verejnost/samoregulacni-standardy-cap/modelace-vyvoje-pojisteni>.

In order to enhance the transparency of unit linked life insurance, other indicators may be recommended that provide a better picture, especially about the product expense ratio:

- TANK indicator – expense ratio indicator generally used for investment products with periodical investment – basically an equivalent to RPSN (annual percentage rate of costs). TANK is a ratio of all expected paid fees to expected future investment.
- Ongoing charge indicator related to individual funds of unit linked life insurance and expressing the amount of total costs of unit linked life insurance in relation to average controlled assets within the fund (in short, if a shares fund appraises the means by 5.3 % and the fund expense ratio is 2.1 %, the net appreciation of a share unit is then 3.2 %); the indicator includes all costs connected with the control of the shares fund and generally speaking if the funds are actively controlled, there are higher costs, and the passively controlled funds show lower costs.
- TER indicator (Total Expense Ratio) indicates how much of the investor's property value is represented by the fund administrator costs per year.
- PER indicator (Product Expense Ratio) evaluates the product expense ratio and how much percent of the paid premium will not be invested but used to cover the administrative expenses.
- RiY indicator (Reduction I Yield) that does not take into account the insured part of the product and all fees are expressed with one percent; its flaw is that it can be influenced by the inclusion of some cost portions in the risk portion of premium, which distorts the final evaluation through this indicator.

### **3 FINANTIAL ARBITRATOR**

In terms of client's protection, consumer protection institutions play a significant role. The insured persons may contact these institutions if they face problems related to life insurance products. In some countries, the insured persons may turn to the institute of insurance ombudsman or to the department of consumer protection within the Association of Insurance Companies. In the Czech Republic, the Czech National Bank has the "Consumer Protection Department" to deal with discrepancies during the practice of insurance products (of other financial products). Dissatisfied insured persons may address their inquiries and complaints to the Czech Association of Insurance Companies. Recently, the Office of Financial Arbitrator has started to operate directly in the area of settling life insurance disputes.

#### **3.1 Significance, status and competence of financial arbitrator**

According to the existing legal regulations, the financial arbitrator could be described as a person heading the Office of Financial Arbitrator and deciding disputes that fall under his competence. The status of the financial arbitrator during the decision-making process is given by two basic principles: the proceedings before the financial arbitrator may be initiated by the client of the financial institution, especially a consumer and the financial arbitrator also primarily acts as a board of conciliation. Consumers' dispute settlement, if possible through arbitration, is a trend which is explicitly requested in EU countries and can be considered more acceptable than an explicit decision (finding) (Schlossberger, 2012, p. 304). At present (i.e. January 2015 – authors' note), the financial arbitrator is equipped with following competences for the dispute settlement, which would otherwise fall under the competences of general courts. It refers to following areas (Act No. 229/2002 Coll., on Financial Arbitrator, § 1 par. 1): payment services, issuing electronic money, consumer credits, joint investments through a standard fund or a special fund, exchange office service and life insurance.

These areas gradually became part of the financial arbitrator's competence. Since 2003, where the original act came into force, the financial arbitrator could only deal with disputes resulting

from the transfer of financial means and with disputes arisen between issuers and holders during issuing and using electronic means of payment. The competences of the financial arbitrator were gradually extended and the competences of the financial arbitrator related to dispute settlement of life insurance have been extended since 2013 (Act No. 278/2013 Coll., which among others amended the Act on Financial Arbitrator, with competences extended by dispute settlement between the insurance company or the insurance intermediary and those interested in the insurance policy, insurant, the insured person, authorized person or beneficiary during offering, providing or intermediating the life insurance). The service of the financial arbitrator in this area is available for all insured persons regarded as consumers who are dissatisfied with the life insurance product. This is mainly internal opinion of the insured person that his rights or obligations of the insurance company or another institution resulting from this relationship are restricted or not fulfilled as agreed in the insurance policy. Life insurance products are not simple and may evoke various negative feelings with the insured person. If his complaint submitted at the insurance company, or another institution, is not handled to his satisfaction, he can submit a proposal to initiate proceedings before the financial arbitrator. Unlike the other above-mentioned bodies, the financial arbitrator directly decides that particular dispute as if it were decided by the court.

The proposal to initiate proceedings is free of charge and can be submitted in any form. Among others, the complainant's proposal has to express his requirement, the so-called demand. After the proceedings initiation, he issues within 30 days (or in extended proceedings) a decision in re complainant, i.e. the insured person, which is called a finding. After coming into force, this finding is executable pursuant to the court civil rules. As mentioned before, the financial arbitrator aims to primarily settle the respective dispute through arbitration. If this is not accepted by the one or the other party, he has to make the decision through the finding. Following a legitimate finding, the financial arbitrator has to impose a financial fine, in our case on the life insurance company in question that was unsuccessful in the dispute and the financial arbitrator decided in favour of the complainant, i.e. the policy holder. We may conclude that the finding of the financial arbitrator offers no option to ask the court for its cessation and decision directly by him.

### **3.2 Analysis of disputes**

Analysis of disputes is slightly problematic given the above-mentioned facts that kept changing throughout the period, or rather extended the competences of the financial arbitrator during suits. The following Tab. 4 presents total numbers of suits initiated by the financial arbitrator since his appointment.

Tab. 4 - Numbers of initiated suits. Source: 2013 FA Annual Report.

Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Number	66	130	160	77	95	99	118	135	167	204	706

Disputes related to life insurance are represented in the table in view of the date of extending competences of the financial arbitrator by life insurance (1 November 2013) to a small extent (see Tab. 5). However, it can be expected that the number and significance of the tackled disputes within the life insurance shall substantially increase considering the nature and a relatively complex structure of individual types of life insurance. Dissatisfaction of some insured persons with the life insurance products, especially the unit linked life insurance, has been manifesting itself for a longer time and it radically increased during the financial crisis. It was demonstrated through a number of complaints and the settlement of these disputes

within the Consumer Protection Department as well as within the complaints submitted at the Czech Association of Insurance Companies. It is a subjective view of the reserves value and the amount of indemnity within the unit linked life insurance often connected with the misconception of the product and insufficient awareness and transparency of the product. With sufficient awareness, this product is unlikely to be sought after. The present figures imply that the extrajudicial resolution of disputes within the life insurance is at the very beginning. Nevertheless, the area of life insurance as part of the new competences of the financial arbitrator is considered to be most sought-after. The significance of the financial arbitrator in terms of the resolution of disputes within the life insurance is going to be enhanced.

Tab. 5 - Areas of disputes from 2011 to 2013. Source: FA Annual Reports from 2011 to 2013.

Area / Year	2011	2012	2013
System of payment	126	72	187
Consumer credits	37	133	502
Joint investments	4	2	0
Exchange offices	X	X	1
Life insurance	X	X	13
Total	167	204	706

## **5 RESULTS**

The structure of the life insurance market change in recent seasons, especially in the sphere of the share increasing is and importance of investment life insurance. This is mainly driven by the way of sale of life insurance products through the agents. Complexity of construction investment life insurance, which has recently become more important, results in problems occurring in the last period. In particular, this is a misunderstanding of the product from the clients 'point of view. It is therefore appropriate to increase the transparency of life insurance. To this situation some indicators may contribute, especially indicator SUN, TANK and other indicators. These indicators will increase the transparency of life insurance products. They can help to the clients to understand the structure of life insurance better; however, they are clear only to certain clients. It follows that investment life insurance is suitable for those clients who are informed about the financial market. On the contrary, for most clients is a more appropriate capital life insurance product. The effort of mainly insurance agents is to sell just the investment life insurance with regard to the possibility of obtaining higher commissions from negotiating insurance contracts. Therefore the institutions for the protection of consumers, which include also the Office of the Financial Arbitrator, play their own role.

Life assurance is regulated by the state. Regulation in relation to life insurance refers to approaches to investing insurance technical reserves, adjustments in tax matters in the life insurance and editing activities of insurance agents. Legislation activities concerning insurance agents belong to discussion in the last few years.

## **6 DISCUSSION**

Indicators which could be an explanation for life insurance products to use, have information capability, explains the base of the product and clients should be familiar with them. The problem is still the complexity of some indicators. Therefore life insurance products will be still complicated for consumers due to their internal structure. For investment life insurance is typical the fact that it is often more an investment product than the product of the insurance

(that is dealing with the meaning of its individual components). It can be discussed whether this product is to be classified as the right insurance products, although in some cases the investment life insurance contains very small insurance component. In some countries these types of products are classed as investment products and regulated as investment products.

Due to the fact that disputes between clients and insurers will exist in connection with the operation of life insurance, it is appropriate to look for the ways how to solve these disputes. These disputes mainly related to the fact that clients often do not understand the base of the product and the fact that the insurance was concluded improperly in some cases. This occurs by the wrong activities of insurance agents. Although new control measures apply towards insurance agents, the basic problem can be very difficult to remove. There is a problem of asymmetric information in relation agent – policyholder and the primary agent's interest - earning commissions (Daňhel, Ducháčková, Radová, 2008, p. 604; Daňhel, Ducháčková, 2013, p. 100). Thanks to this there is also unethical behavior on the market is - so called "over insurance".

## **7 CONCLUSION**

Life insurance products may take various forms which then specify their significance. Recently, life insurance has been wrongly perceived as a savings tool. Life insurance is primarily intended to cover risks. This is the approach that should be adopted. Savings (especially for the old age) is a specific portion of life insurance. There are indicators contributing to better transparency of the product that are used to clarify its form and subsequently the size of indemnity and the possibility of tax deduction. That especially applies to the unit linked life insurance which is primarily intended for clients who are aware of the investment nature and possible consequences for the final size of the indemnity at the end of the insurance policy. In spite of this, new ways of resolving disputes between the insured and the insurance companies are still being searched for. Life insurance is an area of the financial market which does not involve simple products. It provokes various questions that need to be clearly and comprehensibly answered to consumers. However, if a situation arises when the consumer as insurant is not content with the product because he expected a different result, he may file a complaint with the financial arbitrator if he was rejected by the respective contractual subject. The financial arbitrator will then (pursuant to valid legal regulations and the respective insurance policy and insurance clauses) assess the relevant dispute objectively and justly as if it were assessed by the general court. Proceedings before the financial arbitrator are faster, more efficient and free of charge for the consumer as insurant. In order to ensure a more frequent use of his services, it is necessary to raise public awareness of his existence.

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## **DEVELOPING SUPPORTING INDUSTRIES THROUGH BUILDING INDUSTRIAL CLUSTERS IN VIETNAM**

*Dung Vu Tri, Huyen Pham Thi*

### **Abstract**

The Vietnamese Government, highly concerned with the development of supporting industries, has created various policies and proposed a number of solutions to promote the sustainable development of supporting industries. "Industrial cluster" is an important policy tool that is widely used worldwide. International practices have illustrated that the development of an effective industrial cluster network will strengthen the competitiveness of enterprises. However, industrial clusters have not resulted in positive impacts on the development of supporting industries as they were expected. Sustainable growth of supporting industries requires a proper policy from the government, and the Master Plan for the Development of Supporting Industries must be designed to meet this requirement. This article refers to the building of industrial cluster as a solution for the development of supporting industries in Vietnam. We hope that Vietnam's industries can play an important role in the economic development, based on the strategic linkage around an anchor firm, so that it form a cluster. It should be the focused issue of the master plan for developing supporting industry.

This paper aims to clarify the importance of supporting industries in Vietnam to meet the mission to become an industrialized country in 2020. Obviously, Vietnam couldn't become an anchor country in industry. It should find out the way to join international value chain for some original industries. So that, building industrial clusters can be considered as the best approach for Vietnam at this direction.

*Keywords: Supporting industry; industrial cluster; policy*

JEL Classification: L80, R11

## **1 LITERATURE REVIEW**

### **1.1 Overview of supporting industry**

Many researchers and policy makers use the term "supporting industries," but its origin and original meaning are at times ambiguous. Researchers tend to define the term according to their subjective understanding and purpose. In fact, "supporting industries" is a Japanese English term employed first by Japanese enterprises long before becoming an official term. It gained popularity in Japan in the mid-1980s when the Japanese government used it in its documents, as explained below, and has been widely used in Asia ever since. The idea of supporting industries is now routinely discussed in regional meetings on the development of small and medium enterprises (SMEs).

The term "Supporting Industry" appeared in Japan in the 60s of the last century. The "Supporting Industry" phrase itself is directly translated from the original term in Japanese "San-no San-gyuo", in which San-no means "Piedmont" and San-gyuo is "Industry".

Although the term "supporting industries" is widely used in many countries, it is still ambiguous and without consensus in definition. Whether "supporting industries" is understood broadly to include all industries that provide production inputs or narrowly as



industries that provide only parts, components and tools for certain industries depends much on the user.

On a practical level, the leather footwear industry needs industries which produce parts of footwear, processed leather, leather working machinery, and design services. Supporting industries of the motorbike industry supply motorbike assemblers with material inputs and their processing as well as services. On the other hand, supporting industries also refer to industries that are much broader and without a clear borderline. For policy formulation, the scope of supporting industries must be concretely and strategically specified by policy makers in a way that ensures consistency between definition and policy purpose.

For instance, Thailand defines supporting industries to be enterprises that produce parts and components used in the final assembly processes of the automobile, machinery and electronic manufacturing industries (Ratana, 1999). Meanwhile, the US Department of Energy defines supporting industries as those that supply materials and processes necessary to form and fabricate products before they are marketed to end-use industries (2005: 1). In Vietnam's current context, it is hardly practical to import any existing concepts of supporting industries because of differences in economic conditions, development level and the degree of challenges that each country faces in the global economy. It is necessary for Vietnam to single out a definition of supporting industries that is the most appropriate for its own socio-economic conditions.

The term "supporting industries" currently used in East Asia originated from Japan in the mid-1980s. The first official document to use this term, as far as we can identify, was the White Paper on Economic Cooperation 1985 by the Ministry of International Trade and Industry (MITI)<sup>1</sup> of Japan, where the term "supporting industries" was used to refer to "small and medium enterprises (SMEs) that contribute to strengthening industrial infrastructure in Asian countries for medium and long terms" (1985) or "the SMEs that produce parts and components". The purpose of MITI at that time was to promote the industrialization process and the development of SMEs in ASEAN countries, especially in ASEAN 4 (Indonesia, Malaysia, Philippines, and Thailand).

Comparing the entire process of producing a product with a mountain, the supporting industries is like the piedmont, while assembling industry and finished production play the role of mountain peaks. Therefore, without stable support industries, there would not be a sustainable and effective assembling and finished production industries. With this vision, the overall industry can be seen as the combination between supporting industry and final assembly industry. In this, supporting industries are usually referred to as industries that manufacture high-quality production parts, tooling, and machinery that directly "support" the final and sub-assembly processes.

Regarding business organization, supporting industries consist of three types of firms: i) parts and machine tool suppliers located in foreign countries (called "import" afterward), ii) the foreign parts and machine tool supplier located in the domestic market (called "foreign supplier" afterward), and iii) domestically-owned parts and machine tool suppliers (called "domestic supplier" afterward), which are usually small and medium size enterprises (SMEs). In addition, customers of supporting industries are domestic assemblers, foreign assemblers located in the domestic market, and foreign assemblers located in foreign countries. Foreign assemblers are often multi-national corporations (MNCs or called "MNC assembler" afterward).

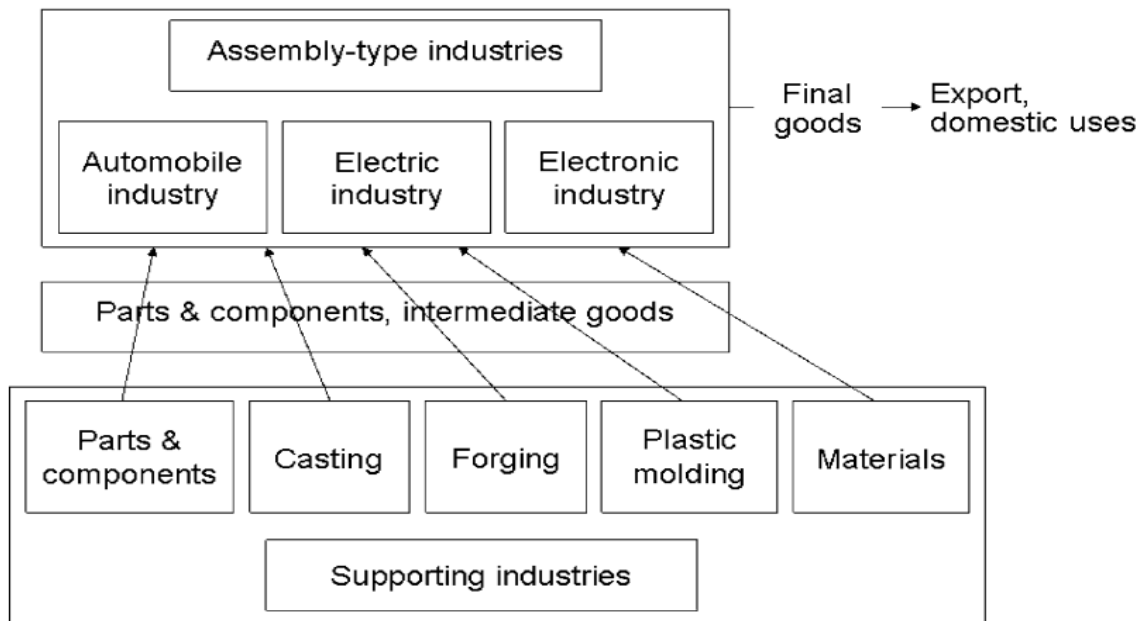


Fig. 1 – Scope of supporting industries according to MITI. Source: Kenichi Ohno (2007)

The decision No. 12/2011/QĐ-TTg of February 24, 2011 on development policy of a number of supporting industries states that: “*Supporting industry* means an industry that manufactures materials, spare parts, details, accessories and semi-finished products supplying to industries that manufacture and assemble finished products for use as production materials or consumer goods”.

Eventually, supporting industry is considered as the piedmont, providing the hard base for the mountain and the peak which include production, industrial assembly and consumption. And supporting industry can develop in parallel or pioneer to form the development basis for key industries such as automobiles, motorcycles, electronics, textiles, footwear, and telecommunications.

Vietnam adopted the term “supporting industries” relatively late. In the past, concentration on the development of heavy industries in the centrally-planned economy required a wide range of production inputs. Vietnam underestimates the importance of supporting industries because parts and components for finished products of such industries such as agricultural machines, bicycles, and automobiles were produced in-house and in a vertically integrated fashion. Even when the term “supporting industries” was introduced in most Asian countries at the meetings of the Asian Productivities Organization (APO) and the Asia-Pacific Economic Cooperation (APEC), Vietnam, which was in the early years of the Doi moi process, continued to pay little attention because it was dealing with other urgent issues such as agricultural revitalization, hyperinflation, economic reform, and poverty alleviation.

When foreign investors first entered the Vietnamese market in the mid-1990s, it was difficult for them to find qualified local suppliers for production inputs. Foreign firms had soon singled out this problem and urged the Vietnamese government to seek solutions. However, at the time the Vietnamese government was not familiar with the concept of supporting industries. The problem rooted in the absence of a legal definition for supporting industries that prevented any effective execution of proposed measures.

## 1.2 Overview of industrial cluster

The United Nations Industrial Development Organization (UNIDO) defines industrial clusters as followed: “Industrial cluster is a geographical concentration of firms, especially SMEs, in the same sector. They include, for example, suppliers of specialized inputs such as components, machinery, and services, and providers of specialized infrastructure; therefore, they have the similar advantages and disadvantages”. This definition by UNIDO emphasizes the geographical concentration of firms with internal linkages, whereby cluster gains are furthered by local firm cooperation, local institutions and local social capital. The growing evidence on small firm clusters in developing countries competing in local and global markets has driven much of the policy enthusiasm in promoting clusters.

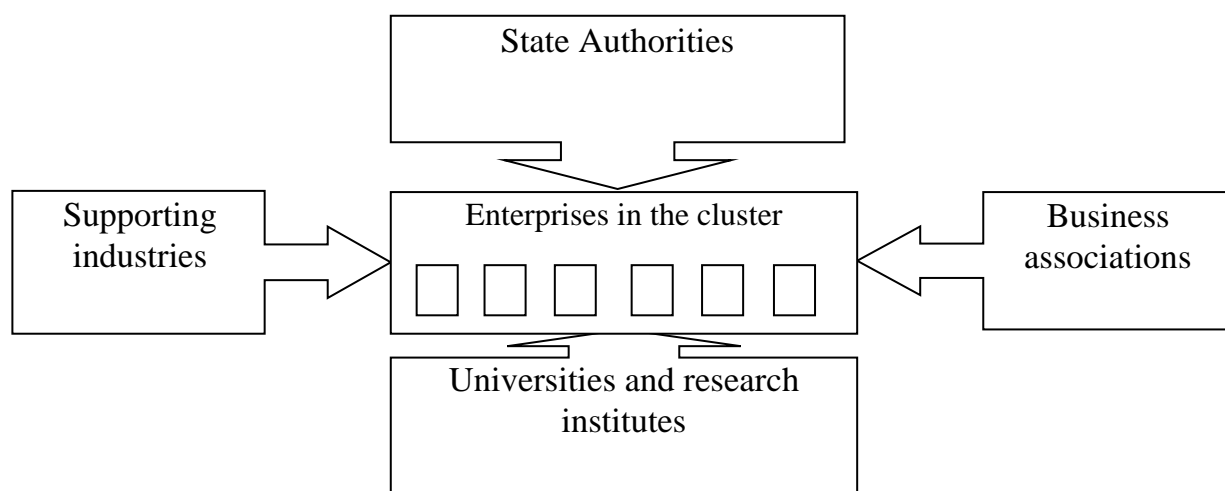


Fig. 2 – A typical industrial cluster. Source: Tran Kim Hao (2011)

Michael Porter (Harvard Business University) defined industrial clusters with 3 key elements: (1) the geographic concentration of interconnected companies and institutions in a particular field; (2) An array of linked industries and other entities; (3) Cooperation and competition among the players in the industrial cluster.

According to definition, concept and diagram of industrial cluster, there does exist a close relationship between the development of industrial clusters and supporting industry. On one hand, the development of industrial cluster is the conditional to the development of supporting industry. In fact, the growth of a cluster usually brings chances to supporting industries. SMEs in supporting industries can access to huge markets and gain support from big corporation to have modern technology.

## 1.3 Industrial cluster and supporting industry

Industrial cluster is formed by the gathering of firms in some closely related industries and sectors, therefore the role of supporting industry can not be denied. The growth of industrial cluster also led to the development of core industries. Industrial clusters featured by high product volume due to concentrated production, high and stable quality, jobs creation, FDI attraction..., will facilitate the domestic firms to develop their capacities to serve. Supporting industries will be strengthening.

On the other hand, the development of supporting industry will facilitate the effective performance of the industrial clusters and enhance the competitiveness of enterprises in the clusters because the development of industrial clusters also significantly depends on the development of supporting industry. According to Mr. Patrik Gilabert, Vietnam is not only operating industrial zones, industrial area, but also industrial clusters. Industrial clusters help to realize the core competitiveness benefit thanks to the concentrated scale, population and urban development.

In industrial clusters, the linkages between firms are reflected in many perspectives, but the most important is economic perspective. In other words, the players in industrial clusters provide products and services to each other. Outputs of one firm can be an input of others or they join together in producing a commodity or operating in one field ... Here, the linkage is positive and effective. They would work together to share information, jointly order products and trainings. The cost of shipping and environmental treatment can be effectively minimized.

## 2 RESULTS AND DISCUSSION

### 2.1 Current development of supporting industry

Currently, Vietnam’s industry mainly relies on processing and assembly production such as textiles and footwear processing, footwear, assembly of automobiles, motorcycles, electric and electronic devices ... resulting in low added value and weak competitiveness of enterprises. The culprit in this situation is the poor development of supporting industry in Vietnam.

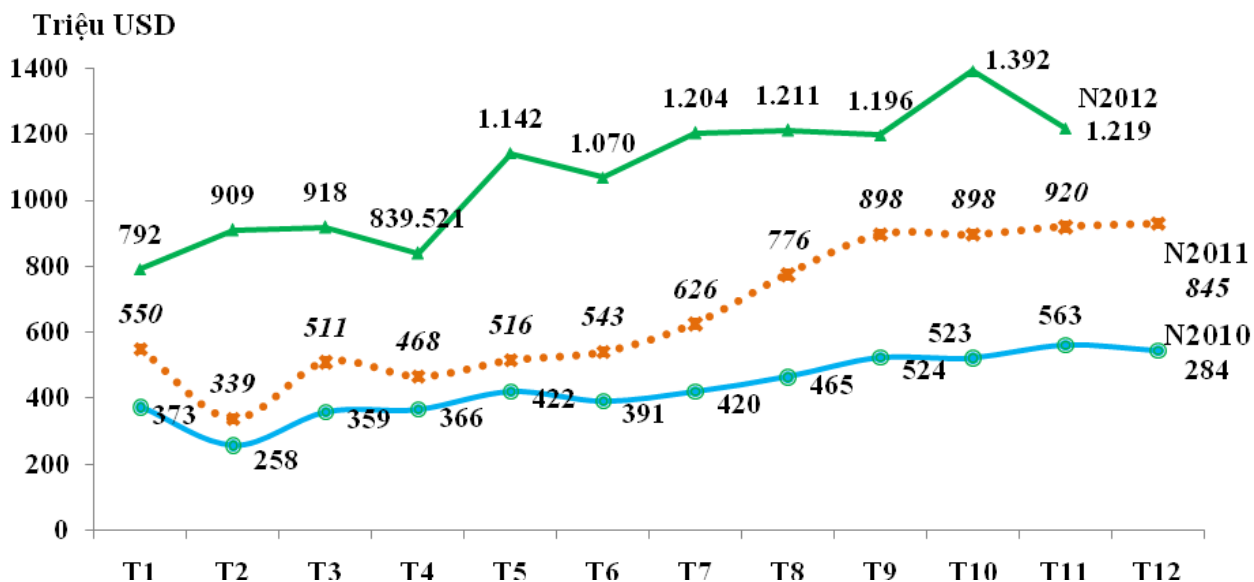


Fig. 3 – Import of computers, mechanic products and accessories. Source: Vietnam’s Custom Department, 2012

### **Supporting Industry for electronics, information technology**

Domestic investment in electronics and information technology is limited with the majority comes from FDI enterprises. More important, the product portfolio there also seriously imbalanced, mainly civil products. It is lacking of specialized electronic products (accounting for only 10-12% of products from the industry), and most of them are using out of date technology, low competitiveness with most of raw materials are depended on foreign suppliers.

Particularly, none of Vietnam's industrial manufacturer participates in the production of electronic materials. The mechanical engineering, electronics, information technology ...imports almost all of raw materials from Japan, South Korea at a very high price. This lacking of stable and affordable sources for raw materials result in difficulties for enterprises when competing with foreign firms.

### **Automotive Supporting Industry**

Automotive assembly production is met with high expectation due to preferable development policy, but the localization rate is still very low, approximately 10% for cars because the low market volume can not attract spare part producers to participate in the supply chain.

At the moment, the automobile manufacturing industry of Vietnam is considered to be rather weak compared to other regional countries, while Mazda, then Ford has recently abandoned the car production project from 700 million to 1 billion USD in Vietnam because they can not find the supply for simple components like screws, wires or plastic. Vietnam's automobile industry will face fierce challenges when Vietnam starts to implement the AFTA commitments on tariff reduction in 2018.

### **Motorcycle Supporting Industry**

In Vietnam, motorcycles account for 90% of traffic vehicles. In the beginning, 100% of the products are imported from abroad. At the moment, supporting industries in Vietnam can produce about 70% of the components and parts, contributing to high localization rate of motorcycles manufactured in Vietnam. However, the cost of parts, accessories from domestic production is still high and of unstable quality.

The current development of Vietnam's supporting industry can be described through the opinions of Mr. Keisuke Kobayashi, Project Director from office of The Japan External Trade Organization (JETRO) in Hanoi. "Many Japanese enterprises with investment in Vietnam have difficulty in purchasing parts here. The shortage of Vietnamese enterprises with relevant capacity required by the Japanese enterprises and the lack of information on the supporting industries are major barriers in the cooperation between enterprises from the two countries. According to Dr. Le Dang Doanh, former Research Director of the Institute for Central Economic Management, restrictions in the chain or cluster linkage in Vietnam are major barriers that make it difficult for Vietnamese enterprises to obtain a raw material supply contract for big enterprises.

## **2.2 Current development of industrial clusters**

Some sectors of Vietnam's economy has implemented industrial linkages and participated in the global value chain, but mainly due to the market imperative. For example, the textile industry and leather processing, 20-30 % of raw materials are processed is within the country, while 70-80% of those are counted for overseas processing due to imported raw materials. Similarly, the localization rate of the automobile industry remains low, currently only about

5-10%. More than 90% of automobile parts and components are imported from parent companies or foreign suppliers. In mechanics, there is a significant imbalance between assembly industries and spare parts and materials manufacture. For a number of enterprises producing spare parts and accessories, there are only 20-40% of materials are localized and focused on packaging, plastic parts, and mechanics. The remaining portions are imported from oversea.

Vietnam's economy has integrated into the world at a deeper level. However, its growth pattern and industrialization process reveal weaknesses such as: cheap labor based width growth, capital intensive, low labor productivity, mainly processing and assembly with low added value. Therefore, Vietnam needs to improve its competitiveness, build up industrial strategy, and focus on industrial cluster performance to achieve development goals.

In Vietnam's context, the "industrial cluster" model is unclear with loose linkage between internal and external firms and low industrial content of the exported products. At the beginning, mechanics supporting industrial clusters are spontaneously formed and developed with low sustainability and dynamism, loose linkages, limited connection among internal and external enterprises in clusters. Therefore, Vietnam does not have effective strategies and policies on formation and development of industrial clusters in order to enhance the sustainable competitiveness of the economy. Moreover, supporting industries, among other key players in industrial clusters, are also currently underdeveloped with weak production network and low value chain.

Over the past few years, Vietnam lacks practical policies on effective development of industrial clusters. Activities related to industrial linkage and concentration, production segmentation, value chain and production network... are neglected by the government, business associations and industries. In the industrial development planning, location issues are often the primary concern while the development of industrial clusters in the area receives limited attention. Therefore, in the future, each industrial cluster must include leading firms. Supply chain and business background with the basic economic and production factors (human resources, technology, capital access, business environment, and infrastructure) should be particularly emphasized.

### **3 CONCLUSION AND RECOMMENDATION**

An important goal of building industrial clusters and attaching them with the development of the supporting industry is to create sustainable linkages among players and to enhance the competitiveness of enterprises. In order to contribute to the supporting industry development, building of industrial cluster needs to respect following basic notions [8]. First, developers must ensure that industrial clusters complement each other; the goal is to increase the competitiveness of the enterprises in the clusters. Second, industrial cluster development can be achieved by various methods, depending on the product value chain. One possibility could be a dominant nuclear business with several surrounding the satellite industries; or a string of businesses in the same sector, each take part in a certain production or assume the role of transit for a finished product.

The question is how to develop supporting industry through industrial cluster? What if industrial cluster formation does not result in expected development of supporting industry? In the project "Industrial Zone and Cluster Development, in association with the supporting industry development, production linkages and value chain formation" by the Central Institute for Economic Management (2011), the authors asserted: "the development of industrial clusters in association with supporting industries will promote the formation of production

linkage chain and save time for partnership searching, reduce costs, quickly launch more designs, new items and diversified portfolio of products "[3].

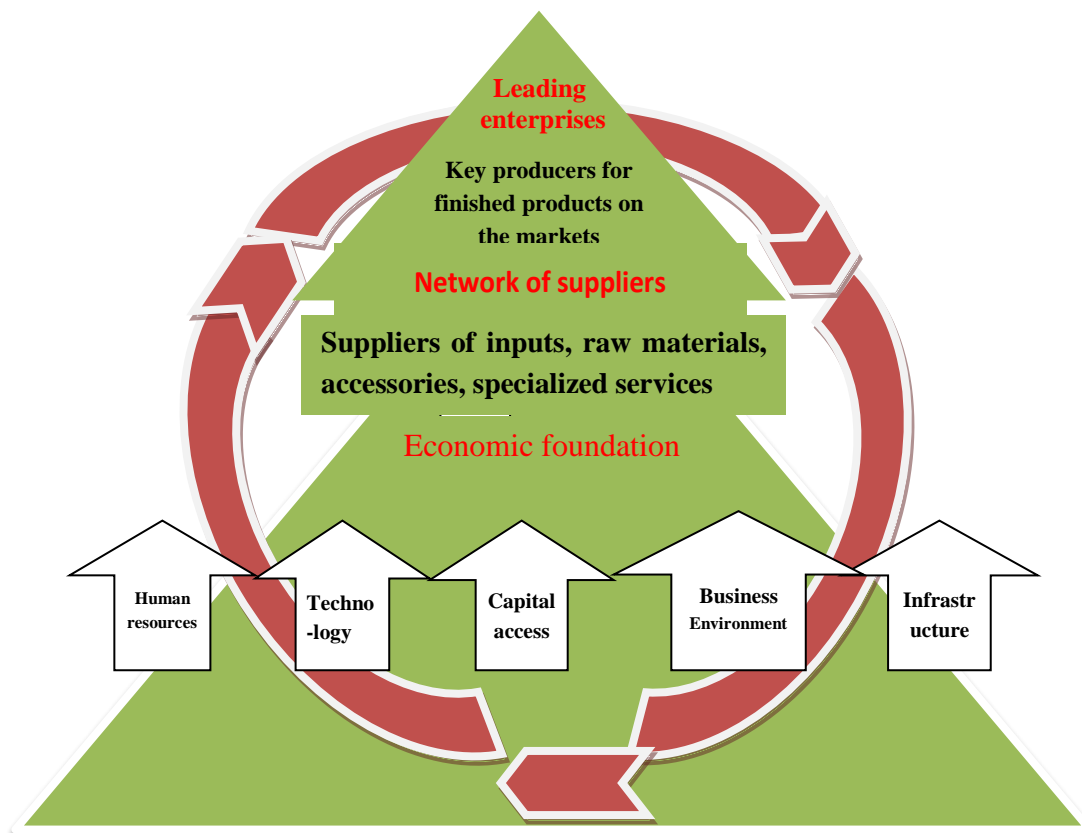


Fig. 4 – Mountain model for Industrial Development. Source: Vietnam's Mechatronic Development Action Plan, 2011

In principle, the Vietnamese Government encourages and creates favorable conditions for the formation of manufacturing focus, manufacturing and industrial clusters, and supporting industries, where production firms in the above mentioned areas can supply products to each other in the production network.

Obviously, the basic conditions for the effective development of any cluster are the economic foundation with fundamentals such as human resources, technology, capital access, business environment and basic infrastructure. On this foundation, the linkages, partnership, competition, supply, consumption and production of gathering enterprises will be naturally and effectively formulated and developed, offering a network of suppliers of production inputs (goods and services) for flagship manufacturers including domestic and international groups or multinational corporations, who then will produce the finished products for final consumption. By that, the competitiveness of the industry cluster is improved so as they are eventually capable of participating in the higher segments of global value chains.

The reality in Vietnam has indicated that business environment factors have strong impacts on the development of industrial cluster and supporting industry. Therefore, it's necessary to build up industrial clusters according to business environmental factors. Theoretical and practical evidences proved that locations with stable and attractive business environment are more lucrative to businesses and investors (especially foreign investors).

Since 2005, the Vietnam Chamber of Commerce and Industry has collaborated with the project Vietnam Competitiveness Initiative (funded by the U.S. Agency for International Development - USAID) to perform studies on Provincial Competitiveness Index (PCI), represented the voice of the private sector to support national and provincial reforms based on specific, measurable indicators of underperformance. The PCI provides a transparent, evidence-based ranking and analysis of the regulatory environment and economic governance in all 63 provinces. [10]. Apparently, for the majority of enterprises (mainly SMEs) in supporting industry, development policy for the private sector will certainly create a favorable environment for businesses in supporting industries.

With this approach, the province with high PCI will likely attract businesses and investors. This is the basis for the formation of the industrial clusters, where the sectors with local investment priorities are regarded as the key industry. The ability of local enterprises to work together is the success factor for industrial cluster development.

Competition among locations promotes business dynamics of players in local industrial clusters and creates pressure for subsequent improvement and innovations. Strong local competition forces businesses to develop new products, improve existing ones, reduce costs and prices, developing new technologies and improving quality and service. Competition also encourages cooperation and mutual support among enterprises in the local industrial clusters. The cooperation among enterprises enhances the possibility of talent attraction, advanced technology application, prestige to corporate image, industrial clusters and their position in the market.

Industrial cluster development allows businesses in supporting industries to implement vertical integration and vertical linkage strategy. This may also improve the business situation of highly specialized enterprises. For instance, this could be a good solution to increase profits, as each production stage will bring about the profit. The final purpose is to obtain surplus value at each production stage as well as in service stage after the final production. In reality, firms in supporting industries often adopt the downstream vertical integration strategy without taking the leading role which should be of the manufacturers of the final products. This strategy allows SMEs to enhance the technical advantages and improve their competitive position on the market.

For a successful linkage strategy, firms in supporting industries should understand the important standards under which the enterprises in final production industries select the input suppliers or satellite businesses. Typically, the partnership or outsourcing decisions by enterprises in final production industry are based on the performance, efficiency and uncertainty level in different situations.

Industrial cluster Development also allows firms in supporting industries to implement horizontally strategic alliance and cooperation. Recently, enterprises in industrial clusters keep developing business relationships and joint venture cooperation with each other in order to reduce costs and jointly make use of resources (labor, relations...). This strategy allows supporting firms in industrial clusters to achieve “economies of scale and experience”, at the same time, increase the market coverage (in terms of both geographical and customer segments). This strategy also facilitates enterprises in minimizing risks of penetrating new markets (particularly financial risk) or expanding business. Cooperation does not only encourage the creation of new products / services, but also reduce the production cost (scale advantage, cost savings on inputs...) as well as minimize or avoid operation risks. Finally, a joint venture between supporting firms in industrial cluster will establish an optimal power block to create competitive advantages.



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## **HOW STRONG POSITION HOLD THE IFRS IN THE WORLDWIDE FINANCIAL REPORTING?**

*Martin Dvořák, Libor Vašek*

### **Abstract**

International Financial Reporting Standards were established as International Accounting Standards in 1973 to be generally worldwide accepted language for financial reporting. Nowadays it is more than 40 years since the beginning of the international accounting standards and there is no doubt that IFRS become the lingua franca for financial reporting of companies whose securities are traded on public markets. IFRS is very close to accounting profession and has been included in accounting education of University programs and various chartered accountants programs. IFRS has become an ordinary part of our professional life. Despite all these facts the goal of the paper is to provide an analysis of three aspects such as number of countries have already adopted IFRS, number of companies presenting figures based on IFRS and market capitalization of those companies and to express opinion whether IFRS can be really designated as global standards for financial reporting. The analysis is based on findings resulting from the IASB's survey which was finished by 138 countries till November 2014.

*Keywords: IFRS, financial reporting, adoption, jurisdictions, globalization*

JEL Classification: M48

## **1 INTRODUCTION**

International Financial Reporting Standards (IFRS) were established as International Accounting Standards in 1973 to be generally and all over the world accepted language for financial reporting which is adopted on voluntary basis (Camfferman&Zeff, 2007; Zeff, 2012). Approximately 30 years later, there were first decisions regarding mandatory adoption such as the decision of the European Union. Other countries such as Australia, Hong Kong, South Africa followed. Nowadays it is more than 40 years since the beginning of the international accounting standards and there is no doubt that IFRS become the lingua franca for financial reporting of companies whose securities are traded on public markets. IFRS is very close to accounting profession, especially in Europe. IFRS has been included in accounting education regardless we talk about University students or chartered accountants. IFRS has become an ordinary part of the life for lots of people. Despite all these facts can be IFRS really designated as global or worldwide standards when criteria such as number of countries using IFRS or number of companies already adopted IFRS are used? We hypothesize that a perception of IFRS is highly influenced by countries in which we operate and companies that are considered and not in all aspects IFRS are global standards.

## **2 REVIEW OF LITERATURE**

The last decade has seen significant progress in adoption of IFRS across the countries or international political and economic groups of states. Ian Mackintosh, Vice-Chairman of the IASB, said in November 2014 that last 10 years were sometimes difficult but absolutely successful for IFRS (Mackintosh, 2014). Many papers on the analysis of international implementation of IFRS are built largely on an abstract concept (Ball, 2006) or are focused on

certain country such as the Czech Republic (Prochazka&Ilinitchi, 2010; Istvanfyova, Mejzlik&Pelak, 2010). Other paper examined if and what kind of economic consequences have raised due to an adoption of IFRS which can be mandatory or voluntary (Daske, Hail, Leuz& Verdi; 2008).

In December 2013, the International Accounting Standards Board as responsible body and standard-setter published a statement about International Financial Reporting Standards (IFRS) to be a global language in financial reporting(IFRS Foundation, 2013a; Pacter, 2014) which makes the financial information more comparable, particularly in spatial scale. The statement was based on a global survey focusing on local implementation of IFRS into national jurisdiction of each country. The global survey was finished by 138 countries around the world till November 2014 (IFRS Foundation, 2014). The survey and its findings have been used as a basis of this paper which tries to bring not widely used synthetic view of the current global position of IFRS. The analysis is based on 3 quantitative aspects which are (i) number of countries using IFRS, (ii) number of companies presenting figures based on IFRS and (iii) market capitalization of those companies (as more relevant aspect than the absolute number of companies above). The main goal of the paper is to analyze all quantitative aspects to express an opinion whether IFRS can be really consider as the global standards of financial reporting. The wide scale of publicly presented statistic data compared with the IASB survey data has been used for the purpose of our analysis (IFRS Foundation, 2014).

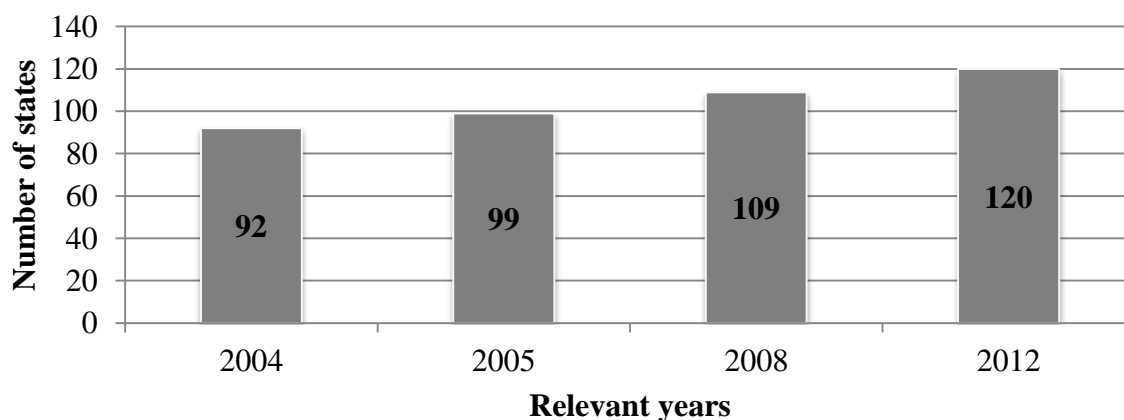
### **3 IFRS FROM THE PERSPECTIVE OF QUANTITATIVE CHARACTERISTICS**

The following analysis uses data primarily from the ambitious project of the IASB that collects information about national processes of IFRS implementation through a global survey, on the contrary, tries to grasp quantitatively the status of IFRS in the world from three perspectives mentioned in the previous part.

#### **3.1 The number of countries and enforcement forms of using IFRS**

With the new millennium, when the standards were approved by IOSCO (Garbutt, 2010), IFRS have begun to strengthen their position.

Fig.1 - Number of states allowing or requesting the IFRS application. Source: Self; based on relevant IFRS Foundation annual reports 2004 – 2013

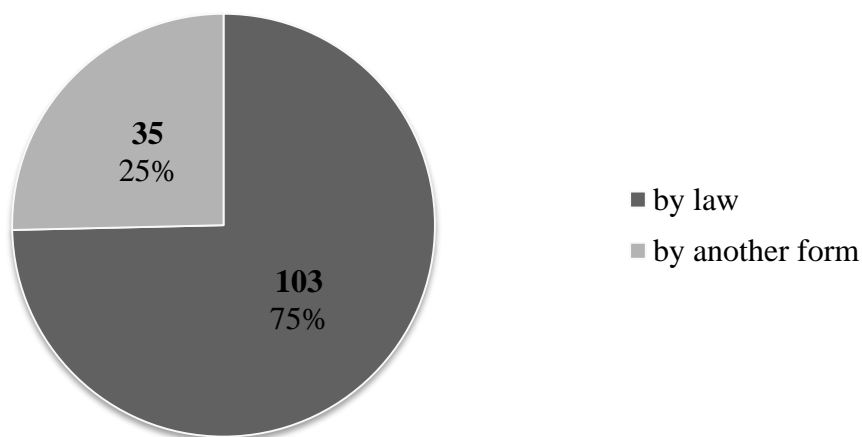


The Figure actually characterizes the situation where every individual country permits using IFRS at least. Several specific approaches have been identified through the global IASB survey:

- (i) required by law (for the particular entities),
- (ii) permitted by law,
- (iii) required/recommended by appropriate professionally-accounting authority (e.g. Accounting Standards Board),
- (iv) required/recommended by special authority for certain sectors (e.g. Banking Supervision Commission),
- (v) other (use IFRS without prior legislative or professional requirement, e.g. due to previous use of US GAAP or other historical experience).

The legislative support (the first form of five alternatives above) has the strongest representation amongst the ways of implementation. The EU member states can be included here due to following the effective European regulation (Berger, 2010). In contrast, the strong position of professional and accounting authorities can be found in addition to traditional developed countries (like the US or Japan) for instance among African countries (Kenya or Zambia). The last form of IFRS application (permission or requirement to use the IFRS on the basis of historical experience) is typical for Caribbean states.

Fig.2 - Number of countries with IFRS implementation by the law or other forms. Source: IASB survey of jurisdiction profiles made in 2012



Three-quarters of countries implemented IFRS by the legislative way. From a legal perspective, it can be said that the law is a strong legislative instrument because the possible annulment process is relatively rigid. On the other hand, it is not so probable that abolition of requirement (permission respectively) to report in accordance with IFRS sometimes happens. One of the main reasons why this cannot be practicable is that legitimate adoption of IFRS in principle was based on initiative of the external environment, not on the whim of the legislature. This statement is supported by Judge, Li and Pinsker (2010). They stated that the implementation of IFRS is not assessed under the economic terms, but from an institutional perspective. Therefore, such adoption is relatively enforced because the main motive of approval is “not to fall out of line” or “not to be considered as reactionaries”.

The remaining quarter includes the states delegating the power to prescribe the accounting framework to professional organizations or the states that do not specify any mandatory framework for financial reporting, and thus the entities (listed) can choose from a wider range the suitable one according to their preferences (e.g. IFRS). Most of African or Caribbean countries fulfill this condition as mentioned previously.

This subsection should be analyzed from another point of view as well - the time evolution of the initial implementation (by any kind of forms, e.g. approval/amendment of accounting legislation or accepted doctrine of responsible professional institutions). It is possible to construct the following Fig.3 from the input data (responses from 122 of 138 countries in total) of conducted global survey. At this moment it should be noted that the Figure does not include all the states which hypothetically may use the IFRS. The diagram incorporates only the countries that have released a particular year, when the initial official declaration leading at least to permission of IFRS was made. Thus, there is a possibility that some countries had applied IFRS before this stated official date. Nevertheless the following chart contains relatively accurate figures bringing solid, comprehensive and essentially undistorted view of the IFRS expansion in the world. The importance of the Fig. is growing with the fact that no official source with exact data about the IFRS expansion from time perspective can be traced.

The Figure 3 shows that a significant IFRS expansion occurred in several waves. It can be seen three significant moments for the entire history of IFRS – years 2001, 2005 and 2012 (see Tab. 1 in detail). The time period until 2001 was linked to a moderate trend of adoption with a few incoming countries per year. Still in the early 80s it was not possible to talk about the IFRS (IAS respectively) as a comprehensive set of standards. And thus, the absence of many important standards could not increase the attractiveness logically. It should be noted that their position was not better even in the nineties. Some external stimulus introducing the IAS in a better light or bringing the serious respect was lacked. Such moment occurred in 2000 when IOSCO decision on suitability of use IAS (by listed companies) was made. The application of IAS spread in eleven other countries thanks to this important signal.

Tab. 1 - IFRS expansion in representative years in continent structure. Source: Self; based on IASB survey of jurisdiction profiles made in 2012

Number of countries in continent structure	2001	2005	2012	Total
Africa	2	3	1	6
Asia	1	2	4	7
Australia and Oceania	-	1	-	1
EU	-	25	-	25
Europe (the rest)	-	4	3	7
South America	-	-	1	1
North America	8	-	3	11
Total	11	35	12	58

On the other hand it is true that high absolute number of countries that adopted the IAS in 2001 does not mean a significant global impact in this case. Indeed, eight of eleven of these countries were island states in the Caribbean (see Tab 1).

With respect to absolute number of countries and their economic power, the most important year was 2005. It was strongly influenced by the mass transition of all EU member states

under IFRS. Namely from 1st January 2005 at least the consolidated financial statements of companies listed on EU regulated markets had to be prepared in accordance with IFRS.

Tab. 2 - EU transition under IFRS measured by economic power (GDP, current price, 2004).  
Source: Self; based on IMF data.

Region	GDP (bn. USD)	EU proportion in global economy
European Union	12 694,61	31,21%
World	40 670,54	X

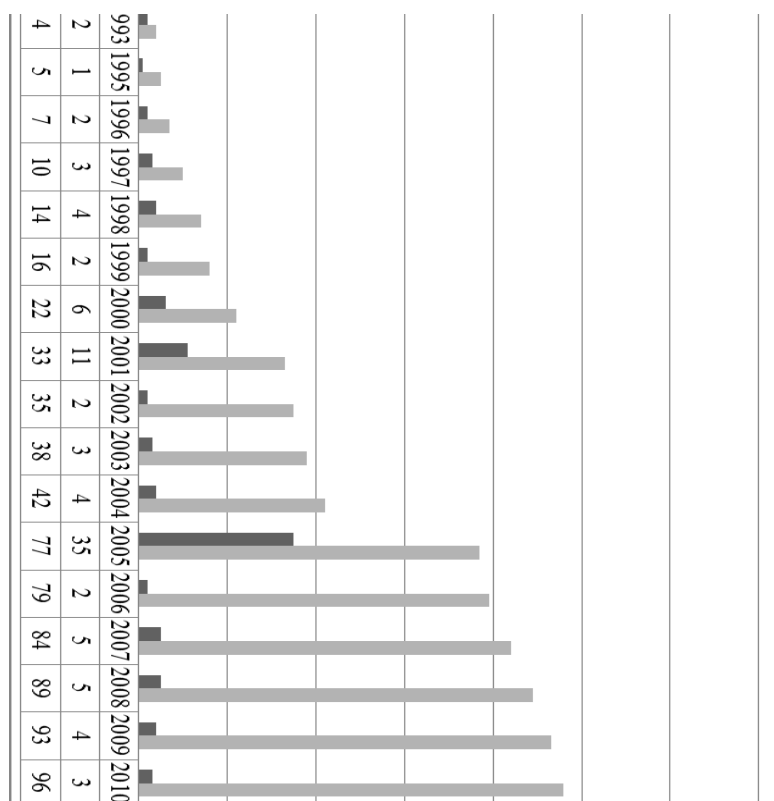


Fig.3 - Number of countries and official IFRS implementation (both realized and planned) - time evolution. Source: IASB survey of jurisdiction profiles made in 2012.

This moment can be considered as unprecedented and clearly the most significant advancement ever the IFRS Foundation and the IASB reached. The representatives of the IFRS Foundation themselves are aware of this fact, as well as the fact that this will not happen again. Nevertheless they have begun to hope that many other countries will follow this expansion process. The Figure 3 shows that it was a relatively realistic estimate. The number of countries using the IFRS has increased by 39 between 2006 and 2013. Although their number was growing slowly but it is a third of the entire set of 116 countries which represents a respectable number for 8 year period if it is taken into account that the first third was achieved essentially until 2003 (22 years since 1981).

The last major anomaly in the observed trend was 2012. In this year 12 other countries implemented IFRS and some of them can be considered as global players such as Russia, Mexico, Argentina and Saudi Arabia. For example, Saudi Arabia however does not require IFRS for all listed companies but only for entities engaged in banking and insurance. Probably one of the compelling reasons why the strong economy (and with them others) resorted to



IFRS implementation, rested in the recent economic crisis. The countries were trying to strengthen a confidence in capital markets by this step and thus encourage activity on them.

Currently about 116 countries through the official implementation use IFRS to some extent (see Figure 3). If the ratio of this number to the total set (expressed by 193 UN member states) is constructed, 60% of all countries in the world have a practical experience with IFRS in their territories. The IFRS Foundation expresses the similar results with fiscal indicators where the mentioned countries represent (in 2012) more than half of world GDP, namely 23,300 bn. USD. The European Economic Area (EU 28 members + 3 associated countries) comprises 17,200 billion USD. Although these figures look auspicious, there is no reason for the undue gladness. A number of world economies and global players have still resisted, although they have acceded to the convergence process. It is talked about China, Japan, India, and last but not least, the most sensitive subject of interest – the United States.

### **3.2 The number of companies and their categories**

IFRS have, in the words of the IFRS Foundation, ambition to be globally accepted accounting standards. The number of countries where IFRS are implemented on the basis of voluntary may affirm this statement. GDP also supports this fact. However will it be possible to achieve the same conclusion, if the number of companies is analyzed?

Tab.3 - The number of registered companies in relevant countries in 2005. Source: data of The World Bank

State	Total number of companies	Listed companies	Share
United Kingdom	2 160 200	2 759	0,13%
Canada	2 400 000	3 721	0,16%
Australia	616 196	1 643	0,27%
Russian	2 908 840	296	0,01%
Mexico	4 290 000	151	0,00%

It is obvious that the absolute number of traded companies represents only a fraction of all companies registered in the country. Individual shares are below half a percent. It must be borne in mind that it still may be felt the effects of the economic crisis although the current situation has given witness to its overcoming. This was also reflected in the number of companies traded on the stock exchanges. The United Kingdom is an obvious example with a downward trend in 2012 where 2179 companies were traded in December of that year compared to 2228 companies in the previous year resulting in a decrease by 2.2%. The difference is noticeable, if it takes into account 2913 traded companies in December 2006 (Turner, 2013).

The following Figure shows that the UK is not the sole affected country. Prevailing economic conditions adversely affect the whole developed Western world.

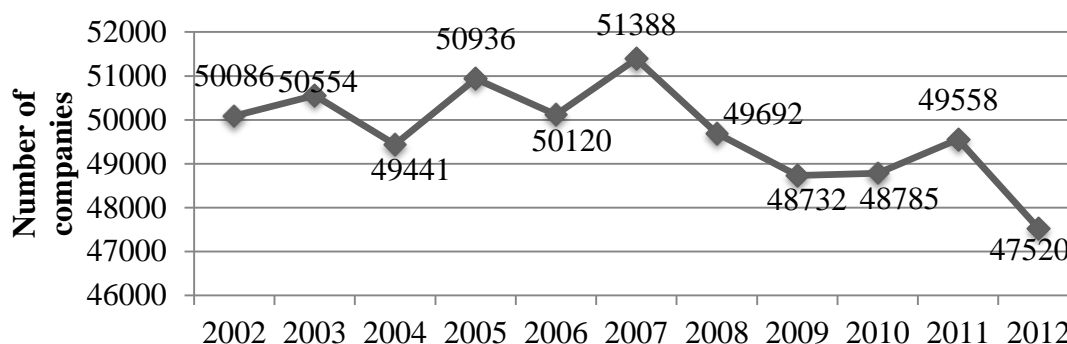


Fig.4 - The trend of number of listed domestic companies in the years 2002 - 2012 (world).  
Source: data of The World Bank

Because IFRS are primarily designed for companies that are traded on the capital markets, the decline illustrated above could affect negatively the extensiveness of their use. However, it is not appropriate to confirm this causality automatically. There is a certain inertia in many countries (emphasis on consistency of rules and methods) in accounting (in preparing the financial statements respectively) when the entity ceased to be traded. Even if this was not explicitly required by the relevant regulations, no authority (e.g. Ministry) has the power to enforce this entity not to follow IFRS voluntarily. The company itself has to assess the benefits and sacrifices to reporting under IFRS related (e.g. The reason for the continuity may be the fact that the company is a subsidiary and thus in a role of subordinate to a parent company or ceases to be traded temporarily but is going to return to the stock market in short time etc.).

Much valuable information is provided in the following table dividing data from the territorial point of view. Table tries to expand the Figure 4 in detail and identify proportions of the individual territories. As can be clearly seen the Asian exchanges have recorded continuous growth despite the crisis. There is no need to explain that the IFRS Foundation has aimed its attention to Asian area and to territory of emerging markets in general as one of the potential options how IFRS could continue to expand around the world.

Tab.4 - Number of listed domestic companies in WFE exchanges in territory perspective.  
Source: data of World Federation of Exchanges (WFE)

Territory	2008	2009	2010	2011	2012	2013
America	9 577	9 158	9 061	9 132	9 089	9 088
Asia-Pacific	20 356	20 421	20 905	21 529	22 488	23 048
Europe-Africa-Middle East	9 529	9 296	9 231	9 467	8 990	8 853
Total	39 462	38 875	39 197	40 128	40 567	40 989

Covering the scope of IFRS only by traded companies is quite confusing and distorted, although they represent the biggest share of entities reporting under IFRS. But the reality is more diverse because the jurisdictions themselves specified in detail (mainly extend) the requirement to report under IFRS to other entity. It can be seen from the global survey and its received questionnaires that the typical businesses (besides the traded companies) are unlisted:

- banks, insurance companies and other financial institutions,
- controlled entities (i.e. subsidiaries), and

- other (see below).

The relationship of the three mentioned groups to IFRS is relatively logical. For example, banks, insurance companies and other financial institutions are classified as public interest entities by the vast majority of countries. IASB understands their status by the same way. It is seen from the definition of “small and medium-sized entities” included in the IFRS for SMEs as well. The using of IFRS by controlled entities results from certain pragmatic approach trying to minimize the additional costs associated with reporting under the two (or more) accounting frameworks (the first required by the law and the second for the needs of the parent entity basically following either US GAAP or IFRS). The "other" means all remaining entities which are required to use IFRS as well if they meet certain legislative criteria. Those criteria are often determined by the size of turnover, value of assets and number of employees. They generally affect a limited number of larger entities. The legal form of company or the specific companies (mostly with majority of state participation additional) also represent the decisive criterion.

Figure 5 shows how many countries and for what types of businesses (entities) determine the mandatory use of IFRS. It can be seen that 109 countries required IFRS for listed companies. Relatively expressed, it represents almost 80% of all countries (respondents of IASB survey). A large part of countries has extended these requirements to financial institutions as well. However, there are also countries that require IFRS only for financial institutions, but generally not for listed companies surprisingly. Saudi Arabia and Uzbekistan represent this group. The obligation to report under IFRS for subsidiaries is only sporadic. Much more frequent situation is to allow IFRS as a possible alternative accounting framework.

Tab.5 - The number of countries requiring the IFRS with regard to company categories.  
Source: Self; based on IASB survey of jurisdiction profiles made in 2012

Category	Number of states	Share of total
Listed	109	79,56%
Financial institutions	64	46,72%
Subsidiaries	19	13,87%
Other	45	32,85%

This section has provided information how many and what types of companies use or have to use IFRS. Analysis of the absolute number of listed companies, for which IFRS are primarily intended, clearly shows that these entities represent only a fraction of all existing companies. The absolute number of companies included in remaining three groups does not spread the total figure of entities reporting under IFRS too much. Therefore, it is not correct to talk about IFRS as the global standards. However another dimension comes when these companies are expressed by their size in financial terms. This consideration describes the essence of things much better because the entities using IFRS are often key drivers of national economies (world economy respectively) and form their substantial part.

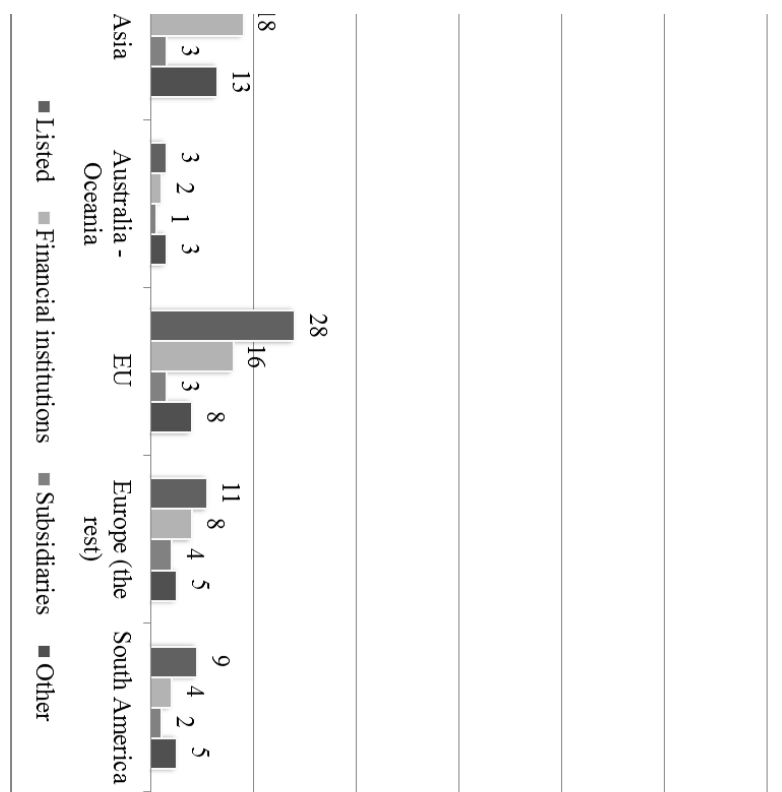


Fig.5 - The number of countries with obligatory reporting under IFRS in perspective of company categories and territories. Source: Self; based on IASB survey of jurisdiction profiles made in 2012

### 3.3 The size of companies measured by the market capitalization

How to grasp the scope of IFRS application from a quantitative perspective, which would sufficiently reflect the importance of these companies? The amount of turnover or recognized assets could help to express appropriate measurement but these variables do not cover comprehensively the company's position in the economy. Searched quantitative indicator must be able to identify the impact as comprehensive as possible. This means that it should include all matters that affect the widest possible range of interested users. Market capitalization (MC) expressed as the product of the number of shares issued and their current market prices could be such indicator, although it can be seen limitations and disadvantages of this.

The Figure 6 is trying to bring a synthetic answer to question how strong position IFRS has acquired. It is measured by market capitalization of listed companies in selected countries to the world's total market capitalization. Market capitalization is compared with global GDP in the next step. The term "selected countries" is patterned on Figure 5 with 109 countries requiring mandatory use of IFRS for listed companies. Thus, "market capitalization in selected countries" gives information about the total market capitalization of domestic listed companies. Therefore this number can offer financially-measurable estimate of the current extent of IFRS application on a global scale, which is based on relatively solid grounds.

The past six years, for which data has been available, it is seen that the market capitalization in selected countries (except anomaly in 2008) has stabilized at about 20 trillion USD. In relative terms, the world market capitalization has held a stable share around 41%. IFRS therefore do not constitute even half of global share. It is possible to assess the situation by a simple comparison with the relative figure based on the ratio of absolute numbers of countries

(109 countries of total 193 which is about 56.5% of countries), as unfavorable. Logical deliberation concludes that IFRS (in so far as possible) are implemented by the economically less developed countries. However it cannot be simplified like that. Of course, many world powers have adopted IFRS – e.g. Germany, Great Britain and France in the EU, as well as Russia, Canada and Australia. But there are a few powers not adopting IFRS. Unfortunately for IFRS these representatives are the US, China, Japan and India. Five of ten largest Exchanges (WFE) do not require IFRS for domestic companies (according to the relevant national legislation). It is talked about NYSE (USA) NASDAQ OMX, Japan EG, Shanghai SE and SIX Swiss Exchange with an aggregate market capitalization of 32,616 billion USD in 2013 (26,129 billion USD for the previous year respectively).

Tab. 6 - The biggest exchanges (WFE members) measured by market capitalization (bn. USD). Source: 2013 WFE Market Highlights

Exchange	2013	2012	% change
1. NYSE Euronext (USA)	17 950	14 086	27,43%
2. NASDAQ OMX (USA)	6 085	4 582	32,80%
3. Japan Exchange Group	4 543	3 681	23,42%
4. London Stock Exchange Group	4 429	3 397	30,38%
5. NYSE Euronext (Europe)	3 584	2 832	26,55%
6. Hong Kong Exchanges	3 101	2 832	9,50%
7. Shanghai SE (China)	2 497	2 547	-1,96%
8. TMX Group (Canada)	2 114	2 059	2,67%
9. Deutsche Börse	1 936	1 456	32,97%
10. SIX Swiss Exchange	1 541	1 233	24,98%

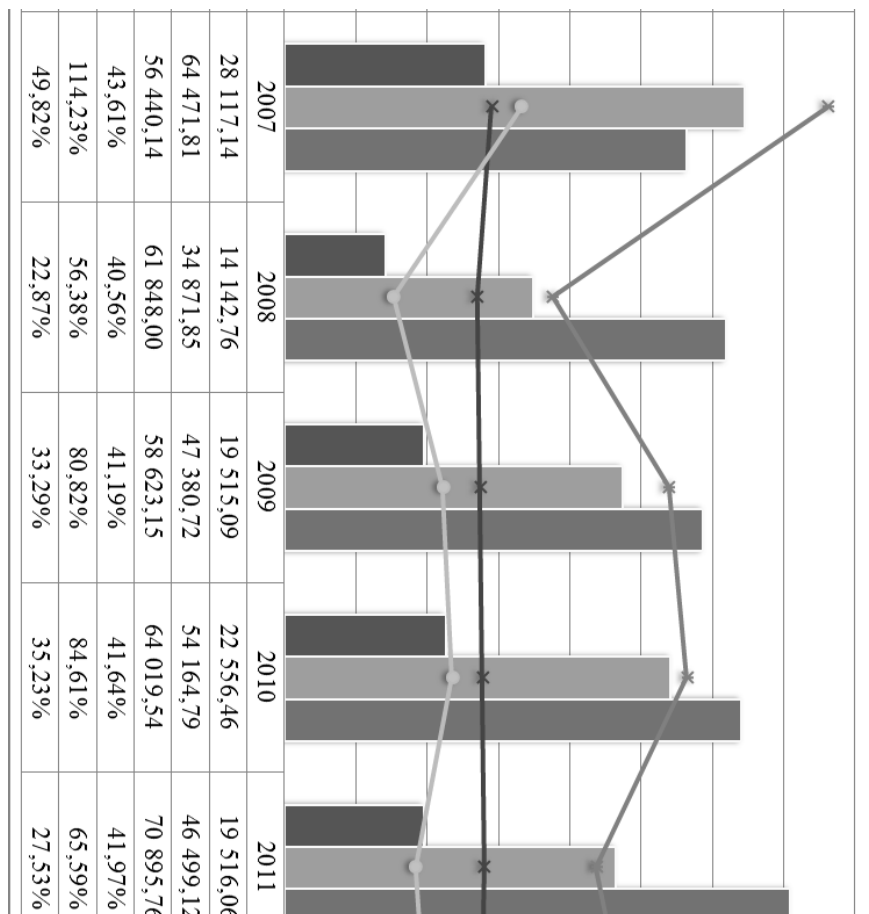


Fig.6 - The relationship and progress of market capitalization and GDP in relevant years for quantification of IFRS using. Source: Authors' computation; based on data of IMF, WFE and the World Bank

#### 4 CONCLUSION

The analysis presented in our paper is significantly based on data obtained from the global survey that has been conducted by the IFRS Foundation since 2012. It can be considered as certain limitation of the paper because the paper does not include origin research made by the authors. However, we believe that our contribution lies on aggregation of the survey results that we assessed using several (there are three described in this paper) own criteria and consequently developed our opinion regarding global use and global perception of IFRS. The first criteria – the number of countries – may be varied depending on definition of use of IFRS. If the definition of use is equivalent to the “official implementation” (in any kind of extent – mandatory/voluntary etc.), then survey gives information about 116 countries using IFRS. If this figure is put into the ratio with the total number of countries (based on the number of the United Nations members which comprises 193 states), it concerns nearly 60% of the countries in the world. Conversion into GDP brings a similar result. A substantial part of total (world) GDP is constituted by the EU economy which is not too positive message. Much worse balance is underlined by the fact that mandatory use of IFRS by domestic listed companies is not applied in China, Japan, India and the USA (however, some of them are in a transition process). The absolute number cannot be found negative but unfortunately it is a key element in terms of GDP to be possible to talk about IFRS as global standards. Given that the active trading is typical for these countries and therefore the quality accounting framework is needed, so it is difficult by our opinion to identify IFRS as global standards, albeit other standards do not enjoy more privileged position.

Secondly, number of companies depends whether listed or all companies are considered. IFRS are with their complexity designed primarily for listed companies. Their number is, however, negligible in comparison with a huge group of all existing companies. In recent years the number moves below the 50,000 listed companies worldwide due to the now receding economic crisis. Relatively it is only a hundredth of a percent of all active companies. IFRS are often required even for the non-listed - notably the financial institution, subsidiaries or companies exceeding certain specified limits (e.g. the amount of assets, turnover or number of employees). But the total number of companies using IFRS would not be changed too much. However, this indicator is linked only with a minimum level of relevance. The absolute number is not decisive in this respect and therefore this paper does not evaluate the status of IFRS by this criterion.

Finally, if the size of companies measured by market capitalization is considered the analyzed values immediately receive another dimension. From the scant hundredths of percent (related to the absolute number of firms) analysis shows quite interesting and especially more relevant figures now. The value of the ratio of the domestic market capitalization of listed companies in countries where IFRS are mandatory for them and the world's total market capitalization oscillates around the level of 41%. In 2012 domestic market capitalization represented 21,500 billion USD in the respective countries. For comparison, in the same year the two largest US stock exchanges symbolized about 18,500 billion USD market capitalization. If we add to them further significant exchanges where IFRS are not mandatory required for domestic listed companies (Japan Exchange EG, Shanghai SE and SIX Swiss Exchange), then the value will increase to more than 26,000 billion USD. This simple ratio provides a solid answer that it is very difficult in our opinion to consider IFRS as global standards due to the fact that only a few major stock exchanges with their market capitalization exceed the IFRS current position measured by the same indicator.

### **Acknowledgement**

This paper is processed as an output of the research project “Relevance of accounting information on the consolidated basis in business and public sector” (IGA VSE F1/47/2015) and under “Institutional support of the Faculty of Finance and Accounting, University of Economics in Prague 2015”.

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## **THE IMPROVEMENT OF HUMAN RESOURCE CONTROLLING IN SELECTED SERVICE COMPANIES**

*Monika Ďugelová, Mariana Strenitzerová*

### **Abstract**

Productive and effective employees are essential for the functioning of the organization. Human resources can become the competitive advantage and organisations should use their skills and abilities properly. Due to underutilisation of human resource controlling we consider important to study its using in service companies. The paper analyses the possibility of human resource controlling improvement with methods: comparison, analysis, synthesis, induction and deduction. The aim of our paper is to analyse the current state of human resource controlling using in selected companies and to identify the possibilities of improvement. Selected companies need to use complex human resource information system, to obtain the access to operative data for companies' managers, to periodically evaluate measured indicators and to measure more qualitative indicators. Our paper is important for future work and the results can be use also in other information technology companies.

*Keywords: Human Resource Controlling, human resource indicators, motivation, Data Envelope Analysis method, job satisfaction, employee productivity, employee efficiency*

JEL Classification: O15, C44

### **1 INTRODUCTION**

In the current turbulent times the companies (manufacturing or service) want to optimize the using of resources, to decrease the costs and to achieve the competitive advantage. They should not forget about human resources – employees which are most valuable assets and also the source of competitive advantage.

Human resource controlling provides to human resource managers multiple benefits, but the usage is spread mostly in manufacturing companies. Because of universal character and strategic tendency we decided to implement human resource controlling in tertiary sector.

We analysed the choice of SK NACE section J – Information technology and communication in the previous work (Dugelova & Strenitzerova, 2014b). Also the definition of problems with implementation in IT companies was defined in our previous work (Dugelova & Strenitzerova, 2014a).

To follow on previous studies the aim of our paper is to define the possibilities of human resource controlling improvement in selected service companies and to propose solutions for lacks in used tools, human resource indicators and in human resource information systems. We focus primarily on four selected (different size) information technology companies. Our study can help understand information technology employees, their performance and their management. The paper forms the basis for further studies and for creating universal methodology of human resource controlling implementation in different IT companies.

There is no extensive research examining the practical issues of human resource controlling. From Slovak authors we use the work of Majtan (2007), Olexova (2011) and Strenitzerova (2010). From Czech authors we would like to mention the work of Dvorakova (2007) and Busina & Sikyr (2014). From Poland authors we work with the paper from Laskowska

(2010). General controlling and human resource controlling is widespread only between German authors' work (e.g. Hentze & Kammel, 1993; Lisges & Schübbe, 2004; Wunderer & Jaritz, 2007; Wütscher, 2006; Dilger, 2005; Dilger et al, 2005; Scherm & Pietsch, 2005). All of them defined the theoretical basis of human resource controlling and the importance of appropriate tools. Busina & Sikyr (2014) solved the problem of human resource controlling in small and medium size companies in building industry. They described the human resource management in the companies and its general characteristics. Laskowska (2010) solved the usage of human resource controlling in Polish libraries. She surveyed library employees to find out the level of motivation and satisfaction with working conditions and she used SWOT analysis to define lacks in human resource management. But Busina & Sikyr (2014), Laskowska (2010), Slovak or German authors did not define the detailed methodology of human resource controlling implementation. For primary research we can use only report Human resource controlling 2013 from PricewaterhouseCooper and German website [www.controllingportal.de](http://www.controllingportal.de).

## **2 THEORETICAL BASIS**

Human resource management and human resource department employees work with control to test employee performance and to find out the level of performance appraisal system. Control can be defined as any process that helps align the actions of individuals with the interests of their employing firm. (Tannenbaum, 1968) The human resource control is not the same as human resource controlling. Control is oriented on the past, controlling is oriented on the future. Main aim of control is to determine an error, aims of controlling are: to plan, to control and to correct mistakes. Controlling also helps to guide and inspire while control only help to remove mistakes and their causes. (Laskowska, 2010)

Fiedler (2011) defines human resource controlling as a management subsystem with main aim to support the company's management. All in the terms of management oriented approach. Controlling helps with the coordination between planning, control, organization, personnel management and information supply. Human resource controlling is than the specialization of general controlling. It differs from the general controlling in its functions (Schäffer & Webber, 2005):

- control and coordination of information flows in human resource management,
- preparation of human resource related decisions by analysing the information provided by and about the employees and
- monitor implementation of the human resource department decisions.

Human resource controlling represents the application of controlling conceptions on the level of human resource management (HRM) as a strategic company's field. Human resource controlling is a controlling of functional area and its role is planning, checking and managing including information supplement for selected functional area. It deals with concretization of short-term and long-term objectives of HRM and with the assessment of their achievement. (Milkovich & Boudreau, 1993; Majtan, 2007)

Human resource controlling deals with the concretization of operational and strategic objectives of human resource management and with an evaluation of their achievement. Olexova (2011) defines human resource controlling as a company's strategic tool. It is important to set objectives, to obtain information about planned and actual level of human resource processes, to find the deviations and to design measures to eliminate shortcomings. (Strenitzerova, 2010)

Dvorakova (2007) uses for the human resource controlling definition the general controlling definition. Controlling is a managerial tool that increases the company's value, involves in the budget and financial plan creation and in eliminations of deviations.

The human resource controlling functions are done by controller. Niedermayr-Kruse et. al (2014) characterise controller as a partner of manager that monitors every process and tries to optimize and save costs.. The main controller's task is to manage the process of human resource activities with human resource indicators, to monitor and evaluate them and to take corrective actions based on found deviations. According to Potkany (2007) this process can be divided into three activities:

- definition of HR objectives,
- monitoring and evaluation of their achievement,
- transparency in human resource function and its approach to customers' requirements.

Potkany also highlighted the importance of objectives set by human resource controlling. They would follow the company's strategic objectives, explicitly define the benefits of human resource management, be specific and set the penalty for failure. (Mihalcova, 2007)

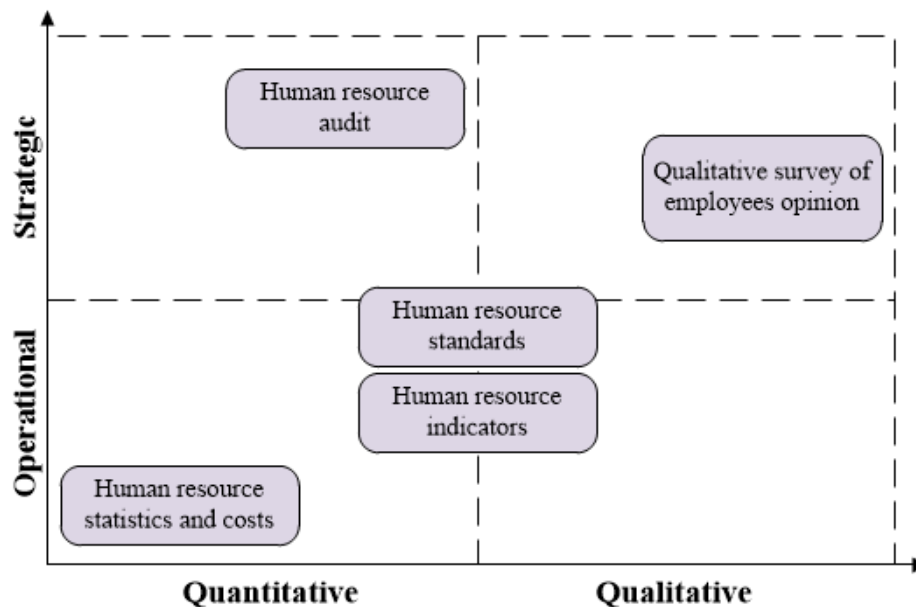


Fig. 1 – Human resource controlling tools. Source: Olexova, 2011

Human resource controlling acts with multiple controlling tools (see Figure 1). Their dividing is based on the strategic/operational view and qualitative/quantitative aspect. The most popular tools according to Olexova (2011) are human resource audit and human resource indicators. The qualitative indicators are difficult to measure and the results are not so explicit but HR managers would not omit them. An interview with employee or the human resource standards can help to find the gaps and improve the HR efficiency.

Website [www.controllingportal.de](http://www.controllingportal.de) recommends these human resource controlling tools: human resource scorecard, human resource due diligence, human resource potential analysis, target-performance comparison, SWOT analysis, risk-reward analysis and portfolio matrix.

Jungmeister (2005) promote other tools. In quantitative tools they include: key human resource indicators, score cards and initiatives to decreasing human resource costs. In

qualitative tools they include: assessment of employees personal development, human resource surveys, SWOT analyses and development scenarios.

Olexova (2011) adds other less used tools: HR benchmarking, model excellence EFQM, methodology Process Survey Tools, the concept of indicators (KPI – key human resource indicators, PI – human resource indicators, KRI – key result indicators) and Balanced Scorecard.

### **3 METHODOLOGY**

Human resource controlling in service companies depends on special characteristics of service companies. Horvath (2004) helped to implement controlling in several service companies and identified main problems of potential successful implementation. Horvath (2004) describes controlling in trading company, in insurance company, in banks, in public administration and in non-profit organisations. The common elements of all branches are:

- problematic accounting of services,
- problematic measurement of employee's work,
- the service sector is dominated by almost invisible inputs and outputs.

Selected service companies are included in information technology and communication branch (according to SK NACE – section J Information and Communication). After practical research we can identify following problems with controlling implementation: problematic measurement of developer's work (developer performance does not depend on the code length but on the quality and utilization for project), the lack of qualified applicants, the matrix organizational structure and project management (this allows employees to participate in more projects and to obtain multiple subordination), the lack of communication and problems with coordination between managers. (Dugelova & Strenitzerova, 2014a)

To gain paper's objective "The definition of the improvement possibilities of human resource controlling in selected service companies." we surveyed four IT companies in Slovak republic. The survey was conducted from June to December 2014. The companies did not wish to publish their names. All companies work in section Information and Communication. Company A has over 60 employees, company B has over 400 employees, company C has over 1.000 employees and company D has over 2.700 employees. Our survey consists of two expert interviews divided into five parts: basic information, human resource department work, human resource controlling tools, human resource information system and possibilities of future human resource controlling development.

To deal with mentioned problems we chose following methods:

- comparison of human resource controlling tools,
- analysis of using human resource information system and following synthesis to gain new insights,
- comparison of human resource indicators (as human resource controlling tool used in all selected companies),
- and induction and deduction to generalise obtained results and to propose appropriate solutions.

## **4 RESULTS AND DISCUSSION**

To generalise the methodology of human resource controlling we use the paper from Horvath & Partners (2004), the recommendations from [www.controllingportal.de](http://www.controllingportal.de) and report Human resource controlling 2013 from PricewaterhouseCoopers. Effective human resource controlling needs appropriate human resource controlling tools and their correct and full utilisation. The tools need to be selected according to human resource vision, human resource processes and human resource controlling aims. All human resource controlling tools need proper data and this data are obtaining from human resource information system. Used human resource controlling tools and various aspects of human resource information system were surveyed in all four selected companies. These characteristics are also later recommended for improvement.

### **4.1 The usage of human resource controlling tools**

The percentage of human resource controlling tools using (see Table 1) was consulted with human resource managers and human resource controllers. They defined the utilisation of the most popular human resource controlling tools (defined by Olexova, 2011). The utilisation is expressed with the percentage of the maximum possible using. We use the scale:

0% = human resource controlling tool is not used

1 – 25% = human resource controlling tool is hardly used

26 – 50% = human resource controlling tool is not used very often, more than a half of functionalities are missing

51 – 75% = human resource controlling tools is used, some specific functionalities are missing

76 – 100% = human resource controlling tool is used, complex evaluation is missing

100% = human resource controlling tool is fully adopted and used

Human resource controlling in company A is based on tools: human resource indicators and qualitative survey of employee opinion which are almost fully used. Human resource audit is performed only as one part of complex company audit and human resource standards, statistics and costs are not used very often. Company B uses the full potential of two tools: Human resource standards and Balanced Scorecard. There is a significant using of qualitative surveys and human resource indicators, other tools are not used very often or very detailed. Company C has fully adopted tools: human resource indicators and Balanced Scorecard, other tools do not have significant results. Human resource controlling in company D is based on human resource audit and human resource standards. Human resource indicators are almost fully used; operative access for lower management is missing. Human resource statistics and costs are not fully adopted.

The human resource indicators are adopted and used in all selected companies. Percentage of using is above 70%. The indicators are also the most important human resource controlling tool for the analysis of current situation in selected companies. It is the cornerstone of human resource controlling. The process of using human resource indicators for human resource controlling consists of the following parts: indicators identification, target results identification and regular monitoring of deviations. The human resource indicators are included between operational tools but they reflect strategic aspects and the quality of human resource management. The resources of human resource indicators data are human resource administrations and payroll accounting. Properly chosen human resource indicators can be used in benchmarking and they show the long-term company development. (Olexova, 2011)

Tab. 1 – The percentage of human resource controlling tools using in selected companies.  
Source: Authors

<b>Human resource controlling tools</b>	<b>Company A %</b>	<b>Company B %</b>	<b>Company C %</b>	<b>Company D %</b>
<b>description</b>	<b>description</b>	<b>description</b>	<b>description</b>	<b>description</b>
Human resource statistics and costs	<b>40%</b>	<b>40%</b>	<b>50%</b>	<b>80%</b>
	Evaluation of fluctuation and utilisation of employees.	Evaluation of fluctuation and utilisation of employees.	Evaluation of fluctuation of employees, human resource costs and labour costs.	Complex evaluation of human resource costs, labour costs and fluctuation and utilisation of employees.
Human resource indicators	<b>80%</b>	<b>70%</b>	<b>100%</b>	<b>90%</b>
	Human resource indicators are used, complex and periodical evaluation is missing.	Human resource indicators are used. There is not operative access to data because of non-existing single information system.	Human resource indicators are used and periodically evaluated with operative access for all levels managers.	Human resource indicators are used and periodically evaluated. The operative access for lower management is missing.
Human resource standards	<b>30%</b>	<b>100%</b>	<b>50%</b>	<b>100%</b>
	Human resource management directive is adopted but not used.	Human resource standards are the part of quality certificates. Certificates are fully adopted and used.	Human resource management directive is adopted but not used in human resource controlling.	Human resource standards are the part of quality certificates. Certificates are fully adopted and used.
Human resource audit	<b>50%</b>	<b>50%</b>	<b>40%</b>	<b>100%</b>
	Human resource audit is only one part of company audit, the detailed analysis of human resource strategy and policy is missing.	Human resource audit is only one part of company audit, the detailed analysis of human resource department work is missing.	Human resource audit is only one part of company audit, the detailed analysis in all human resource functions and aspects is missing.	Human resource audit is fully implemented and used.
Qualitative survey of employee opinion	<b>90%</b>	<b>80%</b>	<b>60%</b>	<b>60%</b>
	Two times per year, the results are not archived.	One time per year, the survey about the identification	One time per year, questions are general and detailed analysis	One time per year, questions are general and detailed analysis

Human resource controlling tools	Company A %	Company B %	Company C %	Company D %
	description	description	description	description
			with the company and its vision is missing.	is missing.
Balanced Scorecard	0%	100%	100%	0%
	not using	Human resource management analysis is a part of the company's Balanced Scorecard.	Human resource management analysis is a part of the company's Balanced Scorecard.	not using

To identify the measured human resource indicators we use the report Human resource controlling 2013. The report divides human resource indicators into seven groups: corporate results, remuneration and employee benefits, behaviour within the organization, training and development, talent management, recruitment and selection and organizational structure. The list of measured indicators is in Table in attachment. We can see selected companies and their HR managers and HR department employees use mostly quantitative human resource indicators. They focus on costs and return on investment and indicators gain from human resource information system (salaries, employee number and structure, training hours, statistics about organizational structure and fluctuation). (Pavlik, 2014)

These indicators should be periodically monitored, evaluated and presented to top management and other interested parties. But only company C has fully implemented tool human resource indicators (we can see it also in Table 3). The indicators are measured, recorded by human resource information system and periodically evaluated. The results and indicator's time evolution are presented during the meetings and by human resource controlling intranet application. The example of selected human resource indicators evaluation in company C is shown in Table 2. We can see only evaluation of quantitative indicators, which are easily compared. The qualitative human resource indicators are not the part of this report. This report contents the results in year 1 and 2 and planning results in year 3. This data is important for strategic plans and managerial decisions.

Tab. 2 – The evaluation of selected human resource indicators in company C. Source: Authors

Human resource indicators	Year 1	Year 2	Difference		Plan – year 3
			Index	Evaluation	
Revenues	325 501 008,94	309 414 000,00	95,06%	↓	314 115 000,00
Productivity based on revenues	21 265,28	20 518,38	96,49%	↓	21 405,00
Labour productivity	2,86	2,84	99,53%	↓	2,84
Average salary	620,33	601,33	96,94%	↓	629,00
Average number of employees	15 306,69	15 079,84	98,52%	✓	14 675,00
Taking holidays	84,34%	84,05%	99,66%	↓	85,00%



<b>hours / all holiday hours</b>					
<b>Absence rate</b>	4,76%	4,83%	101,35%	↓	4,70%
<b>External non voluntary fluctuation</b>	4,81%	4,56%	94,80%	√	4,50%
<b>Number of employees to 1 HR department employee</b>	295,00	325,00	110,17%	√	350,00
<b>Average salary of one HR department employee</b>	903,00	910,00	100,78%	√	-
<b>Total costs to training and development</b>	1 770 973,00	1 065 000,00	60,14%	-	990 000,00
<b>Total training hours</b>	-	12 245,00	-	-	-

√ positive evaluation

↓ negative evaluation

Qualitative indicators are not used in all companies. The selected companies carry out the qualitative survey to determine employee satisfaction and their opinions on company's performance. The survey results are not fully included in HR controlling indicators. Selected companies use these qualitative indicators:

- degree of satisfaction with the salary,
- employee satisfaction within the organisation,
- employee satisfaction with the company performance,
- reasons for leaving the job (companies A, B, D).

Satisfaction degrees are based on employees' answers in Likert-type scale (from very satisfied to very dissatisfied) and these results are not statistically evaluated. The human resource manager or responsible human resource department employee reports comparison of answers to top management and creates solutions or corrective actions in case of decreased satisfaction.

The results of monitored qualitative indicators do not show the performance level and do not answer the questions of motivation level and the relation between these variables. As we previously mentioned the biggest problem in IT companies is measurement of developers' work and relations to motivation and employee satisfaction with occupations and within the company. The possible solution is creation of one indicator that includes all qualitative factors of employee performance. To gain this resolution we test the DEA (data envelopment analysis) method and its using in IT companies. Our DEA indicator integrates employee satisfaction with salary, working conditions, motivation, managerial approach and manager satisfaction with employee and his productivity. This survey is in progress and we will inform about the results in our future works.

#### 4.2 The usage of human resource information system

Human resource information system (HRIS) is designed to assist the human resource and payroll departments in the performance of their overall employee management function. According to Badgi (2012) HRIS contains of IT software and systems that are associated with managing employee data, overall life cycle of employee, benefits administrations, leave management, talent management, payroll and related HR functions. The success of human resource controlling and its tools depends on data obtaining from human resource information system.

Tab. 3 – The important aspects of human resource information system in selected companies.  
Source: Authors

<b>Aspects of information systems</b>	<b>Company A</b>	<b>Company B</b>	<b>Company C</b>	<b>Company D</b>
Type of using information system	Commercial human resource information system	Excel sheets made by human resource manager	Custom-made human resource controlling information system	Custom-made human resource controlling information system
Responsible person	Human resource manager	Human resource manager	Human resource controlling manager and human resource controlling department	Human resource controlling manager and human resource controlling department
Top management access	During the meetings and company's results presentation	During the meetings and company's results presentation	Access via the human resource controlling application	Access via the human resource controlling application
Middle management access	During the meetings	During the meetings	Access via the human resource controlling application	Access via the human resource controlling application
Lower management access	on request	During the meetings	Access via the human resource controlling application	on request

Surveyed companies use different types of human resource information system (see Table 3). Company A uses two basic modules of commercial HRIS Hour (employee data and payroll) and responsible person is human resource manager. Human resource manager informs other company's managers (top and middle management level) about the important results during the meetings and company's results presentation. Lower managers obtain human resource controlling results on request from human resource manager. In company B human resource manager uses as information system custom made excel sheets. The results are available only for human resource manager and he presents the results to other managers during the meetings and other presentations. Company C and company D have custom made human

resource controlling information systems. These information systems operate as OLAP (online analytical processing) models. Employees of human resource controlling department are responsible for data and results evaluation. Selected results are available for other managers via human resource controlling intranet application. In company C managers of all levels have access to intranet application. In company D only managers of top and middle level have access to intranet application, lower managers gain data on request from human resource controller.

## **5 CONCLUSIONS AND RECOMMENDATIONS**

The survey in four selected IT companies shows us the differences between the human resource controlling levels. After the comparison of companies and theoretical and practical work of other authors we can identify the possibilities of human resource controlling improvement. The human resource controlling in IT companies deals with the problematic measurement of employees' work and with multiple subordination. To eliminate the problems and to improve human resource controlling we recommend these solutions:

The company A with only 60 employees does not have resources for big changes. We recommend focusing attention to two human resource controlling tools: human resource indicators (the most important tool) and qualitative survey of employee opinion. The results of qualitative survey will be the part of human resource indicators. They will be archived to obtain the basement for comparison and time evolution analysis. Human resource information system is appropriate used; we recommend buying more modules (education and training) and create the access for management.

The company B disposes of resources to change human resource controlling and human resource management significantly. The biggest problem is inadequate human resource information system. Excel sheets made by human resource manager are appropriate in small companies. The company with 400 employees needs more complex and robust information system. The solution is buying the commercial HRIS or making own human resource management and human resource controlling information system (as in company C and company D). The improved HRIS will optimize the human resource indicators using. The usage of tools: human resource standards and Balanced Scorecard is appropriate. The company can think about the change to other tools only in case of changing company's vision and human resource strategy.

The company C achieved the best results in our survey. HRIS is fully adopted and used; managers of all levels have access to information system and operative results. The only lack is in using the tool "Qualitative survey of employee opinion". It is needed to conduct survey two times per year, including all important aspects of employee satisfaction and evaluate results. The human resource indicators were chosen according to human resource management strategy five years ago. The human resource controller should take into account current issues and change measured human resource indicators.

The company D has the similar problem as company C. HRIS is fully adopted and used by human resource controlling department and managers of top and middle level. Lower managers obtain results on request. The improvement is necessary in access of lower management and in using of qualitative surveys. Other human resource controlling tools are used sufficiently. The change of preferred human resource indicators tools would be necessary after change of employees' organisation or human resource controlling aims.

To generalise our recommendations it is important for IT companies take into account these facts:

- the success of human resource controlling depends on data relevance and data relevance depends on implemented HRIS and its functionalities,
- OLAP system is more appropriate than relational database for human resource controlling information system (relational database is not appropriate for nearly immediate analysis and displaying a big amount of data),
- the most using human resource controlling tools are: human resource indicators, human resource standards and qualitative survey of employee opinion,
- it is important to provide operative results access for managers of all levels (in bigger companies),
- human resource controlling intranet application is appropriate solutions of data obtaining,
- human resource controllers and other responsible persons need to periodically monitor and evaluate important indicators and solve obtained deviations with managers.

Our recommendations for improvement can be used in all IT companies and also in similar service companies. We gain paper's objective: "The definition of the improvement possibilities of human resource controlling in selected service companies." and our survey is first step for following work. Future work will investigate the selection of human resource indicators in IT companies and we will prove our draft in practise. We also investigate the using of DEA method as qualitative indicator and the relation between productivity and the change of individual inputs and outputs. Another study can also focus on the possibility of using IDEA method and on the differences between DEA and IDEA (Imprecise Data Envelopment Analysis). IDEA requires that the number of employees should be at least 30 times higher than the total number of input and output and this condition is fulfilled only in company C and D.

## **Acknowledgements**

This contribution was undertaken, as parts of the research project:

- VEGA 1/0733/15 „Research of quality management to support business competitiveness.“
- VEGA 1/0895/13 Research on strategic business management as promoting competitiveness in a dynamic business environment.
- project co-financed by EU's "Quality of education and human resources development as the pillars of the knowledge society at the Faculty PEDAS University of Zilina, ITMS 26110230083"



Modern education for the knowledge society / Project co-financed from EU sources (Moderné vzdelávanie pre vedomostnú spoločnosť/Projekt je spolufinancovaný zo zdrojov EÚ)

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### Appendix:

Tab. 1 – The comparison of surveyed human resource indicators in selected companies.  
Source: Authors

Human resource indicator	Company A	Company B	Company C	Company D
<b>Corporate results</b>				
Asset returns to FTE	☑	☑	X	X
Total costs to FTE	☑	☑	X	X
Pre-tax profit to FTE	☑	☑	X	X
Pre-tax profit to employee	X	☑	☑	X
Human resource costs / Revenue	☑	☑	X	X
Human resource costs / Total costs	☑	☑	☑	X
<b>Remuneration and employee benefits</b>				
Average human resource costs	☑	☑	☑	X
Quota of additional human resource costs	X	X	X	X
Human resource costs to employee	☑	☑	X	X
Human resource costs by occupation	X	☑	X	X

Human resource indicator	Company A	Company B	Company C	Company D
Average labour costs	☑	☑	☑	☑
Variable labour costs	X	X	☑	X
Performance part of salary	☑	X	☑	X
Overtime Premium	X	☑	☑	☑
Labour costs / Human resource costs	☑	☑	☑	X
Increase in salary	X	☑	☑	X
Average company salary	X	☑	☑	☑
Average salary by occupation	X	☑	☑	X
Degree of satisfaction with the salary	☑	☑	☑	X
Salary structure forms	X	☑	X	X
Labour costs / FTE / month	X	X	X	☑
Overtime hours	X	X	X	☑
Overtime hours / FTE	X	X	X	☑
<b>Behaviour within the organization</b>				
Absence rate	X	☑	☑	X
Absence rate in days	X	☑	☑	X
Absence rate due to illness in days	X	☑	☑	X
Occupational injury rate	X	☑	☑	X
Occupational injury costs	X	☑	X	X
Fluctuation rate	☑	☑	☑	☑
Total external fluctuation	☑	☑	X	X
External non voluntary fluctuation	X	☑	☑	☑
External voluntary fluctuation	X	☑	X	☑
External voluntary fluctuation by length of employment	X	X	X	X
Fluctuation by departments	X	X	X	☑
Employee satisfaction	☑	☑	☑	X
Final pay costs for 1 employee	X	X	X	X
Taking holidays hours / all holiday hours			☑	
Reasons for leaving a job	☑	☑	X	☑
<b>Recruitment and selection</b>				
External recruitment rate	☑	X	X	X
New occupation rate	☑	X	X	X
Occupation replacement rate	☑	X	☑	X
Recruitment costs	☑	X	X	X
Time of offer acceptance	☑	X	X	X
Acceptance rate	X	X	☑	X
Internal recruitment rate	☑	X	X	X
Promotion rate	X	X	☑	X
Career development rate	☑	X	☑	X
Recruitment costs	☑	X	X	X
Number of applicants for one working	X	☑	X	X

Human resource indicator	Company A	Company B	Company C	Company D
station				
Number of interviews with applicants	☑	☑	X	X
Recruit Rank	X	☑	X	X
<b>Talent management</b>				
Investment in training and development of talent employees	☑	X	X	X
<b>Training and development</b>				
Total costs to training and development	☑	☑	☑	☑
Training costs to FTE	X	X	X	☑
Training costs / Labour costs	☑	X	☑	X
Training costs / Total costs	☑	X	X	X
Internal training costs to FTE	☑	X	☑	X
External training costs to FTE	☑	X	☑	X
Specialized training costs to FTE	☑	X	☑	X
Developmental training costs to FTE	☑	X	☑	X
Internal training hours to FTE	X	X	☑	X
External training hours to FTE	X	X	☑	X
Specialized training hours to FTE	X	X	☑	X
Developmental training hours to FTE	X	X	☑	X
Number of training courses to one employee / one year	X	☑	X	X
Average training hours to one employee	☑	X	☑	X
Total training hours	X	X	☑	X
<b>Organizational structure</b>				
Number of employees	☑	☑	☑	☑
Number of key employees	☑	X	☑	X
Administrative workers – all employees ratio	X	☑	☑	X
Number of employees to 1 HR department employee	X	☑	☑	X
HR department costs to FTE	☑	X	X	X
HR department costs / Total costs	☑	X	X	X
Average salary of one HR department employee	☑	X	☑	X
Range of control	☑	X	☑	X
University educate employees ratio	X	X	☑	X
Women – men ratio	X	X	☑	☑
Number of woman in management	X	X	X	☑
Age structure index	X	X	☑	X
Occupational structure	X	X	☑	X
Average job tenure in company	X	X	X	☑
Labour productivity	X	X	☑	X
Labour productivity based on revenues	X	X	☑	X



Human resource indicator	Company A	Company B	Company C	Company D
Employee utilisation	☑	X	X	X
Employee use of working time ratio	☑	X	X	X
Average overtime hours	☑	X	X	X
The volume of work / working time	☑	X	X	X
Participation of employees in outcomes	☑	X	X	X

FTE – full time employee

☑ - indicator is present

X – indicator is not present

## **DETERMINANTS OF INNOVATION IN SMALL AND MEDIUM ENTERPRISES**

*Marek Ehrenberger, Evgeny Lisin, Wadim Strielkowski*

### **Abstract**

This paper investigates the determinants of innovation in small and medium enterprises (SMEs) in the Czech Republic. The country that has undergone painful economic transformation and institutional change leading to the establishment of the new standards of entrepreneurship is now dealing with the aftermath of world's economic crisis. Czech SMEs strive to survive in the tough competition on domestic and EU markets and innovations might become one of the ways how to differentiate their product and outrun the competition.

Our case study is based on the survey questionnaire with 1144 Czech SMEs. We find several significant determinants for innovation: own R&D, investment into technology, improvement of quality of a product or service, or presence on foreign (EU and world) markets. Moreover, bureaucratic barriers for innovations and external factors with negative impact did not come through as significant obstacles for innovative activities in SMEs.

*Keywords: innovations, SMEs, transition, Czech Republic, economic crisis*

JEL Classifications: L25, P36, R10

### **1 INTRODUCTION**

Small and medium enterprises (SME) are thought to be best suited to take advantage of opportunities on the market, as far as they possess the capacity to survive, grow and retain a competitive advantage (see e.g. Nooteboom, 1994; Shane & Venkataraman, 2000; Hayton, 2005; Steyaert, 2007; Felício et al., 2012; Klyver, et al., 2012; or Malbašić & Brčić, 2012).

At the beginning it is important to define the concept of innovation and its multiple types. Edwards and Gordon (1984, p. 1) define innovation as "a process that begins with an invention, proceeds with the development of the invention, and results in the introduction of a new product, process or service to the marketplace". This definition looks at innovation as a rather technological perspective (Dubini, 1988). The issue is that not every innovation begins with an invention. Many innovations take a form of an improvement (Dodd et al., 2007).

Innovations play an indispensable role in everyday activities of today's society, spanning across all areas of our lives. They are especially important in technical and economic disciplines. Whereas they are a key to progress in the former one, they are an essence of success or failure for the later one. Innovative activities have become an important aspect of every economic or scientific activity, because they create new space for potential specialization and future growth (Feldman & Audretsch, 1999). They allow us to push limits further and the new quickly becomes the standard. In the ever more globalized and interconnected world they are a necessity rather than an option for firms if they want to survive and grow further. Thanks to their creative nature they embody positive benefits both for their inventor and their user. The inventor usually earns a reward in a form of money or respect (Hughes, 1992; or Sorensen, 2007). The user then gets a result with improved quality, availability, diversity or increased quantity.

The question is whether small or large firms are better suited to bring the desired goals of growth, employment and competitiveness and whether innovation is something that can significantly improve chances of firms to achieve success. This paper argues that small and medium sized businesses and especially their innovative activity are capable of and well suited for pursuing such desirable goals.

Innovations play an indispensable role in everyday activities of today's society, spanning across all areas of our lives. They are especially important in technical and economic disciplines. Whereas they represent a key to progress in the former one, they are an essence of success or failure for the latter one. Innovations became an important aspect of every business activity due to the fact that they can create a new space for potential specialization and future growth. In addition, they allow pushing up the boundaries. In the ever more globalized and interconnected world they represent a necessity rather than an option for firms if they want to survive and grow further. Thanks to their creative nature they embody positive benefits both for their inventor and their user. The inventor usually earns a reward in a form of money or respect. The user then gets a result with improved quality, availability, diversity or increased quantity of goods and services.

## 2 SMEs IN THE CZECH REPUBLIC IN ECONOMIC TRANSITION

SMEs constitute a backbone of the Czech economy both in microeconomic and macroeconomic realm (see Earle et al., 1994). Kočenda et al. (2004) or Hanousek & Kočenda (2004) note that small firms in Czech transition were the main cause of low unemployment and accounted for the majority of newly created jobs. They conclude that the retained profit of small firms was a major determinant of new investments.

In order to provide an overview of the current state and the development of Czech SMEs since the EU accession in 2004, we present an overview of the structure of active economic subjects in the Czech Republic according to the employee categories (Tab. 1).

The numbers reported in Table 1 are not for all registered subjects (which are about twice as high but for all active entrepreneurial subjects due to the fact that these data are more meaningful (CZSO 2007)). Active entrepreneurial subjects are classified according to the data obtained by statistical surveys, tax returns and payments for social insurance and thus give at least some lead of economic activity.

Tab. 1 – SMEs in the Czech Republic. Source: CZSO (2011)

Year	Total active subjects	Categories according to the number of employees											
		Not specified	Without employees	1 - 5	6 - 9	10 - 19	20 - 24	25 - 49	50 - 99	100 - 199	200 - 249	250 - 499	500 - 999
2005	1 266 336	277 271	733 249	169 922	28 137	26 129	6 356	12 015	7 211	3 394	639	1 163	540
2006	1 256 771	262 296	723 796	183 214	28 473	26 850	6 401	12 138	7 386	3 492	649	1 188	557
2007	1 224 863	302 601	647 818	185 007	29 346	27 267	6 579	12 393	7 473	3 545	691	1 227	579
2008	1 345 589	284 251	780 260	188 734	30 383	28 208	6 845	12 639	7 787	3 599	702	1 236	581
2009	1 346 185	253 963	817 540	183 855	30 316	27 903	6 433	12 454	7 519	3 477	662	1 188	523
2010	1 399 983	281 109	841 562	187 674	29 856	27 258	6 179	12 529	7 473	3 514	669	1 218	584
2011	1 461 201	319 639	862 087	191 302	29 064	26 686	5 991	12 664	7 421	3 506	621	1 242	612

Figure 1 provides information on the total number of active economic subjects and its development over years.

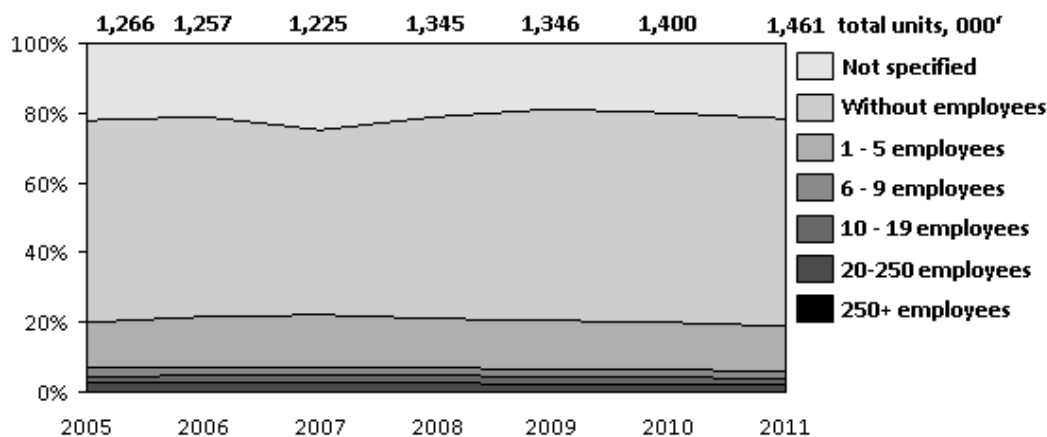


Fig. 1 – Economic subjects in Czekia to total population (2005-2011). Source: CZSO (2011)

The total number has been growing slightly, around 2.4% per year. Likewise, the birth and death rate of economic subjects shows a relatively stable development (Figure 2).

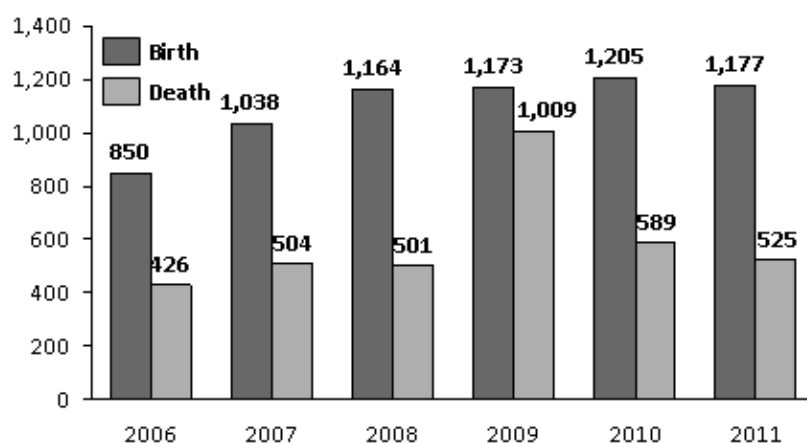


Fig. 2 – Births and deaths of economic subjects in the Czech Republic (2005-2011). Source: CZSO (2011)

Although it includes subjects of all sizes, we can assume, according to above mentioned proportionality, that it represents mainly SMEs. The average birth rate between 2005 and 2011 was 110 101 subjects a year. The average death rate, influenced by a sharp increase in 2009, was 59 229. Without this peak year it is relatively stable 52,289. The increase in the death rate was caused by the economic crisis which caused the Czech GDP to decrease by 4.7% (CZSO 2012) and the unemployment to rise from 4.4% to 6.7%.

Czech SMEs provided employment for over 1.8 million people in 2010, a 60.88% share on total enterprises. Since 2007, when the number peaked at over 2 million, this is a 10% drop (CZSO 2011). In 2009 and 2010 SMEs saw return of their revenues to 3.9 billion CZK and the total revenues were steadily growing since 2000 till 2008 when the economic crisis struck. The economic crisis and the recession brought a significant drop to all SMEs financial indicators.

One of the most important indicators of SMEs' economic activity is their role in international trade (see e.g. Arslan & Karan, 2009). It is good to know how SMEs are doing, especially in the context of the new export oriented strategy crafted by MIT (2012) which has increasing the number of exporters among SMEs by 50% as one of its priorities.

This strategy puts emphasis on exports to territories outside Europe, which means that SMEs will eventually be forced to compete globally. So far, their share on total Czech exports in 2010 was 51.3%, amounting to 1.29 billion CZK.

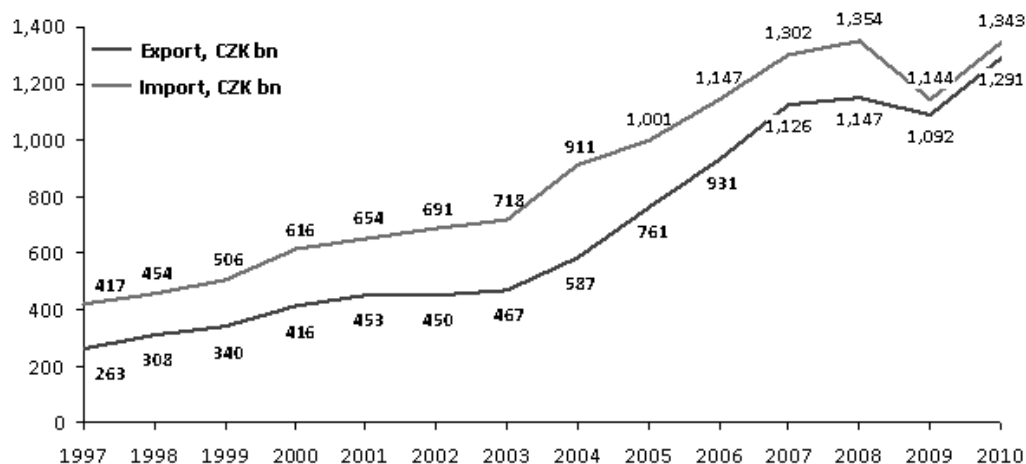


Fig. 3 – Czech SMEs in international trade. Source: CZSO (2011)

This number is steadily growing since 1997 (Figure 3). The number has more than doubled between 2004 and 2001. The gap between exports and imports has been shrinking over time, from almost 35% to little above 4%. This is a clear sign that Czech SMEs are able to withstand competition on the foreign markets.

### **3 SMEs INNOVATION: QUESTIONNAIRE SURVEY APPROACH**

In order to identify the determinants of innovations in Czech SMEs, we collected 1144 online questionnaires and obtained detailed firm-level data on firms' characteristics and innovations. Our complex dataset contains a wide range of indicators covering both SMEs' internal and external characteristics, such as a number of employees, structure of ownership, sources of innovations or their barriers, number of competitors, size of operated market and influence of the firm's environment on its actions. The outcomes thus bear valuable information about specific factors that may ultimately lead to innovations. Thanks to the extent of the dataset the right factors influencing innovative activities of firms can be identified and further evaluated in an econometric model.

The aim of our survey was to obtain as much reliable information from SMEs as possible. Two crucial problems emerge when trying to collect such data in reality. The first one is the difficulty to find someone who would be willing to provide such specific data; in case he actually had them. The second problem builds on the first one: even if a firm was willing to provide the data, it could be extremely difficult to extract them in sufficient quality, because no firm has a reason to spent resources on tracking specific aspects of innovations. This is especially true for SMEs, and so the questionnaire was designed to ask simple questions that can be answered quickly and without any research in firm's books.

Searching for contacts to firms was the first step towards having a sufficient amount of potential respondents of our online survey. The Magnus Web database (Čekia, 2011) was used to gain email addresses to approximately 49 thousand firms in employee categories from without employees to 200-249 employees.

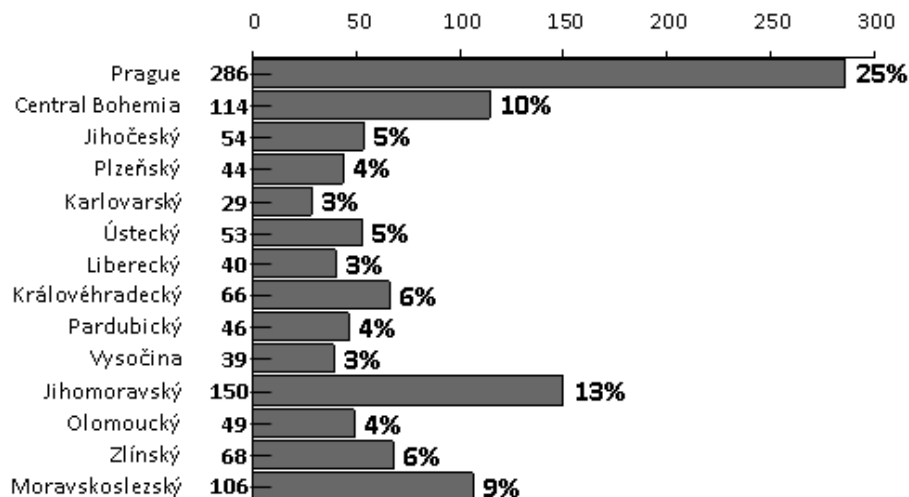


Fig. 4 – Geographical spread of the surveyed enterprises. Source: Own results

The survey consisted of 21 questions and was designed with the help of a specialized online survey server. The questions in the survey were short and ready to be filled with just one click, making the answering process relatively easy and fast. The average time spent with answering our questions was around 11 minutes. Figure 4 shows the geographical distribution of the surveyed enterprises. Although the majority of them originated from Prague (25%), the rest were evenly distributed around the country. Figure 5 reports the main areas of business of surveyed enterprises. The majority (20%) operated in manufacturing. This was followed by 17% and 16% of enterprises operating in construction and wholesale and trade respectively.

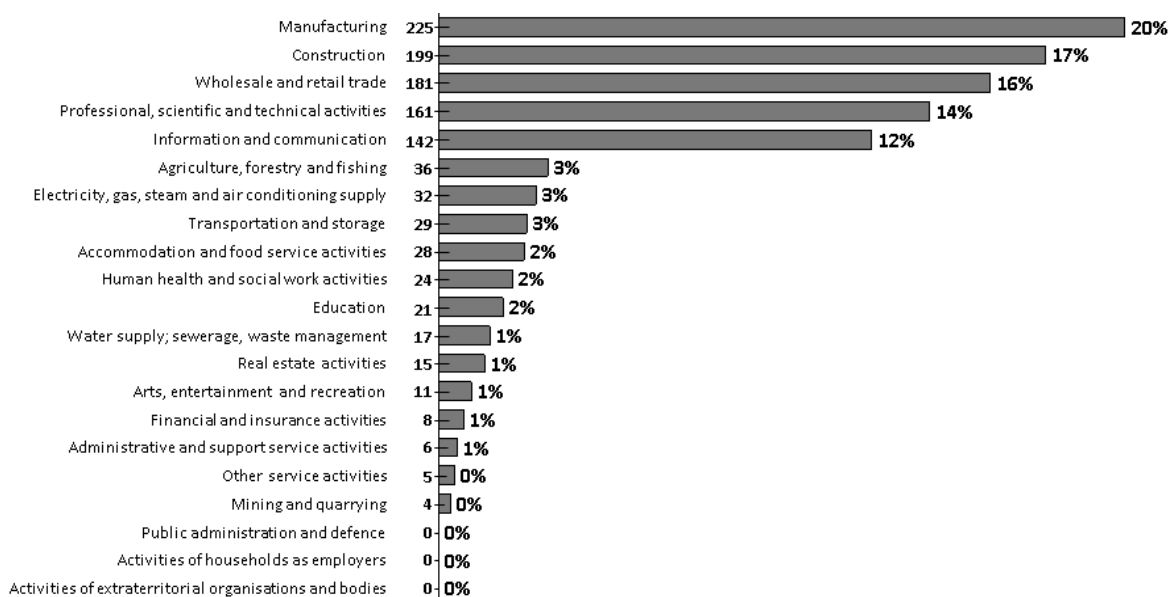


Fig. 5 – Main business activity of the surveyed enterprises. Source: Own results

The majority of firms in the sample (48%) had less than 9 employees, 3% had in between 100 and 199 employees and 1% had between 200 and 299 employees. Figure 6 reports the turnovers in surveyed enterprises in the three consecutive years (2009-2011).

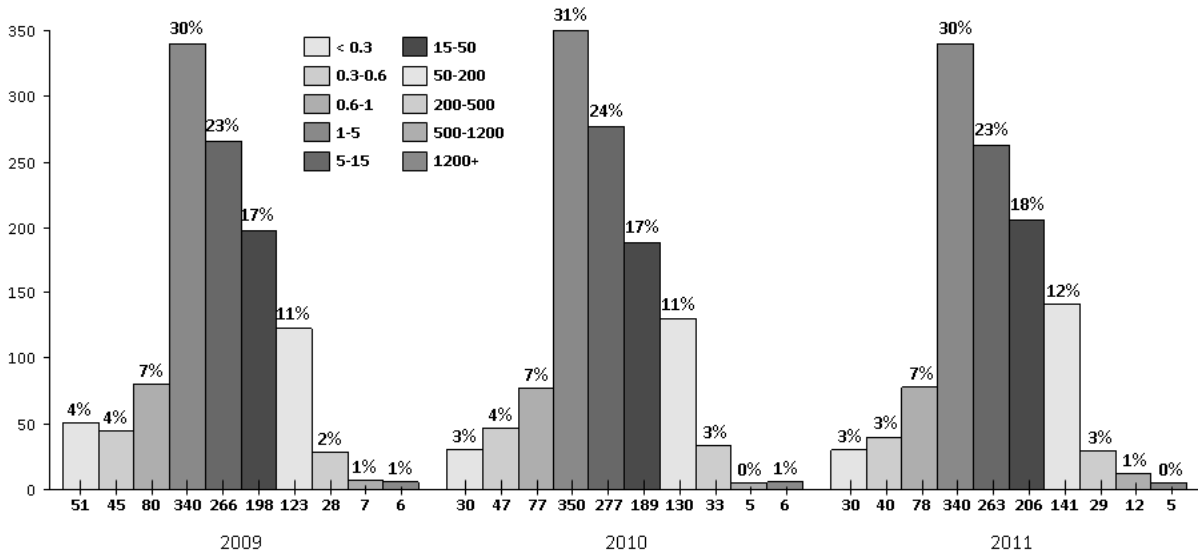


Fig. 6 – Turnover of the surveyed enterprises. Source: Own results

Figure 7 depicts the dynamics of distribution of sales for surveyed enterprises in our sample with respect to local, national, EU and world markets in the three consecutive years. This information is of a special interest, since it reflects the link between innovations and sales spread.

Figure 8 reports licenses, patents or awards. Other answers included plenty of specific certificates, prizes, trademarks or industrial patterns. A few firms are in preparation phase for ISO certificate.

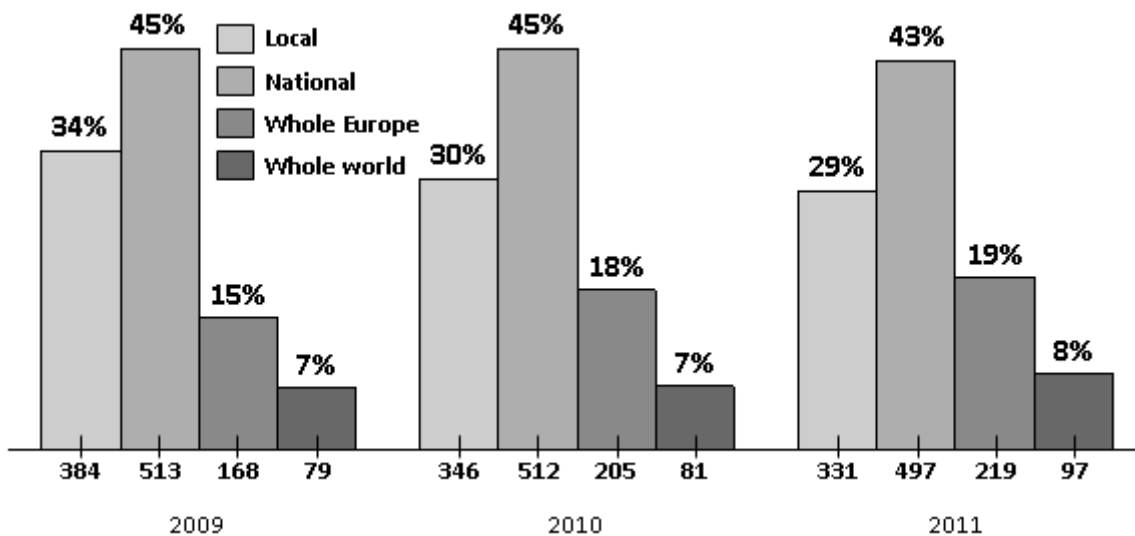


Fig. 7 – Distribution of sales of the surveyed enterprises. Source: Own results

Some firms expressed their mixed or negative experience with ISO certificates. This may be caused by the fact that obtaining a certificate can be a bureaucratic burden for a small firm or that it is of no use for the entrepreneur. Only a small number of firms belong to a cluster and 13% of them do not know whether they belong to such a structure.

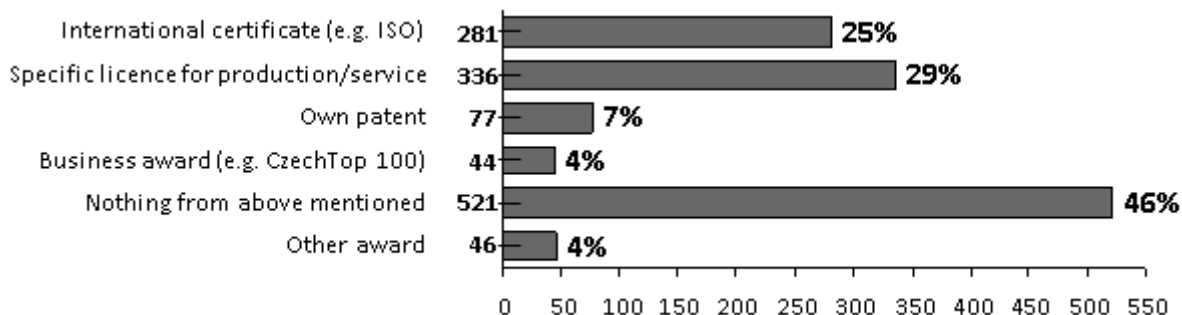


Fig. 8 – Certificates, patents and licenses of the surveyed enterprises. Source: Own results

The majority of firms compete in price (for the majority of firms (44%), there are between 5 and 25 main competitors in their area of business) (Figure 9).

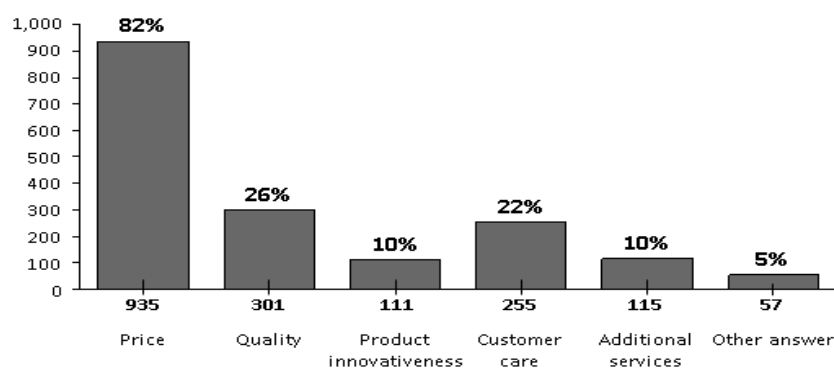


Fig. 9 – Main areas of competition of the surveyed enterprises. Source: Own results

Many firms noted that there was often unreasonable pressure on price at the expense of quality. Proportion of firms competing in quality and product innovativeness also confirms that finding. However, competition in prices pushes margins down and inhibits so much needed investment into development of new and better products or services.

#### 4 EMPIRICAL MODEL AND ITS PROVISIONS

The aim of this model is to identify determinants of innovations in SMEs. After thorough evaluation of the theory behind innovations, intensive collection of a large amount of data and careful finalization of the dataset, we will now proceed to description of the model and later to its estimation. The linear econometric model used in our paper is a multivariate statistical model of the form:

$$Y = \beta_0 + \beta_1 X_1 + \dots + \beta_n X_k + \varepsilon_i \quad (1)$$

where Y is the dependent variable defined as the enterprise profit per employee in 2004,  $X_1, \dots, X_k$  are the explanatory variables and  $\varepsilon$  is the error term.



The results of our estimations are conditional on a set of specification and diagnostic tests. First, heteroscedasticity test was run and heteroscedasticity was detected. Therefore, robust standard errors were used.

Number of innovations according to categories was selected naturally as an explained variable. Dependent variables for the final model have been carefully chosen during the process of crafting a solid model reliably identifying the key determinants of innovations. Just eight observations had to be taken out of the model, because they did not contain information on number of innovations the firm has achieved.

Overall, four models (innovation model, ownership model and impact factor model with robust standard errors and barriers model using OLS) were estimated using Gretl statistical software. They used 1136 observations, consisting of seventeen variables, three of which were categories and the rest binary variables. Table 2 reports the results of all four models in question.

It appears from our analysis that enterprises classified as small or medium ones tend to be more innovative than micro enterprises. This can be explained by their relative abundance of financial and human resources. Some of them can be specifically devoted to developing new products or service, while micro enterprises (often represented by sole traders) do not have this option.

Moreover, it becomes apparent that larger target markets induce more innovations. This relationship could be also viewed from the other direction, namely that innovation causes the firm to expand territorially. These two links cannot be simply separated because they occur simultaneously. Innovations enable the firm to compete internationally and at the same time international market puts more pressure on innovativeness of the offered good.

Quite surprisingly, in the case of Czech SMEs, licenses did not come through as significant determinant of innovation. This might be explained by their diversity and real impact on firms. This finding supports the argument that patents may not be a good representation of innovations which was discussed in section 3. On the other hand, belonging to the cluster plays a positive role (which is in accord to similar findings from other countries – see e.g. Van Zyl & Mathur-Helm, 2007; Navickas & Malakauskaite, 2010; Hovelja et al., 2010; Stephens & Onofrei, 2012; or Conway, 2012). Small firms in the clusters dominated over those that were not aware of the advantages that clusters provide, especially in terms of synergy.

Our findings show that increasing age of equipment is negatively related to innovations. This is quite understandable, as far as the newer equipment allows more innovative usage and implementation. On the contrary, competition had a positive effect (especially higher competition categories). It might be that more competitive environment forces firms to innovate more. However, a top innovative firm with a unique business proposition can have very few competitors. There are also firms that specialize on serving the public sector and if selected in often dubious public procurements, these firms no longer have motivation for improvements in the absence of any competitors (see e.g. Alexandrova, 2012).

A number of investing activities of firms show significant impact on innovations. Investments into technologies and quality show a strong impact, also when compared to other variables. Although investment is just a precondition to a potential discovery and its successful realization, it is a necessary step towards achieving innovation. Unfortunately, our survey revealed that many firms could not afford to invest because their main concern was survival on the market. This creates a vicious circle because without investment innovations have a harder way to come and nobody can expect high profits for mediocre goods or services.

By far and large, the greatest determinant of innovations is own R&D which was indicated as a main source of innovations by 31% of firms. Although own R&D facilities may be a costly investment, it is definitely worth to have it. It is important to emphasize that not only medium firms exploit its benefits. About 30% of micro and small enterprises engage in this activity, followed by 41% of medium enterprises. Customers also represent an important source of innovations. This stems from the fact that they may come to the firm with new and more difficult requests and thus motivate it to higher originality.

Barriers to innovation did not prove to constitute a real obstacle for innovations to a large extent, although two actual barriers emerged nevertheless. Market barriers, e.g. competition or insufficient demand, and cooperation with scientific institutions thus had a negative effect on those firms who encounter them.

Tab. 2: - Results for model estimations. Source: Own results

	Innovation model	Barriers model	Ownership model	Impact factors model
	RSE	OLS	RSE	RSE
Small enterprise	0.1659*** (0.0596)	0.1523** (0.061)	0.1598 *** (0.0596)	0.1673*** (0.0599)
Medium enterprise	0.237** (0.1013)	0.230** (0.1023)	0.2459** (0.1012)	0.2443** (0.1029)
Turnover in 2011	0.0873*** (0.0311)	0.0838*** (0.0306)	0.0922*** (0.032)	0.08903*** (0.0312)
Cluster	0.2103* (0.1113)	0.2056* (0.1115)	0.2085* (0.1127)	0.208* (0.1115)
Equipment age	-0.0583** (0.0282)	-0.0597** (0.0284)	-0.0585** (0.0285)	-0.0613** (0.0285)
Competitors	0.0417** (0.017)	0.0380** (0.0173)	0.043** (0.0172)	0.0412** (0.0171)
New technologies	0.195795*** (0.0511415)	0.2003*** (0.0519)	0.1936*** (0.051)	0.198*** (0.052)
Diversification	0.1707** (0.0711)	0.1706** (0.0715)	0.1745** (0.0726)	0.1746** (0.071)
Quality	0.2247*** (0.0484)	0.2201*** (0.0490)	0.2211*** (0.0487)	0.2211*** (0.0487)
Marketing	0.1864*** (0.0626)	0.1866*** (0.0626)	0.1925*** (0.0620)	0.1857*** (0.0626)
Education	0.1195** (0.0544)	0.1154** (0.0557)	0.1206** (0.0543)	0.1202** (0.0557)
Optimization	0.1868*** (0.0562)	0.1877*** (0.0559)	0.1918*** (0.056)	0.1875*** (0.0566)
Customers	0.1689*** (0.04912)	0.1725*** (0.0492)	0.1632*** (0.0491)	0.1672*** (0.049)
Own R&D	0.420*** (0.0592)	0.4126*** (0.0599)	0.4211*** (0.0596)	0.420*** (0.0598)
Market barriers	-0.1064**	-0.1001**	-0.1007**	-0.103**

	(0.0471)	(0.0481)	(0.0471)	(0.047)
Scientific cooperation	-0.1402**	-0.150010*	-0.1529**	-0.1464**
	(0.0692)	(0.0779)	(0.071)	(0.0703)
Limited company	0.1474*	0.1441	0.1538*	0.1377
	(0.0891)	(0.090)	(0.0909)	(0.0904)
Constant	1.47266***	1.4918***	1.435***	1.48087***
	(0.1592)	(0.1570)	(0.1629)	(0.1634)
Observations	1136			
R-squared	0.47	0.46	0.46	0.45

The legal form of the enterprise is also a factor crucial for innovations, as far as limited companies tend to innovate more than the other legal forms. This finding generally means that the limited company is the right form of enterprise for Czech SMEs nowadays.

## 5 CONCLUSIONS

Our paper provides an overview of factors that influence the innovation in Czech small and medium enterprises in the times of economic crisis. Results based on our empirical analysis tend to be valid for reasonable understanding of firms on a sectoral or regional level. However, when it comes to the micro level of individual firms, it turns out that every case is unique and no common inference can be easily drawn.

Speaking about the limitations of our research, one can mention that that our model was constructed in order to reveal important factors that have a solid impact on innovations in SMEs. Most of the factors can be influenced by the firm itself, it is therefore desirable for the firm to focus on them. At the first sight, some of them may look unsuitable for a particular firm, probably because the terms are used mainly in different context, i.e. R&D for non-technical firms providing services. It is important for every firm to translate these variables into its own language and find ways how to exploit the available opportunities. What can mean a new factory for one firm, can be a better software for another. Investments of different kinds have proven to work and deliver innovations. Firms should always find ways how to invest, even if it will not be large sums of capital. Even optimization of processes within the firm will be a good step forwards. Firms should not put too much weight on barriers or external environment as these have not emerged as real inhibitors to innovations.

It becomes apparent that the Czech government should focus on specific aspects of support for SMEs in the areas, where its guiding hand is really needed. In the Czech context, it might be the support of investment activities of SMEs, education of employees, expansions of Czech exports to the new markets and intensive support of R&D in firms that are the right subjects for that. Those firms have the potential to bring fruits in the future in the forms of productive innovations. General governmental support should create a progressive environment which would enable micro enterprises to grow faster to become small and medium enterprises that tend to be more innovative.

### Acknowledgement

*This paper was partially supported by the Ministry of Education and Science of the Russian Federation, research project No. 26.1795.2014/K*

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**DEPRECIATION INFLUENCE OF FIXED ASSETS  
ON ACCOUNTING RESULT AND CORPORATE INCOME TAX BASE  
PURSUANT ACCOUNTING AND TAX LEGISLATION  
IN THE SLOVAK REPUBLIC**

*Alexandra Ferenczi Vaňová, Renáta Krajčirová, Ivana Váryová, Iveta  
Košovská*

**Abstract**

Fixed assets represent the essential item of assets. Their higher level of wear and tear emphasized the need for asset renewal. The level of wear and tear of fixed assets is expressed by depreciation depending on the accounting measurement of assets, its predicted useful life and the application of depreciation method. Depreciation is not a part of sources of assets recovery from the accounting point of view. Accumulated depreciation is created by means of assets depreciation. It makes the asset measurement more realistic. Depreciation charges arisen from depreciation influence accounting profit or loss. Accounting depreciation is relevant for the compilation of cost calculation and therefore is a part of output measurement. Depreciation is considered as a source of internal asset financing, but generally is not sufficient for its entire renewal. The restricted possibility of investment renewal prolongs the use of depreciated assets which is reflected by costs of repairs and maintenance. The scope for the calculation of corporate income tax base presents disclosed accounting result before taxes which is adjusted by items increasing or decreasing corporate income tax base out of the accounting books. Applied tax depreciations of fixed assets are considered as tax costs.

*Keywords: fixed assets, accounting depreciation charges, tax depreciation charges, depreciation method, accounting result, corporate income tax base*

JEL Classification: K34 Tax Law, M21 Business Economics, M41 Accounting

## **1 INTRODUCTION**

Fixed assets are depreciated in the reproduction process of an accounting entity. Cash expression of assets wear and tear represents depreciation while assets are depreciated from two points of view, state Bojňanský et al. (2013). From the accounting point of view assets are depreciated as regards their wear and tear pursuant current conditions of assets usage. Accounting depreciation represents costs influencing accounting result but not influencing the corporate income tax base. From the tax point of view assets are depreciated pursuant the Act No. 595/2003 Coll. on Income Tax as amended (hereinafter "Income Tax Act"). Tax depreciations are costs influencing the tax base for corporate income tax purposes.

Strouhal et al. (2013) understand depreciation as estimated amount (expressed at cost), which should the most accurately expressed valued allocation of revenues, which depreciated asset brings to the company – it is resulted that prime focus is not to be calculation of material and external depreciation of assets. By calculation of depreciation charges mean correction of valuated assets in connection with its usage, as the balance sheet precisely expressed financial situation of the company.

If an accounting entity finds out that accounting principles and methods used in the accounting period are not compatible with the requirement of true and fair view, it is obliged to prepare financial statements providing true and fair view of facts, emphasizes Farkaš (2006).

Pakšiová (2014) states that the correct amount of depreciation shall enable a subsequent reproduction of assets after useful life termination what shall secure production ability to the future. Thus she understands as well the preservation of assets nature in company; even she does not use such a word expression.

Depreciation charges represent allocation of initiated acquired expense to the period when the asset should according to the expectation bring benefit. Dvořáková (2012) states that the accounting unit is obliged to prepare depreciation plan which belongs to the internal rules of the company and states ruling for depreciation of tangible assets. The expected period of life of assets should be determined for the particular group of assets that can be related either to the time (time depreciation), or to the performance (performance plan).

By the end of 19<sup>th</sup> and subsequent 20<sup>th</sup> century various methods of depreciation of fixed assets (straight-line, arithmetical or geometric series of progressive, regressive, production methods) have been created and have been stabilized. Accounting forms, accounting of transition items provides accounting transactions to be correctly accrued and to calculate accounting result more precisely (Pakšiová, 2012).

From the accounting point of view no depreciation method of assets is set. Determination of depreciation period is exclusively set on the entity's decision. The shortest period shall not be the most advantageous. It is essential to select depreciation method which should be based on the business plan of an entrepreneur. An entrepreneur should be able to state his case before tax administrator. According to Koleček (2015) it is necessary to consider using alternative solution for including certain types of costs when determining acquisition costs.

Stárová et al. (2014) pointed out that fixed assets are used over a long period of time, and therefore their value is presented in more annual financial statements. Determining the value of tangible fixed assets at the end of every reporting period is thus an important part of book closing in every company. The decision to adjust the value of assets as at the reporting date affects the balance sheet total and also the amount of profit or loss. As at each reporting date, a depreciation plan drawn up for depreciable assets beforehand is to be revised so that an adequate amount of depreciation could be entered into the accounts. In addition, any impairment of assets shall be assessed (beyond regular depreciation).

The aim of accounting depreciation charges is real valuation of tangible assets and provision of major information on costs of accounting unit. Accounting depreciation charges are determined based on the decision of accounting unit. The accounting depreciation charges should be regulated by internal rules of the company. Šteker and Otrusínová (2013) state that tax depreciation charges are determined in accordance with the Income Tax Act and are used only for preparation of corporate income tax return.

Vančurová and Láčková (2014) pointed out that the income tax base can accept the accounting depreciation charges however is up to the taxpayer that accounting depreciation charges represent all aspects of true accounting result. Such practice is for the taxpayer difficult and moreover it does not create same conditions for all taxpayers. The second margin solution is to comply of expenses on acquisition of such assets in the tax base for corporate purposes, so total disconnection by accounting result. Even if exist different method, the most often solution is to specify more or less strict and unified rules for tax depreciation and subsequent correction of accounting result by the difference between accounting and tax depreciation charges.



## 2 METHODOLOGY

The legal arrangements of accounting in the Slovak Republic (hereinafter “SR”) enact accounting records to secure a content of selected provisions of the Income Tax Act in the content and subject of accounting with the interest in costs influencing corporate income tax base of entrepreneurs. The aim of the paper is to present, according to the current law in the SR, a theoretical view on the accounting and tax depreciation of fixed assets before the amendment of tax legislation till 31 December 2014 and after the amendment since 1 January 2015 is presented. The comparison of accounting and tax depreciation calculation and their influence on accounting result and tax base for corporate income tax purposes is assessed on a particular type of fixed assets.

Standard methods of scientific work as the method of selection, analysis and the comparison of selected provisions of the Act No. 431/2002 Coll. on Accounting as amended including related law and the Income Tax Act effective in SR focusing on tax deductible and non-deductible costs influencing corporate income tax base have been used in the topic processing. The mentioned methods present a basic methodical manner of article processing.

Depreciation calculation is compiled in accordance with the following formulas deriving from effective accounting and tax legislation in SR:

Time method of accounting depreciation:

$$\text{Annual depreciation} = \frac{\text{acquisition costs}}{\text{depreciation period}} \quad (1)$$

Straight line method of tax depreciation:

$$\text{Annual depreciation} = \frac{\text{acquisition costs}}{\text{depreciation period}} \quad (2)$$

Accelerated method of tax depreciation:

$$\text{Annual depreciation in the 1st year} = \frac{\text{acquisition costs}}{\text{coefficient for accelerated depreciation in the first year}} \quad (3)$$

$$\text{Annual depreciation in the next years} = \frac{2 \times \text{net book value}}{k - n} \quad (4)$$

where:

*k* – the coefficient for accelerated depreciation in the next years of depreciation

*n* – the number of years for which the assets has been depreciated

## 3 RESULTS AND DISCUSSION

### 3.1 Determination of fixed assets depreciation pursuant accounting and tax aspect

Pursuant legal regulations it is mandatory for all entrepreneurs keeping current accounting and subsequently in the disclosure of financial statements to provide true and fair view on facts which are the subject of accounting. Information on costs, revenues and achieved accounting profit or loss provides the view on income situation of entrepreneurs. Business activity is conditioned by the required amount and structure of assets where evidentially fixed assets are dominated.

Substantial part of fixed assets is created by property, plant and equipment which is in accordance with the Income Tax Act specified by:

- individual technical and economic determination,
- prescribed acquisition costs higher than 1 700 EUR,
- useful life longer than one year.

According to the production classification, property, plant and equipment are considered as machines and devices, vehicles, furniture.

Depreciation of fixed assets belongs to the major subjects of accounting for entrepreneurs. Depreciation of fixed assets shall be applied to the extent and under the conditions prescribed by accounting and tax legal arrangements in the SR. An entrepreneur often incorrectly identifies accounting and tax depreciation costs (charges) and therefore conditions of assets usage are not taken into account. Accounting and tax depreciations charges derive from the measurement of assets in accounting.

An entrepreneur is allowed to decide in an internal directive for accounting whether property, plant and equipment with acquisition costs lower or equal to the amount set in the Income Tax Act will be considered as fixed assets. In case the assets are not included in fixed assets, therefore are not used longer than one year, they are recorded as inventories.

The amendments of the Income Tax Act since 1 January 2015 related to the depreciation of fixed assets constitute the increasing number of depreciation groups from original four depreciation groups to six depreciation groups. The amendment deals with the creation of the third depreciation group with the depreciation period 8 years, mainly consisting of production technologies according to the production classification. Before above mentioned amendment shall support investments to this asset item for the purpose of renewal and modernization of production processes. The newly created depreciation group is the sixth with the depreciation period 40 years, consisting of buildings and constructions of non-production character, flats, hotels, accommodation, administration, cultural, educational facilities and others in accordance with the production classification. The amendment is to be realized for the purpose of making the useful life of this asset item more realistic.

Straight line method of depreciation might be applied for fixed assets for tax purposes, except for assets included in the second and third depreciation groups, where an entrepreneur is allowed to select accelerated depreciation method, depending on the advantageous influence of depreciation on the corporate income tax base. The amendment is focused on making selected types of fixed assets of technological character advantageous in comparison with other non-production technologies. The amendments shall be applied for already depreciated assets.

From accounting and as well tax point of view in the first year of asset depreciation it is allowed to apply only proportion of annual depreciation depending on the number of months from putting into use till the end of taxable period. In the next years of depreciation the calculated annual depreciation is applied fully.

### **3.2 Depreciation of fixed assets pursuant the accounting legislation**

Fixed assets are depreciated indirectly by means of accounting depreciation. Currently effective legal arrangements in SR allow facultative approach to depreciation methods from the accounting point of view. The plans of accounting depreciation are compiled when fixed assets are put into use. During the useful life of depreciated assets the accounting depreciation presents the real wear and tear which is brought to the value of outputs by means of costs from economic activity. Depreciation costs cause a decrease in accounting profit or loss.

Depreciation plan presents an accounting record related to real physical and moral wear and tear of particular asset, intensity of usage and total useful life. According to changing conditions depreciation plan is reassessed and pursuant accounting regulations the selected method of depreciation might be changed in one accounting period but in the immediately subsequent period if it requires fair presentation of the accounting subject. The meaning of that is based on the obligation to express real wear and tear of assets corresponding to the normal conditions of use. Depreciation plan as an accounting record shall be archived for five years following the year to which it relates.

The calculation procedure of accounting depreciation of fixed assets is based on the example when an entrepreneur acquired and put into use a truck at acquisition costs of EUR 29 900 in July 2013. Table 1 documents the calculation of accounting depreciation of the truck using the time method of depreciation with expected useful life of the asset four years.

Tab. 1 – Plan of accounting depreciation charges (in EUR). Source: own calculations

Depreciation period in years	Accounting depreciation	Accumulated depreciation	Tax net book value
2013	3 738	3 738	26 162
2014	7 475	11 213	18 687
2015	7 475	18 688	11 212
2016	7 475	26 163	3 737
2017	3 737	29 900	0

Net book value is determined as a difference of acquisition costs of a truck and accumulated depreciation of a fixed asset. The asset is depreciated till its amount of measurement in accounting.

### **3.3 Tax depreciation of fixed assets before the amendment of the Income Tax Act till 31 December 2014**

From the tax point of view depreciation presents maximal possible burden of an entrepreneur regardless real wear and tear of an asset. Pursuant the Income Tax Act and for the purposes of calculation of corporate income tax base, tax depreciation of fixed assets is performed while tax depreciation is allowed to be applied in tax charges only if a depreciated asset is used for securing of taxable income and an entrepreneur records an asset in his accounting books. Tax depreciation presents allowed impact on corporate income tax base and is not recorded in accounting books.

The classification of a particular type of fixed assets to suitable depreciation group is performed in accordance with Appendix No. 1 of the Income Tax Act. The set of movable assets is classified to depreciation group according to its main functional unit which must be determined by an entrepreneur. Fixed assets which cannot be classified to depreciation groups according to the mentioned appendix are generally classified to the second depreciation group. Fixed assets are depreciated by the straight line or accelerated method of tax depreciation. Tax depreciation method shall not be changed during the whole depreciation period, i. e. since putting into use till its disposal.

Table 2 determines the calculation procedure of tax depreciation of a truck acquired and put into use at acquisition costs 29 900 EUR in July 2013 using the accelerated method of depreciation pursuant the Income Tax Act effective till 31 December 2014. According to the production classification a truck is classified to the first depreciation group with the depreciation period 4 years.

Coefficients are assigned to depreciation groups for accelerated method of fixed assets depreciation prescribed by the Income Tax Act. In the first year of fixed assets depreciation only proportion of annual depreciation is applied depending on the number of months from putting into use till the end of a taxable period. In the second year of depreciation net book value for calculation purposes is determined as a difference between acquisition costs of assets and calculated annual tax depreciation in the first year of depreciation unshortened to unclaimed proportion of depreciation. In the next year net book value is set as a difference of net book value determined in the first year of depreciation and calculated depreciations beginning the second year of depreciation. Depreciation period is prolonged because the proportion of unclaimed calculated annual depreciation in the first year is applied until the year following the expiration of the depreciation period.

Tab. 2 – Plan of accelerated tax depreciation charges (in EUR). Source: own calculations

Depreciation period in years	Tax depreciation	Accumulated depreciation	Tax net book value
2013	3 738	3 738	22 424
2014	11 212	14 950	11 212
2015	7 475	22 425	3 737
2016	3 737	26 162	0
2017	3 738	29 900	x

Deriving from the example of truck depreciation from the accounting and tax point of view there arise differences which are determined in Table 3. Pursuant the Income Tax Act depreciations are tax deductible expenses (costs) for achieving, securing and maintaining of income (revenues) from business with the influence on income tax base. Accounting costs from depreciation of a truck are recognized in the amount of tax depreciation in year 2013 and 2015. This means that the tax base is affected only by the differences between the accounting and tax depreciation charges of fixed assets.

Tab. 3 – Differences between accounting and tax depreciation charges (in EUR).

Source: own calculations

Depreciation period in years	Accounting depreciation	Tax depreciation	Accounting depreciation – tax depreciation
2013	3 738	3 738	0
2014	7 475	11 212	- 3 737
2015	7 475	7 475	0
2016	7 475	3 737	+ 3 738
2017	3 737	3 738	- 1

In double entry accounting of entrepreneurs accounting depreciation influence profit or loss by means of costs (Table 4). Costs in the form of accounting depreciation from unused assets not participating in the creation of revenues from economic activity, negatively impact on real calculation of an accounting result. Legal regulations of entrepreneur's accounting in SR prescribe the determination manner of accounting profit or loss before corporate income tax which presents a base for income tax base determination.

Transformation of accounting profit or loss to income tax base is effected by difference between accounting and tax depreciation charges. Difference between higher accounting depreciation than tax depreciation charges in year 2016 (Table 4) which is not considered as tax deductible, is added to profit or loss before taxes. On the other side a difference between lower accounting depreciation than tax depreciation charges in year 2014 and 2017 is

deducted. The following cost adjustments are performed in order to calculate correctly income tax base and subsequently to calculate income tax which reduces profit or loss before taxes. In year 2013 for the calculation of corporate income tax the tax rate was used in the amount 23 %. In years 2014 and 2015 the tax rate of corporate income tax was decreased to 22 % due to the introduction of tax licences. In the following years 2016 and 2017 the currently valid corporate income tax rate of corporate income tax is presupposed to remain the same when calculating a tax liability.

Tab. 4 – Transformation of accounting result into corporate income tax base (in EUR).

Source: own calculations

Year	Revenues	Costs (accounting depreciation)	Profit before taxes	Accounting depreciation – tax depreciation	Income tax base	Income tax	Net income
2013	192 000	3 738	188 262	0	188 262	43 300,26	144 961,74
2014	192 000	7 475	184 525	- 3 737	180 788	39 773,36	144 751,64
2015	192 000	7 475	184 525	0	184 525	40 595,50	143 929,50
2016	192 000	7 475	184 525	+ 3 738	188 263	41 417,86	143 107,14
2017	192 000	3 737	188 263	- 1	188 262	41 417,64	146 845,36

Legal arrangements of entity's accounting in SR prescribe that accounting records shall secure also the content of effective tax legislation. It presents an obligation which shall take into account the classification pursuant requirements for tax base calculation when creating analytical accounts to synthetic accounts. For costs which are deductible only in law prescribed amount, it is evitable to create analytical accounts to the appropriate synthetic accounts. In the process of their creation it is essential to take into account accounting and tax point of view, i. e. tax deductibility or tax non-deductibility.

### **3.4 Tax depreciation of fixed assets after the amendment of the Income Tax Act since 1 January 2015**

For the comparison Table 5 documents the calculation of tax depreciation of a truck pursuant the Act No. 333/2014 Coll. which amended the Income Tax Act effective since 1 January 2015. An entrepreneur commenced depreciating a mentioned asset type after its putting into use in year 2013 by accelerated method of depreciation. As regards the amendment of legal regulation of fixed assets tax depreciation, the asset classified to the first depreciation group might be depreciated only by the straight line method in years 2015 and 2016. According to transitional provisions of the Income Tax Act the applied tax depreciation of a truck are not adjusted retrospectively in years 2013 and 2014.

When the straight line method of depreciation is applied, in years 2015 and 2016 the annual depreciation is determined as a ratio of acquisition costs of fixed assets and depreciation period appropriate for a particular depreciation group pursuant the Income Tax Act. Net book value is determined as a difference of acquisition costs and accumulated depreciation. Annual depreciations attributable to the depreciation period are calculated up to the amount of assets acquisition costs.

Tab. 5 – Plan of tax depreciation charges (in EUR). Source: own calculations

Depreciation period in years	Tax depreciation	Accumulated depreciation	Tax net book value
2013	3 738	3 738	22 424
2014	11 212	14 950	11 212
2015	7 475	22 425	7 475
2016	7 475	29 900	0

Accounting depreciation influence accounting result determined in the accounting books. Tax base for income tax purposes is affected by tax depreciation charges and therefore by incurred differences between accounting and tax depreciation charges from fixed assets. In year 2014 a difference between applied lower accounting depreciation and higher tax depreciation charges (Table 6) presents an item reducing tax base. On the other side a tax non-deductible item to profit or loss before taxes is only accounting depreciation of a truck in year 2017.

Tab. 6 – Differences between accounting and tax depreciation charges (in EUR).

Source: own calculations

Depreciation period in years	Accounting depreciation	Tax depreciation	Accounting depreciation – tax depreciation
2013	3 738	3 738	0
2014	7 475	11 212	- 3 737
2015	7 475	7 475	0
2016	7 475	7 475	0
2017	3 737	x	+ 3 737

Accounting profit or loss before taxes is adjusted to income tax base by means of deductible and non-deductible items. Difference between accounting and tax depreciation charges which in year 2017 presents non-deductible item to income tax base, reduces net income (Table 7) and vice versa.

Tab. 7 – Transformations of profit or loss to corporate income tax base (in EUR).

Source: own calculations

Year	Revenues	Costs (accounting depreciation)	Profit before taxes	Accounting depreciation – tax depreciation	Income tax base	Income tax	Net income
2013	192 000	3 738	188 262	0	188 262	43 300,26	144 961,74
2014	192 000	7 475	184 525	- 3 737	180 788	39 773,36	144 751,64
2015	192 000	7 475	184 525	0	184 525	40 595,50	143 929,50
2016	192 000	7 475	184 525	0	184 525	40 595,50	143 929,50
2017	192 000	3 737	188 263	+ 3 737	192 000	42 240,00	146 023,00

At the microeconomic level, the optimization of the tax burden means achieving a minimum amount of tax liabilities of entrepreneurs. In order to assess this problem there are no indicators in contrast to the macroeconomic level. Tax optimization relates mainly to corporate income tax and is usually solved by the analysis of the accounting profit or loss transformation to the corporate income tax base. For entrepreneurs it presents an alternative to increase their net income and thus their own financial resources needed for investment.

## 4 CONCLUSION

Entrepreneurs demonstrate all facts for tax purposes by means of accounting records. The subject and content of accounting influence taxation of entrepreneur's income since it presents the data for determination of tax base for corporate income tax purposes and subsequently corporate income tax liability.

Last amendments in fixed assets tax depreciation deal with the classification of assets to depreciation groups and its associated changes in depreciation periods. The possibility of accelerated depreciation method has been restricted to selected depreciation groups.

Pursuant the Income Tax Act tax depreciation of fixed assets calculated by the mentioned Act presents tax charges (expenses). On the other side accounting depreciation should reflect the real status of assets. Therefore, the differences between accounting and tax depreciation charges occur increase or decrease an accounting profit or loss in the process of transformation to corporate income tax base. These adjustments are performed out of accounting books.

By means of tax deductible costs (expenses) in the form of fixed assets tax depreciation it is possible to decrease corporate income tax base and as well annual corporate income tax liability. When the straight line method of depreciation is applied, depreciations present tax deductible costs in the same amount during individual years of depreciation, except for the year when an asset was put in use. When the accelerated depreciation method is applied, tax deductible costs of depreciation are higher at the beginning of depreciation while in the next years their amount is gradually decreasing. When in the first years there are higher tax depreciations than accounting depreciations, it is possible to decrease income tax base and subsequently corporate income tax in a bigger extent. By the correct application of fixed assets depreciation methods, it is feasible to partially optimize the tax base. After the amendment of tax legal regulation of assets depreciation the before mentioned statement is possible only in case when assets are classified in the second or third depreciation group. The entrepreneur's decision on assets depreciation method should be influenced by the development of profit or loss in the consequent years. As regards the amendments of legal regulations of fixed assets tax depreciation in SR, namely restricted possibility of accelerated depreciation, in our view that the tax depreciation ceases to be a tool for optimizing the tax base for corporate income tax purposes.

Accounting records secure the verifiability of the Income Tax Act provisions in the subject and content of accounting and as well by creating of analytical accounts to synthetic accounts according to selected criteria. Requirements for analytical evidence deal with the providing of accounting data to all management levels as well as external users.

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## **SOVEREIGN WEALTH FUNDS: WEALTH, ASSETS AND RESERVES**

*Antonia Ficova, Juraj Sipko*

### **Abstract**

The paper explores impact on businesses and GDP of countries that set up SWFs. First, we found that 99.86 percent of the changes of businesses are being explained by variables of Gross Operating Expense in the country, Shareholders' equity, SWF assets, Balance Sheet-income: total assets, Total reserves (includes gold, current US). Second, we explore impact of Volume of imports of goods and services, Volume of exports of goods and services, SWF assets and GDP growth rate on GDP of 44 countries with SWFs, we found that model is significant at 84.49%. Third, we focus on reserves of 18 observed countries with SWFs, we determined the reliability of proportion of total reserves. Findings indicate positive relationship.

*Keywords: Sovereign Wealth Funds, Wealth, Openness of the Countries, Econometric Analysis*

JEL Classification: C12, F31, G10

## **1 INTRODUCTION**

However, controls to the free movement of goods and capitals have been greatly reduced in many economies, some of them still place restrictions on foreign equity investment and capital flows. In other words, some country that set up Sovereign Wealth Funds (SWF's) to sort of tariff barriers to international trade to protect domestic strategic industries.

Nevertheless, strong growth in outward foreign direct investment (OFDI) from developing countries has become important key of the twenty-first century. This OFDI flows come from state-owned enterprises, SWF's as well as private enterprises operating as multinational companies from a home base or as free-standing companies.

Ad rem, interesting is that Government Pension Fund Global according to NBIM bought a 50 percent stake in seven properties in and around Paris from AXA Group in July 2011. More to the point, Norway's fund's largest equity holdings include: Royal Dutch Shell Plc, Nestlé SA, HSBC Holdings Plc, Novartis AG, Vodafone Group Plc, Apple Inc, Exxon Mobil Corp, Roche Holding AG, BP PLC, GlaxoSmithKline Plc. On the other hand, Abu Dhabi has multiple SWFs with different focuses, exempli gratia 9% stake of Apollo Management, 20% of Ares Management Citigroup and 15% of Gatwick Airport. In short, SWFs have appeared in public since 2007 due to their heavy investments in Western corporations, what have been mentioned supra. Viewed in this light, SWFs show absolutely a remarkable size mainly through these investments have become systemically relevant.

Ergo the question is: How can the size of companies influence the economic growth of a country that set up SWF? In other words, in developed as well as developing countries, we can find different types of industrial companies that the size, number and collaboration of companies can hardly influence the industrial development of the whole country. What is best for a country to have, a small number of huge companies that earn billions or a large number of small to medium companies that interact with each other? Essentially, some countries have pursued the strategy of subsidizing national champion firms to compete in the world economy, that seems to work so long as basic market discipline is enforced in terms of

investment decisions. Moreover, direct SWF Investments include: Mubadala Development Company; U.A.E. made USD 7,000.00 deal in Aluminium in the Sarawak (SCORE) Malaysia. Qatar Investment Authority made USD 2,800.00 deal in Agricultural Bank of China. International Petroleum Investment Company; U.A.E. bought 4.99% stake of UniCredit Spa in Italy. Qatar Investment Authority bought 100% of Harrods in U.K.

It is important to mention following positive facilitators of economic growth of its home territory: First, its innovativeness, that means the creation of intellectual assets (patents, trade secrets, copyrights, licences that can enable the firm to harvest revenues from the rest of the world). Second, tied very closely to the first factor would be its talent management systems. Third, its competitiveness (driven by leadership, innovation, productivity, efficiencies). Fourth, its global footprint or reach: including its networks and last one is its quality standards.

A significant factor which determine growth of SWF's is amount of foreign exchange reserves. Nonetheless, real effective exchange rates in surplus economies like China, Korea, continue to build up their foreign reserves. In this case, when these economies has a stronger exchange rate, combined with structural reforms would raise domestic purchasing power and contain inflation pressure. So the fact is that if prices of commodities will be rise, governments in commodity-exporting countries will be continue accruing foreign assets. For example Singapore's Government Investment Corporation was set up in 1981 to manage the country's foreign exchange reserves. However, in 2013, the 15 participating companies, who are all members of the World Gold Council, spent US 22.5bn in payments to businesses in the countries where their mines are producing gold and a further US 3.8bn in payments to businesses in countries where their projects are yet to produce gold.

Monk (2010) presents that the jolt prompting the creation of SWFs was the 1997 Asian financial crisis. This crises led to changes in the demand for international reserves, increasing the accumulating by affected countries. For example, Singapore, which had considerable pre-existing reserves, escaped the Asian crisis relatively unscathed. The accumulation of reserves has been a strategy of crisis prevention. The value of accumulated reserves quickly grew to exceed the level needed by countries for insurance purposes, extremely costly. In short, cost of reserves in emerging market countries are around 1% of GDP annually. By accumulating reserves we should look at issues such as exchange rate appreciation, liquidity expansion, financial sector imbalances, inflation. It may also include opportunity costs. On the other hand, when countries transfer excess reserves to SWF's, that may help isolate the economy from negative effects of reserve accumulation, like reducing costs of sterilisation by issuing domestic debt to avoid inflation.

There are many SWFs with multiple objectives, based on Al-Hassan, A. et al. (IMF, 2013) and the Santiago Principles taxonomy, five types of SWFs can be distinguished as follows: First, *stabilization funds* are set up to insulate the budget and economy from commodity price volatility and external shocks (e.g., Chile (Economic and Social Stabilization Fund), Timor-Leste, Iran, and Russia (Oil Stabilization Fund)). They tend to invest largely in highly liquid portfolio of assets by allocating over 80 percent of their assets to fixed income securities, with government securities consisting around 70 percent of total assets. Second, *savings funds* intend to share wealth across generations by transforming nonrenewable assets into diversified financial assets (Abu Dhabi Investment Authority, Libya, Russia (National Wealth Fund)). Their investment mandate emphasizes high risk-return profile, thus, allocating high portfolio shares to equities and other investments (over 70 percent). Third, *development funds* are established to allocate resources to priority socio-economic projects, usually infrastructure (e.g., UAE (Mubadala) and Iran (National Development Fund)). Fourth, *Pension reserve funds* are set up to meet identified outflows in the future with respect to pension-related

contingent-type liabilities on the government's balance sheet (e.g., Australia, Ireland, and New Zealand). They held high shares in equities and other investments to offset rising pension costs. Fifth, *Reserve investment corporations* intend to reduce the negative carry costs of holding reserves or to earn higher return on ample reserves, while the assets in the funds are still counted as reserves (e.g., China, South Korea, and Singapore). To achieve this objective, they pursue higher returns by high allocations in equities and alternative investments, with up to 50 percent in South Korea and 75 percent in Singapore's Government Investment Corporation.

The question is: How transparent are investments of SWF's? Viewed in this light, is necessary to mention Carl Linaburg and Mich Maduell developed The Linaburg-Maduell Transparency Index, includes ten essential principles. That is a method of rating transparency in respect to SWFs through principles. In other words, mainly intended for government-owned investment vehicles, where were fears from unethical agendas. According to the SWF Institute 3Q 2014 LMTI, by using this method highest score gained Chile, UAE-Mubadala, Singapore-Temasek, Ireland NPRF, Azerbaijan, Australian Future Fund, Alaska, Norway GPFG Fund, New Zealand, Canada. Conversely lower score gained funds like Algeria, Brunei, Kiribati, Mauritania, Venezuela. These transparency ratings may change, depend from additional information funds.

### **1.1 The objectives**

The research objectives of this paper are presented as follows: First, how may expense, shareholders equity, SWF assets, total assets of the country, total reserves of the country influence on businesses in the countries that set up SWF? In other words, larger companies can exploit cost advantages in all aspects of businesses by producing more. They are in a position to use new capital intensive technology at a lower average cost and so they expand businesses further. Second, how openness, more to the point volume of exports and imports, assets of SWFs, GDP growth rate may affect GDP of country with SWF? In other words, most SWFs are driven by export of oil, minerals. Third, what is amount of gold reserves of countries with SWFs? In sum, the accumulation of official external assets, several of which are SWF's, tends to underestimate the importance of capital inflows as a source of reserve accumulation.

### **1.2 Data and methodology**

This paper provides following econometric models. First, we observe 18 countries that set up SWF's and we examine impact of Gross operating expense in the country (US Million), Shareholders' equity, SWF assets (US billion), Balance Sheet-income: total assets (US Million), Total reserves (includes gold, current US) on businesses. Second, we examine impact of Volume of imports of goods and services (Percent change), Volume of exports of goods and services (Percent change), SWF assets (US billion) and GDP growth rate (annual %) on GDP of 44 countries with SWFs. Third, we focus on reserves of 18 observed countries with SWFs, we determined the reliability of proportion of total reserves of observed countries. This has been done by illustrations and calculations by author by using economic software Eviews, moreover by using available data from OECD database of 2013, World Bank Database of 2013, International Monetary Fund, World Economic Outlook Database, October 2014 and Sovereign Wealth Fund Institute 2015. In addition to this, we present the estimations by using Ordinary Least Squares (OLS), correlation matrix, The 'Student' t-test distribution with (N-1) degrees of freedom, Scatter graphs.

### **1.3 Structure of the study**

Outline of the paper is composed as follows: Section 2 presents briefly literature, findings of authors on this subject. Ergo, the main contribution of this paper is contained in section 3 that

provides econometric models, moreover examined hypotheses of observed countries, etc. Section 4 concludes the paper.

## **2 LITERATURE REVIEW**

There are many different definitions of a SWF's. On the one hand, the EU Commission (2008) describes SWF's as state owned investment vehicles, which manage a diversified portfolio of domestic and international financial assets. Id est, SWF's are mainly created when countries have surplus revenues, reserves and their governments feel it would be advantageous to manage these assets with a view to future liquidity requirements and as a way of stabilising irregular revenue streams argued by Gugler, P.; Chaisse, J. (2009). Miracky and Bortolotti (2009) presented definitions of SWFs as follows: (i) an investment fund rather than an operating company, (ii) that is wholly owned by a sovereign government, in other words organized separately from the central bank or finance ministry to protect it from excessive political influence, (iii) that makes international and domestic investments in a variety of risky assets, (iv) that is charged with seeking a commercial return, and (v) a pension fund, the fund is not financed with contributions from pensioners and does not have a stream of liabilities committed to individual citizens.

Non obstante, it is important to mention a number of studies on the subject of SWFs since 2007. In this section we present related research of academics. Jones, S. G. - Ocampo, J. A., (2008) presented in details the evolution of foreign exchange assets in different parts of the developing world, optimal reserves, developed a broader framework for the analysis of the motives for the accumulation of foreign exchange assets. Matoo, A. - Subramanian, A. (2008) described imbalances between undervalued exchange rates and SWFs. They proposed new rules in the WTO to discipline cases of significant undervaluation that are clearly attributable to government action. Beck, R.; Fidora, M. (2008) provided background of the impact of sovereign wealth funds (SWFs) on global financial markets, impact of a transfer of traditional foreign exchange reserves to SWFs on global capital flows. Among authors examined subject of SWF, Baptista, A. M. (2008), Miracky et. al. (2009), Bernstein, S.; Lerner, J.; A. Schoar (2009). Al-Hassan, A. *et al.* (IMF, 2013) presented a systematic (normative) manner the salient features of a SWF's governance structure, in relation to its objectives and investment management that can ensure its efficient operation and enhance its financial performance. Bortolotti et. al. (2013) examined of 1.018 Sovereign Wealth Fund (SWF) equity investments in publicly traded firms and a control sample of 5.975 transactions by private-sector financial institutions over 1980-2012. Bodie, Z., Brière, M., (2013) described management of sovereign wealth from the perspective of the theory of contingent claims. They suggest institutional arrangements that could overcome this obstacle and enable efficient coordination. Chen, S. Y. (2013) addressed certain issues that may arise where a SWF is a claimant in investor-state arbitration. In short, SWFs should not be discouraged from settling issues with a host state through investor-state arbitration. Rose, P. (2014) described the evolution of foreign investment regulation in recent years, analysis of Foreign Investment in the United States Act (FINSAs), including the key statutory definitions that determine the regulatory pathway of a foreign investment transaction. Gelb *et. al.* (The World Bank, 2014) focused on the main priorities concern the criteria for selecting investments, partnerships, external and internal governance arrangements, transparency, reporting and consistency with macroeconomic policy. Backer, L. C. (2014) described that SWFs incarnate and replicate the collisions between two tectonic forces that are grinding their way to a new normative framework of governance and power. Etemad, A. (2014) has explored the effect of the sovereign funds on the volatility of macro-variables. The author showed that countries with oil funds have decreased the volatility of consumer prices and broad money compared to countries without

funds. Gilligan *et al.* (2014) noted that there are inescapable political dimensions to SWFs and other forms of state capital.

Ciarlone, A.–Miceli, V. (2014) investigated the determinants of the investment activity of SWF's at a macro level, with special emphasis on the possible reaction to a financial crisis in a potential target economy, especially 1,903 acquisition deals spanning the period 1995-2010 and involving 29 out of the 69 existing SWFs. Naveen, T. (2014) examined further investment in infrastructure and by explaining why SWFs could help. Van Den Bremer, Ton - van der Ploeg, Rick - Wills, S. (2014) found that commodity exporters should change the allocation of their SWF by leveraging all risky assets and hedging subsoil oil risk. On the other hand, consumption should be a constant share of total oil and fund wealth. Third, if oil wealth cannot be adequately hedged. Ghahramani, S. (2014) presented three models of sovereign-driven portfolio investment (in contrast to foreign investment) and how governments may pursue international law principles through shareholder activism.

### 3 HYPOTHESES

Based on data analyzed for the paper, we developed et sequentes hypotheses. Results are demonstrated in this section.

#### 3.1 Testing Hypothesis I.

In this section, we want to examine the dependence, moreover how changes in following factors x: Gross operating expense in the country (US Million), Shareholders' equity, SWF assets (US billion), Balance Sheet, income: total assets (US Million), Total reserves (includes gold, current US) may affected businesses in the countries that set up SWF. Variable of business (US mln) provides information on number of companies and employees, gross premiums, within the sector in the country that set up SWF. In sum, the number of domestic undertakings, foreign controlled undertakings, branches and agencies of foreign undertakings. In other words, we use data of 18 countries that set up SWF, available data from OECD database of 2013, World Bank Database of 2013 and Sovereign Wealth Fund Institute 2015. In this context, Sovereign Wealth Fund presents 77 SWF's in 58 countries around the world, with total assets US 7.071.2 tn in January of 2015. The question is: How conditions of the country that set up SWF, that are mentioned above may affect businesses. We observed following countries: Australia, Brazil, Canada, France, Hong Kong, China, Chile, Indonesia, Ireland, Italy, Korea, Malaysia, Mexico, New Zealand, Norway, Panama, Peru, Singapore, United States.

Note:

\* China SWF includes: China Investment Corporation, SAFE Investment Company, Hong Kong Monetary Authority Investment Portfolio, National Social Security Fund, China-Africa Development fund.

\* US SWF includes: Alaska, Texas, New Mexico, Wyoming, Alabama, Louisiana.

We use method of least squares by using economic software Eviews, N=18 at 95 percent of probability,  $\alpha=0,05$ ; see bellow.

Tab. 1 – Ordinary Least Squares (OLS) of Businesses. Source: Author's estimation by using Eviews.

Dependent Variable: BUSINESSES				
Method: Least Squares				
Sample: 1 18				
Included observations: 18				
Variable	Coefficient	Std. Error	t-Statistic	Prob.

GOLD RESERVES	1.23E-08	5.85E-09	2.098	0.057
SHAREHOLDERS EQUITY	1.761	0.290	6.073	0.000
SWF ASSETS	-9.593	11.270	-0.851	0.411
TOTAL ASSETS	0.004	0.030	0.146	0.886
GROSS OPERATING EXPENSES	0.997	0.015	65.250	0.000
C	1112.415	3566.428	0.311	0.760
<hr/>				
R-squared	0.998	Mean dependent var	103794.1	
Adjusted R-squared	0.998	S.D. dependent var	239695.1	
S.E. of regression	10655.84	Akaike info criterion	21.64681	
Sum squared resid	1.36E+09	Schwarz criterion	21.943	
Log likelihood	-188.821	Hannan-Quinn criter.	21.687	
F-statistic	1717.968	Durbin-Watson stat	1.7623	
Prob(F-statistic)	0.000			

Results coming out from OLS show following estimation equation of model:

$$\text{Businesses} = \beta_0 + \beta_1 * \text{gold reserves} + \beta_2 * \text{shareholders equity} - \beta_3 * \text{SWF assets} + \beta_4 * \text{total assets} + \beta_5 * \text{gross operating expenses}$$

And after substituted coefficients we get formula as follows:

$$\text{Businesses} = 1112.414 + \beta_1 * 1.22852539081e-08 + \beta_2 * 1.761 - \beta_3 * 9.593 + \beta_4 * 0.004 + \beta_5 * 0.997$$

According to the results of OLS at 95% confidence level, which are presented in Table 1 above show, that coefficient of determination  $R^2 = 0.998$  indicates that 99.86% of the variance of the endogenous variable (businesses) is being explained by changes in the variables x, that shows gold reserves, shareholders equity, SWF assets, total assets, in short that means positive linear relationship. On the other hand, 0.14% of changes in the businesses in the countries that set up SWF may be affected by other variables that are not included in this model, for example rate of economic growth of the country, inflation, government restrictions (higher tax rate, exchange rate, interest rate), etc. In sum, businesses in the countries that set up SWFs are more affected to total reserves of the country, it may depend on the area of the country), shareholders equities (owned by foreign or national), gross operating expenses in the firms in positive relationship.

Ipsa facto, the significance of the model, prob (F-statistic) is  $0.000000 < 0.01$ ; what is high statistically significant (++). The parameter  $\beta_2$ ,  $\beta_5$  are high statistically significant because of the P-value is  $0.0000 < 0.01$ ; (++). The parameter of gold reserves are statistically significant because of the P-value is  $0.057 < 0.05$ . For  $N = 18$ ,  $k = 5$ , and significant level = 5%, the significant Durbin-Watson statistic dL is 0.522, dU is 1.803. Since the Durbin-Watson d statistic,  $4 - 1.803 = 2.197$ , a value near 2 indicates non-autocorrelation in this model.

However, at this point we present illustrations of significant variables below. Moreover, the data are displayed as a collection of points, each having the value of one variable determining the position on the horizontal axis and the value of the other variable determining the position on the vertical axis. If the pattern of dots slopes from lower left to upper right, it suggests a positive correlation between the variables being studied, e. g. gross operating expenses to businesses, shareholders equity and total assets to business. If the pattern of dots slopes from upper left to lower right, it suggests a negative correlation, e.g. SWF assets to businesses, see below.

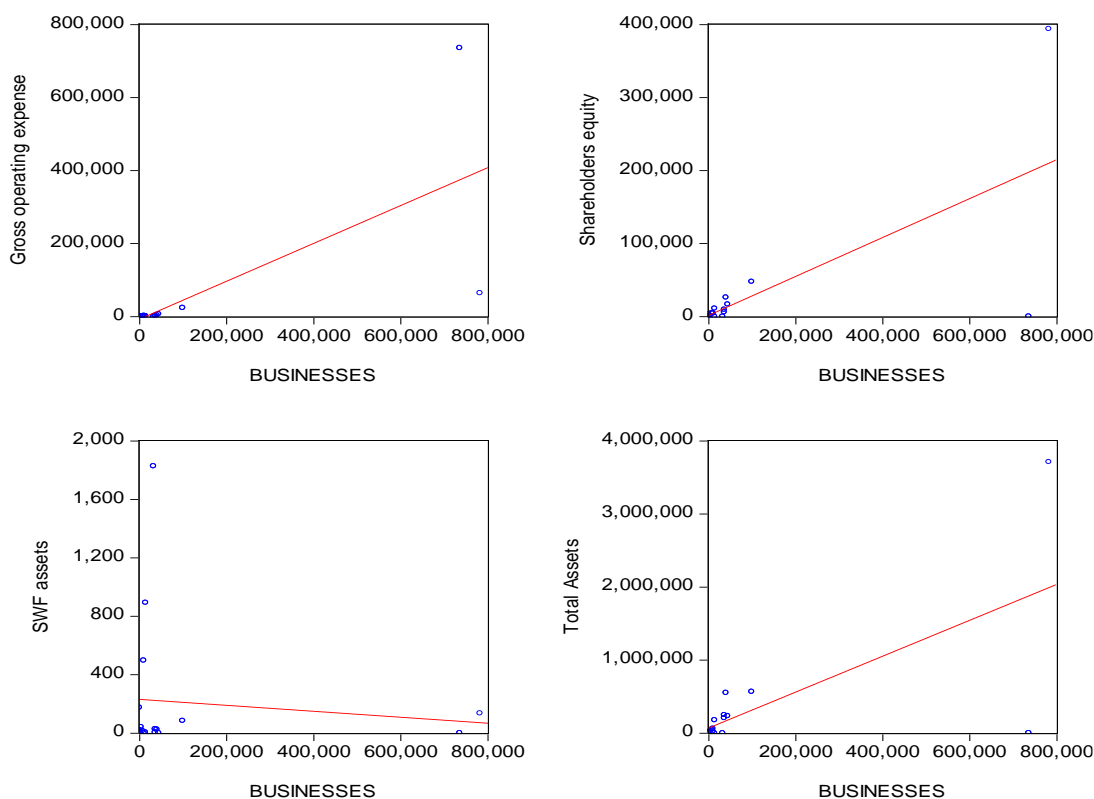


Fig. 1 – Simple Scatter Graphs of significant variables. Source: Author’s estimation by using Eviews.

For more details we provide statistics of observed variables that we used in this model as follows:

Tab. 1 – Summary Statistics. Source: Author’s estimation according to financial data of observed countries that set up SWF by using economic software Eviews.

	SHAREHOLD				TOTAL ASSETS	GROSS OPERATING EXPENSE
	BUSINESSE	GOLD RESERVES	ERS EQUITY	SWF ASSETS		
Mean	103794.1	3.52E+11	29509.78	210.2611	327198.2	47017.26
Median	13611.83	1.17E+11	4482.316	23.65000	39074.45	1317.142
Maximum	782083.0	3.88E+12	393904.7	1827.400	3710998.	735849.0
Minimum	0.000000	1.64E+09	0.000000	0.300000	0.000000	0.000000
Std. Dev.	239695.1	8.90E+11	91725.72	463.2863	863189.3	172599.0
Skewness	2.433190	3.741416	3.774608	2.725229	3.617054	3.830764
Kurtosis	7.021886	15.36974	15.51956	9.574046	14.72085	15.80519
Jarque-Bera	29.89292	156.7525	160.2976	54.69418	142.2830	167.0039
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Sum	1868294.	6.33E+12	531176.1	3784.700	5889567.	846310.8
Sum Sq. Dev.	9.77E+11	1.35E+25	1.43E+11	3648781.	1.27E+13	5.06E+11
Observations	18	18	18	18	18	18

### 3.2 Testing Hypothesis II.

At this point, we examine the dependence, moreover how following factors *exempli gratia*: Volume of imports of goods and services (Percent change), Volume of exports of goods and services (Percent change), SWF assets (US billion) and GDP growth rate (annual %) may contribute to changes of Gross domestic product, constant prices (Percent change) of countries that set up SWF.

Viewed in this light, we focus on 44 countries with SWF as follows: Algeria, Angola, Australia, Azerbaijan, Bahrain, Botswana, Brazil, Brunei Darussalam, Canada, France, Gabon, Ghana, Guinea, Chile, China, Indonesia, Iraq, Islamic Republic of Iran, Ireland, Italy, Kazakhstan, Kuwait, Kiribati, Libya, Malaysia, Mauritania, Mexico, New Zealand, Nigeria, Norway, Oman, Panama, Peru, Qatar, Russia, Saudi Arabia, Singapore, South Korea, Trinidad and Tobago, Turkmenistan, United Arab Emirates, Venezuela, Vietnam, United States. We observed data from International Monetary Fund, World Economic Outlook Database, October 2014, World Bank Database, 2013 and Sovereign Wealth Fund Institute, January 2015.

The question is: How export, import (openness of the country) and assets of SWF may affect GDP of the country that set up SWF. However, some countries that set up SWF still place restrictions on foreign investments. Viewed in this light, these obstacles can negatively affect the decision to invest in a certain country. In this context, we examined factors openness to the international movement of goods and capital: the volume of exports and imports, on the one side, and the SWF value, growth rate, scaled to the country's GDP.

Note:

\* SWF assets; UAE includes: Abu Dhabi Investment Authority, Abu Dhabi Investment council, Investment corporation of Dubai, International Petroleum Investment company, Mubadala Development company, Emirates Investment Authority, RAK Investment Authority.

We use method of least squares by using economic software Eviews, N=44, k=4 at 95 percent of probability,  $\alpha=0,05$ ; see bellow.

Tab. 1 – Ordinary Least Squares (OLS) of GDP. Source: Author's estimation by using Eviews.

Dependent Variable: GROSS DOMESTIC PRODUCT				
Method: Least Squares				
Sample: 1 44				
Included observations: 44				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
VOLUME OF IMPORTS	0.085	0.043	1.936	0.060
VOLUME OF EXPORTS	0.210	0.033	6.366	0.000
SWF ASSETS	4.82E-05	0.000	0.060	0.951
GDP GROWTH RATE	0.533	0.086	6.171	0.000
C	0.830	0.387	2.145	0.038
R-squared	0.844	Mean dependent var		2.956
Adjusted R-squared	0.829	S.D. dependent var		4.313
S.E. of regression	1.783	Akaike info criterion		4.101
Sum squared resid	124.089	Schwarz criterion		4.304
Log likelihood	-85.243	Hannan-Quinn criter.		4.177
F-statistic	53.121	Durbin-Watson stat		2.117
Prob(F-statistic)	0.000			



According to results coming out from OLS show following estimation equation of the model:

$$\text{Gross Domestic Product} = \beta_0 + \beta_1 * \text{volume of imports} + \beta_2 * \text{volume of exports} + \beta_3 * \text{SWF assets} + \beta_4 * \text{GDP growth rate}$$

And after substituted coefficients we get formula as follows:

$$\text{Gross Domestic Product} = 0.830 + \beta_1 * 0.085 + \beta_2 * 0.210 + \beta_3 * 4.82181068712e-05 + \beta_4 * 0.533$$

According to the results of OLS at 95% confidence level, which are presented in Table 1 above show, that coefficient of determination  $R^2 = 0.844$  indicates that 84.49% of the variance of the endogenous variable (gross domestic product) is being explained by changes in the variables x, that includes volume of import, volume of export, SWF assets, GDP growth rate, in short that means positive linear relationship. On the other hand, 15.51% of changes in the GDP of the country that set up SWF may be affected by other variables that are not included in this model, for example rate of current account balance, debt to GDP, etc. In addition to the variables that have been mentioned above, we include several other factors that have the potential of explaining the GDP of the country that set up SWF. However, we have also examined inflation rate and interest rate as well, but these factors are not significant, moreover we did not include these factors in this model.

The significance of the model, prob (F-statistic) is  $0.000 < 0.01$ ; what is high statistically significant (++). Variables examined in this model are significant. The parameter  $\beta_2$ ,  $\beta_4$  are high statistically significant because of the P-value is  $0.000 < 0.01$ ; (++) and  $\beta_1$  is statistically significant as well. Moreover, for  $N = 44$ ,  $k = 4$ , and significant level = 5%, the significant Durbin-Watson statistic dL is 1.156, dU is 1.528. Since the Durbin-Watson d statistic,  $4 - 1.528 = 2.472$ , a value near 2 indicates non-autocorrelation in this model.

At this point we present correlation matrix of model of GDP. Following table show correlation between variables.

Tab. 2 – Correlations matrix. Source: Author's estimation according to financial data of observed countries by using economic software Eviews.

	GROSS DOMESTIC PRODUCT	VOLUME OF IMPORTS	VOLUME OF EXPORTS	SWF ASSETS	GDP GROWTH RATE
GROSS DOMESTIC PRODUCT	1				
VOLUME OF IMPORTS	0.442	1			
VOLUME OF EXPORTS	0.823	0.408	1		
SWF ASSETS	0.119	0.260	0.060	1	
GDP GROWTH RATE	0.771	0.199	0.541	0.102	1

*Note: For example correlation between volume of exports and GDP is 0.823, increase together.*

### 3.3 Testing Hypothesis III.

In this section we focus on reserves. *Ipsissima verba*, China and other East Asian countries have responded to current account surpluses and capital inflows with reserve accumulation by the central bank rather than allowing these surpluses both to be self corrected and lodged in private hands through currency appreciation. China decreased to US 3,843tn in December of 2014 from US 3, 847tn in November of 2014. South Korea accumulated US 362370.10 in February of 2015. Nevertheless, countries have set up SWFs to manage these reserves.

The question is: How we can explain that China has massive foreign reserves? Basically China maintain the same exchange rate, on the one hand increase demand, on the other hand the central bank issue more of the domestic currency and purchase the foreign currency. That may resulted to an increase the sum of foreign reserves. Otherwise if the value of the currency

is being down (weak of currency), the domestic money supply is increasing (because money are being printed)= inflation (spiking of food prices).

First, we use data of 18 observed countries that set up SWF, especially following countries: Australia, Brazil, Canada, France, Hong Kong-China, Chile, Indonesia, Ireland, Italy, Korea, Malaysia, Mexico, New Zealand, Norway, Panama, Peru, Singapore, United States. Second, we determine the reliability at a 95% confidence level and determine level of the reliability of proportion of total reserves in observed countries of SWFs. Third, total reserves include gold in current US bn. We obtained data from OECD database, 2013.

Tab. 3 – Total reserves (US bn). Source: Author's estimation according to data from OECD, 2013. Source: Author's estimation according to data from OECD, 2013

Country	Gold Reserves US bn
Australia	52.837
Brazil	358.81
Canada	71.93
France	145.16
Hong Kong, China	3880.36
Chile	41.09
Indonesia	99.38
Ireland	1.635
Italy	145.72
Korea	345.69
Malaysia	134.85
Mexico	180.2
New Zealand	16.31
Norway	58.283
Panama	2.847
Peru	65.766
Singapore	277.797
United States	448.508
AVERAGE	351.509
STDEV	890.479
Tinv for $\alpha/2$	1.739
Tinv for $\alpha$	2.109

We use the TINV function that returns the value of t Student's t-distribution as a function of the probability and the degrees of freedom; in our case the number of degrees of freedom = N-1 where N is the number of values, and probability  $\alpha = 0.05$ .

The two-sided confidence interval can be determined from the relation:

$$\left( \bar{x} - t_{1-\frac{\alpha}{2}} \frac{s_1}{\sqrt{n-1}} \leq \mu \leq \bar{x} + t_{1-\frac{\alpha}{2}} \frac{s_1}{\sqrt{n-1}} \right) = 1 - \alpha \quad (1)$$

$$\left( 351.509 - 1.739 \frac{890.479}{\sqrt{17}} \leq \mu \leq 351.509 + 1.739 \frac{890.479}{\sqrt{17}} \right) = 1 - \alpha$$

$$(24.07 \leq \mu \leq 727.095) = 95\%$$

Results coming out from formula above show an acceptable range for levels of significance. On the other hand, it explains with at 95 percent of probability level that the proportion of total reserves in 18 observed countries is between US 24.07 and US 727.095 bn. Viewed in this light, countries that are large importers of gold will inevitably end up having a weaker currency when the price of gold rises. For example, countries that specialize in producing products made with gold, but lack their own gold reserves, will be large importers of gold.

To determine the left-hand interval for total reserves we use the following relationship:

$$P\left(\mu \geq \bar{x} - t_{1-\alpha} \frac{s_1}{\sqrt{n-1}}\right) = 1 - \alpha \quad (2)$$

$$P\left(\mu \geq 351.50 - 2.10 \frac{890.47}{\sqrt{17}}\right) = 0.95$$

$$P(\mu \geq 102.05) = 95\%$$

According to the results of this formula, the proportion of total reserves of observed countries will be more than US 102.05bn at 95% of probability level.

Then we formulate the hypothesis as follows:

***H<sub>0</sub>***: These are random deviations due to the selection of elements in the file Z,  $m = \mu$  .

***H<sub>1</sub>***: These are NOT random deviations due to the selection of elements in the file Z,  $m \neq \mu$  .

$$t = \frac{|\bar{x} - \mu|}{s} \sqrt{n} = \frac{351.509 - 102.05}{890.479} \sqrt{17} = 1.155 \quad (3)$$

$$t_{crit} = 2.10$$

The significance level of 0.05 and 17 degrees of freedom, the inverse two-sided t-distribution is calculated by TINV (0.05; 17) is 2.10. Ergo,  $t < t_{crit} \rightarrow$  we accept the null hypothesis, we came to the conclusion that there are random deviations due to the selection of observed funds in our file Z, in short, results are statistically significant.

## 4 CONCLUSION

In short, SWFs are important players in global financial markets due to their rapid growth US 7.071.2 tn in January 2015 according to the Sovereign Wealth Fund Institute. It is important to focus on background of their investments choices, wealth, financial fluctuations.

In fine, this paper presented econometric analysis. The econometric analysis clearly shows that 99.86 percent of changes of businesses are being explained by changes in Gross operating expense in the country (US mln), Shareholders' equity, SWF's assets (US mln), Balance Sheet-income: total assets (US mln), Total reserves (includes gold, current US). Moreover, high significant variables are gross operating expense, shareholders equity and gold reserves. On the other hand, countries with SWF attract attention from investors around the world, depends on industry, return, optimal strategy, Exchange rate, liquidity, risk, etc. As a result, we may say that companies can be chosen by SWF for locations, technologies that will help SWF region of origin. In other words, SWF's use their portfolios to achieve social goal, at the expense of the value and performance of the firm.

Then we examined that GDP of 44 countries with SWFs may be affected by Volume of imports of goods and services (% change), Volume of exports of goods and services (%

change), SWF assets (US bn) and GDP growth rate (annual %) at 84.49%. As we mentioned earlier, it is important to measure how export of oil, minerals, other commodities can affect GDP of country that set up SWF with purpose for future generations.

Third, we focused on reserves of 18 observed countries with SWFs, we determined the reliability of proportion of total reserves, especially we found that countries with SWFs hold gold reserves between 102.05 and 727.09 bn US. SWF's typically buy large quantities of gold when their country is experiencing high levels of inflation. The demand for gold increases during inflationary times due to its inherent value and limited supply. Anyway China holds huge U.S. dollar-denominated assets, but the U.S. dollar has been weakening on the exchange markets, and resulting in a relative loss of wealth. We may say that in the case of fluctuations in exchange rates, defense before inflation so a central banks must continually increase the amount of its reserves to maintain the same exchange rates.

In this regard of the econometric specification, time horizons, country groupings, influence of the size of an economy always plays a positive and highly significant role in affecting a country in terms of investments.

### **Acknowledgement**

Foremost, I would like to express my sincere gratitude to Prof. Zlatica Ivanicova from University of Economics in Bratislava for immense knowledge in econometrics.

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## **THE DEPENDENCE OF ADDITIONAL PURCHASING OF BANKING PRODUCTS OR SERVICES ON THE LOYALTY OF BANKING CUSTOMERS IN THE CZECH REPUBLIC**

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### **Abstract**

Examination of the dependence between the bank customers' loyalty and additional purchases of banking products and services is a current area of scientific research. Relatively few scientific studies try to quantify this relationship. The aim of this article was to examine and quantify the dependence of interest in purchasing additional banking products on the loyalty of banking customers. During the research in 2014, we have divided our respondents into two groups, loyal and disloyal respondents and have compared their attitudes according to the loyalty and additional purchases of banking products. The differences in their attitudes were analyzed by Pearson statistical test. The results clearly declared that loyal customers are more interested in services which are offered by their own bank, when considering what to do with their savings or investments, when taking mortgages or purchasing other banking products or services. According to the results of our research, the loyalty of banking customers is transformed with different types of intensity into potential additional purchases of banking products and services.

*Keywords: commercial bank, loyalty of banking customers, additional purchasing of banking products, share of wallet*

JEL Classification: G21

### **1 INTRODUCTION**

In the banking industry, where convenience and location are important, banks operate in between perfectly competitive and monopoly markets and are known as oligopolistic firms. Even though oligopolistic banks offer some level of differentiated products, the threat of competitors' reactions severely limits their ability to increase price when demand increases. Given this price rigidity, a bank's capability to increase revenues is contingent on the extent to which it can increase the quantity of products sold by attracting new customers and/or selling complementary products to its existing customers. Customers are more likely to purchase complementary products from the same firm when they face capability-based switching costs. (Brush, Dangol, and O'Brien, 2012)

Satisfied customer has a major importance for a current and future financial performance of the commercial bank. Korauš (2011) states that a satisfied customer stays loyal and for a bank to keep existing customer satisfied cost five times less money than to gain a brand new customer. Loyal customer is willing to pay higher price and to lure satisfied customer away to the competitor means for a bank to reduce the price of bank's product by 30%. Satisfied client represents a free form of advertising. He is inclined more to purchase more products from the bank. Satisfied customer gives a feedback to banks' employees in terms of sense of satisfaction and pride of their work and business.

The attention given to the banking customer should lead to a growing satisfaction level and to the satisfaction with partial activities of commercial bank, because it is generally assumed that

satisfied customer is loyal and his loyalty is reflected by higher level of additional purchases when compared to unsatisfied customer.

This study analyses the aspect of activities in commercial banks in detail.

## **2 THEORETICAL BACKGROUND**

Chakrabarty (2006); Manrai and Manrai (2007); Chavan and Ahmad (2013); Wruuck (2013); Chen, Liu, Sheu and Yang (2012); Chu, Lee, Chao (2012) analyzed various factors of customer satisfaction in regards to commercial banks.

Činjurevič, Tatič, and Avdič (2010) confirm the mediating role of satisfaction on the relationship among service quality dimensions and customer loyalty and therefore reconfirm the significance of customer satisfaction in the service setting. Karapete (2011) claims that results reported in his study suggest that all service quality dimensions have significant positive impacts on customer satisfaction. Interaction quality is the most important determinant of customer satisfaction, followed by service environment, reliability, and empathy. In this context Bilan (2013) points out that consumers don't want to play in any games, if they feel that anything goes wrong, they go away and choose another supplier.

According to De Matos, Henrique, and De Rosa (2013) customer loyalty is an important marketing variable for most of the companies, especially those working in more competitive markets. Authors emphasize that satisfaction is a relevant predictor of loyalty. More satisfied customers tend to be more loyal and to recommend the bank to other consumers. Hansen, Samuelsen, and Sallis (2013) more precisely specified that satisfaction has a strong positive effect on loyalty for high NFCs, but no effect for low NFCs (Some people engage in and enjoy thinking more than others, which is the core personality trait of interest in this study: need for cognition – NFC). According to Marimon, Yaya, Fa (2012) there is a direct link between the quality of services and the loyalty of a customer even in e-banking.

By Korauš (2011) loyalty is a state of mind, emotional attitude of customer to products and services, but is also rational assessment of previous experience with the business relationship.

Podl'a Terpstra and Verbeeten (2014) satisfied customers tend to be loyal and willing to purchase more of firm's services at higher prices. They also ascertained that customer satisfaction is positively associated with future customer revenues and customer value, especially in higher customer profitability segments (i.e., customer satisfaction is a value driver).

Cooil, Keiningham, Aksoy, and Hsu (2007) claims that changes in satisfaction are positively and nonlinearly related to the share of wallet a customer allocates to a particular service provider over time; specifically, the initial satisfaction level and the conditional percentile of change in satisfaction significantly correspond to changes in share of wallet. As stated by authors the relationship between satisfaction and share of wallet is moderated by both demographic and situational customer characteristics. In particular, income and length of relationship are significant predictors in the model. Both income and length of relationship negatively moderated the relationship between changes in satisfaction and share of wallet. There is no evidence that age is a positive moderator (satisfaction and share of wallet). Education is not a predictor.

Keiningham, Gupta, Aksoy, and Buoye (2014) make reference to very interesting idea. As claimed by authors, academic research consistently finds that there is a positive, statistically significant relationship between satisfaction and a host business outcomes such as customer retention, share of wallet, referrals and stock market performance. The problem is that the

relationship between customer satisfaction and customer spending behavior is very weak. Our research finds that changes in customers' satisfaction levels explain less than 1% of the variation in changes in their share of category spending. The relationship is statistically significant, but it is not very managerially relevant.

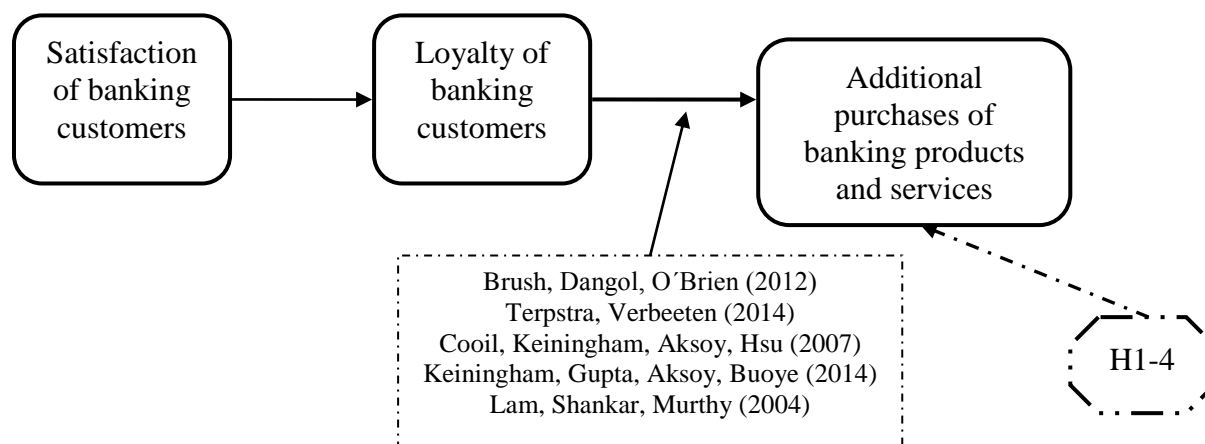
More likely it is possible to agree with the results of Lam, Shankar, Murthy (2004) studies, in which the authors claim that whereas the customer satisfaction completely influence his recommendation to others, it only partially affects his tendency to re-purchase services again. Another factor enters into decision making process and perception of the value of the services when deciding to re-purchase services. With regards to this factor, the provider can devote efforts to increase the value perceived by the customer to enhance customer satisfaction. It also can provide attention to other values that can affect the customer satisfaction, such as fair and equal approach. If a company wants to attract new customers, this should be focused primarily on customer satisfaction, because that satisfaction is the main reason that crucially affects the customers' recommendation to his friends. If the company wants to keep the customer and do not want to lose him, it is important to monitor the perception value of offered services.

### 3 OBJECTIVES, METHODOLOGY AND DATA

The aim of this paper was to examine and quantify the dependence of additional purchases of bank products on customers' loyalty.

On the basis of the qualitative analysis, we created *Conceptual model*, which you can find on Fig. 1.

Fig.1 – Conceptual model of loyalty and additional purchases of customers. Source: own research.



In 2014 we conducted a quantitative research of satisfaction, loyalty and additional purchases in Czech banking sector. We used questionnaire survey on a sample of 459 respondents, of which 44% were men and 56% were women. The age structure of those respondents was as follows: 39% of respondents were aged under 30 years, 44% were aged from 31 to 50 years and 17% of them were customers over 50. The education level of respondents was as follows: 3% had primary education, 54% had secondary education and 43% were university educated bank customers.



The results of Brush, Dangol, O'Brien (2012), Terpstra and Verbeeten (2014), Cooil, Keiningham, Aksoy, and Hsu (2007), Keiningham, Gupta, Aksoy, Buoye (2014), Lam, Shankar, Murthy (2004) research has inspired us to determine these hypotheses:

*H1: Loyal customers are more interested in services of their own bank when deciding to invest money in financial markets in comparison to disloyal customers.*

*H2: Loyal customers are more interested to create deposits in their own bank compared to disloyal customers.*

*H3: Loyal customers are more interested in taking mortgages from their own bank in comparison to disloyal customers.*

*H4: Loyal customers are more interested in additional purchasing of banking products and services in their own bank compared to disloyal customers.*

We examined the connection between loyalty and additional purchasing of banking products. Our procedure was as follows. On the basis of the questionnaire results we divided the whole set of respondents into two groups. The first group consisted of respondents who on the following statement: *I gladly recommend my bank to my friends*, indicated assent (we called them loyal customers). The second group consists of respondents who stated dissenting opinion (disloyal customers). Respondents who did not have an opinion were excluded.

Established scientific assumptions in each table were examined through Pearson statistics. P-value less than 5% leads to the rejection of the null hypothesis. Part of the quantitative analysis is the use of indicators and descriptive statistics such as weighted arithmetical average and the percentage figures.

## **4 RESULTS AND DISCUSSION**

The level of customers' satisfaction in the banking business is in many countries quiet different. For example, in United Kingdom in 2012, top of the table for customer satisfaction were First Direct, The One Account and the Co-Operative Bank with 86%, 80% and 79 %. Respectively Santander and Halifax scored the lowest results with just 46% and 48% of their customers saying they were satisfied - well below the average score of 62%. (www.dailymail.co.uk). McKinsey & Company (2012) states that customer satisfaction scores for retail banks in USA in 2011 were 8.23 out of a total of 10 points. Customer satisfaction in 2011 compared with 2010 has slightly decreased, but up to 39% of clients stated in this research that their bank did nothing about increasing their satisfaction last year. According to results of our research in Czech Republic, the overall satisfaction of clients was around 62 % in 2012. (Belás, Burianová, Cipovová, Červenka, 2013) The overall satisfaction of banks' customers in Slovakia was 61% in 2012. (Belás, Holec, Homolka, 2013)

According to the results of our research, the overall satisfaction of clients of commercial banks was at the level of 66.29% in 2014, and 16.40% of the customers reported a negative attitude and 17.13% of respondents could not decide. We can therefore conclude that the overall satisfaction rate of bank customers has slightly increased in the past years.

Table 1 reflects the results to one of the questions where we asked, if clients recommend their bank to friends.

Tab. 1 – Results about the loyalty of Czech banking clients Source: own research.

I gladly recommend my bank to my friends.	CR 2014 in %
1. agree (loyal clients)	39.18
2. disagree (disloyal clients)	25.28
3. do not know (excluded from the research)	35.54

According to the results which are listed in the Table 1 we have divided the whole sample of respondents into two parts. The first part was created by respondents whose answer was No. 1 (named as loyal customers). Second part were respondents who have chosen No. 2 (disloyal customers) and those who have chosen No.3 were excluded from further research.

Tables 2 – 5 reflect the results to the question about additional purchases of banking products.

Tab. 2 – Potential interest in investments in the financial market. Source: own research.

If I am interested in investments in the financial market, I will use services in my bank.	Loyal clients CR 2014 in %	Disloyal clients CR 2014 in %	p-value
1. agree	48.84	6.31	<b>&lt;0.01</b>
2. disagree	19.77	63.06	<b>&lt;0.01</b>
3. I do not know	31.40	30.63	0.88866

H1 has been confirmed. Loyal customers are more interested in their banks' services when considering where to invest their savings in comparison to the disloyal customers (p-value<0.01). The intensity of this interest was quite low, only 48.84% of banking clients have confirmed that they would invest in their bank.

Tab. 3 – Generating deposits in the bank. Source: own research.

If I save up some money I will put them to my bank.	Loyal clients CR 2014 in %	Disloyal clients CR 2014 in %	p-value
1. agree	71.51	37.84	<b>&lt;0.01</b>
2. disagree	15.12	52.25	<b>&lt;0.01</b>
3. I do not know	13.37	9.91	0.38430

H2 has been confirmed. Loyal customers are more interested in generating deposits in their own bank in comparison to disloyal clients (p-value<0.01). In this case, the intensity of the interest to save in their bank was relatively high, 71.51% loyal customers has confirmed that they would do it. This phenomenon confirms that no matter the interest rate in other banks would be, loyal and satisfied customers would not change their banks.

Tab. 4 – Potential interest in the mortgage. Source: own research

If I wanted to take a mortgage, I would choose products and services from my bank.	Loyal clients CR 2014 in %	Disloyal clients CR 2014 in %	p-value
1. agree	66.86	32.43	<b>&lt;0.01</b>

2. disagree	9.88	36.94	<b>&lt;0.01</b>
3. I do not know	23.26	30.63	0.16758

H3 has been confirmed. We found out that loyal customers are more interested in mortgages from their bank compared to disloyal customers (p-value<0.01). 66.86% of clients said that they would be interested in taking mortgages.

According to a research by Ernst & Young (2012), almost 50% of Czech respondents bought mortgages off their main bank. There could be also noticed an intensive campaign of almost all banks to win new clients from the competition in the banking sector. However, it might be more appropriate to take better care of existing clients and to know how to offer them the product at the right time.

Tab. 5 – Potential interest in additional banking services. Source: own research.

I am considering if to choose any additional banking products and services.	Loyal clients v % CR 2014	Disloyal clients v % CR 2014	p-value
1. agree	56.40	8.11	<b>&lt;0.01</b>
2. disagree	13.37	60.36	<b>&lt;0.01</b>
3. I do not know	30.23	31.53	0.81810

H4 has been confirmed. Loyal customers had more interest in using additional banking products and services in their bank compared to disloyal clients (p-value<0.01). However, the ratio of their interest was quite small.

According to our results, the differences in the intensity are transformed into potential purchases of additional banking products. The highest potential interest was spotted by the question No.3 and No. 4 where we discussed deposits and mortgages. The reason for this could be the fact that these products are the most common ones. Customers were not as interested in financial investments or any additional banking products.

In this context Terpstra and Verbeeten (2014) claim that customers tend to acquire low risk assets first (saving account). In due time, they acquire more risky assets (such as pension fund, life insurance, investment trusts, shares, and bonds). It is likely that the more risky asset categories provide more revenues for financial firms. A potential explanation for our findings is therefore that satisfied customers purchase more (high margin, high risk) services, while dissatisfied customers reduce their product portfolios and eventually discard the low margin, low risk asset product (checking and savings accounts).

According to traditional trade schemes it should apply that satisfied customers are buying more products from their own bank with which they have a long-term relationship based on win-win strategy. The results of our research did not confirm this trend. The data, which were obtained in Czech and Slovak commercial banking trends, suggest that satisfied customers are buying a less fewer products than dissatisfied customers. (Belás, Cipovová, Demjan, 2014)

## 5 CONCLUSION

In the conditions of intense competition in the banking market is satisfaction and loyalty of bank customers significant attribute of the current financial performance of commercial banks and an important prerequisite for future growth.

Retail banking is a typical service industry, in which customers frequently become loyal only after some years of doing business with the same bank. Banking services are contract-based and usually entail a long term relationship between a customer and a bank. There is a reason to believe that the banking industry faces new challenges when the traditionally stable relationships are challenged by deregulation and increased competition. (Činjarevič, M., Tatič, K., Avdič, A., 2010)

The results of our research declare that loyal customers are more interested in the services of their own banks when considering savings, investments in the financial market, mortgages or purchasing other banking products or services. According to the results of the research, loyalty of clients is transformed into potential additional purchases with different strength of intensity. The most interesting products and services for respondents were mortgages and deposits. The level of interest in investments and purchasing any other additional banking products was quite low.

Our study has some limitations. However, the study could be perceived as a good inspiration and motivation for managing relationships with bank customers.

The further research will be focused on theoretical possibilities of the quantification dependence of additional purchases of banking services or products on the loyalty of bank customer.

*Authors are thankful to the Internal Grant Agency of FaME TBU No. 005/IGA/FaME/2014: Optimization of parameters of the financial performance of the commercial bank, for financial support to carry out this research.*

*Authors are thankful to the Internal Grant Agency of FaME TBU No. 000/IGA/FaME/2015: Potential growth opportunities of commercial banks' financial performance in the context of SME credit risk and customers' satisfaction, for financial support to carry out this research.*

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## **EFFICIENCY OF CZECH AND SLOVAK INSURANCE COMPANIES EVALUATED BY DEA MODELS**

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### **Abstract**

The paper compares the efficiency of commercial insurance companies in Slovakia and the Czech Republic on the common insurance market. The aim was to express the efficiency score of the insurance companies by two models and divide the insurance companies into groups based on these two models. The resulting comparisons and classification may be part of benchmarking and may have practical benefits for the insurance companies. In addition to the relative comparison of their efficiency, it will provide information on the need to modify their indicators and may lead to improving their management performance. DEA models were used to evaluate efficiency. Five out of the thirty-two insurance companies were efficient. On the Czech insurance market, three insurance companies were efficient: BNP Paribas Cardif Pojišťovna, a.s.; Kooperativa, pojišťovna, a.s.; Komerční pojišťovna, a.s.. On the Slovak insurance market, two insurance companies were efficient Poist'ovňa Poštovej banky, a.s.; Rapid life životná poisťovňa, a.s.. The result of using the cluster analysis and factor analysis is the formation of two other clusters. One cluster is formed by five efficient insurance companies and ten insurance companies with above average values of input-oriented efficiency scores and below average values of output-oriented efficiency scores. They would become efficient by less radical modifications of their indicators.

*Keywords: insurance market, commercial insurance companies, benchmarking, DEA models, input-oriented BCC models, output-oriented BCC models*

JEL Classification: G22, C44

### **1 INTRODUCTION**

Insurance market belongs to a financial system. Financial system is the heart of each market economy. The international concept of insurance (and especially reinsurance) operations brings a certainty and helps to balance the economic results. (Nečas & Čejková, 2014)

Commercial insurance companies are important actors on the insurance market. Fundamental role of the insurance companies is to relay the risk of their clients. (Majtanová et al., 2009) Strong competition forces them to seek opportunities for improving their position on the market. One possible way of determining increasing competitiveness is analysing the efficiency of insurance companies in relation to other insurance companies.

The efficiency of insurance companies can be evaluated using several quantitative methods. One possible approach is using Data Envelopment Analysis (DEA) models. There are several primary and alternative DEA models. In our analysis we will use radial models.

The application of DEA models may be part of benchmarking and may have practical benefits for the insurance companies. In addition to the relative efficiency comparison, it will also provide information on the need to modify their indicators and may lead to improving their management performance.

The characteristic of DEA models were introduced by Charnes, Cooper, and Rhodes (1978). In 1984 the BCC model under condition of variable returns to scale was drawn up by Banker, Charnes, and Cooper (1984).

In the Czech Republic and Slovakia several scientists deal with the model of data envelopment analysis. Jablonský and Dlouhý (2004) in *Models for Evaluation of Efficiency of Production Units* focused on the specification of basic and alternative models. Stavárek (2005) evaluated bank efficiency in the Group of Visegrad countries. Repková (2013) evaluated bank efficiency of the Czech Republic.

From the extensive research devoted to the efficiency of insurance companies, the results of Diaconis (2001) should be mentioned. Diaconis compiles the efficiency of 431 insurance institutions from six European countries, namely from France (64 insurance companies), Germany (121 insurance companies), from Italy (27 insurance companies), the Netherlands (31 insurance companies), from Switzerland (22 insurance companies) and from Great Britain (166 insurance companies) and published them in *The Efficiency of UK General Insurance Companies*.

At the present there are several authors in the SR and CR devoting their attention to insurance market. Experts on the insurance market are Čejková and Majtanová. Čejková deals with the specification of the insurance market and insurance in the Czech Republic and in Slovakia. Majtanová is devoted to the theory and practice in the insurance industry.

## **2 AIMS AND METHODS**

In the analysis we focus on the efficiency of commercial insurance companies in Slovakia and the Czech Republic on the common insurance market in terms of production. Our aim is to express the efficiency score of insurance companies using two efficiency models and to divide insurance companies into groups based on these two models.

We will focus on expressing the efficiency score assuming there are variable returns to scale (BCC). We will apply

- input-oriented BCC models
- output-oriented BCC models.

The scores expressed by both models will enable us to assess the status of insurance companies in terms of inputs and outputs. Their relative position in the models may vary. However, using both models is important due to the complexity of evaluating their position on the insurance market.

In this paper, we focus on the efficiency of production activities of insurance companies. The main production income of insurance companies is earned premiums. The basic costs of commercial insurance companies are costs of claims and benefits and operational expenses. Therefore, inputs in the models are the costs of claims and benefits and operational expenses, the output are earned premiums. We will use the EMS program to express the efficiency score. The values will be taken from the database of the Czech Insurance Association (2013) and annual reports of individual insurance companies (2013).

The resulting values of efficiency scores will be subject to further analysis. Our aim will be to divide all analysed insurance companies into groups based on the similarity of their determined efficiency scores. We expect to find a group of insurance companies which will have to perform a more radical modification of their inputs and outputs in order to become efficient, and a group of insurance companies requiring a less radical modification of their



inputs and outputs. The resulting values will be part of benchmarking. We will evaluate the similarity of insurance companies based on cluster analysis. The output will be a graphic representation in form of a dendrogram.

## 2.1 DEA Models

DEA models belong to quantitative models designed to express the relative efficiency of the analysed subjects. The subjects analysed by DEA models are called Decision Making Units. Decision Making Unit is to be rated as fully efficient on the basis of available evidence if and only if the performances of other Decision Making Units does not show that some of its inputs or outputs can be improved without worsening some of its other inputs or outputs. (Bogetoft & Otto, 2011)

At the beginning of the analysis indicators of these Decision Making Units are divided into two groups - inputs and outputs. Inputs meet the minimization criterion and outputs meet the maximization criterion. Assuming there are variable returns to scale, radial models known as BCC models are used. Models based on linear programming transform multiple inputs into multiple outputs. They construct non-parametric data envelopment, which is convex. The Decision Making Units that are part of the data envelopment are efficient and their efficiency score is equal to one or 100%. The Decision Making Units that are not part of the data envelopment are called inefficient. The efficiency of inefficient Decision Making Unit is expressed by the efficiency score in relation to data envelopment. (Grmanová, 2010)

### BCC Model Oriented on Inputs

Suppose we have  $n$  homogeneous Decision Making Units  $U_1$  and  $U_n$  and we observe  $r$  outputs and  $m$  inputs. We will denote the input matrix  $\mathbf{X} = \{x_{ij}, i = 1, \dots, m, j = 1, \dots, n\}$ . The output matrix will be denoted  $\mathbf{Y} = \{y_{ij}, i = 1, \dots, r, j = 1, \dots, n\}$ . The dual BCC model oriented on inputs in matrix form has a shape

$$\min z = \theta_q - \varepsilon(\mathbf{e}^T \mathbf{s}^+ + \mathbf{e}^T \mathbf{s}^-), \quad (1)$$

subjects to  $\mathbf{X}\lambda + \mathbf{s}^- = \theta_q \mathbf{x}_q,$

$$\mathbf{Y}\lambda - \mathbf{s}^+ = \mathbf{y}_q,$$

$$\mathbf{e}^T \lambda = 1,$$

$$\lambda, \mathbf{s}^+, \mathbf{s}^- \geq \mathbf{0},$$

(Banker, Charnes, & Cooper, 1984)

where  $\theta_q$  is the efficiency score of the Decision Making Unit  $U_q$ ,  $\mathbf{s}^+, \mathbf{s}^-$  are the deviation variables,  $\lambda$  is the matrix of weights,  $\mathbf{e}^T = (1, \dots, 1)$ ,  $\varepsilon$  is the infinitesimal constant.

Target values of inputs and outputs to achieve efficiency can be obtained in one of two ways:

1.  $\mathbf{x}_q' = \mathbf{X}\lambda^*$ ,  $\mathbf{y}_q' = \mathbf{Y}\lambda^*$ , where  $\lambda^*$  is the vector of optimal values of weights calculated by the model, and

2.  $\mathbf{x}_q' = \theta_q^* \mathbf{x}_q - \mathbf{s}^{-*}$ ,  $\mathbf{y}_q' = \mathbf{y}_q + \mathbf{s}^{+*}$ , where the symbols labelled \* are vectors of optimal variable values in the input-oriented BCC model. (Jablonský & Dlouhý, 2004)

### BCC Model Oriented on Outputs

Suppose we have  $n$  homogeneous Decision Making Units  $U_1$  and  $U_n$  and we observe  $r$  outputs and  $m$  inputs. We will denote the input matrix  $\mathbf{X} = \{x_{ij}, i = 1, \dots, m, j = 1, \dots, n\}$ . The output

matrix will be denoted  $\mathbf{Y} = \{y_{ij}, i = 1, \dots, r, j = 1, \dots, n\}$ . The dual BCC model oriented on outputs in matrix form has a shape

$$\max \quad g = \phi_q + \varepsilon(\mathbf{e}^T \mathbf{s}^+ + \mathbf{e}^T \mathbf{s}^-), \quad (2)$$

subjects to  $\mathbf{X}\boldsymbol{\lambda} + \mathbf{s}^- = \mathbf{x}_q$ ,

$$\mathbf{Y}\boldsymbol{\lambda} - \mathbf{s}^+ = \phi_q \mathbf{y}_q,$$

$$\mathbf{e}^T \boldsymbol{\lambda} = \mathbf{1},$$

$$\boldsymbol{\lambda}, \mathbf{s}^+, \mathbf{s}^- \geq \mathbf{0},$$

where  $\phi_q$  is the efficiency score of the Decision Making Unit  $U_q$ ,  $\mathbf{s}^+, \mathbf{s}^-$  are the deviation variables,  $\boldsymbol{\lambda}$  is the matrix of weights,  $\mathbf{e}^T = (1, \dots, 1)$ ,  $\varepsilon$  is the infinitesimal constant.

Target values of inputs and outputs to achieve efficiency can be obtained in one of two ways:

1.  $\mathbf{x}_q' = \mathbf{X}\boldsymbol{\lambda}^*$ ,  $\mathbf{y}_q' = \mathbf{Y}\boldsymbol{\lambda}^*$ , where  $\boldsymbol{\lambda}^*$  is the vector of optimal values of weights calculated by the model, and

2.  $\mathbf{x}_q' = \mathbf{x}_q - \mathbf{s}^{-*}$ ,  $\mathbf{y}_q' = \phi_q^* \mathbf{y}_q + \mathbf{s}^{+*}$ , where the symbols labelled \* are vectors of optimal variable values in the output-oriented BCC model. (Jablonský & Dlouhý, 2004)

### **Multivariate Exploratory Techniques**

Multivariate exploratory techniques include principal component analysis, factor analysis, cluster analysis, canonical correlation analysis, etc.

The aim of the principal component analysis is to simplify the description of a group of linearly interdependent or correlated variables. It is a method of linear transformation of the original variables into new, uncorrelated variables, which are called principal components. Each principal component is a linear combination of the original variables. Principal components are ranked according to decreasing variance.

The main focus of the factor analysis is to reduce redundant information in multiple correlated variables. The aim of the method is to describe latent properties of the structure of a set of variables using a small number of mathematically constructed characteristics. (Nábělková & Hitka, 2007) These characteristics are uncorrelated and are called factors or dimensions. The output of the cluster analysis is the estimated values of factor loadings and the estimated factor score. Factor loadings of variables (saturation) express the correlation between the variables and factors. Based on the values of the factor loadings it is possible to determine a group of variables for each factor that correlate the most with it. The factor score estimation is the estimation of values that the factors acquire for individual objects. If the factors poorly correlate with a greater number of original variables, their interpretation is made impossible. The solution is factor rotation. There are several factor rotation techniques. It is recommended to use the technique providing the simplest interpretation.

The aim of the principal component analysis and factor analysis is to reduce the dimensionality of a group of data. The main difference between them is that principal component analysis explains the variability of variables and factor analysis explains the correlation between variables. In contrast to principal component analysis, by factor analysis we try to explain the dependence of variables. (Meloun, Militký, & Hill, 2012) Principal component analysis explains all variability between original variables. Factor analysis explains only the variability which is common for all variables. (Rimarčík, 2007) The

disadvantages of factor analysis include for example factor uncertainty, where each object can be quantified by various factor scores.

Cluster analysis belongs to multi-dimensional exploration techniques, by which subjects are grouped into groups - clusters - based on their similarities and differences. The clusters are formed in a way to achieve the greatest possible similarity among subjects within a cluster and at the same time to achieve the greatest difference between subjects in different clusters. The distance between the objects is expressed by various ways. One of them is the Euclidean distance. (Minařík, Borůvková, & Vystrčil, 2013)

For an  $m$ -dimensional space, the Euclidean distance  $d_{AB}$  between  $A = x_1, x_2, x_3, \dots, x_m$  and  $B = y_1, y_2, y_3, \dots, y_m$  will express

$$d_{AB} = \sqrt{\sum_{k=1}^m (y_k - x_k)^2}. \quad (3)$$

Important assumption of the cluster analysis is the use of standardised variables. Based on the organisation of objects into clusters, we distinguish hierarchical and non-hierarchical methods of cluster analysis. Hierarchical methods are based on individual objects and by their linking the number of clusters decreases. They lead to a tree structure depicted as a dendrogram. There are several methods of linking – Single Linkage, Complete Linkage, Unweighted Pair-group Average, etc. Non-hierarchical methods do not produce a tree structure. They link objects into a non-hierarchical system of clusters, which are formed by successive decomposition of a group of objects into sets. The first step is the choice and selection of the seed cluster, which is the initial cluster centre.

Using cluster analysis is associated with risks. These may include, for example, that the number of clusters is the result of the analyst's consideration. Clusters may not arise. Various clustering methods can lead to different results.

### **3 RESULTS**

Our paper is focused on the analysis of thirty-two commercial insurance companies on the common Slovak and Czech insurance market. Out of this number, seventeen insurance companies were from the Czech insurance market and fifteen insurance companies were from the Slovak insurance market. We used the values found in annual reports of these insurance companies (2013) and in the database of the Czech Insurance Association.

We expressed descriptive statistics of the outputs and inputs and compared their variability using the coefficient of variation. The values are shown in Table 1. The arithmetic mean was influenced mainly by high values of a small number of insurance companies. The greatest variability expressed by the coefficient of variation had the claims incurred. Operational expenses had the lowest variability. The expression of descriptive statistics shows that the distribution of the probability of inputs and outputs is asymmetrical.

Tab. 1 – Descriptive statistics analyzed parameters. Source: own calculations in Statistica

	Arithmetic mean of thousands EUR	Median of thousands EUR	Standard deviation	Coefficient of variation in %
Earned premiums	189354,1	110700,5	234704,2	124,0
Claims incurred	127474,6	67378,0	168964,8	132,5
Operational expenses	52617,7	27444,5	60733,8	115,4

### 3.1 Efficiency Scores by Input and Output - Oriented BCC Models

In the next step

- we expressed the efficiency score in the input-oriented BCC model;
- we ranked insurance companies based on their efficiency score in the input-oriented BCC model;
- we expressed efficiency score in the output-oriented BCC model;
- we ranked insurance companies based on their efficiency score in the output-oriented BCC model.

The resulting values are shown in Table 2. Five out of the thirty-two insurance companies were efficient. On the Czech insurance market, three insurance companies were efficient: BNP Paribas Cardif Pojišťovna, a.s.; Kooperativa, pojišťovna, a.s.; Komerční pojišťovna, a.s.. On the Slovak insurance market, two insurance companies were efficient Poist'ovňa Poštovej banky, a.s.; Rapid life životná poisťovňa, a.s.. Interestingly, the insurance company Allianz – Slovenská poisťovňa, a.s., which has long been one of the leaders on the insurance market, was not efficient. Similarly, KOOOPERATIVA poisťovňa, a.s. Vienna Insurance Group, which also has long belonged to the leaders on the Slovak insurance market, was not efficient. A total of twenty-seven insurance companies were not efficient. The efficiency score in the input-oriented models was less than 100%. The value of the efficiency score determines the percentage to which the insurance company has to reduce its inputs in order to become efficient. The higher the value of the efficiency score, the more favourable for the insurance company.

The efficiency score in the output-oriented models was greater than 100%. The value of the efficiency score determines to what percentage the insurance company has to increase its outputs in order to become efficient. The lower the value of the efficiency score, the more favourable for the insurance company. The ranking of insurance companies on the common insurance market was determined based on both efficiency scores.

Tab. 2 – Efficiency score by BCC models. Source: own calculations in EMS

	Insurance companies	Efficiency score in the input-oriented model (%)	Ranking	Efficiency score in the output-oriented model (%)	Ranking
1	Allianz pojišťovna, a.s.	74,4	13	118,5	10
2	AXA životní pojišťovna a.s.	79,5	10	124,8	11-12

3	BNP Paribas Cardif Pojišťovna, a.s.	100,0	1-5	100,0	1-5
4	Česká pojišťovna, a.s.	82,4	8	115,5	8
5	Česká podnikatelská pojišťovna, a.s.	48,5	21	167,7	16
6	ČSOB Pojišťovna, a.s. člen holdingu ČSOB	42,2	26	146,6	15
7	ERGO pojišťovna, a.s.	65,0	16	226,1	25
8	Generali Pojišťovna, a.s.	42,8	25	174,7	18
9	Hasičská vzájemná pojišťovna, a.s.	80,1	9	168,2	17
10	ING Životní pojišťovna N.V., pobočka pro Českou republiku	24,5	32	210,5	23
11	Kooperativa, pojišťovna, a.s.	100,0	1-5	100,0	1-5
12	Komerční pojišťovna, a.s.	100,0	1-5	100,0	1-5
13	MAXIMA pojišťovna, a.s.	86,4	6	115,8	9
14	MetLife pojišťovna a.s.	39,0	30	255,0	29
15	Pojišťovna České spořitelny, a.s., Vienna Insurance Group	73,9	15	112,5	7
16	UNIQA pojišťovna, a.s.	46,4	24	209,7	21
17	Wüstenrot, životní pojišťovna, a.s.	59,5	18	248,3	28
18	Allianz - Slovenská poisťovňa, a.s.	84,8	7	110,6	6
19	ČSOB Poist'ovňa, a.s.	74,0	14	134,6	14
20	ERGO Poist'ovňa, a.s.	76,6	11	261,2	30
21	Generali poisťovňa, a.s.	40,6	28	232,7	26
22	ING Životná poisťovňa, a.s.	37,2	31	267,9	31
23	KOMUNÁLNA poisťovňa, a.s. Vienna Insurance Group	40,5	29	220,8	24
24	KOOPERATIVA poisťovňa, a.s. Vienna Insurance Group	62,9	17	124,8	11-12
25	MetLife Amslico poisťovňa, a.s.	41,0	27	239,1	27
26	Poisťovňa Cardif Slovakia, a.s.	76,5	12	130,7	13
27	Poisťovňa Poštovej banky, a.s.	100,0	1-5	100,0	1-5
28	Poisťovňa Slovenskej sporiteľne, a.s. Vienna Insurance Group	46,9	23	272,3	32
29	Rapid life životná poisťovňa, a.s.	100,0	1-5	100,0	1-5
30	Union poisťovňa, a.s.	47,6	22	210,0	22
31	UNIQA poisťovňa, a.s.	51,1	20	189,4	19
32	Wüstenrot poisťovňa, a.s.	51,8	19	192,2	20

*Note: MetLife Amslico poisťovňa, a.s., Rapid life životná poisťovňa, a.s. did not publish prescribed premiums but earned premiums in their annual premiums.*

### **3.2 Similarity of Insurance Companies**

In respect of the efforts to develop typologies of insurance companies on the basis of their achieved efficiency scores, we applied the methods factor analysis and cluster analysis. Due to the asymmetric probability distribution of the variables, we used log-normal transformation. In factor analysis, we used principal components as the method of extracting.

The result was the factor explaining 88.68% of the variance. The own number was 1.773569. Factor loading of the input-oriented efficiency score was 0.941692. Factor loading of the output-oriented efficiency score was -0.941692. Values of the factor score for each insurance company analysed, designated by a number as in Table 2, are shown in Table 3.

Tab. 3 – Factor scores in factor analysis. Source: own calculations in Statistica

	1	2	3	4	5	6	7	8	9	10	11
Factor score	0,749	0,767	1,428	0,934	-0,385	-0,383	-0,413	-0,625	0,330	-1,704	1,428

Tab. 3 – Factor scores in factor analysis - continuation of the table. Source: own calculations in Statistica

	12	13	14	15	16	17	18	19	20	21	22
Factor score	1,428	0,998	-1,326	0,818	-0,783	-0,680	1,040	0,551	-0,394	-1,131	-1,467

Tab. 3 – Factor scores in factor analysis - continuation of the table. Source: own calculations in Statistica

	23	24	25	26	27	28	29	30	31	32
Factor score	-1,056	0,431	-1,157	0,642	1,428	-1,160	1,428	-0,749	-0,492	-0,495

Positive values of the factor score had insurance companies that achieved above-average value of the input-oriented efficiency score and below-average value of the output-oriented efficiency score. They would become efficient by less radical modifications of their indicators. Negative values of the factor score had insurance companies that achieved below-average value of the input-oriented efficiency score and above-average value of the output-oriented efficiency score. The smallest difference in values was in the case of UNIQA poisťovňa, a.s, and Wüstenrot poisťovňa, a.s. The lowest value was achieved by ING životní poisťovňa.

We used cluster analysis to analyze similarity. We applied hierarchical clustering in order to create a certain typology of insurance companies with respect to the achieved efficiency scores. For linking clusters we used the method Single linkage (Nearest neighbour), where the distance between two clusters is determined as the distance between the two closest members.

The aim was to determine the similarity of insurance companies based on their efficiency scores and divide insurance companies into groups. The results are shown in Figure 1. Insurance companies are designated by serial numbers listed in Table 2.

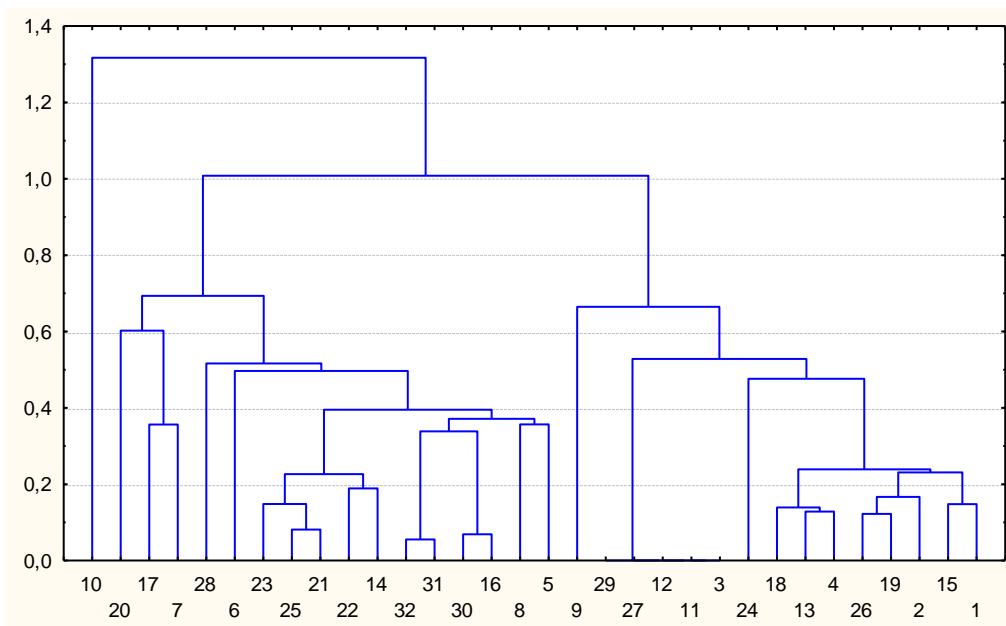


Fig. 1 – Dendrogram. Source: own processing in Statistica

The result of using the cluster analysis is the formation of two other clusters. One cluster is formed by five efficient insurance companies and ten insurance companies with above average values of input-oriented efficiency scores and below average values of output-oriented efficiency scores. They would become efficient by less radical modifications of their indicators. This group includes insurance companies which were able to better transform their inputs into outputs. On the Czech insurance market it is the insurance companies Allianz pojišťovna, a.s.; AXA životní pojišťovna; Česká pojišťovna, a.s.; MAXIMA pojišťovna, a.s.; Pojišťovna České spořitelny, a.s., Vienna Insurance Group. The cluster includes also the Hasičská vzájemná pojišťovna, a.s.. On the Slovak insurance market it is the insurance companies Allianz - Slovenská poisťovňa, a.s.; ČSOB Poisťovňa, a.s; KOOPERATIVA poisťovňa, a.s. Vienna Insurance Group; Poisťovňa Cardif Slovakia, a.s.. The second cluster is formed by insurance companies which are not efficient and do not belong to the former group. These insurance companies would become efficient by a more radical modification of their inputs and outputs. Special positions in this cluster have ING Životní pojišťovna N.V., pobočka pro Českou republiku, that achieved the least value of the efficiency score in the input-oriented model.

The comparison showed that this insurance company should focus mainly on increasing its output-earned premiums.

By comparing the output of factor analysis and cluster analysis we can conclude that the two main clusters of insurance companies are formed by the same insurance companies. Insurance companies with the smallest Euclidean distance in the cluster analysis have the smallest differences between factor scores in the factor analysis. The insurance company that has the efficiency scores the least similar to other insurance companies in the cluster analysis has the lowest values of the factor score in factor analysis.

## 4 DISCUSSION

DEA models are very useful in assessing efficiency. Their application in research is extensive. This is evidenced by many scientific studies. A part of such studies deals with their application for the insurance industry. The survey focused on assessing efficiency is, in

addition to quantitative methods, often supplemented by statistical methods. Examples of such methods are tests aimed at testing the differences in the probability distribution and thus detecting differences between various groups. For example, Diaconis (2001) used the Kruskal-Wallis test. In our paper, we focus on the application of the data envelopment analysis models supplemented by the cluster analysis, which belongs to multivariate statistical methods.

We focused on the use of these methods in the insurance industry, especially in view of benchmarking. We used a combination of approaches – input-oriented BCC models, output-oriented BCC models and statistical methods.

When assessing effectiveness, however, several kinds of quantitative methods can be used. Each application has its specific advantages and disadvantages. One very important aspect is controllability. On a very specific level, ease of interpretation is also important. (Bogetoft & Otto, 2011) The advantage of the BCC models is that they provide information on how to adjust inputs or outputs to make the Decision Making Unit effective. Interpretation in this case is ease.

Their disadvantage BCC models is that they can not effectively eliminate the negative impact of random errors and the results are highly affected by the choice of inputs and outputs.

## **5 CONCLUSION**

In this paper, we focused on assessing the efficiency of insurance companies on the common Slovak and Czech insurance market.

Expressed efficiency scores were used to rank insurance companies on the insurance market on the basis of their transformation of inputs into outputs. When ranking the insurance companies, it is important to express their ranking in input-oriented BCC models and in output-oriented BCC models. By performing cluster analysis it is possible to obtain a broader view of the benchmarking of these insurance companies.

### **Acknowledgement**

*The paper is a part of the project supported by the Ministry of Education, Science, Research and Sport of the Slovak Republic, VEGA 1/0208/14 Insurance market and efficiency of insurance companies.*

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## **COMPARISON OF CZECH AND SLOVAK PUBLIC ADMINISTRATION APPROACH TO THE CONCEPT OF EU COHESION POLICY IMPLEMENTATION FOR THE PROGRAMMING PERIOD 2014 - 2020**

*Oldřich Hájek, Lenka Smékalová*

### **Abstract**

Programming period of the European Union for the years 2007 - 2013 enabled the Czech Republic to utilize up to EUR 26.7 billion within the frame of EU economic and social cohesion policy. Similarly, the Slovak Republic was able to support its development in this period by using up to EUR 11.7 billion. During the implementation of this coordinated EU policy public administration institutions in the Czech and Slovak gained substantial experience. The aim of this article is to present the approaches of the Czech and Slovak public administration to the concept of implementation of EU cohesion policy for the programming period 2014 - 2020. This is once more a great opportunity for the Czech and Slovak governments as in this period. The above mentioned countries may gain up to EUR 23.9 billion and EUR 15.5 billion respectively in order to enhance their own development.

*Keywords: public administration, European Union Cohesion Policy, EU Structural Funds*

JEL Classification: O18, R12, R58

### **1 INTRODUCTION**

Cohesion Policy of the European Union or the policy of economic and social cohesion of the EU has been for many years well-established coordinated policy at the European level. Member States and their governments actively participate in the implementation of this policy and within its framework present various types of development projects. During the seven year lasting programming period it is possible to draw funds from the structural funds or other instruments to support these projects. Governments of the Czech and Slovak Republic were confronted with the economic and social cohesion of the EU before the accession year of 2004 and the success of the politicians in acquiring necessary funds for development represents a part of their public popularity (Horváth and Machyniak, 2014). The pre-accession period, which denotes the meantime between the full membership of these countries in the EU and the date of application, these countries could benefit from EU pre-accession funds. These specific tools were aimed at support of projects including the implementation of European legislation, i.e. *acquis communautaire*, into national legislation, also projects concerning transport and the environment (see e.g. Sedelmeier 2011, Scherpereel 2010). In the period before joining the EU fundamental changes had to take place in the primary and secondary sector, which, especially after the accession to the EU, faced tougher competition in an open EU market (Baldwin, Francois and Portes 1997, Fuller 2002). A large part of the funds from the pre-accession instruments was oriented on the training of employees of public administration institutions, transfer of experience and examples of good practice in the implementation of EU policies within the local and national conditions, and in twinning programmes, aimed at increasing the skills of the individual officials. PHARE (Poland and Hungary Aid for Restructuring of the Economy), ISPA (Instrument for Structural Policies for Pre-Accession) and SAPPARD (Special Accession Programme for Agriculture and Rural

Development) are among the most important pre-accession instruments in the period ending by the 2004 accession of the Czech and Slovak Republic (Bízikova et al. 2004, Marek and Baun 2002, Kluvánková-Oravská 2004). Implementation of these pre-accession instruments significantly eased the preparation of the Czech and Slovak Republic accession to the European Union and helped them emerge as a part of Visegrad convergence club as identified by Gligoric (2014). Based on experience from this particular period governments of the Czech and Slovak Republic prepared the concepts of funds drawing in each of the following programming periods. The aim of this article is to present the approaches of the Czech and Slovak public administration to the concept of implementation of EU cohesion policy for the programming period 2014 – 2020.

## **2 TOWARDS PROGRAMMING PERIOD OF COHESION POLICY OF THE EUROPEAN UNION**

In the shortened programming period 2004 - 2006 the government of the Czech Republic prepared the implementation of EU cohesion policy by means of five operational programmes, one of which was introduced as a joint Regional Operational Programme, other tools of this period included community initiatives and two single programming documents (Blažek 2003, Blažek and Vozáb 2006). The Czech Republic also had access to the Cohesion Fund and within the three objectives the Czech Republic could acquire development support up to EUR 2.6 billion (Viturka et al. 2009, Grebeníček 2012). In the same programming period 2004 - 2006 the Slovak government could also draw the funds from the policy of economic and social cohesion of the EU. The Slovak public administration prepared the following concept using these tools - 4 operational programmes, two single programming documents, Community Initiatives and as well as the Czech Republic Slovakia too had accession to the Cohesion Fund (Kraftová, 2008). Thus in the period 2004 – 2006 Slovakia could draw up to EUR 1.05 billion for development support of its territory.

The following programming period for the years 2007 - 2013 brought so far unprecedented opportunity for the both countries to obtain European support for the implementation of projects in their territories. In the Czech Republic the public administration prepared to implement cohesion policy of the European Union within all three available objectives. Within the Convergence objective seven new regional operational programmes were prepared and the implementation ensured by a completely new public authority - the regional councils, thus reflecting the fact that the competitiveness and disparities is question of more administrative levels within a national state (Bachtler et al. 2007, Ivanová 2013). Eight more thematic operational programmes were prepared to be implemented in the entire territory of the Czech Republic, excluding the capital city of Prague, this again within the Convergence objective. For the objective Regional Competitiveness and Employment two operational programmes were prepared and for the third objective, European territorial cooperation, nine operational programmes existed. The total amount available to the Czech Republic in Structural Funds and the Cohesion Fund for period 2007 - 2013 amounted to 26.2 billion Eur, a significant amount which somewhat cushioned the negative external effects (Clowes and Bilan 2014). The Slovak Republic implemented cohesion policy in this period during the same objectives as the Czech Republic. The Slovak government elected to prepare 11 operational programmes financed by the Structural Funds and the Cohesion Fund, with a total financial allocation of 11.4 billion Eur (Charvát et al., 2013). This programming period constituted a major challenge for the governments of both countries. On the one hand there was the responsibility of preparing a sufficient absorption capacity of the entities within their territories in order to make maximum use of the European funds, on the other hand both governments had to prepare adequate control mechanisms to support truly beneficial projects,

as well as ensure adequate legal environment for the entire mechanism of drawing EU funds (Ferry and McMaster 2005, Cartwright and Batory 2012). How then was the conceptual preparation of public administration institutions of both countries reflected in the actual implementation of EU cohesion policy?

### **3 CZECH AND SLOVAK REPUBLIC - EMPIRICAL EVALUATION OF THE PROGRAMMING PERIOD 2007-2013**

Assessment of the situation in the Czech Republic is based on an analysis of 32 800 projects, which were recorded in the relevant sources as of March 2013 and the total amount allocated to these projects amounted to CZK 355.6 billion. The first step of the analysis focused on the evaluation of the financial allocation of the EU funds within individual types of supported regions as determined by the location of project implementation, where the aggregated values obtained were recalculated per 1 inhabitant of the territory. Table 1 presents the main results in this regard:

- Regions with concentrated state support reported slightly lower allocation of financial resources of the European Union per 1 inhabitant than is the case in the regions not included in this category.
- Within the sub-types of regions with concentrated state support the lowest financial allocation of the European Union per 1 inhabitant is recorded in the economically weak regions, financial allocations for the other two types of regions with concentrated state support is higher.

Figure 1, completed via ESRI ArcGIS software, complements the above mentioned conclusions with the observation that there are also differences between regions with concentrated state support. This way regions with concentrated state support can be identified in which the financial allocation of EU funds exceeds the national average of CZK 43 954 per 1 inhabitant. Most of these regions, however, do not reach this value. So far, these claims are consistent with the findings published by Hájek et al. (2012), which were formulated using a similar methodology applied to a lower number of projects (as of April 2011).

Tab. 1 – Allocation of EU funding per 1 inhabitant by the type of supported region; evaluation by location of project implementation site (as of March 2013). Source: Authors' calculations based on data by Centre for Regional Development of the CR, Ministry of Regional Development and Czech Statistical Office

Type of region	Financial allocation (CZK)
Regions with concentrated state support	46 933
- structurally affected	48 693
- economically weak	39 699
- affected by high unemployment	55 579
Other regions	49 345

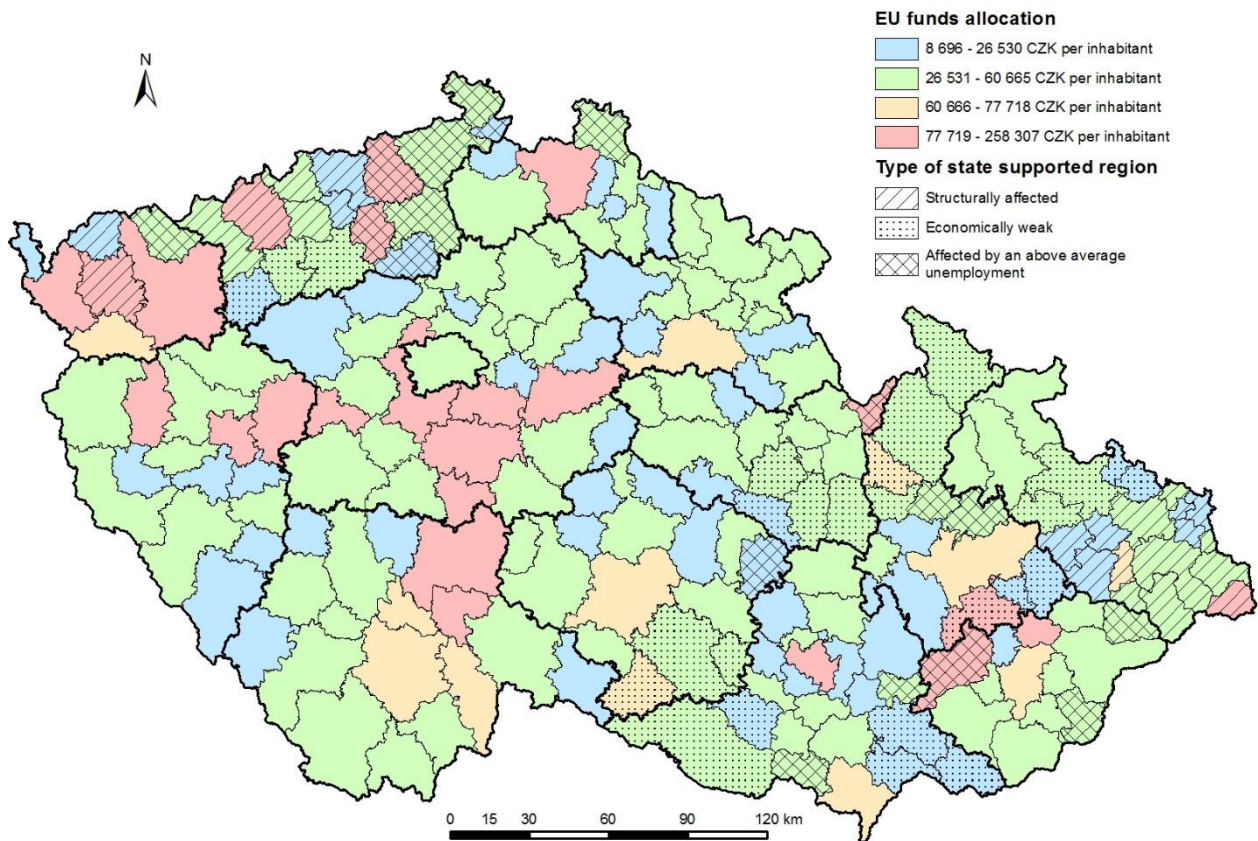


Fig. 1 – EU funding per 1 inhabitant in municipalities with extended scope of powers across supported region type; evaluation by location of project implementation site (as of March 2013). Source: Authors', based on Regional Information Service data, Czech Statistical Office for number of inhabitants

Tables 2 and 3 show the results of evaluation of the structure of the EU funds financial allocation within individual types of the state supported regions with regards to the institutional sector (table 2) and with regards to the thematic focus of the projects (table 3). The following facts may be derived from the tables:

- Public institutions, primarily the central public institutions, are the main recipient of EU funds. The structure of the financial allocation of these funds as dispersed among the different types of state supported regions is similar. The most significant difference can be seen in the case of a higher share of local government on financial allocation of EU funds in the economically weak regions at the expense of lower share of the central government.
- In terms of thematic focus of the projects some differences can be observed in the structure of the financial allocation of EU funds between structurally affected regions on one side and the other regions on the other. Thus, the first type of regions is characterized by a higher share of financial allocations in transport infrastructure and services topic, while the second type of regions have higher proportion of financial allocation in the research, development, innovation or development of human resources.

Tab. 2 – Financial allocation in the Czech Republic, structure by regional type and institutional sector; evaluation by location of project implementation site (as of March 2013). Source: Authors' calculations based on data by Centre for Regional Development of the CR and Ministry of Regional Development

Institutional sector	Regions with concentrated state support				Other regions
	Total	1*	2**	3***	
Local government	31.7 %	29.6 %	37.5 %	28.5 %	27.4 %
Non-profit non-government	3.9 %	4.8 %	2.6 %	3.7 %	3.5 %
Private	21.5 %	20.5 %	23.6 %	20.7 %	17.1 %
Central government	42.9 %	45.1 %	36.3 %	47.1 %	51.9 %

\* 1 – Structurally affected regions

\*\* 2 – Economically weak regions

\*\*\* 3 – Regions affected by high unemployment

Tab. 3 – Financial allocation in the Czech Republic, structure by regional type and thematic focus; evaluation by location of project implementation site (as of March 2013). Source: Authors' calculations based on data by Centre for Regional Development of the CR and Ministry of Regional Development

Thematic focus of projects	Regions with concentrated state support				Other regions
	Total	1*	2**	3***	
Transport infrastructure and services	40.6 %	39.5 %	39.5 %	43.8 %	30.2 %
Effective public administration and services	15.0 %	15.3 %	13.3 %	16.7 %	13.9 %
Environmental infrastructure and human resources	10.0 %	7.1 %	15.0 %	9.2 %	9.2 %
Human resources development	7.0 %	7.2 %	7.5 %	5.8 %	10.2 %
Enterprise environment development	8.9 %	9.4 %	7.8 %	9.1 %	10.0 %
Social infrastructure and social development aspects	5.3 %	5.6 %	4.9 %	5.3 %	5.5 %
Research. development and innovation	13.3 %	15.9 %	12.1 %	10.0 %	20.9 %

The Slovak Republic evaluation is based on the analysis of a total of 7,500 projects which were recorded in the relevant sources as of March 2013 and that the total with total value of the projects amounting to EUR 912 million. The first step of the analysis, as in the case of the Czech Republic, focused on the evaluation of the financial allocation of EU funds within individual types of state supported regions, depending on the site of the project implementation. The aggregated values obtained were recalculated per 1 inhabitant of the territory. Table 6 presents the main results in this regard:

- The growth poles of Slovakia have higher financial allocations from the European Union funds per 1 inhabitant than the municipalities not included in the growth poles category.

- As for the sub-types of the growth poles larger financial allocation per inhabitant is concentrated in the innovative growth poles, the cohesion growth poles are characterized by smaller allocation.

Figure 2, completed via ESRI ArcGIS software, adds to the above mentioned conclusion with the observation that there are also differences between the growth poles. As present in the case of the Czech Republic, there are municipalities not classified as growth poles, which have relatively high financial allocations from the European Union per 1 inhabitant.

Tab. 4 – Financial allocation of EU funds in Slovakia, structure by regional type; evaluation by location of project implementation site (as of March 2013). Source: Authors’ calculations based on data by Central register of contracts maintained by Government Office of the Slovak Republic, Central Coordination Authority and Statistical Office of the Slovak Republic for number of inhabitants

Municipality type	Financial allocation (€)
Growth poles	1 376
- innovation growth poles	1 440
- cohesion growth poles	1 287
Other municipalities	966

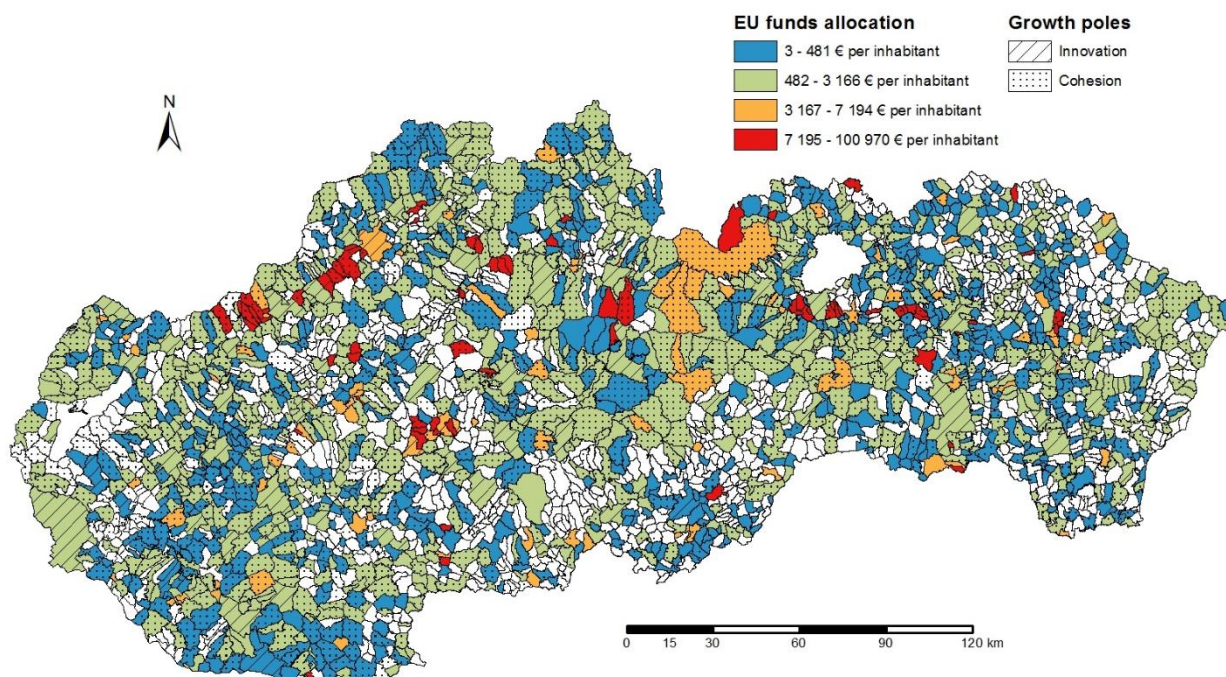


Fig. 2 – EU funding per 1 inhabitant in municipalities across growth pole type; evaluation by location of project implementation site (as of March 2013). Source: Authors’ based on data by Central register of contracts maintained by Government Office of the Slovak Republic, Central Coordination Authority and Statistical Office of the Slovak Republic for number of inhabitants

Tables 5 and 6 represent, as in the case of the Czech Republic, the results of the evaluation of the EU financial allocation structure within individual types of supported regions with regards to the institutional sector (table 5) and with regards to the thematic focus of the projects (table 6). Following conclusions might be drawn based on this data:

- Evaluation by institutional sector of the beneficiary provides similar results as in the case of the Czech Republic and in Slovakia. Thus, even in the case of Slovakia are public institutions, primarily the central public institutions, the main recipients of EU funds. Also, the structure of the financial allocation of these funds by institutional sector of the beneficiary and in relation to different types of assisted regions is similar. As in the case of the Czech Republic may be the most striking difference seen in a higher proportion of local government financial allocation of EU funds in the cohesive growth poles as economically weak regions of Slovakia.
- Evaluation of the structure of the financial allocation of EU funds according to the thematic focus of the projects shows differences between the various types of assisted regions of Slovakia. The main difference can be seen between growth poles on one side and municipalities outside the growth poles on the other. In the case of the second type of cases significantly higher share in the structure of the financial allocation of EU funds for thematic focus in the area of transport and environmental infrastructure. This is in a slightly lesser extent, also in case of cohesive growth poles. Conversely innovative growth poles show a significantly higher proportion particular topic research, development and innovation, but also the issue of social infrastructure and development aspects.

Tab. 5 – Financial allocation in Slovakia, structure by regional type and institutional sector; evaluation by location of project implementation site (as of March 2013). Source: Authors' calculations based on data by Central register of contracts maintained by Government Office of the Slovak Republic, Central Coordination Authority

Institutional sector	Growth poles			Non-growth poles
	Total	Innovation	Cohesion	
Local government	30,5 %	21,1 %	45,4 %	21,9 %
Non-profit non-government	3,1 %	3,8 %	1,8 %	0,6 %
Private	15,4 %	15,9 %	14,5 %	14,6 %
Central government	51,1 %	59,2 %	38,4 %	62,9 %



Tab. 6 – Financial allocation in Slovakia, structure by regional type and thematic focus; evaluation by location of project implementation site (as of March 2013). Source: Authors' calculations based on data by Central register of contracts maintained by Government Office of the Slovak Republic, Central Coordination Authority

Thematic focus of projects	Growth poles			Non-growth poles
	Total	Innovation	Cohesion	
Transport infrastructure and services	25,5 %	21,3 %	32,0 %	57,7 %
Effective public administration and services	10.2 %	8.5 %	12.9 %	6.6 %
Environmental infrastructure and human resources	19.5 %	15.6 %	25.7 %	26.5 %
Human resources development	13.3 %	13.0 %	13.6 %	1.3 %
Enterprise environment development	6.0 %	5.7 %	6.7 %	3.6 %
Social infrastructure and social development aspects	10.2 %	14.0 %	4.3 %	2.0 %
Research, development and innovation	15.3 %	22.0 %	4.8 %	2.3 %

#### **4 COMPARISON OF THE CZECH AND SLOVAK PUBLIC ADMINISTRATION APPROACH TO THE CONCEPT OF EU COHESION POLICY IMPLEMENTATION FOR THE PROGRAMMING PERIOD 2014 – 2020**

Czech and Slovak public administration already have extensive experience in preparing for implementation of an economic and social cohesion policy programming period of the European Union. Government of the Czech and Slovak Republic used these experiences in the preparation of the programming period for the years 2014 - 2020. In terms of comparison of the architectural concepts of this EU policy implementation into national frameworks the Czech Republic may use an amount of up to EUR 23.9 billion and the Slovak Republic was allocated financial framework of EUR 15.5 billion for the 2014 – 2020 period.

Czech administration prepared following operational programmes in order to obtain monetary support from the European Structural and Investment Funds: Operational Programme Transport with an allocation of EUR 4.7 billion, Integrated Regional Operational Programme with an allocation of EUR 4.6 billion, Operational Programme Enterprise and Innovation for Competitiveness was allocated EUR 4.3 billion, Operational Programme Research Development, and Education with an allocation of EUR 2.8 billion, Operational Programme Environment with an allocation of EUR 2.6 billion, Rural Development Programme with an allocation of EUR 2.3 billion, Employment Operational Programme with an allocation of EUR 2.1 billion, Operational Programme Technical Assistance with an allocation of EUR 0.22 billion, Operational Programme Prague - A Pole of Growth with an allocation of EUR 0.2 billion, and Operational Programme Fishery with an allocation of EUR 0.03 billion. Other policy instruments were also prepared in the form of eight operational programmes of cross-border or international cooperation as well as ESPON 2020 and Interact III programmes (Ministry of Regional Development, 2014).

Slovak administration prepared following programmes for drawing from European structural and investment funds: Operational Programme Research and Innovation with an allocation of EUR 2.2 billion, Operational Programme Integrated Infrastructure with an allocation of EUR 4 billion, Operational Programme Human Resources with an allocation of EUR 2 billion, Operational Programme Environmental Quality with an allocation of EUR 3.1 billion, Integrated Regional Operational Programme with an allocation of EUR 1.8 billion, Operational Program Effective Public Administration with an allocation of EUR 0.27 billion, Operational Programme Technical Assistance with allocations EUR 0.16 billion, Rural Development Programme with an allocation of EUR 1.5 billion, and Operational Programme Fishery with an allocation of EUR 0.1 billion (Slovakia, 2014). Among other instruments seven operational programmes of cross-border or international cooperation were readied as wells as Interreg, ESPON, Interact and Urbact programmes.

In this period both countries will deal with notable challenges in terms of meeting the newly required conditionalities, setting their own objective with strengthened responsibility for meeting them (Mendez, 2013), promoting economic growth in the aftermath of the economic crisis and subsequently confront the decline in wealth as reflected in viability of the companies and number of personal bankruptcies (Paseková, 2013). The countries will also have to introduce new way of using the ESIF via recoverable monetary assistance further increasing the pressure on banking sector, its security and customer treatment (Belás et al. 2013a and Belás et al. 2013b).

## **5 CONCLUSION**

Institutions of public administration in the Czech and Slovak Republic already have experience with several programming periods of the European Union cohesion policy therefore this article focused on the challenge which was presented by preparing the strategic architecture for a new programming period. In spite of the above mentioned experience the public administration at both sides of the border recorded repeated difficulties in the preparation of the programming period 2014 - 2020 and failed to ensure timely start of fund drawing. In the case of the Czech Republic the issues is further exacerbated by issues of public procurement and public service (see e.g. Jurčík, 2014). During the current period, the concept of concentration was strengthened in both countries, which may lead to increased effectiveness and efficiency of obtaining monetary resources through the defined operational programmes and thus to an increase in the overall absorption capacity of both the compared countries. Both member states belong among those ranking highest when comparing the allocation per capita. They owe this enviable position to their relatively high allocations of EUR 23.9 billion in the case of the Czech Republic and EUR 15.5 billion in case of Slovakia. The use of this funding in the Czech Republic can be summarized as strongly focused on public sector with relatively loose spatial targeting in spite of declaration of support of economically lagging regions. Moreover the differences between economically lagging regions and other regions are more visible in terms of thematic structure of the projects. In this regard the economically lagging regions are characteristic by implementing projects of lower added value concerning basic infrastructure while the economically better off region focus more prevalently on research, human resources and other types of projects with larger added value. Slovakia suffers from even more pronounced differences among the economically advanced growth poles and other economically weaker regions which are likewise characteristic by infrastructure related projects. The focus of public sector remains central in Slovakia as well as in the Czech Republic. To conclude this comparison, both states implement the EU cohesion policy of the current programming period in relatively similar

context and it will be rather interesting to see, similarly as in Chapter 3 of this text, the successful implementation of this public policy in the Czech and Slovak Republic.

### **Acknowledgement**

Authors are thankful to the Internal Grant Agency of FaME TBU No. IGA/FaME/2015/026 “Návrh modelu vzniku klastrové organizace v oblasti zemědělství v podmínkách České republiky a v oblasti designu na Slovensku” for financial support to carry out this research.

The authors are thankful to the Operational Programme Education for Competitiveness co-funded by the European Social Fund (ESF) and national budget of the Czech Republic for the grant No. CZ.1.07/2.3.00/20.0147 - “Human Resources Development in the Field of Measurement and Management of Companies, Clusters and Regions Performance”, which provided financial support for this research.

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## **RESEARCH AND DEVELOPMENT EXPENDITURE ASSESSMENT BASED ON SELECTED INDICATORS IN THE EU COUNTRIES**

*Martina Halásková, Renáta Halásková*

### **Abstract**

The paper evaluates and compares financing of Research and Development (R&D) in EU countries. Close attention is paid to the comparison of total expenditure on R&D (GERD) in EU (28) countries, including R&D expenditure based on sectors (the business enterprise sector, the government sector, the higher education sector, the private non-profit sector) in years 2004 and 2013. Results of the research provide a comparison of public expenditure on R&D in the government sector and the higher education sector in years 2004, 2009 and 2013 in EU countries (in %), and based on the R&D intensity (in % of GDP). Using the correlation analysis, further assessment of mutual relationship of total expenditure on R&D and selected R&D indicators (patents, number of publications, researchers, and GBAORD) is provided.

*Keywords: research and development, expenditure, assessment, indicators of R&D, EU countries*

JEL Classification: H59, O39

### **1 INTRODUCTION**

Research and development (R&D) play a key role in creating new knowledge, products and technological processes, which are a necessary prerequisite for a stable and sustainable economic growth within a society. R&D have become one of the central areas of national and international policies over recent years. Both EU initiatives and individual states have been paying their attention to conditions for research, development and innovations over recent decades. The level and intensity of research, development and innovations is closely connected with the economic development, the dynamics of economic development, and the structure of generating added value and employment. The strongest emphasis is put on improving the conditions of financing research, development and innovations in EU countries. Public direct and indirect support of R&D is for developed countries one of the ways of contributing to an increased competitiveness of their economies in the long-term perspective (European Commission, 2010). The policy of research and development is a standard part of the integrated system of national policies related to main areas of functioning of a society in most developed countries. This mainly concerns interconnectedness of the R&D policy with the policy of education, innovation, employment, information and the policy of industry and business. The European Research Area (ERA) concentrates its European resources associated with science, research and innovations, in order for an enhanced coordination of these activities, at the level of both member states and the EU. At the European level research faces numerous inefficiencies. These are scattered activities, isolated national research systems, low financing from public and private resources, and low investments in knowledge development. Usage of financial resources in terms of the ERA enables comparing results, conducting multidisciplinary studies, and gaining access to sources and services of “*centre excellence*” and to the most advanced technology (Delanghe, Muldur & Soete, 2009). The development of knowledge economy, trends in R&D, and relations between R&D expenditure and other indicators in EU countries are supplied by research and studies already carried out (Bojnec & Ferto, 2014; Krčál, 2014; OECD, 2014a; UNESCO-UIS, 2014).

## **2 THEORETICAL FRAMEWORK OF RESEARCH AND DEVELOPMENT**

Science, research, development and innovations are one of the numerous sources of economic growth and social welfare. From the viewpoint of macro-economy, the areas of research and development belong to the category of intensive (qualitative) sources of economic growth, i.e. they enable the increase in and improvement of the productivity based on the factors of production (European Commission, 2010). Currently, what mainly dominates the development of economies and societies is knowledge connected with research and development outputs. Significant economic indicators, such as economic growth, unemployment rate, or company competitiveness, are, according to Lelek (2014); Majerová (2014); OECD (2014a), actually dependent, to a marked extent, upon the outcomes of research and development. What is connected with the mutual relationship between inputs and outputs is the term “efficiency”, which can generally be defined as “attaining maximum results from a given volume of resources used in doing an activity (UNESCO-UIS, 2014).

Science, research and development have a significant place in areas of national economies and the public sector. Based on the demands of the public sector, science and research are placed into the category of knowledge and information. R&D focus on society as a whole, their role lies in satisfying the need for knowledge and using new information, in increasing welfare, and in boosting the standards of living (European Commission, 2010; Wildmannová, 2013). From another viewpoint, science, research and development, according to Stiglitz (1988), can be placed into the area of services. R&D is part of economic activity classification (NACE), where they belong to the section of Professional, scientific and technical activity. Elementary R&D are included in the COFOG classification (Classification of the functions of the government), being one item from the category of General public services. Related R&D are included in other items of COFOG classification (e.g. Social protection, Health, Education) (Szarowská, 2013).

An important conditions for fulfilling the Europe 2020 strategy in the area of R&D are financial capabilities of the individual countries (European Commission, 2010). The largest and most significant program that provides financing for science, research, development and innovations at the European level is for the period 2014–2020 the Horizon program (H2020). It is a framework program for research and innovations, following up on programs for research, which the EU has been announcing since as early as 1980. What is supported is the connection to the structural funds and other EU programs. In the formulation stage of the H2020 program, objectives were defined which are to be reached and which will serve as indicators of the program evaluation (i.e. enhanced competitiveness, new jobs, increased employment) (European Commission, 2010).

International comparison mostly measures total expenditure on R&D (GERD) towards GDP. This financial relation is called “research and development intensity” and belongs to the group of elementary structural indicators evaluating the progress of Lisbon-treaty objective-fulfilments in individual EU countries (European Commission, 2010; Halásková, 2011; OECD, 2014a). Gross domestic expenditure on research and development (GERD) includes all R&D activities performed within the territory, whatever the origin of funding. This sector presents various indicators that provide information on GERD as a whole, GERD performance structure and GERD financing structure. The total expenditure on R&D (GERD) includes expenditure on doing research and development in four sectors according UNESCO-UIS (2014), namely:

- **Government sector** – Government intramural expenditures on research and development (GOVERD) include all government R&D activities by R&D performance structure and financing structure. The Government sector includes expenditures on the workplace of the

Academy of Science, research facilities, libraries, archives, museums, and other institutions.

- **Higher education sector** – Higher education expenditures on research and development (HERD) include R&D activities performed by the higher education sector. This sector includes public and state universities, teaching hospitals, and private universities, and expenditures on research and development associated with these institutions.
- **Business enterprise sector** – Business enterprise expenditures on research and development (BERD) includes all R&D activities performed in Québec by enterprises. This sector provides information on R&D performance, R&D financing structure, distribution of enterprises conducting R&D, R&D activities in the information and communication technology (ICT) sector, industrial R&D tax support, R&D personnel and R&D activities by administrative region.

In addition, another sector involved is the **Private non-profit sector**, which comprises but a small part of conducted R&D and associated expenditure (see Table 2).

### **3 OBJECTIVE AND METHODS**

Based on theoretical-empirical approach, the paper aims to compare and evaluate sources of financing R&D in EU countries, focusing on selected R&D indicators. More closely, it focuses on changes in total expenditure on R&D in EU countries, including sectors conducting them, comparison of expenditure in the government sector and the higher education sector in EU countries in years 2004, 2009, and 2013, and on an evaluation of mutual relations of total expenditure on R&D and selected indicators of R&D.

Key methods of scientific research are those based on analysis, comparison and abstraction in the creation of the theoretical-methodological frame for the solution; methods of causal analysis and comparison when solving the defined research question in the application part, and methods of synthesis and partial induction when concluding the outcomes. Gross Domestic Expenditure on R&D (GERD) in EU countries including expenditure for individual sectors (Expenditure on R&D in the Business Enterprise Sector (BERD), Government Intramural Expenditure on R&D (GOVERD), Expenditure on R&D in the Higher Education Sector (HERD)) were compared in years 2004, 2013. Public expenditure on R&D (government and higher-education sector) in EU countries in years 2004, 2009, 2013 are compared (as % and as % of GDP).

The selected group comprises 28 EU countries (Belgium-BE, Bulgaria-BG, Czech Republic-CZ, Denmark-DK, Germany-DE, Estonia-EE, Ireland-IE, Greece-EL, Spain-ES, France-FR, Croatia-HR, Italy-IT, Cyprus-CY, Latvia-LV, Lithuania-LT, Luxembourg-LU, Hungary-HU, Malta-MT, Netherlands-NL, Austria-AT, Poland-PL, Portugal-PT, Romania-RO, Slovenia-SI, Slovakia-SK, Finland-FI, Sweden-SE, United Kingdom-UK). A secondary collection of data from available Eurostat statistics was carried out through the constructive method, and its processing and interpretation through statistical methods with the emphasis placed on correlation analysis. For the correlation analysis, statistical data from 2012 was used due to the fact that the data from 2013 was not available for all observed indicators in EU countries. Selected indicators (researchers, patents and number of publications and GBAORD) were used to evaluate the total expenditure of efficiency in R&D in EU28 countries in 2012 (Tab. 1).

What is being statistically tested is the research matter of the existence of the relations between the extent of total expenditure on R&D, and between the selected indicators (patent applications to the EPO applications per million inhabitants, total researchers head count, number of



publications in R&D per thousand inhabitants, government budget appropriations or outlays for R&D (GBAORD) as a % of total general government expenditure) in EU countries in the year 2012 by means of correlation analysis.

Tab. 1 – Selected R&D indicators in EU countries in 2012. Source: Authors according to Eurostat (2015)

Co unt ry	Research ers head count	Patents applications to the EPO applications per million inhabitants	Number of publication in R&D per thousand inhabitants	Co unt ry	Research ers head count	Patents applications to the EPO applications per million inhabitants	Number of publication in R&D per thousand inhabitants
BE	63207	144.76	1.70	LT	17677	2.62	0.25
BG	15219	3.05	0.29	LU	3267	213.36	1.34
CZ	47651	10.48	0.92	HU	37019	13.33	0.60
DK	58568	219.77	2.52	MT	1451	27.94	0.46
DE	522010	291	1.16	NL	104265	214.36	2.06
EE	7634	4.96	1.07	AT	65609	184.96	1.50
IE	22131	66.35	1.54	PL	103627	3.35	0.54
EL	45239	10.06	0.92	PT	81750	11.71	1.09
ES	215544	31.40	1.11	RO	27838	1.34	0.31
FR	356469	133.47	1.04	SI	12362	53.77	1.73
HR	11402	7.74	–	SK	25069	5.79	0.55
IT	157960	84.81	0.91	FI	56704	254.8	1.97
CY	1914	22.90	1.04	SE	80039	269.93	2.32
LV	7995	7.92	0.61	UK	442385	93.53	1.61

From the perspective of standardized method of statistical testing of the dependence of variables (e.g. Spearman's rank correlation coefficient, where no linearity of the expected relationship or the common distribution of two variables can be supposed, Kendall's coefficient of concordance, based on data related to metric or ordinary evaluation of  $n$  objects ( $i = 1, 2, \dots, n$ ) according to two criteria X and Y) (Lynch, 2013) and the character of available data, the method using the Pearson's correlation coefficient appears the most appropriate.

The Pearson correlation coefficient determines the strength of the dependence between the observed variables. It shows the level of closeness of linear dependence. The estimate of a pair correlation coefficient is defined as the estimate of covariance  $x$  and  $y$  divided by the multiplication of estimates of their standard deviations, i.e.

$$r_{yx} = \frac{\text{COV}_{xy}}{s_x s_y} \quad (1)$$

where  $\text{COV}_{xy}$  is the covariance between  $x$  and  $y$  a can be calculated as the average of multiplication of deviations, i.e. it is a "common" measure of variability (covariance) for two features ( $x$  and  $y$ ). The equation is based upon covariance, which is the level of mixed variability of variables  $x$  and  $y$ .

$$\text{cov}_{xy} = \frac{1}{n} \sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y}) = \overline{xy} - \bar{x} \cdot \bar{y} \quad (2)$$

The coefficient of pair correlation (Pearson correlation coefficient) uses the values ranging

from <-one, +one>, while the more the value approaches -one, the closer the correlation (direct linear correlation in case of positive values, indirect in case of negative ones); the more it approaches zero, the weaker the correlation is. Correlation coefficients provide, on both sides, the dependence between  $x$  and  $y$  (Lynch, 2013; Harlow, 2010). The calculations in the following part are the output of the SPSS Statistics 21.0 software.

## 4 RESULTS

### 4.1. Comparison of total R&D expenditure in EU countries and R&D expenditure based on sectors

In 2013, the EU28 Member States spent almost €275 billion on Research & Development (R&D). The R&D intensity, i.e. R&D expenditure as a percentage of GDP, stood at 2.02% in the EU28 in 2013, compared with 1.76% in 2004. In 2013, the highest R&D intensities were recorded in Finland (3.32%), Sweden (3.21%) and Denmark (3.05%), all above 3% of GDP, followed by Germany (2.94%) and Austria (2.81%). At the opposite end of the scale, ten Member States recorded an R&D intensity below 1% of GDP: Romania (0.39%), Cyprus (0.48%), Latvia (0.60%), Bulgaria (0.65%), Greece (0.78%), Croatia (0.81%), Slovakia (0.83%), Malta (0.85%), Poland (0.87%) and Lithuania (0.95%). Compared with 2004, R&D intensity increased in twenty-two Member States, decreased in Croatia (from 1.03% in 2004 to 0.81% in 2013), Luxembourg (from 1.63% to 1.16%) and Sweden (from 3.39% to 3.21%), and remained almost stable in Romania, Finland and the United Kingdom (Eurostat, 2015).

Total expenditure on R&D in the EU28 Member States as % of GDP in years 2004 and 2013 is provided in Figure 1. A more detailed comparison of R&D expenditure in years 2004 and 2013 by sector performance is provided in Table 2. The business enterprise sector continued to be the main sector in which R&D expenditure was performed accounting for 64% of total R&D conducted in 2013, followed by the higher education sector (23%), the government sector (12%) and the private non-profit sector (1%).

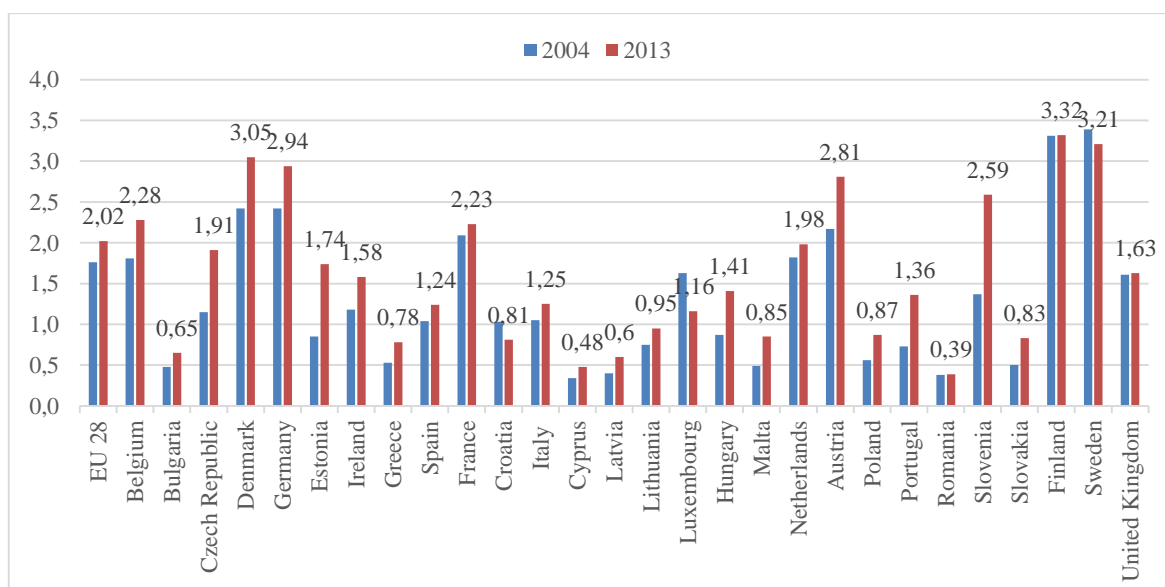


Fig. 1 – Total Research and development expenditure in the EU28 Member States (as % of GDP). Source: Authors according to Eurostat (2015)

The main sector in which R&D was performed in 2013 was the business enterprise sector in all

Member States, except Greece, Cyprus, Latvia, Lithuania (where the higher education sector was the dominant performing sector) and Romania (where almost half of the R&D expenditure was conducted within the government sector). The highest shares of R&D expenditure performed in the business sector were observed in Slovenia (77%), Ireland (72% in 2012), Belgium, Hungary, Austria and Finland (all 69%), Germany and Sweden (both 68%) and Denmark, France and the United Kingdom (all 65%). Compared with 2004, the share of R&D conducted in the business enterprise sector increased in fifteen Member States, decreased in twelve, while it remained stable in Belgium and within the government sector in Romania and the higher education sector in Cyprus and Lithuania. For the government sector, the highest share was by far registered in Romania (49%), followed by Bulgaria (30%), Latvia (29%), Greece and Poland (both 27%) and Croatia (26%). The highest shares of R&D conducted within the higher education sector were recorded in Cyprus (57%), Lithuania (55%), Latvia (43%) and Estonia (42%) (Table 2).

Tab. 2 – Total Research and development expenditure in the EU (28) Member States by performing sector (% of total expenditure). Source: Authors' calculation according to Eurostat (2015)

	Business enterprise sector		Government sector		Higher education sector		Private non-profit sector	
	2004	2013	2004	2013	2004	2013	2004	2013
EU28	63	64	13	12	22	23	1	1
Belgium	69	69	8	9	22	22	1	0
Bulgaria	24	61	67	30	9	9	1	1
Czech Republic	62	54	22	18	15	27	0	0
Denmark	68	65	7	2	24	32	1	0
Germany	70	68	14	15	17	17	–	–
Estonia	39	48	13	9	45	42	2	1
Ireland	66	72	8	5	27	23	–	–
Greece	31	35	20	27	48	37	1	1
Spain	54	53	16	19	30	28	0	0
France	63	65	17	13	19	21	1	1
Croatia	42	50	21	26	37	24	–	–
Italy	48	54	18	15	33	28	2	3
Cyprus	21	15	36	14	35	57	7	13
Latvia	44	28	19	29	36	43	–	–
Lithuania	21	25	25	20	54	55	–	–
Luxembourg	88	61	11	23	1	15	–	–
Hungary	41	69	30	15	25	14	–	–
Malta	66	54	3	10	31	36	–	–
Netherlands	54	58	13	11	33	32	–	–
Austria	68	69	5	5	27	26	0	0
Poland	29	44	39	27	32	29	0	0
Portugal	36	47	16	6	37	38	12	9
Romania	55	31	34	49	10	20	0	0
Slovenia	67	77	20	13	13	10	0	0
Slovakia	49	46	30	20	20	33	0	0
Finland	70	69	9	9	20	22	0	0
Sweden	74	68	3	4	23	28	0	0

United Kingdom	63	65	11	7	25	26	2	2
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Note: (– not applicable, 0 = less than 0.5%)

Apart from total R&D expenditure and expenditure by sectors, what also can be observed are other key indicators related to total expenditure. One of these, related to R&D financing, is Government Budget Appropriations or Outlays for R&D (GBAORD) as a % of total general government expenditure (Eurostat, 2015).

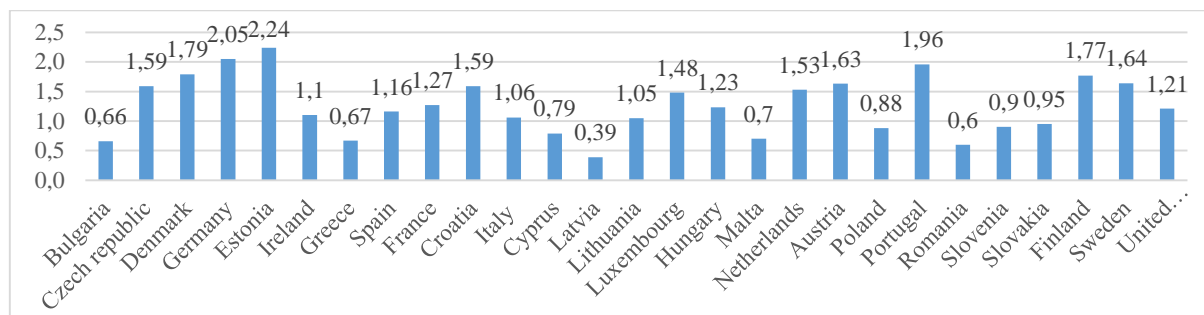


Fig. 2 – GBAORD in EU countries in year 2012 (as a % of total general government expenditure). Source: Authors according to Eurostat (2015)

The results of comparison (GBAORD) in EU countries in 2012 are presented in Figure 2, which shows that the highest ratio of Government Budget Appropriations or Outlays for R&D (GBAORD) to total general government expenditure in 2012 was in Estonia and Germany, as opposed to Latvia and Romania, with the lowest GBAORD from all EU countries.

#### 4.2. R&D expenditure comparison in government and higher education sector in EU countries

This part deals with the comparison of public expenditure on R&D, i.e. expenditure on R&D in the government sector (GOVERD) and higher education sector (HERD). In 2013, expenditure on R&D carried out in the government and higher education sectors reach 96.8 billion Euros in the EU28, thus by 0.6 billion Euros more compared with the previous year. The Czech Republic belongs to the countries with a higher representation of public resources in R&D financing. In 2013, public resources accounted for 45% of total R&D expenditure (GERD), which is approximately 10% above the average of the EU28, where public resources accounted for approximately 35% of total R&D expenditure in 2013.

R&D in the government sector and higher education sector play an important role (accounting for no less than 40%) in relation to total R&D expenditure, mainly in countries entering the EU in 2004 and later (except for Hungary, Estonia, and Slovenia), but also in Greece, Spain, Portugal, Italy, and the Netherlands. The strongest position of higher education sector in terms of the public R&D in EU countries is present in Denmark, Malta, Ireland, and Sweden. By contrast, in most EU countries (entering the EU in 2004 or later, with the exception of the Baltic states), the government sector plays a more dominant role, mainly due to its strong position of institutions of the Academy of Science type (e.g. in Poland or Hungary), or owing to low expenditure on R&D in higher education sector (Bulgaria, Romania). Among countries with a balanced ratio of higher education sector and government sector belong France, with notable expenditure on defence R&D, and Germany, with a dominant position of four research institutes. Total expenditure on R&D of government and higher education sector in EU countries (in %) is provided in Figure 3.

However, we get a completely different view of the significance of government and higher

education sector in the R&D area from the above mentioned order of EU countries, compiled based on the representation of these sectors in GERD, should the expenditure in these sectors be expressed as % of GDP in each country. In 2013, expenditure allocated to the public R&D in EU countries accounted for 0.72% of GDP (0.64% in 2004). Public R&D reaches the highest representation in GDP, around 1%, in Finland, Sweden, Denmark, and the Netherlands, as opposed to the lowest representation of R&D in GDP, less than 0.5%, which was observed in most member states entering the EU in 2004 and later (with the exception of Estonia, Slovenia, and the Czech Republic), despite a notable representation of public R&D in total R&D expenditure.

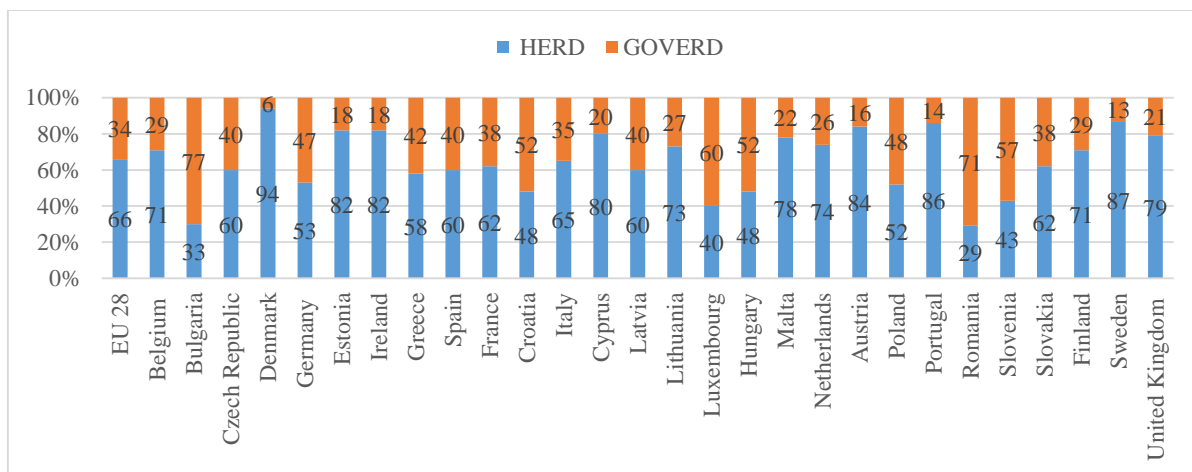


Fig. 3. – Total R&D expenditure (%) in the government sector (GOVERD) and higher education sector (HERD) in 2013. Source: Authors' calculation according to Eurostat (2015)

Total R&D intensity in government sector (GOVERD) and higher education sector (HERD) (in % of GDP) in 2004, 2009, and 2013 is presented in Figure 4.

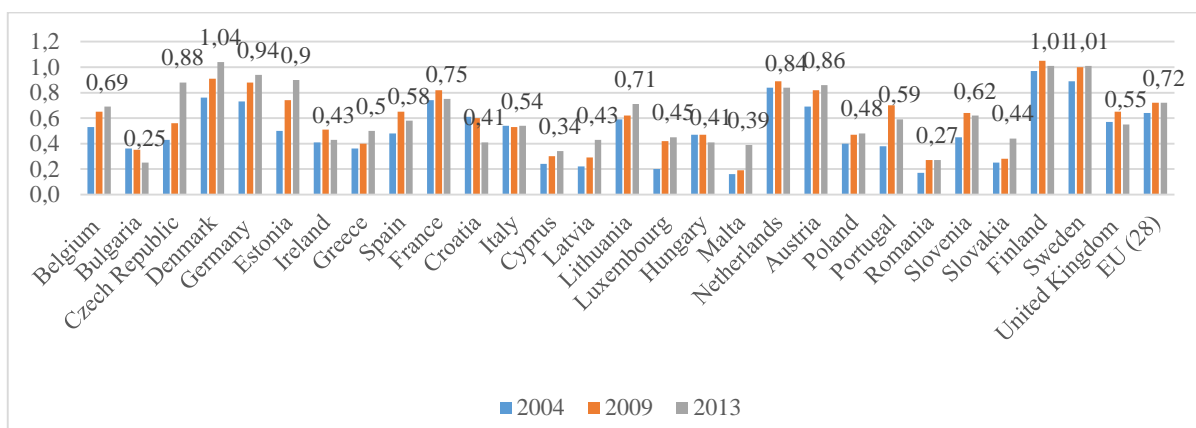


Fig. 4 – R&D intensity in the government and higher education sector (% of GDP). Source: Authors according to Eurostat (2015)

R&D intensity solely in government sector is provided in Figure 5. Preceded by Germany, Slovenia, and Finland, the Czech Republic is a country with the highest expenditure on R&D in government sector (GOVERD) relative to GDP. In the Czech Republic, R&D expenditure in government sector in relation to GDP comprises a larger part by one quarter than the EU28 average in 2013, which reached (as well as in 2000) 0.25%. Compared with the EU28 average

in 2004 and 2009, that is a small decline (0.24%), and a small increase (0.26%), respectively.

In 2013, higher education R&D reached the highest values in % of GDP in Scandinavian countries, similarly to other indicators, varying from 0.71% in Finland, to 0.97% in Denmark from EU28. As a large number of EU member states, the Czech Republic had long been lagging behind the EU average (0.47%), but in recent years it was approaching it quickly. In 2013, with 0.52% of GDP, it even surpassed the EU average (see Figure 6).

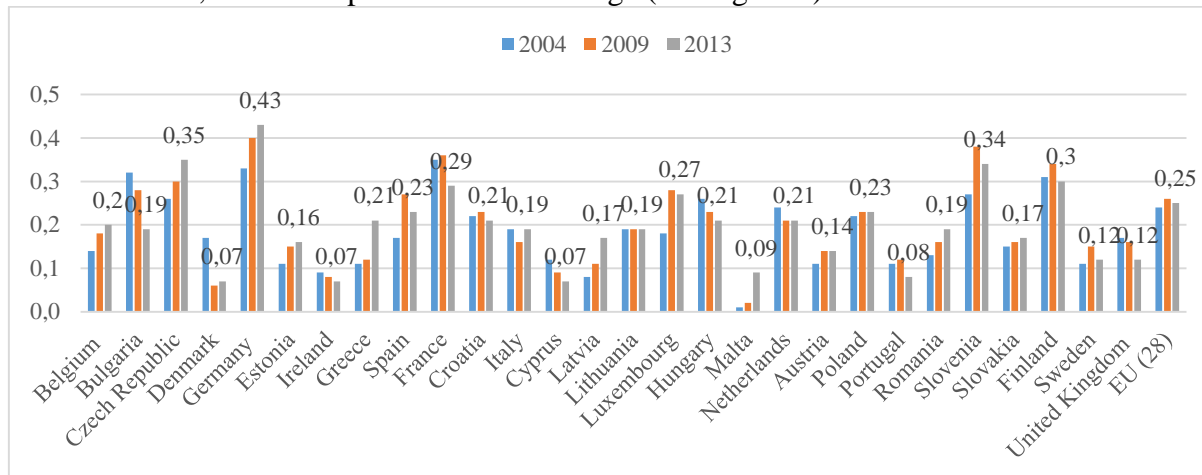


Fig. 5 – R&D intensity in EU countries in the government sector (% of GDP). Source: Authors according to Eurostat (2015)

In absolute figures, all EU28 countries allocated 63.4 billion Euros to R&D conducted at universities, which is by 30 billion Euros more than in government sector. University institutions in Germany, France, and the United Kingdom benefited from most of these resources. The Czech Republic accounted for 790 million Euros. 33.4 billion Euros was spent by government sector on conducted R&D in the EU in 2013, which is by 0.4 billion Euros more than in the previous year. Germany accounted for more than 1/3, and France for 1/5 of this sum. The Czech Republic accounted for 0.5 billion Euros, which is far the most out of all EU countries joining the EU in 2004 or later (with the exception of Poland).

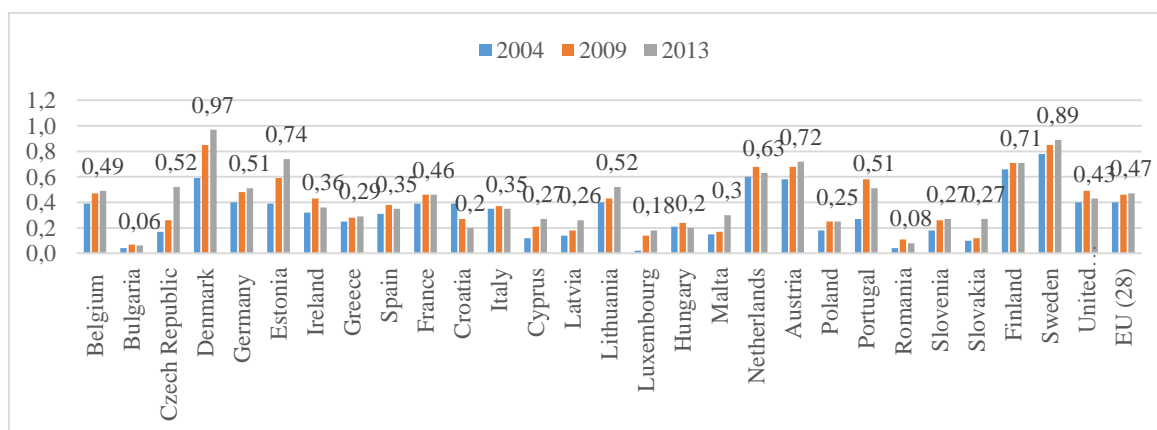


Fig. 6 – R&D intensity in EU countries in the higher sector (% of GDP). Source: Authors according to Eurostat (2015)

#### 4.3. Mutual relation of total expenditure on R&D and selected indicators using correlation analysis

Correlation coefficient ( $r$ ) and coefficient of determination ( $r^2$ ) were calculated to evaluate the mutual relation between R&D inputs and outputs. Correlation between total expenditure on R&D and selected indicators of R&D in EU countries was observed in 2012. For more specific information about the output of Pearson correlation coefficient and coefficient of determination, see Table 3. Results of correlation analysis between total R&D expenditure and selected R&D indicators in 2012 are presented in Figures 7, 8, 9, 10.

Tab. 3 – Pearson correlation coefficient and coefficient of determination, total R&D expenditure (GERD) and selected indicators. Source: own calculation

Mutual relations of total R&D expenditure and selected indicators	Pearson correlation coefficient ( $r$ )	Coefficient of determination ( $r^2$ )
Total R&D expenditure (% of GDP) and patent applications to the EPO applications per million inhabitants	0.865	0.749
Total R&D expenditure (% of GDP) and the number of publications in R&D per 1.000 inhabitants	0.800	0.640
Total R&D expenditure (% of GDP) and total researchers (head count)	0.310	0.096
Total R&D expenditure (% of GDP) and GBAORD as a % of total general government expenditure	0.682	0.466

A strong correlation between total R&D expenditure as % of GDP and Patent applications to the EPO applications per million inhabitants was proven in EU countries. This shows that Pearson correlation coefficient is 0.865 ( $p < 0.01$ ), and coefficient of determination is 0.749, i.e. 75%. The coefficient of determination results in the fact that the dispersion of the share of total R&D expenditure as % of GDP is from 75% explained by the dispersion of Patents applications to the EPO applications per million inhabitants, and from 25% is this relation influenced by other factors. A more noticeable dispersion is observed in Scandinavian countries, Germany and Austria (see Figure 7). Another strong correlation was proved between total R&D expenditure as % of GDP and the amount of publications in R&D per thousand inhabitants. This relation shows that Pearson correlation coefficient is 0.800 ( $p < 0.01$ ) and the coefficient of determination is 0.640, i.e. 64%. The coefficient of determination results in the fact that the dispersion of the share of total R&D expenditure as % of GDP is from 64% explained by the dispersion of the number of publications in R&D per 1,000 inhabitants, and from 36% is this relation influenced by other factors (Figure 8).

The last relation observed was between total R&D expenditure as % of GDP, and GBAORD as % of total general government expenditure. This relation results in the fact that Pearson correlation coefficient is 0.682 ( $p < 0.01$ ), and the coefficient of determination is 0.466, i.e. 46%. The coefficient of determination results in the fact that the dispersion of the share of total R&D expenditure as % of GDP is from 46% explained by the dispersion of GBAORD as % of total general government expenditure, and from 54% is this relationship influenced by other factors. A more noticeable dispersion is again observed in Scandinavian countries, Germany, Austria, and Estonia (Figure 9). By contrast, a weak correlation in all EU countries was proved between total R&D expenditure as % of GDP, and total number of researchers (head count).

This results in the fact that Pearson correlation coefficient is 0.310 ( $p < 0.01$ ) and the coefficient of determination is 0.096, i.e. 9.6%. The coefficient of determination results in the fact that the dispersion of the share of total R&D expenditure as % of GDP is from only 9.6% explained by the dispersion of the total number of researchers (head count), and from 90.4% is this relation influenced by other factors (Figure 10).

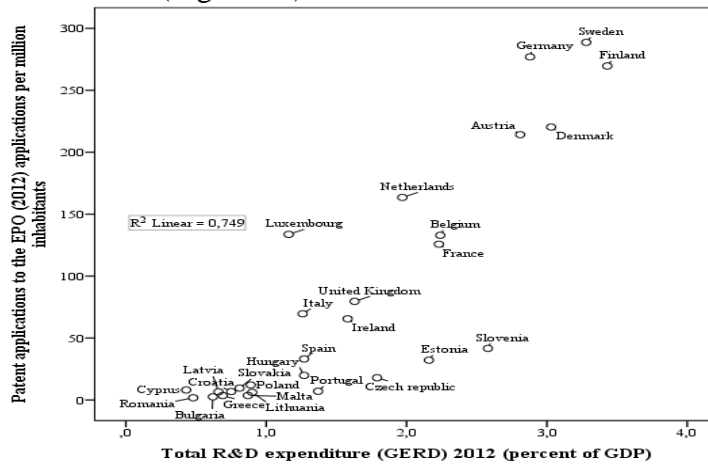


Fig. 7 – The coefficient of determination between total R&D expenditure and patent applications to the EPO. Source: own calculation

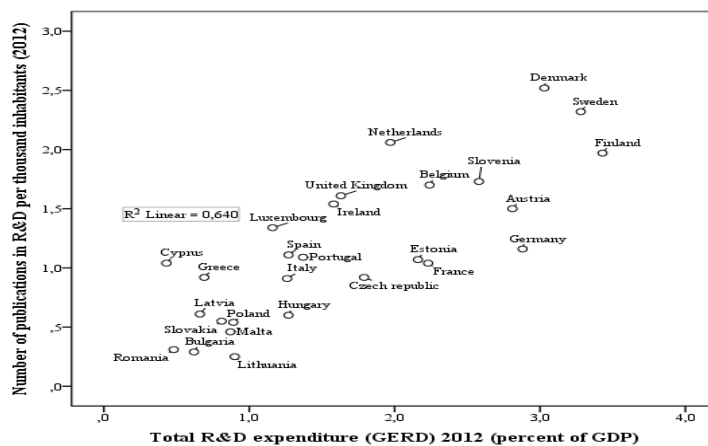


Fig. 8 – The coefficient of determination between total R&D expenditure and numbers of publications in R&D. Source: own calculation

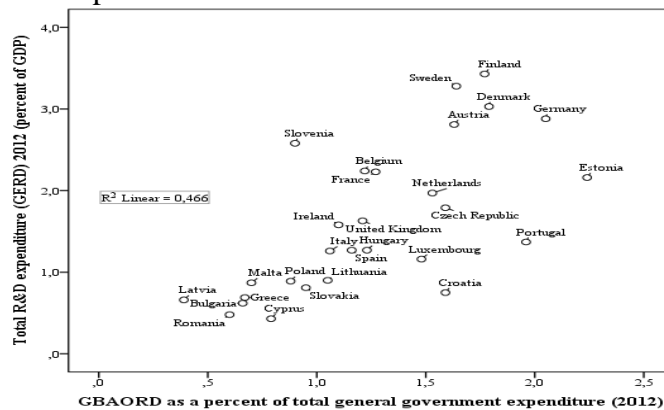


Fig. 9 – The coefficient of determination between total R&D expenditure (% of GDP) and GBAORD. Source: own calculation



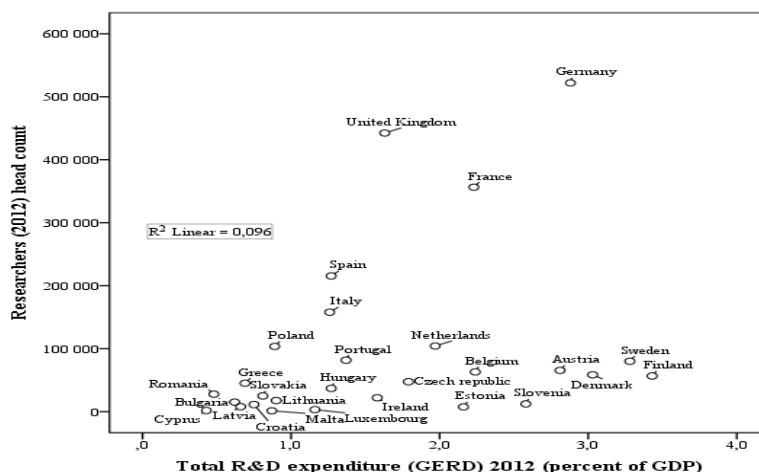


Fig. 10 – The coefficient of determination between total R&D expenditure and total researchers. Source: own calculation

## 5 DISCUSSION

Evaluation of the Europe 2020 strategy shows that without sufficient volume of financial resources, both from the government and the business enterprise sector, it is not possible to expect that R&D will deliver internationally competitive information, innovations and technologies that will provide for increased productivity, employment and economic competitiveness (European Commission, 2010). The research studies carried out show that total expenditure on R&D (GERD) is a significant indicator for comparison and evaluation of economic competitiveness (European Commission, 2010; Majerová, 2014; OECD, 2014a). As some authors state e.g. Delanghe, Muldur & Soete (2009); Halásková (2011) or Bojnec & Ferto, (2014), total expenditure on R&D are mostly compared to GDP for the sake of international comparison, expressing “the R&D expenditure intensity”. The R&D intensity, i.e. R&D expenditure as a percentage of GDP, stood at 2.02% in the EU28 in 2013, compared with 1.76% in 2004. According to the Eurostat (2015), OECD (2014b) this level remained, however, lower in the EU28 than in other major economies. R&D intensity was much higher in South Korea (4.04% in 2011) and Japan (3.38% in 2011) as well as, to a lesser extent, in the United States (2.81% in 2012), while in both China (1.98% in 2012) and Russia (1.11%) the R&D intensity was below that of the EU28.

In almost all observed countries, including the Czech Republic, the last decade has seen an enhancement of the role of higher education sector in the structure of public research. This can be explained by increasing demands for quality and extent of not only elementary but also applied research at universities, which is one of the assessment criteria for their financing. The research aimed to define the mutual relation between total expenditure on R&D in EU countries (inputs) and selected key R&D indicators (outputs). Results of correlation analysis confirmed an effective relation between total research and development expenditure and patent applications to the EPO applications per million inhabitants, and between total research and development expenditure and the number of publications in R&D per 1000 inhabitants. Who takes a different perspective in their research are, for instance, Lelek (2014), dealing with R&D indicators (human resource in knowledge economy), and Bojnec & Ferto (2014), studying expenditure on R&D in OECD countries. According to the OECD (2014a); Eurostat (2015), the key indicator of R&D, pertaining to financing, is Government Budget Appropriations or Outlays for R&D (GBAORD) as a % of total general government expenditure. This was also confirmed by the results of the correlation analysis between total expenditure on R&D and

GBAORD, where a strong correlation is present. As the OECD (2014a) states, the number of publications connected to researchers' FTE in R&D is an approximate indicator of research-activity efficiency. The Czech Republic is found slightly above the EU average, at the same level as large EU countries (France, Germany, the UK). In EU countries with a size similar to the Czech Republic, this definition of research sphere is by 50–100% higher. A weak correlation was observed between total R&D expenditure (% of GDP) and total number of researchers (head count). When evaluating R&D, what needs to be considered is not only the total volume of resources and development of a given country, but also their structure and sources of financing. To evaluate R&D inputs and outputs, key indicators have to be defined, serving as an adequate criterion. Other key R&D indicators are considered to be from the area of human resources, for instance the number of researchers, the share of women, university educated individuals, and indicators focused on R&D (e.g. the number of publications per 1000 inhabitants, academic publication quote-level by subjects [% of the global average], number of EPO patent applications per 1 million inhabitants). This fact is also supported by other studies dealing with R&D evaluation and financing in EU countries (Aristovnik, 2012, 2014; Cohen, Nelson & Walsh, 2002; Krčál, 2014; Kubák et al.; Lee, Park & Choi, 2009). In connection with the extensive issue of R&D financing in EU countries, a large number of questions remain open, which can inspire future research.

## **6 CONCLUSION**

An important prerequisite for fulfilling the Europe 2020 strategy in the area of R&D are financial capabilities of the individual countries. Statistical data of the OECD enables analysis and coordination of policies of R&D of both the member states, and the EU as a whole. International comparison most frequently balances total expenditure on R&D (GERD) to GDP. The highest level of total expenditure on R&D is observed in Scandinavian countries (Finland 3.3% GDP, Sweden 3.2% GDP, Denmark 3.0% GDP, Germany 2.9% GDP). By contrast, the lowest level of total expenditure on R&D is observed in Romania 0.39%, Cyprus 0.48%, and Bulgaria 0.65%. The outcome of the R&D comparison in EU countries proved that their structure plays a significant role. R&D expenditure by sector performance vary considerably across EU countries. The business enterprise sector continued to be the main sector in which R&D expenditure was performed, accounting for 64% of total R&D, conducted in 2013, followed by the higher education sector (23%), the government sector (12%) and the private non-profit sector (1%). The comparison of public expenditure on R&D, i.e. the government (GOVERD), and the higher-education sector (HERD), showed that the majority of EU28 countries allocate more resources to the latter sector. In public expenditure, this expenditure reaches as much as 80%, or even more, in many countries. The largest expenditure of the government sector is observed in Romania and Bulgaria, which are countries that have very small expenditure on R&D in higher-education sector. In the observed period, balanced expenditure in the government and the higher-education sector is observed in France and Germany. The research results, using correlation analysis, have confirmed an effective relation between total R&D expenditure and the selected key indicators related to the R&D results and financing. The research confirmed a relatively strong correlation between total R&D expenditure (GERD) (% of GDP) and patent applications to the EPO applications per million inhabitants, numbers of publications in R&D per 1000 inhabitants and Government Budget Appropriations or Outlays for R&D (GBAORD). By contrast, no positive relation was found between total R&D expenditure and human resource indicators, i.e. between total R&D expenditure and total number of researchers, nor between expenditure and researchers in the GOVERD and HERD sectors.

## Acknowledgement

This paper was supported within Operational Programme Education for Competitiveness (Project No. CZ.1.07/2.3.00/20.0296).

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## **PUBLIC SECTOR EFFICIENCY ANALYSIS - ISSUES AND PERSPECTIVES**

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### **Abstract**

The public sector efficiency analysis, its segments, and institutions are one of the instruments utilized to increase the quality of economic policy. Thus, the research focus on the methods of efficiency analysis and their application to problems is topical. The aim of this paper is to present the emerging trends in this field with regard to the prospect of a possible broader application of selected methods to the Czech Republic.

*Keywords: efficiency, public sector, analysis methods*

JEL Classification: H10, H11, D61

### **1 INTRODUCTION**

The public sector and its efficiency have long been one of the most discussed issues of economic theory and practice. The close interconnection of this issue with the field of public finance enhances its controversial nature with regard to the dynamics of public spending, the development of tax burden, and growth of deficit and public debt. With regard to the past, ongoing, or planned public finance reforms, the problems and prospects of the public sector development have been, in the most recent years, “subdued” by the imperative to face the consequences of the global financial crisis by all possible means (including fiscal). Finding the optimal mix of anti-crisis measures and an adequate scope of selected steps (on a transnational or national level) represented just another phase in the long-term discussion among theoreticians, politicians, and practitioners about the role of the state in the economy; this time in terms of globally interconnected world markets, transactions, and impacts.

Long-term problems of public sector efficiency and public finances, albeit “under the banner” of anti-crisis measures in economic policy have resurfaced. Within the public sector efficiency analysis, the public sector cannot be separated from public finances. The interconnection of economic analysis in these two fields is derived from their close interconnection in reality. An unpopular and a difficult-to-accept “head of a coin” - the tax burden on taxpayers - is a common denominator for both the public sector and public spending.

The public sector efficiency, its analysis, and potential, as well as the problems of applying different methods, are topical issues, even in the Czech Republic. Despite some increase in research and scientific studies, there is still a plenty of space for deepening its methodological, analytical, and comparative research. Hence the aim of this paper is to analyse the current state in the field of public sector efficiency research, both abroad and in the Czech Republic, and present some approaches and methods that have been less frequent in our environment.

## **2 PUBLIC SECTOR EFFICIENCY - THEORETICAL REFLEXION**

The public sector efficiency and its theoretical reflection constitute a relatively large area of economics research and are subject to a long-term discussion. There are several causes why such a discussion has been underway for so long, for example:

- Problems with the definition and determination of the scope of public sector as well as the subject of its efficiency analysis (1)
- Specific features of the public sector production compared to the private sector production and the ensuing difficulty associated with its definition, expression, and measurement (2)
- Problems with the selection of effective methods and appropriate indicators to express and measure the public sector efficiency and its segments (3)
- Diversity and specifics of individual segments (regions or sectors) of public sector and their outputs, and the ensuing difficulty associated with the expression and measurement of the total (cumulative) efficiency (4)
- Existence (or absence) of relevant and quality statistical data (5).

The stated causes are both theoretical and methodological/analytical in nature.

In foreign publications on public sector and public finance written by J. E. Stiglitz (1997), R. A. Musgrave and P. B. Musgrave (1994) or P. M. Jackson and C. V. Brown (1990), which can be considered classics today, public sector is defined by a state's basic fiscal functions: allocation, stabilization, and redistribution.

Attempts of local literature to define the nature of public sector have been made mainly in the 1990's: C. Lawsson, J. Nemeč (1992), B. Hamerníková (1996, 1997, 1998), K. Kubátová (1999, 2000), Y. Strecková (1997, 1998), I. Malý (1998), R. Duben (2001), F. Ochrana (2001), J. Rektorič (2002), and others.

Together, with many other economists, it may be argued that the public sector and its scope should be understood in the broader context and defined by applying a set of criteria, such as the functions it meets, entities deciding about the nature and extent of its activities, the nature of ownership, management and funding of its institutions.

Public sector can include not only institutions, but also public expenditure projects and programs, including their implementation. The existence and development of the so-called nongovernmental (non-profit) sector, which is functionally related to public sector, creates new opportunities for the expansion of public projects and programs. To perform its functions, the public sector needs to have a huge amount of assets and services at its disposal. It can either directly produce or purchase both of them from private sector through public procurement. The meaningful use of these assets and services is possible only if outsourcing of the production to private sector leads to savings in expenditures on the part of public sector. The existence of these savings is strongly dependent on the transparency of procurement processes, lack of corruption, and the nature of the goods in demand (Hamerníková, Maaytová et al., 2007).

A problematic definition of public sector leads to difficulties with selecting of relevant indicators to express and effective methods to measure its size and efficiency. In the following text, we will focus our attention on the public sector efficiency. The methodological issues constitute a big obstacle to obtaining valuable and presentable conclusions in all analyses of the public sector efficiency and public spending. One of the sub-problems (albeit not less important) is the issue of selecting appropriate indicators and relevant data.

What may be considered when assessing the public sector efficiency and its optimal size is whether it is justifiable to include certain products in the public sector, as well as allocative and productive efficiency.

Due to close ties of public sector and public finances, it is important for a deeper analysis of its efficiency to also point out problems with the efficiency of public spending, projects, and programs. In the budgetary sphere, the efficiency has, over time, been increasingly understood in unity with its three dimensions: i.e., as a multiple of efficiency, efficacy, and effectiveness.

Analysis of the public sector efficiency can be focused in different ways, for example, on:

- the efficiency of its institutions, the efficiency of its chosen segments, the public sector efficiency as a whole over several years, international comparison.

According to J. Bénard (1991), the methods of analysing the efficiency of public expenditure, projects and programs can be classified into mono-criteria methods and multi-criteria methods, in which it is difficult to determine the significance of one criterion over other criteria.. “The advantage of multi-criteria methods is that they cannot reduce non-economical criteria to economic criterion at the expense of sensitive and sometimes controversial operations” (Bénard, 1991). Regarding the existing methods, their techniques and procedures are described very well in foreign and domestic literature (Ochrana, 2004; Strecková, Malý, 1998; Wright, Nemeč, 2003). It is particularly important to assess these options properly, with respect to the analysed problems, including the role of a time factor; a fact that is highlighted by a number of authors (e.g., Allen, Tommasi, 2002).

### **3 SELECTED APPROACHES TO THE PUBLIC SECTOR EFFICIENCY ANALYSIS**

The difficulty determining the public sector efficiency, its segment, and institutions causes that inventors of new methods are increasing creative. Not only domestic, but also foreign economic research has, in recent years, brought many positive results in the application of new techniques, methods, and analysis techniques. The application of methods such as Data Envelopment Analysis (DEA) and the Free Disposable Hull (FDH) serves as an example of this innovative approach.

Within the Data Envelopment Analysis (DEA), while analysing the efficiency of public spending, actual expenditure is compared to minimal expense, which is enough to produce the same result (outcome). The method was developed by Debreu (1951) and Farrell (1957), later Färe et al. (1994), Seiford and Thrall (1990). DEA can be focused to inputs (1) or outputs (2). The first case (focus on inputs) examines how many inputs could be reduced without changing the output.

The second case (focus on outputs) examines how many outputs can be created without changing inputs. Both approaches examine the public sector efficiency and only slightly differ in results (Coelli et al., 2005).

#### ***Measuring public sector performance and efficiency***

The approach taken by A. Afonso, L. Schuknecht, and V. Tanzi (2003) can be considered very inspiring. In order to contribute to expressing and measuring of public sector performance and efficiency, they have suggested, first, the *public sector performance indicator* and, second, *public sector efficiency indicator*. As regards the expression and measurement of public sector performance, the authors base it on the assumption that the performance depends on the values of certain economic and social indicators ( $I$ ). Let us assume that there are  $i$  number of states and  $j$  number of territories where the government



operates, which together determine the overall public sector performance in the country  $i$  -  $PSP_i$  (from the English term Public Sector Performance). We can, thus, write that:

$$PSP_i = \sum_{j=1}^n PSP_{ij} \text{ where} \quad (1)$$

$$PSP_{ij} = f(I_k)$$

It can be assumed that the growth of public sector performance depends on improving of the values of the selected socio-economic indicators:

$$\Delta PSP_{ij} = \sum_{k=1}^n \frac{\partial f}{\partial I_k} \Delta I_k \quad (2)$$

Seven socioeconomic indicators have been chosen as sub-indicators of an aggregate indicator of public sector performance, three of which relate to the government basic fiscal functions, four are related to public administration, education, healthcare, and public transport infrastructure. Other factors and variables (see diagram) have been selected to express these indicators.

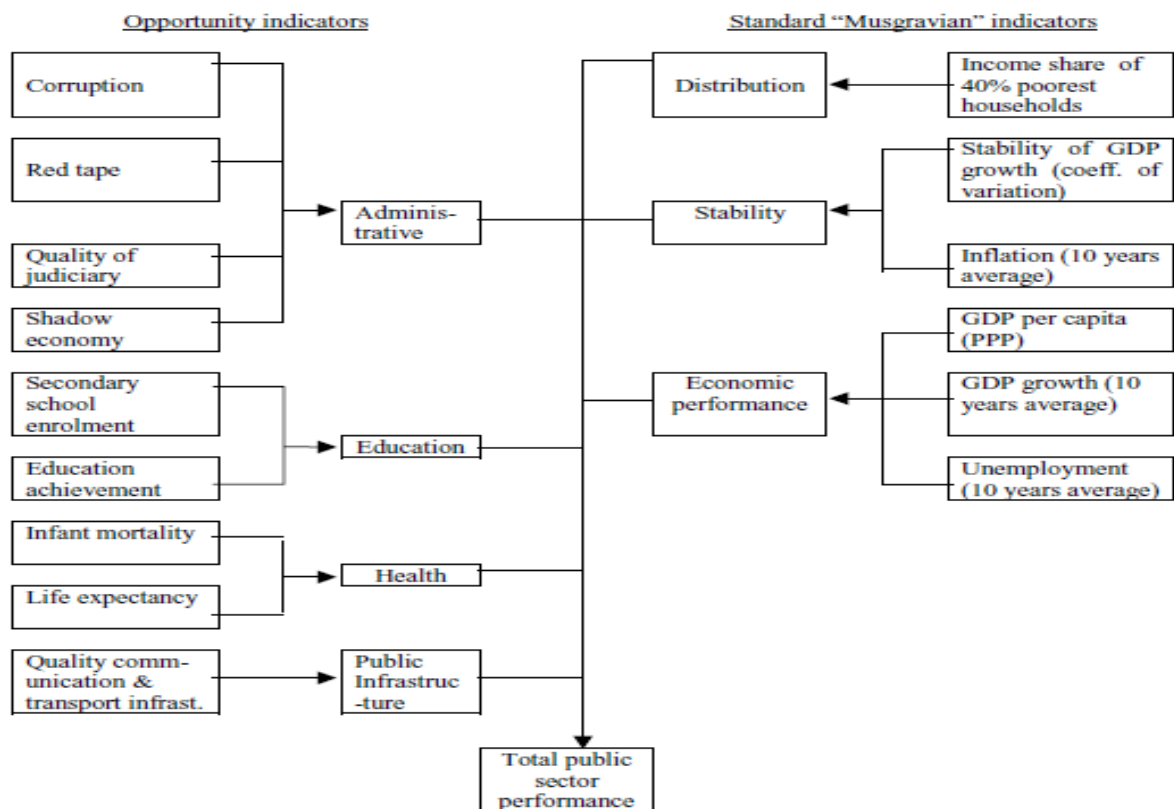


Fig. 1 - Total public sector performance (PSP) indicator. Source: Afonso, A., Schuknecht, L., Tanzi, V. (2003).

With regard to the efficiency of public spending, the authors have attempted to define an indicator of the overall public sector efficiency. This indicator of the overall efficiency is for a country,  $i$ , as follows:

$$PSE_i = \frac{PSP_i}{PEX_i}, \text{ where} \quad (3)$$

$$\frac{PSP_i}{PEX_i} = \sum_{j=1}^n \frac{PSP_{ij}}{PEX_{ij}} \quad (4)$$

An indicator measures the public sector performance (PSP) with expenditures to achieve it (PEX - Public Expenditure).

Expenditures for assets and services, transfers, purposeful expenditures for education and healthcare, and public investment have been included in the aggregate public expenditure.

The analysis of the efficiency of public spending has been carried out using the FDH method. FDH is a non-parametric method suggested by Deprins, Simar, and Tulkens (1984). Through this method, manufacturers can be sorted according to manufacturer's efficiency by comparing each individual performance with the so-called production possibility frontier, which ensures the highest possible output for a given level of inputs and vice versa – it is possible to determine the lowest level of input required to achieve a given level of output. Public expenditures, as a percentage of GDP, measure inputs and outputs, which are already expressed by a comprehensive indicator of the public sector performance.

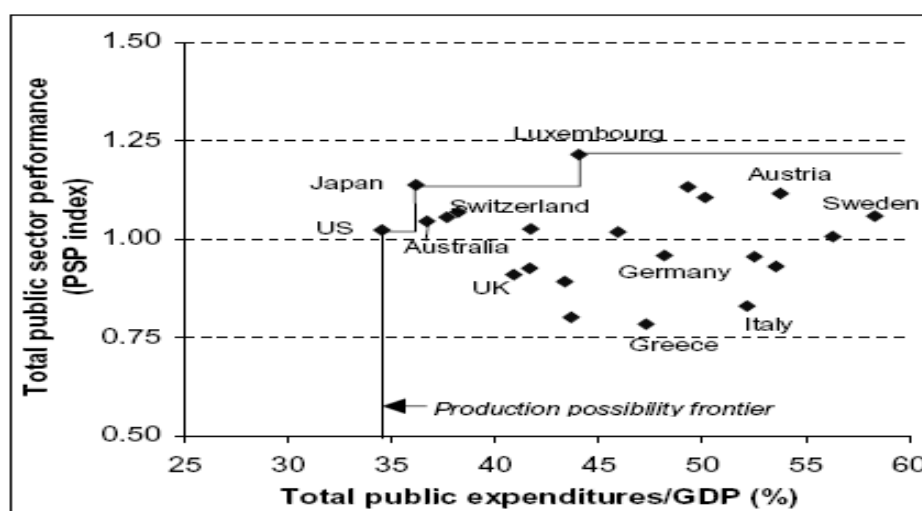


Fig. 2- Production possibility frontier, 23 OECD countries, 2000. Afonso, A., Schuknecht, L., Tanzi, V. (2003).

The figure shows that the most efficient countries are Japan, USA, and Luxembourg, while EU countries are inside the production possibility frontier. The average input efficiency for 15 EU member countries is 0.73; this means that they should be able to achieve the same output with 73% of commonly used inputs; an average score of non-EU countries in the OECD is 0.89 inputs.

The study of A. Afonso, L. Schuknecht, and V. Tanzi (2006) on the public sector efficiency in the new EU Member States and emerging markets has been another that significantly contributed to the field. In this study, the authors extend the discussion regarding the expression and measurement of effectiveness, analyse Public Sector Performance (PSP) and efficiency (PSE), and apply DEA analysis. Unlike in the previous study, the authors have slightly changed some indicators within the PSP.

The DEA method has been applied by Afonso et al. (2005) to estimate the efficiency of some public sector areas (between 1980 and 1990), and Afonso, Aubyn (2005) to analyse the efficiency of education and health. This method has been applied by Gupta et al. (2001), Sijpe

Rayp (2007), and Afonso et al. (2006) to analyse the situation in the public sector in developing countries. Balaguer-Coll et al. (2007) applied DEA to analyse the efficiency of local authorities in Spain.

While Afonso et al. (2005) examined PSE in seven public sector segments, Angelopoulos, Philippopoulos, and Tsionas (2008) focused on four segments, namely: education, administration, infrastructure, and stabilization. Based on data from 52 countries (for the period between 1995 and 2000), the authors have attempted to calculate the so-called technical efficiency (TE) of public expenditures, using the so-called Stochastic Frontier Analysis. Subsequently, using the PSE and TE within econometric models, they have examined the relationship between the public sector size (extent) and economic growth. In their opinion, this relationship is affected by the so-called size-efficiency mix.

In terms of shift in public sector efficiency research, this approach constitutes a further step to achieve greater reliability of economical and analytical instrumentation and, at the same time, confirms that the efficiency can be measured despite great difficulties with the selection of appropriate indicators. This is supported by further research.

As emphasized by Hauner and Kyobo (2008), it is logical that current literature examines the factors influencing differences in efficiency between countries in different public sector areas. Hauner and Kyobo (2008) examine the factors of public expenditures efficiency in Russia and comes to the conclusion that a higher efficiency is associated with higher income per capita, smaller proportion of federal subsidies in incomes of lower segments of administration, better governance, stricter democratic control, and lower government spending.

Hauner and Kyobo (2008) completed the first large panel for the field of education and health based on data from 114 countries of different income levels for the period between 1980 and 2006 with approximately 1800 annual observations in individual countries in order to analyse the factors influencing the efficiency of public spending in these areas. The authors calculated the three types of indicators for each country:

- Indicators of Public Sector Performance - PSP, measuring only the results (outcomes);
- Indicators of Public Sector Efficiency - PSE, measuring the results (outcomes) and expenditures;
- Data Envelopment Analysis - DEA, measuring efficiency in relation to the production possibility frontier.

In the second part of research, these authors tied the obtained results to a set of factors from the economic, demographic, and institutional field and by means of regression analysis examined their effect on the efficiency. The most important conclusions were the following:

- Higher volume of expenditure in relation to GDP leads to lower efficiency,
- Within the efficiency of expenditures for education and health, other factors play its role (e.g., that the corruption worsens the efficiency, that the relatively younger population decreases the performance and efficiency in education, while a higher population density increases performance, etc.).

For their analysis, the authors applied public sector indicators (PSP) and public sector efficiency (PSE) indicators proposed by Alonso et al. (2005) and the Data Envelopment Analysis (DEA) method. In all three cases, the results (outcomes) are the baseline indicators for the analysis.

Authors Donath and Maurius (2008) emphasize the importance of data based on COFOG (Classification of the Functions of Government) classification of public expenditure for a

deeper analysis of public sector efficiency. With regard to the difficulties of comparing the results of the activities of different public sectors, the authors focus their attention only on education and health. Given the progress made in these two areas, in terms of indicators and their international monitoring, it is completely understandable.

A. Afonso, A. Romero, and E. Monsalve (2013) have followed up on previous research made by A. Afonso, L. Schuknecht, and V. Tanzi (2005 and 2010) in the analysis of public sector efficiency in twenty countries of South America and three in Caribbean countries. The results of this analysis fully corresponded with the conclusions of the previous two studies.

The research focused on the public sector efficiency, taking into account the effect of other factors, such as fiscal decentralization, competition between jurisdictions, political and budgetary institutions, fiscal capacity, democratic participation, etc., is also very inspiring. The analysis of these factors is a focal point of research conducted by D. Becker (2008), A. Antonis, D. Manthos and K. Pantelis (2008), T. Curristine, Z. Lonti, and I. Joumard (2007), L. Borge et al. (2007), and others. Similar processes can be considered beneficial because they enable to fill in more white space of the compiled mosaic about the image of public sector efficiency.

Becker (2008) analyses the public sector efficiency in 74 countries around the world (in 1985, 1990, 1995 and 2000) using the methodology of Afonso et al. (2005). Based on the application of non-parametric FDH and DEA methods to assess the public sector efficiency, the author reaches conclusions, which he subsequently confronts with the intensity of the so-called inter-jurisdiction competition. Becker made the following conclusions:

- The level of public sector efficiency can be partly explained by the so-called continental factors based, for example, on a shared history and culture;
- Smaller governments are more public sector effective, even though it can not be argued that they are closer to the efficiency frontier; countries that were able to achieve that have a medium-sized public sector compared to other analysed countries;
- Globalized countries tend to be more efficient (although this effect is not so strong);
- Competition between jurisdictions plays a key role in the public sector efficiency;
- More centralized countries in the sample were more effective, although even this result was not significant.

However, the author emphasizes that the results of his study do not necessarily confirm the view that a higher degree of competition between jurisdictions (between countries or local authorities within these countries) automatically means higher public sector efficiency.

Antonis, A., Manthos D. and Pantelis K. (2008) analyse the impact of decentralization on the Public Sector Efficiency - PSE in 21 OECD countries between 1997 and 2000 using DEA. The effort is to propose two alternative PSE indicators reflecting the government's objectives in the area of economic development and stability. On the basis of the methodological knowledge of Simar and Wilson (2007) and Khan and Lewbel (2007), the authors attempt to confront the results of the PSE analysis with a group of indicators of fiscal decentralization. These authors characterized the degree of fiscal decentralization in two ways [according to GSF and according to Stegarescu's proposal (2005b)]. The conclusions of this experiment to study the effect of fiscal decentralization on the public sector efficiency are clear: the growth of fiscal decentralization promotes the growth of efficiency.

Is the efficiency of public sector services influenced by political and budgetary institutions, fiscal capacity, and democratic participation? This question was posed by Borge et al. (2007) in their research based on the so-called new global level of efficiency for local government in

Norway. The authors believe that the increased public sector efficiency means an increase in the volume of its services without increasing costs. It is considered an important factor for increasing the governments' economic performance. Factors conditioning the so-called global efficiency were previously analysed, for example, by De Borger et al. (1994), De Borger and Kerstens (1996), Ashworth et al. (2006) using data for Belgium, or Hayes and Chang (1990) and Hayes et al. (1998), using data for the USA, or Balaguer-Coll et al. (2007), using data for Spain. Studies that have been compiled in Norway focus rather on measuring the efficiency of individual public services in healthcare or education.

Since 2001, Norway has published data from the so-called aggregate output of six kinds of public sector services (care for the elderly, primary and secondary education, day care, social benefits, custodial care and basic healthcare). The Norwegian Advisory Commission on Local Government Finances has developed levels of the so-called aggregate output. This level of aggregate output consists of 17 indicators of production in all six kinds of public services. Each of these defined indicators is assigned weight according to the share of public expenditure in total expenditure of any particular public sector services (in terms of sub-indicators) or across the public sector (in the case of all six types of public services). On this basis, the authors analyse the links between the public sector efficiency, on the one hand, and political and budgetary institutions (1), fiscal capacity (2), and democratic participation (3), on the other.

To indicate the influence of political power, the authors apply the so-called Herfindahl index that enables one to measure this power through the fragmentation of political parties. The classification of political regimes and their division into four types was another indicator of political power. In this case, the authors used the approach of Kalseth and Rattsø (1998). Their conclusions about the influence of political power as measured by means of this classification, however, are ambiguous and differ from those of other similar studies (Borge, Falch, & Tovmo, 2007). T. Curristine, Z. Lonti, and I. Joumard (2007) define efficiency as costs per unit of output. Measuring efficiency requires quantitative information about costs (or inputs in tangible terms). An accrual accounting system, which covers costs, can be considered better for this purpose than the system of cash flows. While measuring efficiency, it would be ideal if we could cover not only quantitative, but also qualitative aspects of public services, which still, however, causes difficulties.

#### **4 CONCLUSION**

Little attention has so far been paid to the public sector efficiency research in the Czech Republic, especially methods of its analysis. F. Ochrana has been for long dealing with this issue. He mainly focuses on the theoretical aspects of the cost-benefit analysis and the issue of using the selected methods (CMA, CBA, CEA, CUA, etc.). F. Ochrana (2007) also proposes steps to apply selected methods of evaluating the efficiency of institutions in the public sector based on situational analysis in the Czech Republic.

Regarding the application of the DEA method in the public sector in our country, the list of surveys and studies is even more limited. We can mention, for example, the outputs of GA CR project: Models and methods of evaluating the efficiency of public and private sectors ("Modely a metody hodnocení efektivnosti ve veřejném a soukromém sektoru"). This project No. GA 402//01/0133, person responsible: J. Jablonský, University of Economics, Prague 2001-2003. M. Dlouhý, V. Pánková (2003) and M. Dlouhý, J. Jablonský and I. Novosadová (2007) applied the DEA method in evaluating the efficiency of healthcare.

It can be concluded that the application of selected methods of public sector efficiency analysis, its segments, and institutions have a great perspective in the Czech Republic.

Research focus on various aspects of this efficiency can be beneficial not only for the development of the theory, but also for economic policy and practice.

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## **MULTI-CRITERIA ANALYSIS FOR THE MOST EFFICIENT SELECTION OF BANK ACCOUNT FOR YOUNG PEOPLE**

*Martina Hedvicakova, Alena Pozdilkova*

### **Abstract**

Due to the growing competition in the banking market, banks try to attract potential clients as soon as possible and target their offers at students of secondary schools and universities and young people up to 30 years. They offer free accounts and attract young people to the various benefits. The aim of the paper is to compare all the options available on the market (student accounts, accounts for the young and standard accounts). Using multi-criteria analysis the best accounts will be chosen based on selected criteria for two defined profiles - Active and Inactive clients. The overall results of each type of bank account will be compared with each other and the most advantageous account for young people will be selected.

*Key words: bank, account, multi-criteria analysis, costs, client.*

JEL Classification: G21, C58, C610

## **1 INTRODUCTION**

In the Czech Republic there are currently 44 banks and branches of foreign banks (Czech national bank, 2015). The number of banks is much higher than for example in Slovakia, where the market is smaller. This situation leads to high competition in the market and constantly finding new offers, packages and marketing campaigns. One of the target groups are young people under thirty years of age. This group can choose from different types of bank accounts. If they are still students, they are targeted by student accounts. When they meet the age requirement, e.g. they are up to thirty years, they can choose from accounts offered for young people (e.g. Komerční banka offers the G2.2 Account (26-30 years), UniCredit Bank offers a U Account for young people etc.). This offer is smaller than that of the student accounts. Last but not least, they can choose any standard bank account, preferably from a "low-cost" bank such as mBank or FIO, which have no account maintenance retail fees. It always depends on the specific requirements on the bank account or the benefits that banks provide, or the availability of ATMs, level of online banking or smartbanking. The aim of this paper is using multi-criteria analysis to select the most appropriate account for two client groups: active and inactive.

## **2 THEORETICAL BASES**

From a functional point of view, the bank described as a financial intermediary, whose main activity is the acceptance of deposits, provides loans and execution of payments. (Revenda, 2011; Polouček, 2009)

The perception that banks are exploiting customers through their fee-charging practices in a bid to maximize profits, has fuelled widespread public interest in identifying the banks that profit most heavily from fees. (Tennant, 2014)

European Union Directorate-General for Health and Consumers Protection focuses on tariff transparency, client mobility and easier product comparison improvement. In accordance with these efforts in 2010 in the Czech Republic there was launched an independent retail core

banking services calculator project (hereinafter as Calculator). Its purpose is to compare bank fees of different accounts based on demanded services and price. Each customer inputs his or hers usage pattern and the RCBS Calculator suggests the cheapest alternative on the market in the Czech Republic. (Hedvicakova, Soukal, 2012).

A young person up to thirty years of age can choose from the following three types of bank accounts:

#### **a) Student accounts**

Student accounts are restricted by the condition of study at secondary school or university and by age - usually 15 to 26 years. These accounts are promoted by banks as the best for young people. Account management is free, but it is often subject to conditions such as a minimum number of ATM withdrawals per month or a minimum monthly turnover on the account etc. These conditions are often unwieldy for students and this leads to an increase in costs for the management of student accounts. Banks also try to lure students to various benefits such as free backpacks, flash drives when opening an account, ISIC card for free, discounts in shops etc. Banks are based on the assumption that the Czech client is conservative and does not often change their bank. They hope that after their graduation, students will remain at the same bank, and the bank immediately convert the student account to a standard account which is already charged.

#### **b) Accounts for young people**

Accounts for young follow a student account, as it is in the case of Komerční banka and its G2.2 Account. It is designed for people from 26 to 30 years of age. If young people want a free account, this account is also debited with conditions and it is necessary to meet at least one of them: a regular income; loan, credit or mortgage from KB; savings deposited in KB or to be saving or investing at KB. (Komerční banka, 2014)

#### **c) Standard bank accounts**

As mentioned above, in the Czech Republic there are currently 44 banks, 6 of which do not provide a full range of banking services, but focus on one or a few types of banking products, e.g. Hypoteční banka, Česká exportní banka and others.

Other banks provide different accounts for different groups of customers with similar requirements. Today, there are very modern products and services packages that are free or for a fee known in advance. In most cases, the client pays more than the bank declares with the package, because they exceed the pre-determined number of operations.

In the last five years the so-called "low-cost" banks began to appear. These are banks, where account management is free, but they do not provide all the products or services such as payment orders abroad, they do not have a physical location or ATMs, etc.

The first low-cost banks in our country include mBank, FIO, Equa bank, Air bank, ZUNO.

### **3 OBJECTIVE AND METHODOLOGY**

The aim of this paper is to confirm the scientific issues:

- A) Are student accounts for young people more advantageous than basic accounts from low-cost banks?
- B) How much extents do the offers made by the banks according to the monitored criteria?

This paper aims to select the best bank account of all kinds (student accounts, accounts for the

young, standard accounts) accounts offered on the Czech market. For selecting the most suitable bank account the multi-criteria analysis will be used.

For the analysis of basic accounts from low-cost banks will be used the following methodology.

To choose the best bank account with the lowest account management costs, data from the bank charges Calculator (hereinafter Calculator) will be used, which is available from: <http://www.bankovnipoplatky.com/kalkulator.html>. The aim of the Calculator is to compare the services and products of individual retail banks in the Czech Republic within the offer of basic banking services. The Calculator provides a calculation and comparison of individual banks based on individual demand of banking clients. According to the bank account statement, a client fills the questionnaire in seven steps and the results will outline the most appropriate accounts (in terms of cost). Due to maximum accuracy of the data, the form does not include questions regarding irregular activities - for example, one-off establishment of a service or change processes (change of address, PIN, standing order, etc.). (Bankovní poplatky, 2014)

The data are evaluated monthly and quarterly by Martina Hedvičáková (co-author of the paper) and Ivan Soukal. The bank charges Calculator has been used by 88,711 bank customers so far. In the first part of this paper will be used data for the fourth quarter 2014. In this quarter the Calculator's services used 1238 respondents.

In terms of marketing research, it includes the following data:

- **multi-dimensional** - 54 variables are monitored on the use of service, 2 system variables for each element in the set and 45 variables regarding pricing on individual accounts,
- **primary** – data was obtained directly from the users of banking services,
- **subjective** - data based on the client's judgment regarding their own use of banking services. (Bankovní poplatky, 2014)

Based on the data obtained from the Calculator, the Client and the Bank index are calculated.

Calculations and statistical analysis were performed using the statistical IBM PASW 18 software (formerly SPSS) and MS Excel 2013. Calculation is performed on a monthly and quarterly basis for the selection of the population obtained in the reference month or quarter. The calculation precedes verification-validation part to avoid skewing of results e.g. by the respondents who should not use the retail products (self-employed individuals, small businesses with the frequency of use of banking services, which in practice a client can never reach with a civil account), and the respondents who only clicked through the form without filling the key services. (Bankovní poplatky, 2014; Draessler et al, 2011)

#### **a) Client index**

The Calculator follows the behaviour of clients very closely and captures the use of retail banking services of respondents. The Calculator therefore reflects accurate costs that the clients actually pay to their banks. It is a precise monitoring of tariff headings: mainly the number of times the clients use the services and the amount they are charged. For this reason, if it is an active client then in an averagely expensive bank they will pay hundred crowns monthly. If someone hardly ever uses a bank, then even in an expensive bank they can get below 100 CZK per month.

The methodology for calculating the average cost per account is based on information regarding the bank as well as the particular account. The average costs of a particular account

are obtained by the arithmetic average of the clients computed by the Calculator, who have chosen the monitored account. This methodology is more accurate, but it requires a greater number of clients. The number of accounts with a lack of respondents for calculation is much higher. More information on the methodology of calculation: <http://www.bankovnipoplatky.com/klientsky-index---metodika-12507.html>. (Hedvicakova, Soukal, 2014)

### **b) Banking index**

An alternative view on fees is provided by Banking index, which analyses the best bank accounts for 4 main groups of clients (Active, Branch, Average internet, Passive internet).

The calculation methodology is available from <http://www.bankovnipoplatky.com/bankovni-index---metodika-12509.html>. (Soukal, Hedvicakova, 2014)

**c) For the analysis of accounts for young people** will be used the following methodology.

Multi-criteria decision-making and evaluation of alternatives will be used, where the criteria are as follows. (Huang, Keisler, Linkov, 2011) The first set of criteria will be fee criteria, which include fees for account management, fee for incoming and outgoing payments, fees for standing orders and fees from the merchant (including the number of payments and the total amount).

Another possible selection criterion could be fees for mobile and internet banking, which is especially very often used by young people, but nowadays the bank offers are comparable and almost all institutions offer these services for free. Therefore, it is unnecessary to include them in the ranking. (Ekel, Martini, Palhares, 2008)

Plus as other criteria for selecting the most suitable account, we will consider the benefits offered and the availability of ATMs, which will now be described in detail. (Jablonsky, 2007)

One of the most important criteria when choosing an account is also the availability of ATMs, because the service is extensively used especially by young people and can influence the selection of their future bank and account in both ways positively as well as negatively (if the ATM's network of the selected institution is inadequate in the location). The top coverage of ATM's network belongs to Komerční banka and ČSOB, which offer more than 700 ATMs across the Czech Republic (plus it is also necessary to consider ERA Poštovní spořitelna, which has ATMs shared with ČSOB).

The above criteria will be used in multi-criteria decision-making and evaluation of the alternatives. Firstly, it will be necessary to determine the importance that will portray the significance of each criterion. (Dostal, 2008), (Mikulecky, Lenharcik, Hynek, 2002)

The importance of each individual criterion will be used in a standardized form:

$$v_j \geq 0, j = 1, \dots, m, \sum_{j=1}^m v_j = 1 \quad (1)$$

The overall evaluation of variants is determined by using utility function as follows:

$$u(x) = \sum_{j=1}^m v_j u_j(x) \quad (2)$$

in which  $v_j$  represents standardised importance of individual criteria and  $u_j(x)$  represents the evaluation of each variant. (Talasova, 2003)

Importance for individual criteria and all results will be shown in a separate chapter.

#### 4 SELECTING THE BEST BANK ACCOUNT ACCORDING TO AVERAGE MONTHLY COSTS

If young people choose an account according to the lowest average monthly costs, then in the last quarter of 2014 the following accounts turned out to be the best, i.e. up to 60 CZK:

Tab. 1 - Accounts and average costs in CZK, Source: (Soukal, I., Hedvicakova, M., 2015)

ACCOUNT	The average costs in CZK
Equa bank Běžný (active client)	12
AirBank Malý tarif	24
Fio Běžný	32
mBank mKONTO	57

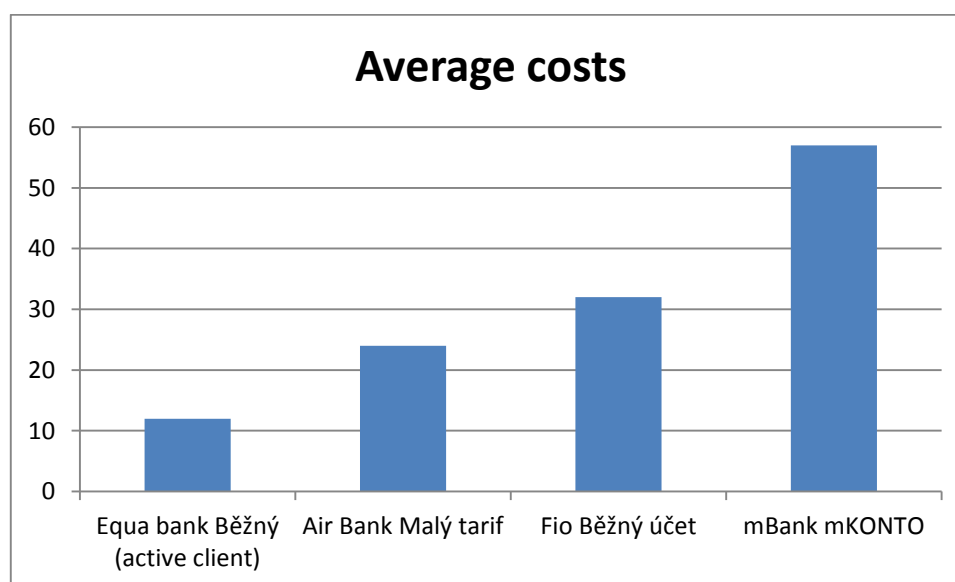


Fig. 1 - Average costs for individual accounts. Source: own

Table 1 is missing Raiffeisenbank bank with eKonto Smart and UniCredit Bank with U Account, GE Money Bank with Genius Free & Flexi with which the clients should fit within the 60 CZK boundary, but there were either an insufficient number clients (as in Raiffeisenbank bank and UniCredit bank) or according to the Client index for fourth quarter of 2014 they did not fit into the boundary.

The following four banks Equa bank with Current account, Air Bank with Small tariff, Fio with Current account and mBank with mKonto will be further calculated for the Active and Passive client according to the multi-criteria analysis.

The Client index (table 1) order is determined solely on the basis of the average monthly costs. This analysis does not take other aspects into account that may be important for the client, such as the availability of ATMs, benefits offered, physical location of a bank branch, the level of smartbanking etc. These criteria will be used in multi-criteria analysis in the next section.

## 5 THE SELECTION OF CRITERIA FOR MULTI-CRITERIA DECISION-MAKING

For the comparison of individual accounts, we will use multi-criteria decision-making and evaluation of alternatives defined in methodology section.

For the above defined criteria we define the importance as follows:

Tab. 2 – Standardised importance of individual variants. Source: own.

CRITERION	Standardised importance
Management account fees	0.10
Fees for incoming payments	0.05
Fees for outgoing payments	0.15
Fees for standing orders	0.05
Fees from a merchant	0.20
Benefits	0.20
Availability of ATMs	0.25

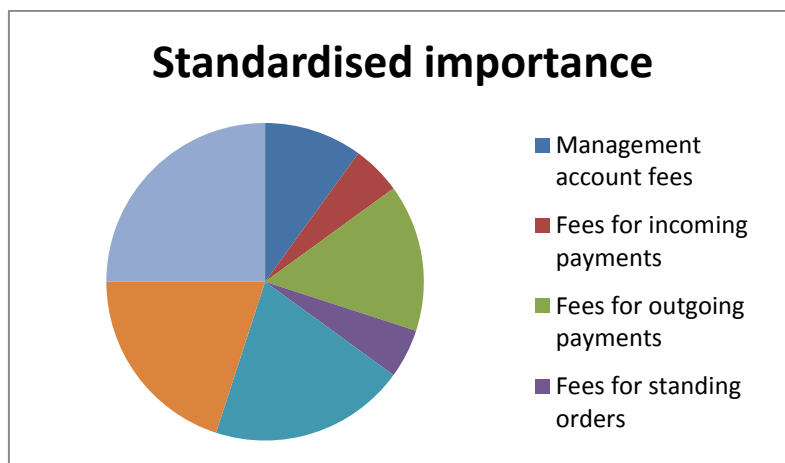


Fig. 2 – Standardised importance of individual variants. Source: own

## 6 CLIENT PROFILES

Now let's have a look at two typical profiles of young people due to the use of banking services, which we will continue to call active and inactive profile.

An inactive profile will represent a young client who uses their account relatively little. They have a monthly average of 2 ATM withdrawals, 2 outgoing payments (such as food and one order from the internet) and 2 incoming payments (they receive pocket money from parents and an income from a part-time job). They use one standing order for regular payment for accommodation. Payments at a merchant are very often used especially by young people (very few young people pay by cash); this model profile has 5 payments at a merchant per month totalling 1,000 CZK.

In contrast, the active profile will represent a young person who frequently use their account and tries to use the benefits of this account. They have a total of 5 ATM withdrawals per month, 4 outgoing payments (orders from the Internet are paid via the account, not by COD) and 2 incoming payments (due to their age they have income only from their parents and from a part-time job). They also have only one standing order same as the previous type, which is used for the payment of accommodation. Payments at a merchant, however, are used on a regular basis, they have 15 of them per month totalling 2,500 CZK.

Internet and mobile banking is used by both defined profiles, but since it is now a standard matter, we will not consider it in the further comparison.

## **7 THE RESULTS OF THE MULTI-CRITERIA ANALYSIS FOR THE 4 SELECTED CURRENT ACCOUNTS**

Four similar accounts were chosen for the multi-criteria analysis for which the cost calculation was carried out using client index, i.e. Equa bank Běžný (active client), Air Bank Malý tarif, Fio Běžný účet and mBank mKONTO (Equa bank, 2014; Air bank, 2014; FIO, 2014; mBank, 2014). The multi-criteria decision-making was performed for these accounts for the two defined above client profiles in accordance with these 7 criteria.

The following table 3 describes the overall value of the totality of fee criteria at selected banks for the inactive profile

Tab. 3 – Overall value of the totality of fee criteria at selected banks for the inactive profile.  
Source: custom processing from pricelist of the banks

<b>ACCOUNT</b>	<b>Total monthly charges in CZK</b>
Equa bank Běžný (active client )	0
Air Bank Malý tarif	-4
Fio Běžný účet	0
mBank mKONTO	18

The following table 4 describes the overall value of the totality of fee criteria at selected banks for the active profile:

Tab. 4 – Overall value of the totality of fee criteria at selected banks for the active profile.  
Source: custom processing from pricelist of the banks

<b>ACCOUNT</b>	<b>Total monthly charges in CZK</b>
Equa bank Běžný (active client )	0
Air Bank Malý tarif	21
Fio Běžný účet	30
mBank mKONTO	88



Another important criterion is the benefits offered, which in the four selected banks are as follows:

Air bank offers advantageous interest (as the only one from the offered accounts) and also the possibility of withdrawals from the terminals of Sazka. Equa bank offers free withdrawals from all ATMs in the Czech Republic as well as online payments without charges. Fio banka, same as mBank offers free incoming and outgoing payments, standing orders, withdrawals at a physical branch and a certain number of withdrawals from ATMs of another as well as their own banks.

The following table 5 evaluates the overall level of benefits of the individual accounts (linguistically defined variable) including the assigned standardised evaluation:

Tab. 5 - Overall level of benefits of the individual accounts. Source: own

<b>ACCOUNT</b>	<b>Level of benefits</b>	<b>Evaluation</b>
Equa bank Běžný (active client )	Average	0.5
Air Bank Malý tarif	Very good	0.7
Fio Běžný účet	Excellent	1
mBank mKONTO	Excellent	1

Availability of ATMs is compared in the following table 6, which reflects the degree of availability while using the linguistically defined variables, expressing the availability degree of ATMs of a given bank. It is divided into the range of high availability, average availability, low availability. The value of withdrawals anywhere is superior to these values. The table also includes a standardised evaluation of linguistically defined variables.

Tab. 6 - Comparison of the accounts according to the availability of ATMs. Source: own

<b>Bank</b>	<b>The total number of ATMs</b>	<b>Availability ATMs</b>	<b>Evaluation</b>
Equa bank	-	Withdrawals anywhere	1
Air bank	52 + terminals of Sazka	Average availability	0.5
Fio bank	153	Average availability	0,5
mBank	-	Withdrawals anywhere	1

The results for individual banks are clearly expressed in the following table 7.

Tab. 7 - Results for individual banks. Source: own

Bank	The evaluation for an inactive client	The evaluation for an active client
Equa bank	0.79	0.9
Air bank	0.815	0.705
Fio bank	0.765	0.71
mBank	0.725	0,67

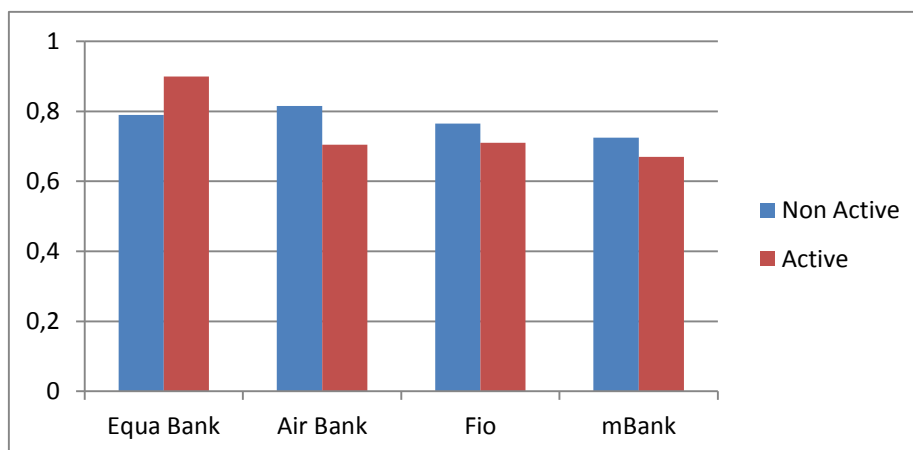


Fig. 3 - Results for individual banks. Source: custom processing

The multi-criteria analysis for the profile of an inactive client evaluated the AirBank account as the best, because it had the best values of fee criteria and relatively advantageous benefits. Conversely, for an active client the Equa bank account was evaluated as the best, which also had the best values of fee criteria and withdrawals from any ATM free of charge.

## 8 THE RESULTS OF THE MULTI-CRITERIA ANALYSIS FOR THE SELECTED STUDENT ACCOUNTS

Apart from low-cost current accounts, student accounts are a highly beneficial product for young people. Six accounts were selected for the multi-criteria analysis, which are the best in terms of fee, i.e. ČSOB Student account, The U account for young people from UniCredit Bank, FRESH account from Česká spořitelna, Era personal account for young people from Poštovní spořitelna, G2.2 Account from Komerční banka and Genius Student account from GE Money Bank (Komerční banka, 2014; ČSOB, 2014; UniCredit Bank, 2014; Česká spořitelna, 2014; ERA, 2014; GE Money Bank, 2014). Multi-criteria decision-making was carried out in accordance with these 7 criteria for these accounts for the two client profiles defined above.

The following table 8 describes the overall value of the totality of fee criteria at selected banks for the inactive profile:

Tab. 8 – Overall value of the totality of fee criteria at selected banks for the inactive profile.  
Source: own

<b>ACCOUNT</b>	<b>Total monthly charges in CZK</b>
ČSOB Student account	0
UniCredit U account for young people	0
ČS FRESH account	16
Era personal account for young people	16
KB G2.2 Account	18
GE Genius Student	20

The following table 9 describes the overall value of the totality of fee criteria at selected banks for the active profile:

Tab. 9 - Overall value of the totality of fee criteria at selected banks for the active profile.  
Source: own

<b>ACCOUNT</b>	<b>Total monthly charges in CZK</b>
ČSOB Student account	35
UniCredit U account for young people	0
ČS FRESH account	77
Era personal account for young people	60
KB G2.2 Account	58
GE Genius Student	72

Another important criterion are the benefits offered, which in the six selected banks are the following.

The ČSOB Student account offers free incoming and outgoing payments, ATM withdrawals from own bank, credit card with overdraft and smartbanking. The UniCredit U account for young people offers free incoming and outgoing payments, standing orders, withdrawals from ATMs of any bank and smartbanking. The ČS FRESH account provides free all incoming payments and 2 withdrawals from ATMs from own bank. The Era personal account for young people offers free incoming payments, 2 ATM withdrawals and overdraft free of charge. The KB G2.2 account offers annual bonuses and bonuses for payments at merchants in the form of withdrawals from ATMs free of charge. The GE Genius Student provides free incoming payments and standing orders, and all withdrawals free from ATMs of own bank.

The following table 10 evaluates the overall level of benefits of individual accounts (linguistically defined variable) including the assigned standardised evaluation to them.

Tab. 10 – Overall level of benefits of individual accounts. Source: own

<b>ACCOUNT</b>	<b>Level of benefits</b>	<b>Evaluation</b>
ČSOB Student account	Very good	0.9
UniCredit U account for young	Excellent	1
ČS FRESH account	Below average	0.4
Era personal account for young	Below average	0.4
KB G2.2 account	Below average	0.4
GE Genius Student	Average	0.6

The availability of ATMs is compared in the following table 11, which reflects the degree of availability while using the linguistically defined variables, expressing the availability degree of ATMs of a given bank. It is divided into the range of high availability, average availability, low availability. The value of withdrawals anywhere is superior to these values. The table 11 also includes a standardised evaluation of linguistically defined variables.

Tab. 11 – Availability of ATMs. Source: own

<b>ACCOUNT</b>	<b>The total number of ATMs</b>	<b>Availability of ATMs</b>	<b>Evaluation</b>
ČSOB Studentské konto	874	Very good	0.7
UniCredit U konto pro mladé	200	Withdrawals anywhere	1
ČS FRESH účet	1497	Excellent	0.9
Era osobní účet pro mladé	72+874 ČSOB	Very good	0.7
KB Konto G2.2	703	Very good	0.7
GE Genius Student	699	Very good	0.7

The results for individual banks are clearly expressed in the following table 12.

Tab. 12 – Results for individual banks. Source: own

<b>ACCOUNT</b>	<b>Evaluation for non-active profile</b>	<b>Evaluation for active profile</b>
ČSOB Studentské konto	0.905	0.795
UniCredit U konto pro mladé	1	1
ČS FRESH účet	0.69	0.58
Era osobní účet pro mladé	0.64	0.585
KB Konto G2.2	0.585	0.585
GE Genius Student	0.57	0.57

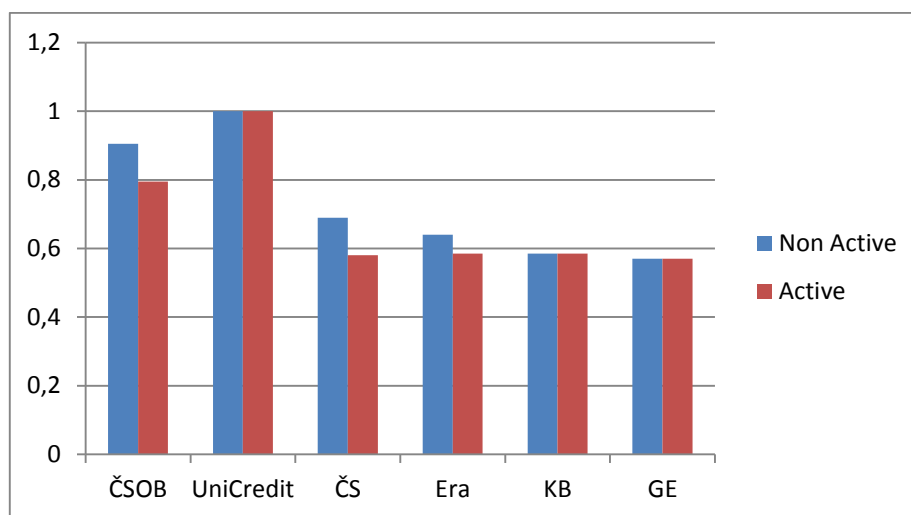


Fig. 4 – Results for individual banks. Source: own

## **9 DISCUSSION FOR THE MULTI-CRITERIA ANALYSIS OF THE SELECTED STUDENT ACCOUNTS**

Is it more advantageous for a young person to choose a standard current account, which presents itself as low cost or use the targeted banks' offers for young people or directly for students? Accounts for young people also offer a range of benefits targeted at this group. Using multi-criteria analysis, 4 similar accounts were chosen for which the cost was calculated using the Client index, i.e. Equa bank Běžný, Air Bank Malý tarif, Fio Běžný and mBank mKONTO. According to the 7 criteria described above, multi-criteria decision-making was carried out for two profiles: active and inactive client. The best account for an inactive client seemed to be the Malý tarif from AirBank, which had the best values of fee criteria and relatively advantageous benefits. Conversely, for an active client the best account seemed to be Běžný from Equa bank, which also had the best values of fee criteria and withdrawals from any ATM free of charge.

If we compare the results of the multi-criteria analysis using low-cost accounts with student accounts, the best was the U account for young people, in terms of both bank charges as well as withdrawals from all ATMs free of charge, calculated for an active as well as inactive client.

This confirms the first scientific issue that student accounts are for young people more advantageous than basic accounts from low-cost banks.

The second scientific issue was demonstrated on two client profiles. Results are shown in tables in relevant section (see Tab. 10 and Tab. 11), where all criteria are described. Differences between banks are significant and depend on the preferences of individual users, two defined profiled show different results.

The offer of accounts for young people is very diverse in the market; it always depends on personal criteria and requirements for a bank account. Precise definition and choice of their evaluation is the basis for selecting the correct account.

## **10 CONCLUSION**

If a young person wants to choose the best account, they have several options. They can carefully examine all scales of individual banks or they can use online comparators freely

available on the web. Both of these options assume perfect knowledge of all monthly operations that the client will carry out. However, it does not take into account other criteria that may be important for clients, such as the availability of ATMs, physical location of bank branches, smartbanking level, etc. For this reason, the first part of the paper used data from the bank charges Calculator and ranking of the most beneficial standard current accounts up to 60 CZK per month was created regardless of other criteria.

In the next part of the paper, 2 profiles were set: Active and inactive client and according to seven criteria the best bank account was chosen for each profile. For simplicity, only 4 banks were analysed, which the Calculator evaluated as the cheapest and they fit into the 60 crowns border.

These banks are referred to as low-cost banks, but they do not provide such a wide range of products and services. Using multi-criteria analysis, the best for an Inactive client is the Malý tarif from AirBank, which is characterised by the best fee criteria and relatively favourable benefits. For an Active client the best seems to be Běžný účet from Equa bank, which also had the best values of fee criteria and withdrawals from any ATM free of charge. This assessment is consistent with the results from the bank charges Calculator.

Young people are targeted also with student accounts, which were analysed in the last section. Six student accounts were selected, which seem to be the best regarding fees according to the tariff terms of individual banks. According to same seven criteria used in the previous analyses, multi-criteria decision-making for the two client profiles was carried out. For both profiles: Active as well as Inactive, taking into account only the fee criteria, the most favourable is UniCredit bank with the U account for youngsters, which has free account management. An inactive client can also choose the ČSOB Student account, which is also free of charge. For an inactive client it does not matter if they select the standard bank account or a student account. In both types of bank accounts they can fit into the 20 CZK boundary. For an Active client, the average monthly cost for maintaining the account range from 0 to 88 CZK. Young people who decide to actively use a student account should choose a standard current accounts rather than the student ones. However, it depends only on the person, how well they know their monthly payment operations, what benefits and services they require from the bank. Only then are they able to effectively decide what account to choose.

### **Acknowledgements**

This paper is written with financial support from specific university research funds of the Czech Republic Ministry of Education, Youth and Sport allocated to the University of Hradec Králové Faculty of Informatics and management, project no. 2/2015, order 2102.

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## **REGULATORY CAPITAL REQUIREMENT UNDER BASEL, THE ABILITY TO PERFORM OF VIETNAMESE COMMERCIAL BANKS**

*Ho Thanh Tung*

### **Abstract**

This study aims to analyze whether Vietnamese commercial banks may feasibly apply the regulation of Basel in the next few years. The study examines 10 Vietnamese commercial banks, which have been selected by The State Bank of Vietnam (SBV) to apply Basel regulation, during the period from 2003 to 2013. By employing the multi – regression, permutation – test and Granger – causal, the results show that adjusted turnover of loans, expenditure for interest and leverage would have an impact on banks' capital structure. Additionally, if both turnover of loans and expenditure for interest could be controlled as the same level of 2010, Vietnamese commercial banks may achieve the benchmark of the Central Bank.

*Keywords: Bank regulation, capital regulation, Basel regulation, leverage.*

JEL Classification: G21, G28

## **1 INTRODUCTION**

In an effort to establish a roadmap for banks of Vietnam to be more integrated with the international financial environment, SBV has issued a number of regulatory requirements and regulations governing activities of commercial banks of Vietnam, including regulation on minimum own capital issued in 2006, circular number 13/2010/TT-NHNN on prudential ratios, capital ratio, risk weight assets (RWA), maximum ratio of lending loans released in 2010 (see link from reference N<sup>o</sup>.15). Recently, SBV has selected ten commercial banks as the pilot to apply Basel regulatory (SBV N<sup>o</sup>. 1601/2014, 2014). This trial will begin in early 2015 and subsequently, all commercial banks in Vietnam are required to apply Basel regulatory in 2018.

Based on the analysis of data which was collected from annual report of Vietnamese commercial banks, in this writing, I will discuss about the possibility of implementation this in terms of (just about the) improvement the capital regulation, and focus on three following objective points. Firstly, I consider whether the changing trends of banks' capital in recent years have showed the readiness of banks for the standards applying. Secondly, I am going to find out whether there is a relationship among the changes in the inherent index performance indicators of the banks and which variable is the most important factor that banks should focus on for capital regulation. And lastly, I will find whether the trend directions are observed from business, the Vietnamese commercial banks may meet the regulatory requirements by the central banks or not.

Follow these points, section 2 of this writing is a short review from some studies that related to my research. In section 3, I will describe how data was collected and testing methods were used. Section 4 is the discussion about some main indicators and capital structure during 2003 – 2013. Section 5 is offered some conclusions.

## **2 THEORETICAL BACKGROUND**

### **2.1 Capital requirements, capital ratio and leverage**

Aggarwal & Jacques (1997) found the impact of The Federal Deposit Insurance Corporation Improvement Act (FDICIA) regulation on banks' long-term targets for the Tier 1 ratio and Michael & Perraudin (1998) study of UK bank data actually exceeds that convergence of the Tier 1 ratios to its long-run average is quicker. Actually, banks were more constrained by their leverage ratios than by the Basel-Accord Tier 1 and Tier 2 ratios. These studies may explain that when ratios based on narrow-equity measures, almost banks had chosen to raise its Tier 2 capital with Tier 1 adjusting subsequently. So, when analyzing on the data of Canadian banks from 1955 to 2009 Bordeleau, et al. (2009) argued that banks should have to have a constraint of leverage, and suggested that a leverage ceiling would be a useful tool to complement risk-weighted measures and mitigate procyclical tendencies in the financial system. More reinforced for capital structure studies, Ephraim Clark, et al (2014) showed that higher level of return on assets and/or a higher investment coefficient increase systemic volatility at all intervention banks. Given that, banks can increase their return on assets and their assets base by reducing their capital requirements; this evidences that a system of highly leveraged banks (high investment coefficients and high return on assets) is more volatile (less stable) and less sensitive to regulatory intervention than a system with higher capital requirements.

Study of Ruthenberg and Landskroner (2008) about loan pricing under Basel 2 suggested two approaches for capital requirements. These are internal and standardized. The reason of this suggestion was to adjust loan to the requirement of capital of Basel 2. Then Cipovová and Belás (2012) study risk approach under Basel 3, found advanced methods for credit risk measurement are more flexible on class change of corporate exposures in portfolio. Internal rating is the most used method in the Czech Republic, which worked out a much lower capital adequacy than The Standardized approach without assigned external rating. That means banks are trying to get profit from loans and avoiding to increase the capital for the risk weigh. Addition for loan pricing under Basel 2 & 3, Allen, et al (2012) had proved the reduction in cost of equity almost entirely offset the increase in funding that come from the shift from relatively low cost debt to relative high cost equity. So, the new requirements of capital will increase cost of funding a corporate loan portfolio to addition capital requirements but constraint on institutions with substantial exposure (low risk weighted assets), bank will reject to hold traded securities or mortgage lending.

### **2.2 Capital requirements and adjusting balance sheet**

Distinguin, et al. (2013) review some studies found that capital buffer and business cycle have positive two-way relationship. Negative co-movement with the cycle, capital buffer decrease during upturns or the contrary. The relationship of capital and liquidity is negative for small banks considering both liquidity creation measures. Authors employing the VAR model as formula. And with two definitions, these are Tier 1&2 capital to risk weighted assets (T12\_RWA) and Tier 1 capital to risk weighted assets (T1\_RWA). The result showed that indicators are replaced by one year lagged value. Running separate regression for US and EU banks with the variable environment, the results show that banks do not strengthen their regulatory capital when they face illiquidity issues. But as a new vision in research about Basel, in Cathcart et al (2014) study from data 1990Q1- 1992Q2 and 2007Q3 – 2009Q2 of US banks, quarterly growth rates for several asset categories on variables which regulators might be considered as financial indicators. These indicators of financial include Tier 1 ratios, total capital, total capital to risk-weighted asset ratios, leverage ratios, loans and mortgage

assets. Cathcart et al suggested that the ratio in risk weight capital should be flexible for the selection of capital target of bank.

### **3 METHODOLOGIES AND DATA**

I am using the panel data from annual report of all Vietnamese commercial banks in 2003 to 2013 for my analysis.

Firstly, I show the charts of some main financial indicators of 10 selected banks. The figures and charts are outline about capital facts of the ten Vietnamese banks, which have been chosen for the regulations applied.

Second, base on data and analysis of the first step, I choose a regression model fixed with data by employing Bayesian Model Average (BMA) method. This method will consult which model is the best model by pointing out which is the most explained the variation of the dependent variable. Then, from independent variables of model, I value the most important variable by using Lindermann – Merenda – Gold (LMG) method for test with Granger-Causation.

The Granger-Causation test of one dependent variable and one most independent variable is to focus on the most important indicator so banks should pay more attention to this indicator for a better result to improve capital regulation.

#### **3.1 Data**

The data used is panel data, which was collected from the annual reports of 40 banks of Vietnam from 2003 to 2013. In this period, some small banks had four year or less than four year of operation were removed from data. The data is disproportionate data, so when processing with R statistics language, a filter for missing data was used for a smooth result.

Data of 10 selected banks was taken from data of all banks above. Then from this data, I took total assets of 10 selected banks, which accounted for 50.2% of total assets of all Vietnamese banks as shown in *Fig.1*.

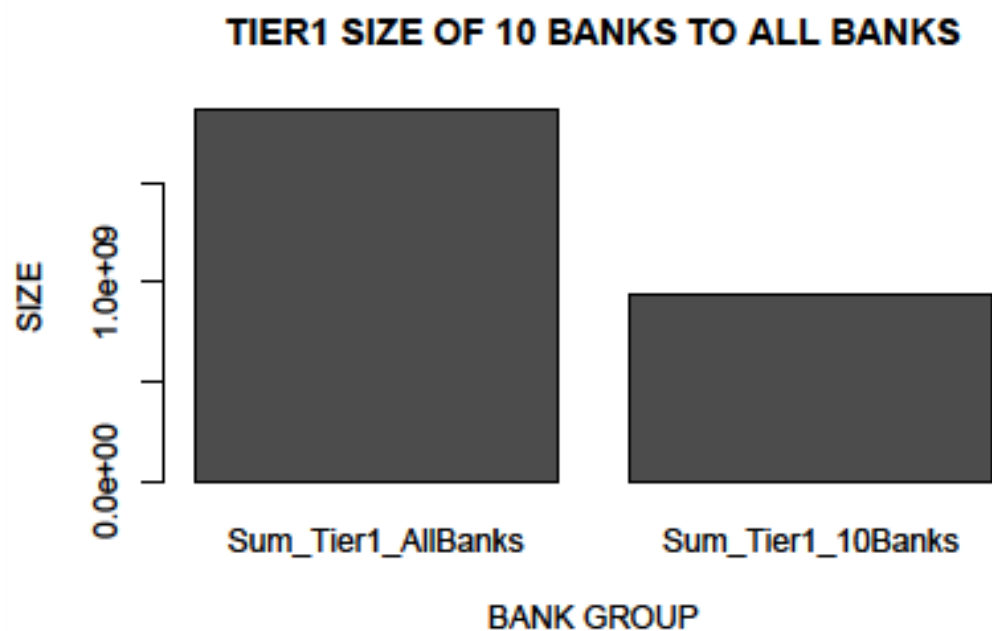


Fig. 1 – Tier 1 size of 10 banks to all Vietnamese commercial banks (Figures for Fig.1 are Total of these indicates, take data from data of all commercial banking industry of Vietnamese. Calculated by author. \*R statistics language.)

Ten figures representative indicators of capital and operation of bank were calculated at mean from data of the 10 selected banks, as summarized in Tab.1

Tab.1 – Indicates coded and Charts

Indicator	Code	Calculating	Shown on
Tier1 of banks	Tier1		Fig.2
Tier2 of banks	Tier2		Fig.3
Total assets of banks	TA	<i>Total Unweight Assets</i>	Fig.4
Own capital of banks to unweight total assets	OCA_UWA	$\frac{Tier1 + Tier2}{TotalUnweightAssets}$	Fig.5
Leverage	Leverage	$\frac{TotalLiability}{Tier1}$	Fig.6
Loans to customer of banks	LC		Fig.7
Deposit of customers in banks	DC		Fig.8
Expenditure for interest of banks	IEX		Fig.9
Return on equity of banks	ROE		Fig.10
Revenue from loans' interest of banks (only for description)	RI*		Fig.11

And all computing in many progresses, I used sources from panel data of 10 banks. From this group, I calculated the mean of some main indicators shown on the charts and transformed panel data as time series data for the Granger – Causation test.

### 3.2 Methodologies

- *Models and variable*

**First**, I employ the permutation test to test all 9 indicators to distinguish the variation value from two separated groups. This test is named "permutation test" (or randomization test, re – randomization test, exact test). This test method has an advantage that it tests for both parameters and non-parameters in compare between two groups. The result of this testing may give us a more consolidated explanation the trend from graphics. Those groups are control group and variation group and I can assign randomly for our two groups. In our case, I test to find out changing of banks from 2007 to 2013 has been more regulations or not.

Null hypothesis: the two groups have identical probability distribution, meaning the changing before and after 2008 is same. If p-value is close to zero, the changed significantly in period 2008 to 2013 is significant in compare with the changed of 2003 to 2007 period. Alternative hypothesis: the change is not significant between these periods. I expect that  $H_0$  won't be rejected as a good signal about the changing last time.

During the period from 1999 to 2005, capital ratio adequacy (CAR) had been mentioned by SBV, which indicated criterions about minimum of CAR for Vietnamese commercial banks. But until April 2006, The Central Bank issued the regulation to force commercial banks to enforce the regulations. So, data from 2003 to 2007 were grouped in two groups, one is from 2003 to 2007, the non-strictly compliant period about capital requirement and the second is from 2008 to 2013 strictly compliant period of capital regulatory.

**Second**, from representative indicated, I am going to choose the variable for our regression model. I take consultancy how many independent variables be in the best model by BMA method. This method proposes 4 models for selection.

Although *model 3* have all the variables but BMA method argue that application is based on BIC (Bayesian Information Criterion) index of this model is too small to be suitable (see Hoeting 1995). Therefore, I take *model 1* which have maximum BIC for explanation the variations of three main indications. They have been more affect to OCA\_UWA (Own capital on un-risk weight assets).

*Model 1* has three independent variables. These are IEX, LC and Leverage. Its form is:

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + u_{it}$$

In my study, this model can be writing:

$$\text{OCA\_UWA}_{it} = \beta_0 + \beta_1 \text{IEX}_{it} + \beta_2 \text{LC}_{it} + \beta_3 \text{Leverage}_{it} + u_{it} \quad (1)$$

Where  $i(1,10)$  and  $t(1,11)$  are number of banks and the year in period, IEX is expenditure of banks for interest, LC is Loans from banks to customers.

Assumptions: Ten banks are same. IEX, LC, Leverage have normal distribution,  $u_{it} \sim N(0, \delta^2)$ .

The regression result of (1) by pooling data is shown on Tab.4

Result from Tab.3 shows that regression has significant with all variables at 95 percent, and talks to us that our "*model 1*" is available to explain 19.6 percent varies OCA\_UWA by IEX, LC and Leverage. R-squared of *model 1* is the general affect of all three variables, and these variables are not same significance level. Although they have regression coefficients but

regression coefficients of each variable somehow depend on stand error and its variance. From here, I employ one more method name's LMG to take consultancy about the significance level of dependent variables in "model 1". This method has been developed and proposed by Lidermann, Merenda and Gold (1980). LMG metric the important related of each dependent variables in model by computing the average contribution of R-square from each variable as its importance in model. In this case, our model take consult from LMG is *model 1*. Result is shown on Tab.5. Consultancy from Tab.5 advices I focus on which variables will be considered in next step.

- ***Causation test***

To corroborate our second aim, I conduct Granger – causation test. I expect null hypothesis rejection which would support findings of variables in *model 1* are causality one another, our initial idea to provide further insight for next period.

Before going to run Granger – Causation test, I first tested the stationary of variables to make sure the data into Granger – Causation test could not make false positive test and may give right result as well. The Ljung-Box test was performed to test their stationarity. In all tests, I am received that all data which are represented by the variables are not stationary. If input this form of these data into Granger test, we may take of false positive result. Hence, I transformed all with first-order difference and then checked again if they were stationary or not. Then, the results are shown by Tab.6, after transform at first-order difference, all variables are become stationary.

The form of models in Granger – Causation test is:

$$\begin{aligned}
 Y_{it} &= \sum_{i=1}^n \alpha_i Y_{t-i} + \sum_{i=1}^n \beta_i X_{t-i} + u_{mt} \\
 Y_{it} &= \sum_{i=1}^n \alpha_i Y_{t-i}
 \end{aligned}
 \tag{2}$$

Where  $Y$  at first test is dependent variable,  $X$  is independent variable, at first it is ST.LC.

$i(1,n)$ ,  $n = 3$ .  $n$  is the lag for this test. After lag = 3,  $Y$  and  $X$  change position together. And this process be repeated second time with the replacement of ST.IEX for ST.LC

$m$  is the time of  $Y$  and  $X$  changed or  $X$  be replaced,  $m(1,4)$ .

Hypothesis: the null hypothesis for this test is of no causality from independent variable to dependent variable.

I repeated a similar test of Berger in 1994 to verify my second aim, I conducted Granger-Causation test with OCA\_UWA, LC and IEX (Berger, & Udell, 1994). Leverage has a good trend already and I abort Granger – causation test with this variable. I expect  $H_0$  rejection, which would support my initial idea about the causality of these variables. My data was not perfect and some other environmental factors were ignored. Therefore, I had to relax some assumptions related to the linear regression: Capital market is perfect in the period of model, shareholder maximizing behaviour, no bankruptcy costs, no barriers to entry, no taxes and deposit insurance changed, nonnegative amounts of equity and debt are chosen at the beginning of the period. Bank management has no private information, so debt and inventory are symmetrically informed with management about bank investment payoffs.

The null hypothesis of Granger tests are changed as the variables are tested if they cause forward and backward each other. And the alternative hypothesis are opposite for each cases.

These hypotheses are showed together with Tab.7. And before Granger test, I do the test of stationary of data as show in Tab.6.

## **4 RESULTS AND DISCUSSIONS**

### **4.1 The trend of indicators**

#### *a. Own capital*

The variance of Tier 2 may be explained by two main reasons. Firstly, during period from 2000 to 2005, thanks to good economic situation, growth rate of banks was very high. In 2006, SBV issued the prudential ratio regulation, which required minimum capital for all commercial banks. So, banks' own capital including Tier1 and Tier2 had been increased sharply as it was shown in *Fig.2* and *Fig.3*. Secondly, some empirical studies found that when banks were required to increase their capital, initially, banks tend to raise its Tier 2 capital with Tier 1 adjusting subsequently (see Aggarwal & Jacques 1997). But as the regulation, in the Basel framework and circular No. 13/2010 of SBV, if a bank fails Tier 1, it automatically fails the total requirement as the regulator impose that Tier 2 cannot exceed 50% of Tier 1. The requirements on minimum capital of banks forced banks to consider either to increase their capital or to merge with other bank so as to achieve such minimum capital in the beginning of 2011. There were two M&A transactions taken by 05 Vietnamese commercial banks during that period. The main reason is capital while the same difficult stage of the Vietnamese stock market.

Because the total capital and tier1 were being increased while tier2 was being decreased, this trend had effected to the lessened of OCA\_UWA. In Rime (1998) and some articles published before, studies look at the effects of lagged capital ratios on banks' long-run targets for the ratio of risk-weighted to total assets, and such substitution, rather than being a response to binding capital requirements, might reflect the efforts of financially troubled banks to rebuild capital structure.

#### *b. Leverage, expenditure and ROE.*

As the charts shown, we see that although leverage in *Fig.6* is variations in the whole the period but the decrease from 2010 is a good signal, all the indicators had been growing during two third of the period from 2003 to 2010 but then after 2010 tier2, OCA\_UWA and ROE had been going down. The decrease of leverage (Leverage) is a good signal. The lower leverage the lower risk too. A rising sharply gives risk-weight capital ratio a stable and seemingly strong (see Bordeleau, 2010).

While p-value from permutation test (show in Tab.2) of both leverage (LC) and return on equity (ROE) are not significant but leverage is near to the threshold of ninety percent significance. Expenditure for interest (IEX) has a highest change in the 2008 to 2013. This manifestation may be understood that while strengthen the capital, banks were costs much more than before as the finding of Apanard (2009). In the study of Allen, et al (2012), authors argued that when had been cost higher than before, banks had been being cost the borrower, but when the economic going down banks can not do it.

In 2009, Leverage level was sharply down, while expenditure increased. These were simply as the result of some empirical studies had evidences that a high leverage of banks' capital tend banks to high profit (or opposite) and increase (or decrease) risk as less liquidity (Gorton & Winton, 2000). Or addition capital requirements but constraint on institutions with substantial exposure (low risk weight assets), bank will reject to hold traded securities or mortgage lending higher risk-base capital standards (Aggarwal & Jacques, 1997), the result that it effect narrower loans to customer of banks but LC in *Fig.7* is shown that this indicator

has been growing up along period. Then in 2010, Leverage had been turn up and kept smooth variance till 2011 before down again during 2012 and 2013 simply as the trends of IEX, DC and ROE in period. The changing during 2011 to 2013 was not quite same as its in last period especially trend of leverage and expenditure.

**Summaries the trends:** During 2003 to 2013, Vietnamese commercial banks have strengthened their capital. Although there are some indicate trend of the transformation has been more tend to the capital requirements of The Central Bank, and reflects the change from 2007 has been more following up to the trend of capital requirement than previous. The result of testing in Tab.2 showed that Tier1, OCA\_UWA, LC, TA, IEX in period 2008 to 2013 have been changed more significantly than before and this provided more consolidation in explanation for the trend of these indicators.

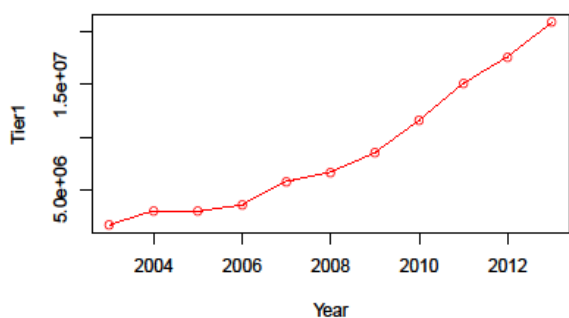


Fig. 2 – Tier1 Evolution  
(Calculated by author)

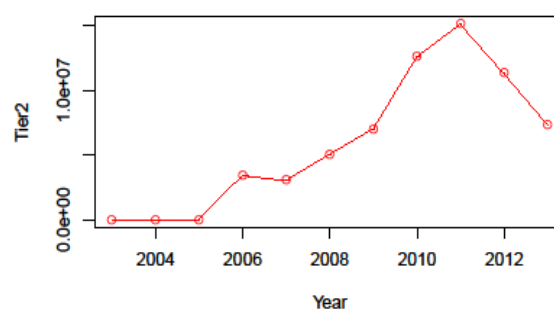


Fig.3 – Tier2 Evolution  
(Calculated by author)

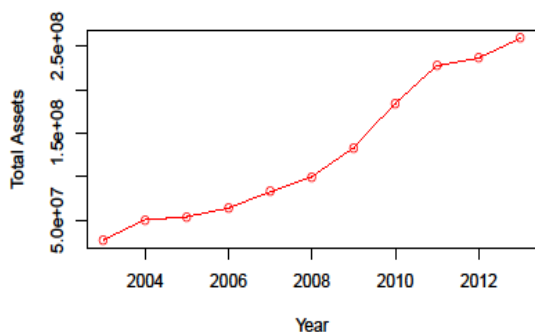


Fig.4 – Total Assets Evolution  
(Calculated by author)

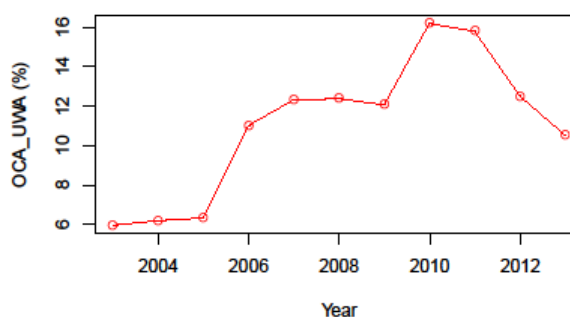


Fig.5 – Own Capital to Unweight Assets Evolution  
(Calculated by author)

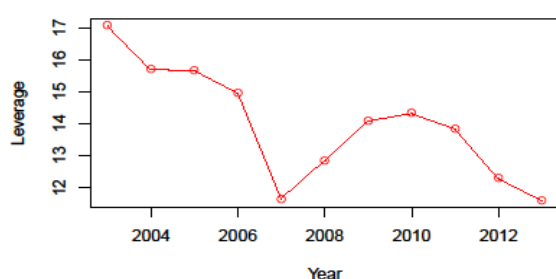


Fig.6 – Leverage Evolution  
(Calculated by author)

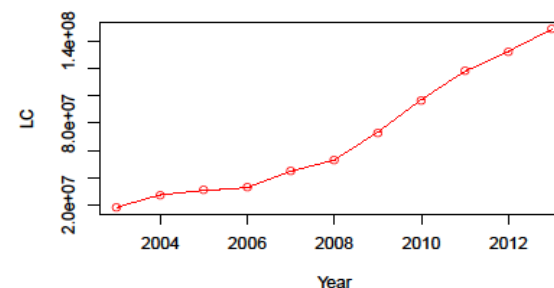


Fig.7 – Loans To Customer Evolution  
(Calculated by author)



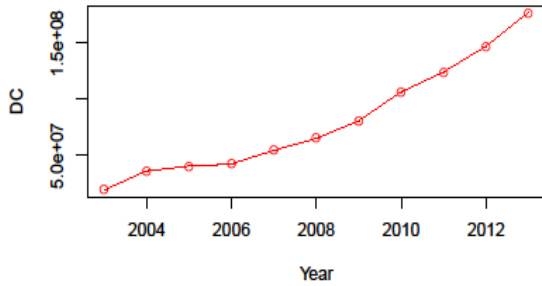


Fig.8 – Deposit of Customer Evolution  
(Calculated by author)

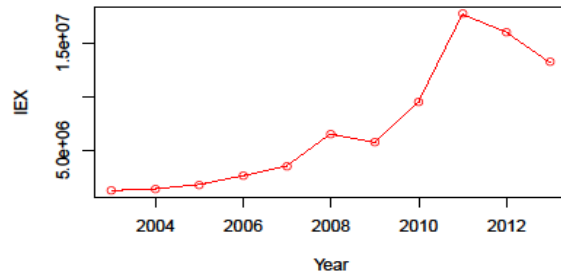


Fig.9 – Interest Expenditure Evolution  
(Calculated by author)

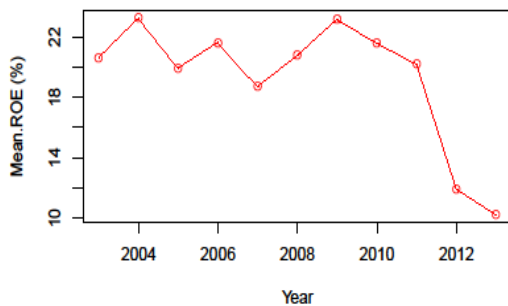


Fig.10 – Return on Equity Evolution  
Evolution(Calculated by author)

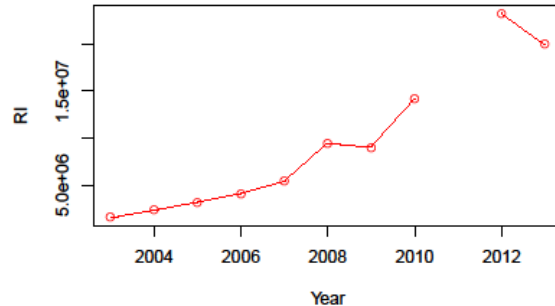


Fig.11– Revenue from Loans Our Interest  
(Calculated by author)

\*(Figures for charts Fig.2 to Fig.11 are means (except Fig.10)of these indicates, take data from data of 10 selected Vietnamese commercial banks, calculated by author. R statistics language.)

Tab.2 – Result of Permutation Test. Source: Take data from data of 10 selected Vietnamese commercial banks, calculated by author.

Approximative 2-Sample Permutation Test data: x by as.factor(y) (2013, 2007)			
Indicator (Variable)	Z value	p-value	Changing Signification
Tier1	-4.5988	0.0000	Yes
Tier2	-4.0907	0.0000	Yes
OCA_UWA	-3.795	0.0000	Yes
Leverage	1.649	0.095	Yes(at 90%)
LC	-3.7432	0.0000	Yes
TA	-4.4874	0.0000	Yes
DC	-4.1106	0.0000	Yes
IEX	-5.1187	0.0000	Yes
ROE	1.3802	0.159	No

(R statistics language.)

Approximative 2-Sample Permutation Test had been take data from panel data of 10 banks chosen. **Null hypothesis:** that the two groups have identical probability distribution. If p-value is close to zero, the changed significantly in period 2008 to 2013 is significant in compare with the changed of 2003 to 2007 period.

**Alternative hypothesis:** the change is not significant between these periods. Permutation test method has an advantage that it tests for both parameters and non-parameters in compare between two groups or periods.

## 4.2 Relationship of variables

To answer for the second main point of our study, I employed a regression model. From indicators in Tab.1, I decided to place OCA\_UWA as dependence variable. Intension of OCA\_UWA included own capital and total assets (unweight-assets). So I predicted that if this variable could be improved, it means the capital should be improved in general.

While OCA\_UWA is dependence variable, I do not use Tier1, Tier2 and TA because they are absolutely relate with OCA\_UWA and the occurrence of them in model will lessen the estimation efficiency of other variable in model. Thus, the output of BMA method, I have ROE, IEX, LC and Leverage as the independent variables in my model. *Model 1* may explain 19.56 percent variation of OCA\_UWA Tab.3.

Tab.3 – Result of BMA method. Source: Take data from data of 10 selected Vietnamese commercial banks, calculated by author.

	p≠0	EV	SD	model 1	model 2	model 3	model 4
OCA_UWA	100	1.314e-01	2.189e-02	1.475e-01	1.125e-01	1.376e-01	1.015e-01
ROE	35.7	3.999e-04	6.571e-04	--	--	1.218e-03	5.607e-04
IEX	100	-6.096e-09	1.523e-09	-6.002e-09	-6.056e-09	-6.229e-09	-6.170e-09
LC	100	-5.681e-10	1.398e-10	-5.568e-10	-5.778e-10	-5.678e-10	-5.868e-10
Leverage	64.2	-2.081e-03	1.864e-03	-2.645e-03	--	-3.696e-03	--
nVar		--	--	3	2	4	3
r2		--	--	0.196	0.154	0.232	0.163
BIC		--	--	-7.012e+00	-6.813e+00	-6.804e+00	-3.277e+00
post prob		--	--	0.338	0.306	0.304	0.052

*(R statistics language. BMA method.)*

Result of permutation test (*tab.2*) for Leverage is not good as the other but leverage is an important indicator of Basel core so I keep this variable and abort DC variable because DC absolutely relate with Leverage.

Back to the trend of indicates we have from charts, LC and IEX are two indicators which keep going up all the period. But the figures are shown in Tab.4 that both LC and IEX are negative with OCA\_UWA and Tab.5 consult that LC and IEX are respectively the most importance variable and the second importance variable in *model 1*. Thus, these variables would better reduced rather than increased. But in this case, the time to improve capital of Vietnamese commercial banks occurred right into economic recession effected worldwide, so banks could not pass on the increased costs to their borrowers, this situation explains why ROE falls sharply and IEX increases during the same period.

Tab.4 – Regression (Pooling) result of "Model 1". Source: Take data from data of 10 selected Vietnamese commercial banks, calculated by author.

Unbalanced Panel: n=10, T=6-11, N=95				
Residuals:				
Min	1Q	Median	3Q	Max
-0.0815	-0.0316	-0.0107	0.0182	0.1240
Coefficients:				
	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	1.475e-01	1.752e-02	8.417	5.22e-13 ***
IEX	-6.002e-09	1.516e-09	-3.960	0.000149 ***
LC	-5.568e-10	1.393e-10	-3.997	0.000130 ***
Leverage	-2.645e-03	1.224e-03	-2.161	0.033346 *
Signif. codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1				
Total Sum of Squares: 0.24574				
Residual Sum of Squares: 0.19768 on 91 degrees of freedom				
Multiple R-squared: 0.1956, Adjusted R-squared: 0.18734				
F-statistic: 7.375 on 3 and 91 DF, p-value: 0.0001772				

(R statistics language. Regression of formular (1)).

Tab.5 – Result of LMG method. Source: Take data from data of 10 selected Vietnamese commercial banks, calculated by author.

Response variable: OCA_UWA		
Total response variance: 0.002614304		
Analysis based on 95 observations		
3 Regressors: IEX, LC, Leverage		
Proportion of variance explained by model: 19.56%		
Relative importance metrics: LMG		
	Variable measured	Important
IEX	0.07096332	II
LC	0.07809938	I
Leverage	0.04651052	III

(R statistics language.)

When requirement for banks' capital has been enforced, to addition capital requirements but constraint on institutions with substantial exposure (low risk weight assets), bank will reject to hold traded securities or mortgaged lending (Aggarwal & Jacques, 1997). In Vietnam, all most banks loans are mortgaged ones and together with a poor and illiquidity market of bond, do not give them more choices as the finding of Malloy (2008).

On the other hand, economic downturn coupled with high inflation at around ten percent during 2008 - 2013 made people stop exposure to other investments but rather focus on bank deposits, as shown in Fig.10. The decreasing of ROE from 2010 to 2013 although expenditure for interest has been turned down from 2011. So, the gap of interest for loans of Vietnamese commercial banks this period is come narrower than before and the downturn is shown in Fig.11 of RI in 2011 as evidences about this situation.

Calculating from data of all Vietnamese commercial banks the ratio of turnover from interest of loans out on total turnover I take figure is 89.5 percent. It means that all most revenue of Vietnamese commercial banks comes from banks' assets (or lending out).

Study of Bordeleau (2009) found that Canadian banks did not have non performing loans during the downturn as other countries did due to a constraint of leverage level. Additionally, the negative correlation between OCA\_UWA and LC shown in Tab.4 suggested that a reduced of LC contributes for an increased of OCA\_UWA. Thus the decrease reflects of Leverage in Fig.6 is a good trend of this indicate and may help OCA\_UWA to be improved. A decreased of LC or Leverage or IEX to improve expected OCA\_UWA. In this case, the finding of Belas, et al (2012) about approaching method with collateral ratios, resulting capital requirement would be much usage. Own methodology for credit risk measurement can bring substantial saving on equity through which the bank can accelerate their performance to minimization effect in relation to impacts of new banking regulation (See Cipovova, E., & Belas, J., 2012).

Trial calculation following SBV's guidance with an assumption that all these 10 banks would apply the calculation as guidance of the Central Bank. Ratio of CAR<sub>try</sub> in end 2013 is 6.81 percent (OCA\_UWA in the end 2013 is 10.54 percent). Compare with figures from empirical data, I may estimate that if IEX wouldn't be increased, Leverage will be kept the down trend as two recent years and LC will be cut down same as 2010 level, 10 Vietnamese commercial banks may perform as the CAR benchmark of SBV (9 percent) in a short time after 2013.

### **4.3 Granger causation and next period**

It is too interesting that IEX and LC are caused by OCA\_UWA include IEX and OCA\_UWA are bilateral causality. The causal relationship is occurred within two lags of Granger test model. Tab.7 provides a prediction of econometric methodology for trend of OCA\_UWA. After OCA\_UWA has changed for two years, LC will be changed, and the changing of IEX and OCA\_UWA causal each other. Connecting this point with the fact of charts graphic may explain why the chart of LC would not be going down while the economy has been being down and similar trends of OCA\_UWA together with IEX.

As the gap of loans interest is come thinner, pressure on interest rates on deposits will affect deposit volume. Both banks' assets and liabilities would decrease in the next period and then expenditure of bank for interest would decrease as well.

The expectation to reduce LC and IEX will make OCA\_UWA promptly become better, after two years it may affect to LC and IEX and improve the profitability of bank. When bank is changing toward higher capital regulation required the loans out would be cutting down and this process itself subsequently may make profitability of bank dropped (Allen, et al, 2012). Notably, at the same time, bank is safer and more stable. Higher capital regulation and stable of bank are positive with bank's profitability (See Chien-Chiang Lee and Meng-Fen Hsieh, 2013 and Ephraim Clark, et al, 2014). And greater capital regulation stringency exerts marginally positive effects on bank efficiency (Barth, 2013). In this case I find that the improvement for LC, IEX and some other relative indicators is two year lag.

Tab.6 – Result of stationary test by Ljung-Box test. Source: Take data from data of 10 selected Vietnamese commercial banks, calculated by author.

Variable	X-squared	Df	p-value	Stationary
OCA_UWA	39.5581	1	3.184e – 10	No
LC	56.6926	1	5.096e – 16	No
IEX	55.865	1	7.76e – 14	No
First-order Difference				
OCA_UWA	0.0735	1	0.7863	Yes
LC	0.0374	1	0.8466	Yes
IEX	3.6557	1	0.05588	Yes

(R statistics language. The Ljung-Box test.)

Tab.7 – Granger-Cause test. Source: Take data from data of 10 selected Vietnamese commercial banks, transform panel data to be time serial, calculated by author.

<b>OCA_UWA cause LC. <math>H_0</math>: LC does not cause OCA_UWA</b>				<b>H<sub>0</sub></b>
Lag	F	Pr(>F)		
1	0.7322	0.425		Can not reject Reject at 90%
2	6.9474	0.07483 .		
Signif. codes: ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1				
<b>LC causes OCA_UWA. <math>H_0</math>: OCA_UWA does not cause LC</b>				<b>H<sub>0</sub></b>
Lag	F	Pr(>F)		
1	0.0773	0.7903		Can not reject Can not reject
2	0.2396	0.8007		
<b>OCA_UWA cause IEX. <math>H_0</math>: IEX does not cause OCA_UWA</b>				<b>H<sub>0</sub></b>
Lag	F	Pr(>F)		
1	8.7971	0.0251 *		Reject at 95% Can not reject
2	2.5264	0.2274		
Signif. codes: ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1				
<b>IEX cause OCA_UWA. <math>H_0</math>: OCA_UWA does not cause IEX</b>				<b>H<sub>0</sub></b>
Lag	F	Pr(>F)		
1	4.5264	0.0775 .		Reject at 90% Can not reject
2	0.1797	0.8439		
Signif. codes: ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1				

(R statistics language. Granger – Cause test. Formular (2))

**Summary:** All variables in *model 1* are negative correlation with OCA\_UWA two of which have been moving toward opposite direction for efficient to OCA\_UWA from 2007 to 2013. They are not conducive for the next period in general. Vietnamese commercial banks may meet the benchmark issued by SBV if they could control loans to customer as the level of 2010.

Granger – causation showed that within 2 lag an improvement of OCA\_UWA of Vietnamese commercial banks going to cause LC and IEX. In case the control of OCA\_UWA is positive, this fact will make the regulatory of Vietnamese commercial banks be better after 03 years adjusted of OCA\_UWA.

## 5 CONCLUSIONS

After issuing requirement of capital regulation, SBV selected 10 commercial banks from 40 Vietnamese commercial banks to applying more regulatory capital of Basel. Our analysis from data of 10 selected banks from 2003 to 2013 could answer two questions.

First: As discussion in charts, result from Tab.2 about the trend of variation of capital indicates in 2003 - 2013 period. To have the answer, I employ the permutation test from data separated to two periods, one from 2003 to 2007 when regulation was not effective and the other one from 2008 to 2013 when regulation is compulsory. The result and analysis may come up with the first conclusion: in second half of 2003 – 2013 period, the ten selected commercial banks of Vietnam is tend to positive significant with more capital regulation.

Second: Employing BMA methodology to select best model from some model having same variables group, and taking the consult from LMG regression method to measure the important level of variable in model, I recognized that loans to customer, expenditure of banks for interest and leverage have negative relationship with the capital structure beside some indicators which have direct relationship with capital as tier1, tier2. But at this time, loans to customer and expenditure of banks for interest are still high. I propose that banks should consider to control their loans to have a better profit when improving capital structure.

Following these consultancies, and last, I tested Granger – causation to provide a more information that after control and adjust for capital structure (as OCA\_UWA in this article) in some lags, this adjustment may cause to loans out and expenditure of bank.

In one hand, regulation of Basel and SBV mentioned more regulatory criterions than my study. In the other hand, Vietnamese commercial banks were not fully applied or simultaneously enforcement of the circulars of The Central Bank. Thus, the models, tests and analyses mostly were based on assumptions. Management, strategy, environment variables and other fluctuations were not taken into model. Moreover, data of small group of Vietnamese banks are not the representation for the whole banking industry and so on. These are the limitations in my study.

Time for applying Basel largely to Vietnamese commercial banks is expected in the end of 2018. More empirical study in the coming time may provide more evidence for the performance Basel in Vietnam. . So, data from next time would give clearer picture than this study. My findings and recommendation in this study are regarding to loan out of Vietnamese banks. So, our next study would be address about the regulation impact on this activity and their interactive.

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## **SUBSAMPLE ANALYSIS IN STRUCTURAL EQUATION MODELLING EXAMPLE FROM CUSTOMER SATISFACTION MODELLING IN BANKING INDUSTRY**

*Lubor Homolka, Jaroslav Belás, Jiří Doležal*

### **Abstract**

This paper stresses the importance of sub-sample analysis in the context of Structural Equation Modelling. Based on original survey on 459 banking customers, structural model of latent variables pricing policy, individual approach to customer and customer satisfaction was investigated with respect to sex groups. We've found that pattern of *females'* answers is inconsistent with economic theory-driven expectations and differ a lot from answers obtained from male subsample. Combining both subsets resulted in expected behaviour pattern –this was the problem we've decided to analyse. We show that although overall model exhibit good fit characteristics, results cannot be generalised on both sexes. This is because of different values of estimated coefficients and their corresponding standard errors on subgroups.

*Keywords: customer satisfaction, Structural Equation Modelling, factor analysis, sub-sample analysis*

JEL Classification: C18, M39

### **1 INTRODUCTION**

Understanding to customers' needs is crucial for successful business endeavour. This kind of knowledge is necessary condition for establishing customer satisfaction and loyalty. Customer satisfaction is a topic which received a lot of attention in the literature. Thomas (2013) summarises findings on determinants of customer satisfaction in retail industry and also finds that the association between satisfaction and repurchase-behaviour is positive and strong. Also, satisfied clients are more likely to spread positive information about products and prices. Wang, Zhao, Wang & Liu, J. (2007) review research on relation between satisfaction and loyalty. They list important papers which demonstrate that satisfaction positively affects loyalty. They claim that loyal customers are source of the stable profits because they are less cost sensitive, re-purchase more and transaction costs diminish faster than in group of not-loyal customers. They conclude that satisfaction influences financial performance through loyalty. But, they also point to "satisfaction trap" described in Jones and Sasser (1995) which states, that satisfaction itself does not guarantee loyalty. Modelling satisfaction is therefore important for understanding present state, but also for prediction of business development.

Recent development in retail banking industry introduced type of banks with non-personal customer relationship management. Trust and loyalty is built on the quality of financial products rather than on personal communication with bank officer or on other supplementary services. For such banks proper understanding of customer segments is of the highest importance.

This paper points to the problem of inconsistent results which can occur on different sub-samples of the overall dataset. Our premise states that aggregated results can be considered as valid and useful for further inferences only when estimated characteristics can be found in sub-samples, such as nationality, sex or education level. Belás, Cipovová, E., & Demjan (2014) found significant differences in all of these factors. For this paper we have selected



sub-class analysis on sex. In the questionnaire survey respondents were asked about their sex (male/female). This is biological perspective (sex) which differs from gender concept, which is social-psychological. It is expected, however, that this difference in meaning does not significantly affect the results and therefore next discussion on gender is relevant. In the research review article written by Meyers-Levy and Loken (2014) authors analyse differences in gender with relation to cognitive processing style, responsiveness and reactions on marketing stimuli. They point to the three streams of theoretical approaches which might identify such a difference. Social-cultural approach highlight inherent capabilities (physical size of individuals of group) resulted in different roles in the society. Evolutionary approach is concerned about the process which resulted in roles we witness today. Hormone and brain science "enhances the plausibility" (Meyers-Levy and Loken, 2014) of the previous two approaches. All of these perspectives can explain different customer behaviour, which were found in retail banking research (Belás, Holec, Homolka, 2013) or activity-travel research (Ren, 2009). Ren provides references on specific consumer behaviour with respect to gender. He concludes that gender is often treated as an exogenous variable and its role in estimating causal structure is not considered. Meyers-Levy and Loken (2014) confirm this by stating that "... gender has been treated as an interesting moderating variable and less as a subject of theoretical inquiry".

The aim of this paper is to address the problems which might be present but are hidden to the researcher when the analysis is made only on the top level of aggregation. The paper is organised as follows. In the methods section we present descriptive statistics of the sample and list methods used for assessing reliability and validity of measurement model of Structural Equation Model (SEM). Result section is divided into two chapters. First presents results obtained from the overall sample. In the second chapter we discuss results and its differences for two sexes obtained on respective subsamples.

## **2 METHODS**

Our convenience sample of 459 respondents consisted of 258 females. For 245 respondents the highest education level was high school. 202 respondents hold university degree. These proportions do not mimic educational situation in Czech Republic as the proportion of university degree holders is around 30 % in group of 30-34 years.

Original questionnaire was designed to address more dimensions than 3 selected for this paper. Questions were constructed by experts in the field of banking to govern face validity of questions.

Internal consistency of the indicators (item reliability) was assessed by Cronbach ALPHA coefficient with corresponding standard error. Discriminant validity requires indicators to load on latent construct which they are supposed to measure. Principal Component Analysis (PCA) or Exploratory Factor Analysis (EFA) are two main approaches which are being used to check whether the constructs exhibit discriminatory power. As opposed to Confirmatory Factor Analysis (CFA) these analysis do not know in advance which indicators should, according to economic theory, group together. In case of PCA even the number of latent constructs is not known. We use EFA because we are more concerned about the latent variables than about dimensionality reduction which is primary purpose of PCA. Oblimin (oblique-type) factor rotation was used because we expect latent constructs to be correlated. Criteria for confirming discriminatory power amongst factors were: 1) individual loading is close to 0.4 or higher, 2) cross loading is considered if the second highest loading is close to 0.3 or higher and the difference between loadings is smaller than 0.1. We have iteratively updated our model by removing/adding variables with high cross-loadings and low

communalities. Communality is a proportion of the shared variance of the indicator with the factors. Low communality indicates that the question is perceived as unique and therefore irrelevant to other questions.

Appropriateness of data was checked by performing Bartlett's Sphericity test of correlation matrix. Kaiser-Mayer-Olkin statistics of sampling adequacy was performed, too.

SEM model was estimated using R package lavaan (Rosseel, 2012). Additional absolute fit statistics, root mean square error of approximation (RMSEA) and standardised root mean square residual (SRMR) were computed. Comparative fit measure (Comparative fit index - CFI) shows how the model changed by user specification when compared to the full baseline model. Usually the value above 0.9 is considered as good fit (Hair, 2013).

In the first step EFA was employed and corresponding characteristics described above were computed. Analysis on sex sub-samples follows.

### 3 RESULTS

We start our analysis on full data set. In the following chapter differences between sexes are discussed.

#### 3.1 Analysis without subsetting by sex

Results of EFA on the overall set without stratification revealed that the most important dimension (on overall) is pricing policy. This dimension accounts for 40 % of explained variance. Factor analysis identified 48 % of all variance if the data (displayed in Tab. 1). Indicator with the lowest communality was sat2 ("I inform people around about the satisfaction with my bank."). This statement might not have been understood as the others because it does not directly speak about satisfaction development but rather about sharing experience and satisfaction. Because this indicator has high cross-loadings it was dropped from the further analysis of overall results. The second most important dimension was satisfaction. All corresponding satisfaction indicators load as expected and their cross-loadings are small.

Tab. 1 – Results from EFA. First column contains names of indicators. In the next three columns factor loadings are displayed. Column Com contains value of indicator's communality. Last column is estimated Cronbach  $\alpha$  and corresponding standard error in brackets. Last row presents values of variance which is explained by corresponding factor. Variable with low communality is being usually eliminated from the data-set, because the factor loadings are small. Source: Own processing.

	F1	F2	F3	Com	Reliability
prpo2	0.79	-0.04	-0.02	0.59	0.786 (0.016)
prpo1	0.71	0.07	0.07	0.59	
prpo3	0.6	0	0.05	0.37	
prpo4	0.52	0.2	-0.03	0.42	
sat4	0.07	0.72	-0.06	0.55	0.739 (0.0199)
sat3	0.21	0.6	-0.03	0.52	
inap2	-0.18	0.53	0.31	0.41	
sat1	0.29	0.45	0.02	0.44	
inap1	0.01	-0.06	0.77	0.56	0.678 (0.026)
inap4	0.14	-0.05	0.57	0.33	
inap3	0.02	0.32	0.51	0.5	

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Variance (%)    40    34    26    Total variance 48%

Question *inap2* ("My bank accommodates my specific needs.") was initially intended to gauge individual approach to client. Because of the correlated nature of the studied variables and their content-close proximity we include this indicator into the satisfaction group. High loading and significant test of convergent validity ( $z\text{-test} < 0.01$ ) justifies this decision. Constructs' reliabilities are moderate. The lowest value is related to individual approach and reaches values of 0.678 (standard error of the estimate is 0.026) which might be considered high with respect to the large sample size.

From the Fig. 1 we can read standardised estimates of path coefficients. They indicate positive effect of both pricing policies (*prp*) and individual approach (*inp*) on satisfaction (*sat*). On the overall sample the effect of pricing policies is stronger than individual approach. Both estimates are statistically significant ( $p\text{-val} < 0.01$ ).

Bartlett test of sphericity rejected null hypothesis ( $\chi^2 = 51.176$ ,  $p\text{-val} < 0.01$ ) about absence of correlations between constructs. KMO index equals 0.58 and MSA for each item are 0.58, 0.55 and 0.65 for pricing policy, satisfaction and individual approach respectively. These values are close to the minimum recommended value 0.6.

In the next step SEM model was fitted. Overall fit statistics indicate acceptable fit with CFI = 0.908. 90 percent confidence interval of root mean square error ranges from 0.073 to 0.099 and standardised RMSEA = 0.069. Overall  $\chi^2$  test equals to 178.7. This indicates that observed covariance matrix is different than population matrix from the full model. This means that the model does not describe reality. Well-known problem related to this test is the sample size. The larger the study, the more inflated the test statistics. We will not therefore print this statistics further as it will result in significant results due to the sample size.

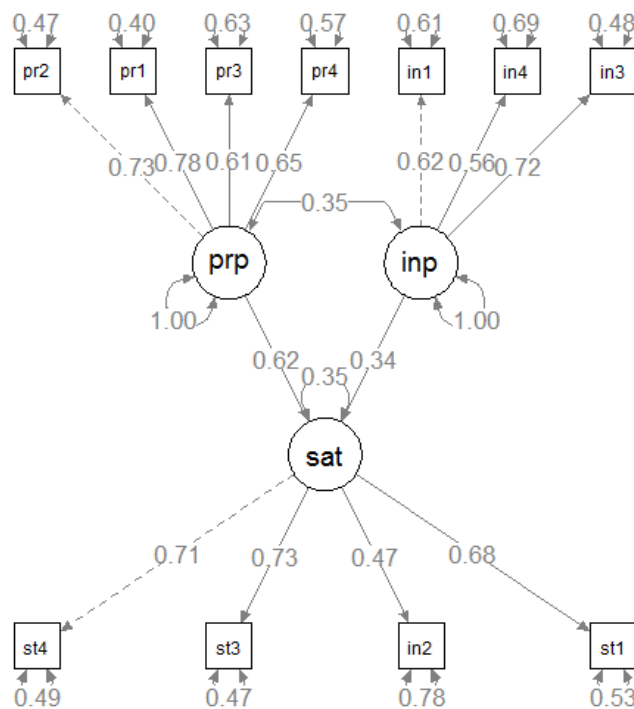


Fig. 1 – Structural model presents type of relation (double-headed arrow indicates covariance whereas single arrow directional relation). Price policy (*prp*) exhibit stronger influence on Satisfaction (*sat*) than Individual approach (*inp*). Source: Own processing.

### 3.2 Analysis on subsamples

In the next step analysis on both levels of sex was performed. Factor analysis results obtained from male subset revealed that two constructs, price policy and satisfaction have similar importance in describing the variance. Indicator with the smallest communality and factor loadings is sat2 (and therefore was removed from male subset). Indicator inap2 exhibited large values of cross-loadings in initial model (0.41 on satisfaction factor and 0.37 on individual approach). This indicates that this indicator cannot be considered as a sole measure of individual approach to customer or satisfaction and therefore was omitted from analysis. This result points to existence of intersection of perspectives. This intersection is stronger than in case of females. Female's scores achieved bigger difference; for satisfaction 0.59 and 0.31 for individual approach. But, females' results are more uncertain because two other indicators showed cross-loadings. Second was sat1 ("I'm satisfied with services bank provides me.") was considered as indicator for pricing policies (0.43) and satisfaction (0.37). Second cross-loaded question was inap3 ("I feel to be important client when I visit my bank"). This question was considered as both satisfaction (0.37) and individual approach (0.42) indicator. This (price policy and individual approach and its relation to satisfaction) seems to be the most visible difference between males and females viewpoints. Surprisingly, problematic question sat2 profiled strongly as indicator for satisfaction. After attempts of achieving loadings matrix without cross loading and composition which would reflect face validity requirement (indicators' positions in the matrix have to be in accordance with underlying economic theory) we have not able to identify clear structure. The best result is shown in Tab. 3. The most problematic is assigning *sat1* indicator to the second factor. We will continue with this assignment because it will be in accordance with our initial expectation and it is also the same results as in case of the full-set model.

Tab. 2 – Results from EFA on male subset. Results are after elimination of *sat2* and *inap2* as expected as designed. Source: Own processing.

	F1	F2	F3	Com	Reliability
prpo2	0.75	0.02	-0.11	0.58	0.753 (0.029)
prpo3	0.72	-0.11	0.13	0.47	
prpo1	0.61	0.21	0.03	0.56	
prpo4	0.36	0.26	-0.05	0.29	
sat3	0	0.81	-0.02	0.66	0.741 (0.032)
sat4	0.01	0.66	0.12	0.51	
sat1	0.16	0.49	0	0.36	
inap1	0.01	-0.07	0.72	0.49	0.704 (0.036)
inap4	0	0	0.63	0.4	
inap3	0	0.23	0.6	0.5	
Variance (%)	36	35	29	Total variance: 48 %	

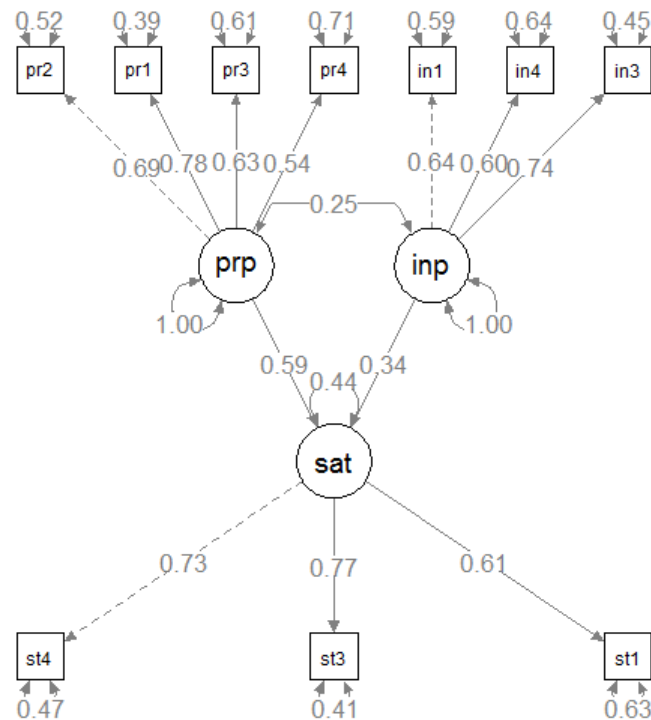


Fig. 2 – SEM model on the male subset. Strength of relations is close to the overall model.  
 Source: Own processing.

Tab. 3 – EFA results on female subset. Although *sat1* loads more with first factor, difference is small. If the *sat1* was eliminated from the subset and EFA was performed again, results would not meet condition of face validity. Source: Own processing.

	F1	F2	F3	Com	Reliability
<i>prpo2</i>	0.79	-0.04	0	0.59	0.803 (0.020)
<i>prpo1</i>	0.77	-0.02	0.1	0.6	
<i>prpo4</i>	0.65	0.12	-0.03	0.51	
<i>prpo3</i>	0.58	0.03	-0.01	0.35	
<i>sat1</i>	0.41	0.4	0.04	0.51	0.743 (0.026)
<i>sat4</i>	0.24	0.61	-0.15	0.54	
<i>inap2</i>	-0.15	0.59	0.31	0.48	
<i>sat3</i>	0.36	0.45	-0.03	0.48	0.658 (0.0370)
<i>inap1</i>	0	0.01	0.78	0.62	
<i>inap4</i>	0.24	-0.09	0.53	0.34	
<i>inap3</i>	0.08	0.39	0.41	0.47	
Variance (%)	0.48	0.28	0.23	Total variance: 50 %	

Researcher is not only interested in estimated values of parameter but also about other related statistics such a standards error. Standard error of the sampling distribution of the parameter conveys information about the uncertainty about the estimate. To make this uncertainty measure scale-irrelevant we compute z-score which is a ratio of the parameter and corresponding error. Higher value of z-score indicates higher confidence about the estimated parameter. From the Tab. 4 we conclude that estimates on overall sample are the most

optimistic. Note that standard error reflects the number of observations which is here about two times higher than in sub-sample.

Tab. 4 – Comparison of path estimates. Values in brackets are z-scores which represents ratio of estimate to its standardised standard error. Note that the whole set standard values are inflated when we compare them to sub-group results. Source: Own processing.

Covariate	All sample	Male	Female
Pricing policy	0.619 (9.427)	0.587 (5.827)	0.675 (7.429)
Individual approach	0.341 (5.443)	0.340 (3.662)	0.277 (3.297)
Covariance (inap, prpo)	0.348 (4.881)	0.245 (2.426)	0.435 (4.313)

## 4 DISCUSSION

Results from the factor analysis indicates that perception of construct vary between sexes. We have not found any approach (removing indicators with cross-loadings and low communalities, change of factor-loadings rotation technique) which would yield in results which would meet conditions of both discriminant and face validity. However, we have provided solution which is in our opinion the best possible. After problematic indicators were eliminated from the analysis we have performed SEM analysis.

Results from the structural model which were obtained from the full dataset are very similar to those on sex sub-samples; in terms of path orientation and magnitude. We provide an evidence for claim that positive attitude towards pricing policy positively affect level of satisfaction. This effect is stronger than effect of positive individual approach on satisfaction (which is also statistically significant). From the uncertainty perspective full dataset results exhibit higher z-scores than those obtained on sub-samples. This would be interpreted as more certain results. This might be justified by the sample size. On the other hand this finding contradicts results obtained on sub-samples (because total set consists of two distinct-pattern subsets).

This paper pointed to the problem related with inconsistent data structure, which might not be obvious when the analysis is performed only on full data set. We cannot consider statements about the strength of relations which were found as valid. This is because of the omitted variable problem. Originally, questionnaire was designed to capture customer behaviour and preferences on ten dimensions. This is not a flaw of the paper, because paper's aim was more methodological than inferential.

### Acknowledgments

Authors are thankful to the Internal Grant Agency of FaME TBU No. 005/IGA/FaME/2014: Optimization of parameters of the financial performance of the commercial bank, for financial support to carry out this research.

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## **PLASTICS CLUSTER MEMBERS AND THEIR COMPETITORS - DEA BENCHMARKING STUDY**

*Lubor Homolka , Adriana Knápková, Drahomíra Pavelková*

### **Abstract**

This paper presents a benchmark analysis of 13 companies. Companies were selected by an expert's judgement from the sample of plastic manufacturers. These companies exhibit similar product characteristics. We propose Data Envelopment Analysis as a benchmarking tool. Nine of the selected companies are Plastics cluster members. Based on balance sheet and profit & loss statement figures from the period 2012-2013 technologic set was estimated by Variable Returns to Scale technique. Results are presented in scatter plot and described in more detail with reference to companies' peers (companies which are similar to a particular company and which highly influence efficiency estimates). Five out of six companies which constitute technology frontier are Plastics cluster members. These findings cannot be, however, considered as evidence for positive effect of cluster membership on higher efficiency. Research design is not experimental and the selected method serves only as a comparison method, not an inferential tool.

*Keywords: Data Envelopment Analysis, Benchmarking, Cluster organisation*

JEL Classification: C18, C44, G32

### **1 INTRODUCTION**

The Encyclopaedia of Management defines benchmarking (2009) as "the process through which a company measures its products, services, and practices against its competitors, or those companies recognized as leaders in its industry. Benchmarking is a management tool for determining whether the company is performing particular functions and activities efficiently, whether its costs are in line with those of competitors, and whether its internal activities and business processes need improvement." This paper was motivated by the author's research interest in companies' performances appraisal. And, additionally, by inquiry of Plastics cluster which wanted to assess and compare performance of its members and their competitors. Benchmarking is a complex process which requires various research methods and different analytical techniques. Benchmarking is concerned with the comparison of specific agents and companies. This paper addresses only quantitative parts of the process.

Results of our study have only limited implications on current economic theories as it is only an exploratory study which utilises convenient methods for multi-criteria comparisons. The goal of this paper is to identify the production frontier with respect to two inputs and two outputs and identify corresponding efficiencies for all companies. The number of inputs and outputs was selected to show the benefits of proposed Data Envelopment Analysis (DEA).

In the next section we describe and justify the selection of our data. Then, we review literature on the topic of DEA, both from the application and theoretical perspective. Then, we formalise our model and deliver results. Finally, we discuss efficiencies for cluster members and other companies. The paper concludes with limitations and suggestions for further analysis.

## 2 METHODS

This benchmark study belongs to relativist analysis, which sees reality in a time and location bound context. Findings may be transferrable to studies taking place under very similar conditions. The rubber and plastic industry plays an important role in the economic environment of the Zlínský region. According to the Czech statistical office (Statistical Yearbook of the Zlínský Region, 2014), concentration of the industry is the highest in the Czech Republic. On average, the share of plastic and rubber producers with more than 100 employees rose from 14 % in 2010 to 17.2 % in 2014. This is twice as high as the national level (8.1 % in 2013).

The most relevant companies were identified by Plastics Cluster Supervisory Board member Ing. Jaroslav Šuranský, CSc., MBA. Because of the similarity of internal processes and final products, only injection moulds manufacturers were considered in the analysis. The largest company, Greiner assistec, s.r.o. was removed from the sample because it was identified as an outlier by the technique described in Wilson (1993). Analysis was performed on data obtained from balance sheets (BS) and profit & loss statements (P&L) on netto values. Assets (BS, row 001) and inventory (BS, 032) were selected as *inputs*. These indicators were selected because they can proxy both company size (assets) and inventory strategy. Revenues from own goods and services (P&L, 05) and Ordinary income (profit / loss from ongoing operations) (P&L, 52) serve as *output* variables. Inputs were computed as a mean value of two consecutive observations because they are static variables. Both outputs are cumulative values over a year and therefore values only from the year 2013 were used.

In traditional settings several indicators are analysed both horizontally (change in time) and vertically (relative importance to base). Usually, the best companies are selected by means of expert opinion. Results observed from these companies then serve as contrasting levels to analysed companies. An alternative approach utilised in this paper, data envelopment analysis (DOE), does not rely on an expert's opinions to such a large extent. Instead of comparing single indicators (financial multiple is also considered as a single indicator although it consists of at least two indicators), frontier models aim to identify a set of maximum attainable outputs that can be produced by collection of inputs. This frontier is therefore defined on input-output space of appropriate indicators containing information about efficiency of decision making unit (DMU). Intuitive notion of efficiency states that DMU with higher outputs and with the same inputs are more efficient. When multiple inputs and outputs are considered, it might be difficult to compare the outputs as there might not be a common base (costs expressed in currency and company size measured by number of employees).

A comparison of Key Performance Indicators (KPI) among companies, which differ in size, can be difficult because of the implicit assumption of constant value on scale. This assumption is clearly violated in non-linear relations, such as the case of diminishing returns. DEA is usually performed on absolute values rather than on ratios. The rationale for this is that absolute values determine the size of DMU. Another distinguishable feature of DEA compared to other benchmarking methods is that multiple inputs and outputs are allowed to be part of the model, although they are not comparable on the same scale or unit. It is also important to point out the fact that DEA (standard model) is a non-parametric and deterministic model. There are no assumptions regarding the uncertainty of measurements that can be found in the regression analysis approach or in Stochastic Frontier Analysis (SFA).

DEA framework is versatile. It is not limited to benchmarking studies only. Network analysis which seeks to evaluate efficiencies of entities (organisation division) within the DMU is a promising application of the general DEA (multi-process) framework (Fukuyama, 2012). Samoilenko, Osei-Bryson (2013) proposed the DEA-centric Decision Support System (DEA-DSS). They also present references and a short description of ensemble methods (DEA + cluster

analysis, neural network and decision tree induction, regression analysis and others). Emrouznejad, A., Tavana, M., & Hatami-Marbini (2014) propose a fuzzy DEA (FDEA) method which might be employed in a situation where imprecise input or output variables are present. DEA was also used for bankruptcy modelling (Premachandra, Chen, Watson, 2011) and credit risk modelling Tsolas (2014).

For detailed DEA problem formulation and concept definitions we refer the reader to Cooper (2011). For solutions to common problems encountered in employing DEA (homogeneity of units and products, identification of input/output set, factor measurement and its implication on ratio or normalised data, undesirable inputs and outputs and the problem of indispensability, weight identification) see Dyson et al. (2001).

In the following section we define elements of DEA modelling and also provide some descriptive analysis of the sample.

## 2.1 Elements of DEA model and data

Technology set  $T(x, y)$  is a combination of inputs  $x$  which can produce outputs  $y$ . This technology set have to be homogenous across analysed DMUs; it also consists (implicitly) of directly unmeasurable factors, such a social or geographical condition (if this aspect brings some competitive (dis)advantage). Boundary of technical set is the set with the best performing DMUs. This boundary has to be estimated empirically. Several estimation techniques were proposed, both of parametrical and non-parametrical form. In this study we use Variable Returns to Scale (VRS) technology approach, because it relies only on two assumptions described later. Some authors prefer to use term production possibility set for the technology. There are two assumptions VRS model rely upon. Free disposability assumption states that if there is an input-output combination which constitutes technological frontier than any combination with more inputs can also produce less outputs then efficient combination and therefore belongs to technology set. Second assumption concerns convexity of frontier. That is, any mixture of efficient input-output combinations also belongs to frontier or is in technology set.

It is convenient to measure efficiency as a proportional change of inputs and outputs. Input efficiency is the smallest multiplier (change) of inputs  $x$  which allows DMU to produce  $y$ . This Farrell input efficiency is written as:

$$E(x, y) = \min(e \mid e \cdot x = y^*) \quad (1)$$

If the  $e$  is lower than 1 then DMU can produce frontier production  $y^*$  but can save  $(1 - e)$  of inputs. Value of 1 indicates that DMU is a member of technology frontier. Higher values points to the infeasible frontier production of particular DMU.

Farrell efficiency can be analysed from output perspective as:

$$F(x, y) = \max(f, x^* = f \cdot y) \quad (2)$$

Value of multiplier  $f$  then identifies how large should be the output if frontier inputs  $x^*$  would remain constant.

Authors are not unanimous on interpretation of effectiveness measures (EM). One argues that comparison is possible only when one DMU dominates the other. If this is the case, effectiveness is a measure of dominance (Bogetoft 2011). Less restrictive interpretation allows DMU comparison based on EM even in the absence of domination. Interpretation is limited to

the comparison of an analysed company to companies which constitute closest technological frontier.

### 3 RESULTS

The simplest case of the DEA model with one input and output variable can be interpreted graphically by constructing a technologic frontier in a two-dimensional plot. If more than two inputs or outputs are considered the technological frontier cannot be displayed directly. This is the case in our model. Values in Fig. 1 suggest that association between company size expressed in terms of mean asset value and total revenues is positive. Points printed in crosses and triangles define the technological frontier. Other companies are considered inefficient. Efficiency scores are printed in Tab. 1.

Tab. 1 – Table summarises Input (E) and Output (F) Efficiency for companies with company registration number (ID). Source: Own processing.

ID	Efficiency		Plastics Cluster	ID	Efficiency		Plastics Cluster
	E	F			E	F	
30988	0.458	2.035	No	43874801	1.000	1.000	Yes
49974084	0.620	1.460	No	44005253	0.717	1.477	Yes
25325442	0.829	1.001	No	46905049	1.000	1.000	Yes
60793791	1.000	1.000	No	46973982	1.000	1.000	Yes
26267381	0.593	1.641	Yes	25939483	0.621	1.690	Yes
27448550	1.000	1.000	Yes	31445	0.968	1.028	Yes
27508404	1.000	1.000	Yes				

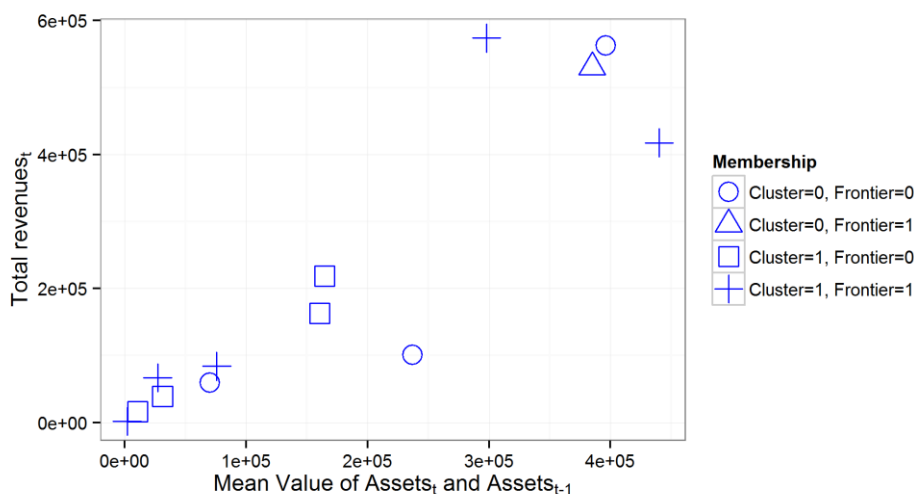


Fig. 1 – Scatter plot of companies according to their size (Assets) and performance (Total revenue). Shape of data-point indicates both cluster organization and technological frontier membership. There is not visible frontier as the frontier was computed from two inputs and two outputs. Source: Own processing

The smallest company, which also defines the technological frontier is the company with id=27508404 (Sunplast s.r.o.). To find out which companies have similar characteristics and are therefore comparable in efficiencies, we need to look at Tab. 2. These similar companies are not directly observable in Fig. 1 because this plot shows only two of four studied variables. We will use values from Tab. 2 which reflect all variables. Tab. 3 points to peers (companies

which effect DMU's efficiency due to theirs similar characteristics of inputs and outputs) for each non-efficient DMU. Influence strength of peer is expressed as  $\lambda$ .

Comparable companies to the 27508404 (number 7) company are 9 and 12. Efficiency estimates of company 9 are more influenced by company 7 than by company 12. Company 9 reaches the value of input efficiency  $E = 0.72$  and output efficiency  $F = 1.477$  (from Tab. 1).

Tab. 2 – Column 1-13 correspond to company in row. Last column show Farrell's input efficiency. Values in table are  $\lambda$  values which point to closest DMU to DMU in row. Higher values indicate stronger influence on DMU input efficiency. Source: Own processing.

ID		1	2	3	4	5	6	7	8	9	10	11	12	13	E
30988	1										0.835	0.165			0.46
49974084	2										0.975	0.025			0.62
25325442	3						0.943				0.008	0.049			0.83
<b>60793791</b>	<b>4</b>				1										<b>1.00</b>
26267381	5						0.175		0.423		0.402				0.59
<b>27448550</b>	<b>6</b>						1								<b>1.00</b>
<b>27508404</b>	<b>7</b>							1							<b>1.00</b>
<b>43874801</b>	<b>8</b>								1						<b>1.00</b>
44005253	9							0.778			0.222				0.72
<b>46905049</b>	<b>10</b>										1				<b>1.00</b>
<b>46973982</b>	<b>11</b>											1			<b>1.00</b>
25939483	12							0.446	0.068		0.486				0.62
31445	13						0.29				0.696	0.014			0.97

## 4 DISCUSSION

The research design adopted for this study does not allow for generalisations. This study is exploratory and descriptive and also space- and time-bounded. The sample was not selected by random. Moreover we cannot fix the factors which differentiate companies. Therefore, we do not perform a replicable experiment. Although the majority of Plastics cluster members constitute the technological frontier, we cannot claim that cluster membership makes companies more efficient. It might be the case that good companies group but the effect of being together might only be negligible.

This study is also limited by its single-period study design (although some variables are deflated by values which average two-period values). Selected technique used for estimation of technology frontier can affect the final result significantly. We have selected the VRS model because it is considered a flexible approach and only relies on two assumptions – convexity and free disposability. For the next analysis we suggest other input/output indicators, perhaps from the operational area such as the amount of material waste or energy consumption.

### Acknowledgments

The authors are thankful to the Operational Programme Education for Competitiveness co-funded by the European Social Fund (ESF) and national budget of the Czech Republic for the grant No. CZ.1.07/2.3.00/20.0147 - "Human Resources Development in the field of Measurement and Management of Companies, Clusters and Regions Performance", which

provided financial support for this research. This article has been elaborated also as one of the outcomes of research project IGA/FaME/2014/015.

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## **SOCIAL RESPONSIBILITY AND ITS IMPORTANCE TO THE PERFORMANCE MANAGEMENT OF BUSINESS COMPANIES: ACTUAL SITUATION IN THE CZECH REPUBLIC**

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### **Abstract**

The aim of this article is to provide a framework of standards of social responsibility in the Czech Republic and mention its importance to the business management. Paper offers a literature review supplemented by the author's empiric research into the social performance. Currently the „firm's survival“ depends not only on financial competitiveness, it is equally important that the organization could demonstrate their position in relation to the various interested parties (stakeholders), which are affected by the activities of the enterprise. Based the empirical research, there is no relationship between established standard of social responsibility and profitability of company. Despite the fact of absence of this relationship, it is possible to conclude that the social responsibility in various areas is associated with many benefits for the enterprise itself. That can be a significant competitive advantage in today's rapidly changing environment.

*Keywords: social responsibility, standards, IT sector, Pearson's coefficient*

JEL Classification: M14, M21

### **1 INTRODUCTION**

The concept of corporate social responsibility and its understanding, whether in relation to the stakeholders, employees, or other interest groups, in essence, from the first half of the 20<sup>th</sup> century constantly evolving. There is a gradual refinement and expansion of different definitions, but as an essential turning point may be considered the idea: "the undertaking which meets the only legislative requirements cannot be considered socially responsible." On the basis of the synthesis of individual knowledge, Carroll designed in 1979 definition of CSR, which was based on the 4 basic elements, which are, however, many believed that exclude each other. Carroll joined the area in this definition of business activities, which many believed that exclude each other. An example may be entrepreneurs who in its "economic responsibility" also gave a donation, or felt the commitments to the community, and is a typical example of Tomáš Baťa and the construction of the "business cities" (Svoboda, 2010). Businesses that do not respect the inclusion of socially responsible behavior (they are not socially responsible) into their strategies, systems and procedures, will probably remain behind the competition. Increasingly, customers, employees, stakeholders, investors, government, business partners, and the company decided to support companies which are little interested in the planet and the happy life of its inhabitants (SGS Czech Republic, 2013). To be a socially responsible company also brings benefits, among which include: reduce operating costs, increase corporate image and improve reputation, increase customer loyalty and sales (Boyd & Gessner, 2013; Blowfield & Murray, 2008).

On the timeliness issue to point out some of the research, which presents the company Bureau Veritas Czech Republic, that helps customers comply with standards and regulations relating to quality, health and safety, environmental protection and social responsibility. The company in its report "Social responsibility by standard SA 8000" from the year 2011 states that 70%



of customers prefer to socially responsible companies, every second is willing to pay more for products and services of these companies. View of social responsibility is reflected in employees, since 86% of Europeans prefer working in a solid, socially responsible company before a higher salary for the competition. CSR is a key question in business, as 85% of senior executives of transnational chains (Bureau Veritas Czech Republic, 2011).

Social responsibility should therefore be part of a corporate strategy, as expressed in the voluntary commitment of the company, contributing to a better society. Socially responsible businesses are characterized by proactive, not just reactive policy, for their leadership to actively apply new and positive trends (Boyd & Gessner, 2013).

The aim of this article is to provide a framework of standards of social responsibility in the Czech Republic and its importance to the business management. In order to achieve this aim, a critical literature review and questionnaire survey (primary research) was used. The area surveyed was Information and Communication Activities, and the focus was especially on companies in the Czech Republic with more than 250 employees.

The structure of the article is as follows. Section 2 describes the theoretical background of standards of social responsibility, section 3 presents research that explores the relationship between social responsibility and financial performance. Section 4 reveals the estimated results and the last section discusses the results (key findings) with the summary of other selected groups of standards.

## **2 STANDARDS OF SOCIAL RESPONSIBILITY**

The social area also has certain types of indicators, which can be used to measure and evaluation of performance and responsibility. For the evaluation of the social performance of the majority of non-financial indicators are used (called soft indicators). For social performance is needed to determine which of the standards will be selected social indicators. Among the ones that include in their social context, include:

- Corporate Social Responsibility (CSR);
- Social Accountability 8000 (SA8000);
- ISO 26000;
- Safe company;
- ČSN OHSAS 18001:2008 – Management of health and safety at work;
- IQNet SR 10 – Social accountability management system;
- FE – Friendly employer;
- The methodology KORP;
- Normative document – Social accountability management system.

### **2.1 Corporate Social Responsibility (CSR)**

This concept appeared in the early middle of 20<sup>th</sup> century and means a way of conducting business and building relationships with partners, which contributes to increase the credibility of the company. It's basically about the voluntary commitment of enterprises to behave responsibly in the context of its operation to the environment and the society in which they carry out its business activities. The essence of CSR is the belief that the sustainable prosperity of the company responsible and transparent way of doing business. The concept is based on the three pillars – economic, social and environmental. These pillars correspond to the three characteristics of the "triple-bottom-line" (Robins, 2008; Wood, 2010):

- Profit (economic area);
- People (social area);

- Planet (environmental area).

Behavior of an undertaking in accordance with the principles of CSR brings with it many profits, in particular, in the form of increasing the value of intangible assets such as company reputation, brand value, human capital, relationships of trust and partnership. CSR, however, can lead to cost savings, for example in connection with the low staff turnover or as a result of environmental measures. Last but not least, CSR has a positive effect on the increase in the value of the company to the shareholders (Boyd & Gessner, 2013).

According to the authors of the booklet "The concept of CSR in practice: a guide to responsible business" is the responsible behavior of the company can be divided into four areas, which expresses the following Figure 1. Alternatively, however, is the concept of CSR is divided into three areas as mentioned above.



Fig. 1 – The four areas of business responsible conduct. Source: Steinerová and Makovski (2008).

In the context of the "market environment", from the socially responsible enterprise is expected to mostly transparent business and positive relationships with investors, customers, suppliers and other business partners, taking a responsible approach to these partners leads to building mutual confidence, improving the quality of products and services and, ultimately, to achieve a higher profit in the context of trade cooperation. The inclusion of CSR concept into the corporate strategy is considered a sign of good management in the enterprise. From the point of view of the market is also watching the impact of the business on the economy, for example in the form of employment, infrastructure development and the fight against corruption. At the same time, it is possible to identify the benefits that are related to responsible behavior in the market environment and ranks among them mostly: customer loyalty, differentiate from the competition, the desired vendor and business partner, increasing the efficiency of the supply chain (Milichovský, 2013; Steinerová & Makovski, 2008).

In the area of "working environment" are the most important component of the staff who are dependent on the enterprise considerably, not only financially, but also "human", as in the work of the day and spend a significant portion of carried out activity affects the quality of their private and family life, often has an impact on their health. On the other hand, the long-term success of the company depends on the quality of its employees, who are an essential part in achieving the goals. With responsible behaviors in the work environment are associated certain benefits, which can be defined as follows: desired employer, quality employees, motivation, productivity, leading to a creative and innovative environment and low staff turnover.

As far as the "local community", only for explanation, it should be noted that, at the commencement of the business activities of the company becomes part of the surrounding

community. Socially responsible enterprise develops efforts to establish good "neighborly" relations (e.g., its negative impacts mitigated). A specific form of support can be financial or material support of public activities and projects. The firm, which has been actively involved in the local community, can identify new markets and business opportunities, build contacts with local authorities, to attract the attention of the media and also makes it easier to establish new partnerships with other enterprises. Also in support of these activities, it is possible to count with certain benefits, which may be: the good name of the undertaking, customer loyalty, employee loyalty, access to local resources, a new business opportunity, etc. (Steinerová & Makovski, 2008).

Also in the area of the "environment", the company, which is trying to minimize its impact on the environment, this may be an effort to bring new business opportunities. Active in the environmental field has the option to bid on tenders of large corporations and public administration or to obtain new customers from among environmentally conscious consumers. An eco-friendly way of doing business also brings financial savings. Environmentally friendly energy use, pollution prevention, minimization of waste and recycling, all this can bring to the company more efficient operations, a significant reduction in costs and other benefits (Steinerová & Makovski, 2008).

## **2.2 Social Accountability 8000 (SA8000)**

SA 8000 is an international reference standard for the improvement of working conditions, which may be regarded as the basic standard for the certification of conformity with the requirements on corporate social responsibility, which is globally recognized as the reference standard for social responsibility. This is the standard by which they are carried out by independent third party audits. This standard is generally applicable to any sector, the scope of business activities and for a company of any size (Ciliberti et al., 2011; Bureau Veritas Czech Republic, 2011). Businesses can convince and prove a measurable way to its business partners the results of corporate social responsibility in their business. Significantly improve your position so in a competitive environment. Gilbert and Rasche (2007) evaluating the standard SA 8000 as a very high beam assist, not only for businesses but also for all interested parties, since they help to communicate effectively on issues of social responsibility.

## **2.3 ISO 26000**

This standard was published at the end of 2010. The aims of introduction of ISO 26000 are: to increase the competitiveness of the enterprise; increase the reputation of the company and strengthen confidence; improve the relationship business to interested parties; increase loyalty, engagement, participation and morale of staff; increase the safety and health of workers; the creation of innovation, improve the procedures for risk management in the organization; increase the reliability and correctness of transactions; the prevention or reduction of potential conflicts with customers, etc. (Jacobsen, 2011). On the basis of this standard it is possible to completely assess the performance of the company and at the same time increase the level of responsible behavior (SGS Czech Republic, 2013). In July 2011, this standard was introduced as the Czech technical standard ČSN ISO 26000: 2011 (Kašparová & Kunz, 2013; Národní politika kvality [NPK], 2011; Henriques, 2010).

## **2.4 Safe company**

The program "safe company", which is called by the Ministry of labor and Social Affairs of the Czech Republic and the State Labour Inspection Office, allows to employers implementation of OSH management system which corresponds to the Czech legislation, but also the requirements applicable in EU countries. Currently belongs to the most recognized

documents in the area of OCCUPATIONAL SAFETY and HEALTH in Europe, document OHSAS 18001 and ILO-OSH 2001 and just program the "safe company" comes from these documents. The aim of this program is to increase the level of safety and health at work, including the protection of the environment, to achieve this higher level of culture at work and well-being and create the conditions for the introduction of the integrated management system (Státní úřad inspekce práce [SÚIP], 2009).

## **2.5 ČSN OHSAS 18001:2008 – Management of health and safety at work**

Standard OHSAS 18001 has been designed to be applicable for businesses of all types and sizes and builds its structure to the standard ČSN EN ISO 9001 and ČSN EN ISO 14001, to create a management system for safety and health at work in parallel with the quality management system and environmental management system. Application of OHSAS 18001 is based on risk analysis and their minimization. The main purpose of the application of the standard is to lead companies to propose and implement measures that will reduce the danger of removing, or employee from him isolated. In the event that it is not possible work must be planned and controlled by organizational measures so that its performance will be safe and not to endanger the health (Association for the Certification of Quality Systems [ACQS], 2010).

## **2.6 IQNet SR 10 – Social accountability management system**

The main requirement of this standard is that the organization has identified all its impacts arising from their decisions and actions. These impacts must evaluate, and that with regard to the stakeholders and to sustainable development. An important part of this standard is to identify the requirements, expectations and needs of stakeholders. The company, on the basis of the obtained information, establishes goals, target values and programs. In their compilation takes account of the involved parties, but also on its technological options, financial, operational and business requirements. The company must determine what is the perception of stakeholders, i.e., if their expectations and needs were filled (Association for the Certification of Quality Systems [ACQS], 2010).

## **2.7 FE – Friendly employer**

The Association for the certification of quality systems, together with the Association of TRIANON Bohemia work together to create and promote new certification marks FRIENDLY EMPLOYER. This label is awarded to organizations or individuals in recognition of the long-term capability and accordingly to include people with disabilities into the workforce and continuously develop their skills and qualifications. This certification mark meets one of the pillars of corporate social responsibility. Its main concern is the confirmation of the purity and transparency in the implementation of Act No. 435/2004 Sb., on employment and anti-discrimination Act No. 198/2009 Sb. The company which, thanks to the rules creates an environment for peaceful and safe involvement of workers with reduced working ability should be properly visualized and awarded (Association for the Certification of Quality Systems [ACQS], 2010).

## **2.8 The methodology KORP**

This is a purely Czech standard, which is used in particular as the basis for the evaluation of enterprises for the purposes of "CZECH national awards for social responsibility of organizations", but it is also usable as a self-assessment tool for organizations. This is a set of criteria and sub-criteria that are divided into three pillars of corporate social responsibility. The methodology focuses on the evaluation of the results, both in the field and in the area of

assumptions, where is applied the cycle PDCA. It is possible to evaluate the ability of the organization in achieving positive results in the area of corporate social responsibility in the long term (Krohová, 2009).

## **2.9 Normative document – Social accountability management system**

On the basis of the demand of the business sector after the certification standard for the area of corporate social responsibility of organizations within the framework of the National policy of quality in 2011 created a normative document titled "social responsibility management system". The requirements of this document are in accordance with the requirements of other management systems standards (in particular, the standards ISO 9001 and ISO 14001), and thus facilitate its application in organizations that have any of these management systems are introduced. However, the document may be used by any organization as a basis for the introduction of the concept of the social responsibility of organizations across the breadth of the three basic pillars, including the creation of the necessary conditions for the maintenance and continual improvement of the system of management of corporate social responsibility (Národní politika kvality [NPK], 2011).

## **2.10 ČSN 01 0391 – The management system of social responsibility of organizations**

The standard advocates CSR principles in the context of management systems. It includes requirements for social responsibility pillars (economic, environmental and social) management system requirements and the requirement for continuous improvement in accordance with the PDCA cycle (Plan - Do - Check - Act). It creates a space not only for certification, but also for integration with other management systems standards (quality, environment, etc.). It is applicable to organizations of any size and type of business and public sector (Empress, 2013).

# **3 CORPORATE SOCIAL RESPONSIBILITY AND CORPORATE FINANCIAL PERFORMANCE**

In fact, since the beginning of the emergence of the concept of CSR exist in both its supporters and opponents, who are presenting their belief in the correctness of their opinion. Many experts began to focus on the empirical impact of CSR on its economic and financial performance. However, it should to add that to this day has not been achieved by any general scientific consensus on this issue and the views of many groups of experts and scientists are quite different.

One of the first studies with the impact of CSR on economic performance is the work of Milton Moskowitz from the year 1972. Author of 67 companies selected the 14 best in terms of the level of CSR and calculated the average growth in value of their shares. The result was the average appreciation of 7.28% while the Dow-Jones Industrial exhibited a value slightly lower. This result was considered to confirming the hypothesis that CSR has a positive impact on the economic performance of the company (Moskowitz, 1972; Kukačka, 2008).

Heinz (1976) used the correlation analysis of ROE, ROA and margins and in this case showed a positive correlation between CSR and ROE. Cochran and Wood (1984) have used in their work several financial indicators, and their conclusion is that the strongest correlation exists between CSR and age of corporate assets, i.e. enterprises with legacy assets reach lower valuation in terms of social responsibility.

Guerard (1997) examined the impact of CSR on the share price of companies in the course of eight years and found that there was no difference between the average stock returns socially

responsible and irresponsible businesses. McWilliams and Siegel (2000) in their econometric study concluded that CSR has no impact on the financial performance of companies. Regarding the relationship between CSR and CFP (corporate financial performances several studies have found that CSR impacts CFP positively (Bird et al., 2007; Nicolau, 2008). Inoue and Lee (2011) did not find any significant effect of CSR both on ROA and Tobin's q across three different dimensions of CSR. In another recent empirical study, Barnett and Salomon (2006) examined 61 mutual funds that apply social responsibility screens and found a curvilinear relationship between social investment and financial performance. They further found that financial performance varied with the type of social screens; while community relations screening helped financial performance, labor and environmental relations did not, underlining the importance of considering that different kinds of socially responsible activities can have different results (Lee et al., 2013).

#### **4 METHODOLOGY AND RESEARCH RESULTS**

The basis of the empirical research was a questionnaire prepared as part of the doctoral thesis of the author. For the purposes of the author's research, businesses were selected which met the following three conditions:

- Registered economic companies from section J (CZ-NACE) – Information and Communication Activities;
- Location – the Czech Republic;
- Enterprises with > 250 employees.

A basic sample was made of 56 companies. All these businesses were addressed during the survey, 32 out of them answered (effectiveness was almost 57.14%). In terms of identification, it can be significantly statistically evaluated which types of legal form predominated: joint-stock companies (43.8%) and limited liability companies (56.3%). In the framework of the social sphere, it was first necessary to determine whether the undertakings currently pursue their social agenda, or report.

As shown in Table 1, only a small number of enterprises have introduced this type of standards. After the review of the annual reports of companies I have come to the opinion that if businesses from the selected areas have established one of the standards, it is likely to be one of the following: ISO/IEC 27001:2006 Information Security; ISO/IEC 20000-1:2006 – Management Services for Information Technology; ISO/IEC 20000-1:2012 – Management Services for Information Technology.

Tab. 1 – An overview of the use of standards of corporate social responsibility. Source: Own research.

<b>STANDARDS</b>	<b>ISO 26000</b>	<b>SA 8000</b>	<b>Safe company</b>	<b>ČSN OHSAS 18001:2008</b>	<b>IQNet SR 10</b>	<b>FE - Friendly employer</b>
<b>Introduced and used</b>	-	-	9.4%	12.5%	3.1%	-

<b>It will be implemented</b>	-	3.1%	6.3%	6.3%	9.4%	9.4%
<b>Introduction we are planning in the future</b>	68.8%	46.9%	9.4%	34.4%	9.4%	6.3%
<b>It is not significant, and therefore is not considered for the introduction</b>	25.0%	43.8%	68.8%	40.6%	71.9%	78.1%
<b>Barriers for the implementation</b>	-	-	-	-	-	-
<b>Without answers</b>	6.3%	6.3%	6.3%	6.3%	6.3%	6.3%
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

From the table, it is clear that businesses usually don't have currently enabled one of the standards of corporate social responsibility. There it is possible to believe that one of the latest standards ISO 26000 is in effect only briefly and essentially replaced by the SA 8000, therefore its use is not up to such an extent as would be expected. It depends on whether these standard businesses will want to use in the context of its activities and within a few years will occur gradually. Proof of this is the fact that, on the basis of that research firms are considering the introduction of rather particular standards of ISO 26000, SA 8000 or the latest one ČSN 01 0391.

In relation to the calculation of the defined researches (Section 3) that examined the association between corporate social responsibility and its impact to economic area, the following *statistical hypothesis* was established:

- ***"There is an influence of corporate social responsibility (CSR) on the profitability of equity (ROE) and the profitability of assets (ROA)".***

It has been suggested that that social responsibility business has an impact on the profitability of equity and profitability of assets. In this case, was the hypothesis provided in relation to critical definition of Heinz (1976), that there is a positive correlation between CSR and ROE.

The relationship between two intervals characters is measured using a Pearson linear correlation coefficient. These characters are characterized by a long scale of measurements for this reason would be for such characters it was too desirable to create a grading table of degree II.

To verify this hypothesis was used the answer the respondents of the survey, of the question: "Do you work in the social field with one of the following standards, which are related to corporate social responsibility (CSR)?" At the same time the amount of ROE was detected and ROA by using the database Amadeus, where applicable, the data were supplemented from the annual reports of enterprises. Due to the low number of enterprises which have any of the listed standards established, the answer has been to merge: "is introduced and used" and "will be implemented." These responses have been taken as a positive answer to the question of the introduction of CSR, other than as a negative answer. To verify the statistical dependencies of the null hypothesis  $H_0$  was tested, that the random variables are independent in relation to the alternative hypothesis  $H_1$ .

- ***$H_0$ : There is no statistical relationship (link) between the CSR and referred profitability's.***
- ***$H_1$ : There is a statistical relationship (link) between the CSR and referred profitability's.***

The resulting correlation matrix has the form of a square table that contains as many rows and columns, how many variables enter into the analysis. The result of the calculation is shown in Table 2.

Tab. 2 – Pearson's coefficient of linear correlation for statistical hypothesis. Source: Own research.

		CSR	ROA	ROE
CSR	Pearson's correlation coefficient	1	-0.400	-0.363
	The significance level		0,100	0,152
ROA	Pearson's correlation coefficient	-0.400	1	0.925**
	The significance level	0,100		
ROE	Pearson's correlation coefficient	-0.363	0.925**	1
	The significance level	0.152	0.000	

\*\* Correlation is significant at the 0.01 level of significance

Pearson's linear correlation coefficient for CSR and ROA is -0.400 that exhibits a negative dependency between these two variables. The tightness of this context, however, it is average. The negative sign indicates that with the growing one variable decreases the other (in this case, the increasing number of enterprises with CSR dropping ROA).

The same incident occurred in respect of CSR and ROE, when Pearson's linear correlation coefficient achieves a negative value -0.363.

Table shows the achieved level of significance. Also in this case, the resulting value of the minimum level of significance tested at 5% level of significance ( $\alpha = 0.05$ ). If this value is less than or equal to  $\alpha = 0.05$ , negative  $H_0$ . In this case to the rejection of the  $H_1$  as the observed significance level is greater than the minimum level of significance ( $0.100 > 0.05$  and  $0.152 > 0.05$ ). Denied, therefore null hypothesis  $H_0$  at 5% significance level, meaning that between CSR and referred to profitability's there is a statistical link. CSR thus has no effect on the profitability.

To complement the above Table it is possible to observe a strong relationship between ROE and ROA, which reaches 0.925. A positive sign tells us that the ROA more grows, more grows the ROE. In this case, it is possible to interpret this statement logically and it so that both indicators are based on the calculation of the profit and therefore, if it is to increase profits, increase the value of one, so the other indicators as well. If the proposed hypothesis, which examined the influence of one of cost-effectiveness on the other, there would be in this case, to reject  $H_0$ , since the observed significance level =  $0,000 < 0.05$  and the relationship of one variable to the other would be a 5% level of significance is confirmed.

- ***Statistical hypothesis is not confirmed.***

Due to the claim therefore, Heinz is the opposite the case correlations.

## 5 DISCUSSION

Based the empirical research, there is no relationship between established standard of social responsibility and profitability of company but reason for this result may be some disclosing the value of the research. This could be increased if it is attended by more businesses. Even though the number of respondents was low enough that it is not possible to evaluate the data and formulate certain conclusions. Among the main barriers to research joined a certain reluctance of businesses in obtaining primary data. However, it is possible to say that with realization of some of the standards of corporate social responsibility, are linked several



advantages that may have a greater importance in the management of company than, for example, achieving a certain level of profitability.

It depends on the strategy of any company which takes its principles that will govern and will put the greatest emphasis. The focus at least in part on an area of CSR brings significant benefits, which lists the server [www.csrnetwork.com](http://www.csrnetwork.com), among which it is possible to define:

- **Access to capital.** Thanks to involvement in social responsibility projects, some businesses get access to capital, to which it would otherwise never get. The degree of social responsibility is taken into consideration, for example in the Dow Jones Group Sustainability Index, FTSE4Good Index, or Bit Corporate Responsibility Index. These indexes used by investors who want to learn about the CSR activities of certain companies.
- **Increase efficiency and reduce costs.** One way to reduce costs is the introduction of environmentally friendly processes and systems. At the beginning the company must spend a larger amount of money, but it will later return in the form of waste reduction, recycling and reuse of materials, less consumption of water and energy. The introduction of these systems delivers the benefits for the local community, the environment, and economic page of the organization.
- **Improve the image and the reputation of the organization.** Good reputation and confidence of stakeholders is very important for the company, but it is often difficult to achieve. One option is to care for the environment and the local community. For the enterprise, it is important to try to minimize it, but completely eliminate the possibility of environmental accidents. If any such undesirable situation occurs, it should be appropriately prepared company to learn from its and to introduce effective corrective and preventive action.
- **Sales growth and customer loyalty.** As already stated, people judge companies by their approach to the environment, corporate sponsorship or position to staff. The majority of buying customers focus primarily on price and quality, but still a greater amount takes into account other indicators.
- **The growth of productivity and quality.** Improvement of the working environment, better care of employees or employees' share of the growth in decision-making can enhance their loyalty, reduce turnover and increase the productivity of their work. Another effect may be the reduction of rejects.
- **A better opportunity to acquire and retain high-quality employees.** This point is related to the quality of the working environment, the possibility of a further deepening and improving the skills and the sharing of values, together with the management of the organization. People prefer to work for the firm, which they trust, share his views and can identify with the firm.
- **Greater leniency in the case of state authority of some misconduct.** If the company makes clear that compliance with the law is, of course, for the minimum and has activities beyond the scope of the law, can it help, for example when a request for a permit or when discussion of a particular issue.
- **Reducing the risk and the growth of risk management.** The introduction of the system of social responsibility of the enterprise can significantly contribute to reducing the commercial risk. The destruction of reputation in the media can very damage the firm in his future business dealings. Companies are increasingly trying to include it in their press releases, information on corporate social responsibility and

give their stakeholders the necessary information about the impact of the management of the company on its surroundings.

- **Increasing the competitiveness and sales.** State administration, local community and nonprofit organizations expect from companies that they will comply with all legislation and that their activity will not be too much of the burden on the environment and surroundings (Kuchtíková, 2011). Along with these benefits, or complement and extend also Weber (2008), Trnková (2004) or Kašparová and Kunz (2013).

It is therefore desirable to monitor social performance and to express its benefits for the enterprise. Social indicators should be monitored in the context of the economic result of the company and to identify deficiencies in the feedback processes, which is needed to remove (Kaplan & Norton, 2000; Porter, 1996; Kocmanová et al., 2010).

In the future there could play an important role the concept of "shared value" because increasingly, businesses are realizing that building common values can benefit both the company and increase its competitiveness. Companies can not only improve quality, quantity and cost aspects of their inputs, but can act as a driving force not only economic, but also social development. How come Bockstette and Stamp (2012), in the future will prosper especially those companies that assume and use new frontier of competitive advantage while active role in shaping the environment in which it operates, rather than just react to it. In the context of shared value is worth to mention a concept CSV (Creating Shared Values), which stems from the idea that a firm's competitiveness is naturally connected with the good of the community in which it operates. Understanding and using these links between society and the economy should lead to a new wave of economic growth (Bockstette & Stamp, 2012). Perhaps there could develop new strategic actions that would draw from this approach in the future and would be able to confirm or refute the idea of shared values to the community.

## **6 CONCLUSION**

This paper gives a comprehensive view of existing standards of social responsibility. The aim of the article was to provide a framework of these standards in the Czech Republic and its importance to the business management. Currently, more and more companies in the Czech Republic are focus on their corporate social responsibility, so the topic of the article is therefore very timely. Organizations should also consider strengthening the link (or congruence) between professional ethical standards and organizational ethics/CSR (Shafer, 2002).

On the analysis of the sample of enterprises using statistical verification has not been proven statistical link between the undertakings which have enabled one of the standards (or the introduction is already dealt with) and the values of profitability's. According to the results of the Pearson correlation coefficient was found a negative dependency between these two variables. Due to the claim therefore, Heinz is the opposite the case correlations. Despite the fact that in the absence of this relationship, it is possible to conclude that the social responsibilities in various areas is associated with many benefits for the enterprise itself. Due to the fact that the topic of corporate social responsibility in the management of enterprises starts only push interesting will be executing the same empirical research over the course of several years, so this research it is possible to consider as a starting point for further examination, which will deal with this issue. Examined all enterprises could be parsed from the area without limiting their size and individual results could be compared. At the same time could be more focused on the research of numerical data, as might be done in the period of

comparison (using time-series) and the impact of CSR on economic performance could be explored in the longer term.

Social performance, standards and indicators associated with it are an important part in the management of enterprises since they are associated with a number of advantages that can be a significant competitive advantage in today's rapidly changing environment.

### Acknowledgements

This paper is supported by the Czech Science Foundation. Name of the Project: 'Measuring Corporate Sustainability in Selected Sectors'. Registration No. 14-23079S.

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## **MEASURING SUCCESS OF MERGERS AND ACQUISITIONS AND COMMON MISTAKES TO AVOID**

*Martin Hudak, Anna Neumannova*

### **Abstract**

The main objective of this paper is to provide an overview of methods and opinions on measuring success of M&A transactions being used in academic as well as in other professional spheres around the world. Setting generally accepted principles and criteria of valuation enables to determine whether a particular merger/acquisition has generated required benefit or value in accordance to the accepted set of these principles and criteria. There is no guidance or instruction book to achieve a 100% success of M&A transaction, however, there are general principles which if they are applied correctly, there is a high probability that the results, required by investors, managers and/or other stakeholders of company, will be reached.

*Keywords: measuring success, profitability of mergers and acquisitions, mistakes in M&A process, M&A success rate*

JEL classifications: G34

## **1 INTRODUCTION**

The main objective of this paper is to provide an overview of methods and opinions on measuring success of M&A transactions being used in academic as well as in other professional spheres around the world. Alongside with this objective, we explain what are the most common mistakes in an M&A process and how professionals involved in the process itself should advance in order to ensure the highest possible benefits for themselves and other stakeholders.

Diverse interests of company's stakeholders often result in different opinions and accepted decisions about the company's strategy. In general, there are several goals that most profit organizations try to achieve. The goal of maximizing shareholder value, often followed by ensuring sustainable revenue growth and generating the highest possible cash flow are among the most important ones. The latter mentioned, generating cash flows and growth alongside with return on invested capital (ROIC) relative to the cost of capital are key drivers of value creation in any profit making company. (Koller, Goedhart, and Wessels, 2010 and Marik, 2007).

A strategy of inorganic growth is often defined as a strategy on mergers and acquisitions (M&A), business combinations or simply, a strategy related to a purchase or sale of company or its business/-es. There are many methods which have been used in practice for measuring success of particular M&A transaction, however, in many cases, it is all about a subjective view of evaluator. Success is a relative term and can be defined in various ways depending on the receiver of information. Whether it is a CEO of company, an owner of company, a majority/minority shareholder or an investor investing in a particular firm or business, these all can have similar or completely opposite opinions on measuring the success of M&A transaction they are involved in. Despite this fact, setting generally accepted principles and criteria of valuation enables to determine whether a particular merger/acquisition has

generated required benefit or value in accordance to the accepted set of these principles and criteria. Therefore, it may be more correct to talk about measuring M&A performance instead of M&A success, however, for the purpose of this academic contribution, both terms are used interchangeably.

## 2 MEASURING PERFORMANCE OF M&A TRANSACTION

When we look for an answer to the question of defining successful M&A transaction, we have to take a look at the process of transaction itself and the most common failures and their causes.

Every decision on an inorganic growth starts with a strategic planning and strategic transactions as its main parts. A strategic transaction is any action that helps implement company's strategic plan. While that action can be on a small scale, such as the sale of one business unit or manufacturing plant, it can also be done on a large scale including a corporate merger with another company, building, buying and/or selling assets. A strategic action can also relate to financing, such as the decision to implement an aggressive stock buy-back program or recapitalization. According to Castillo and McAniff, the value of a strategic transaction is measured by many metrics, the most important of which is a company's stock price. A company can maximize shareholder value using both strategic transactions and financing transactions and its tools as shown in the figure below. (Castillo and McAniff, 2007, p.73)

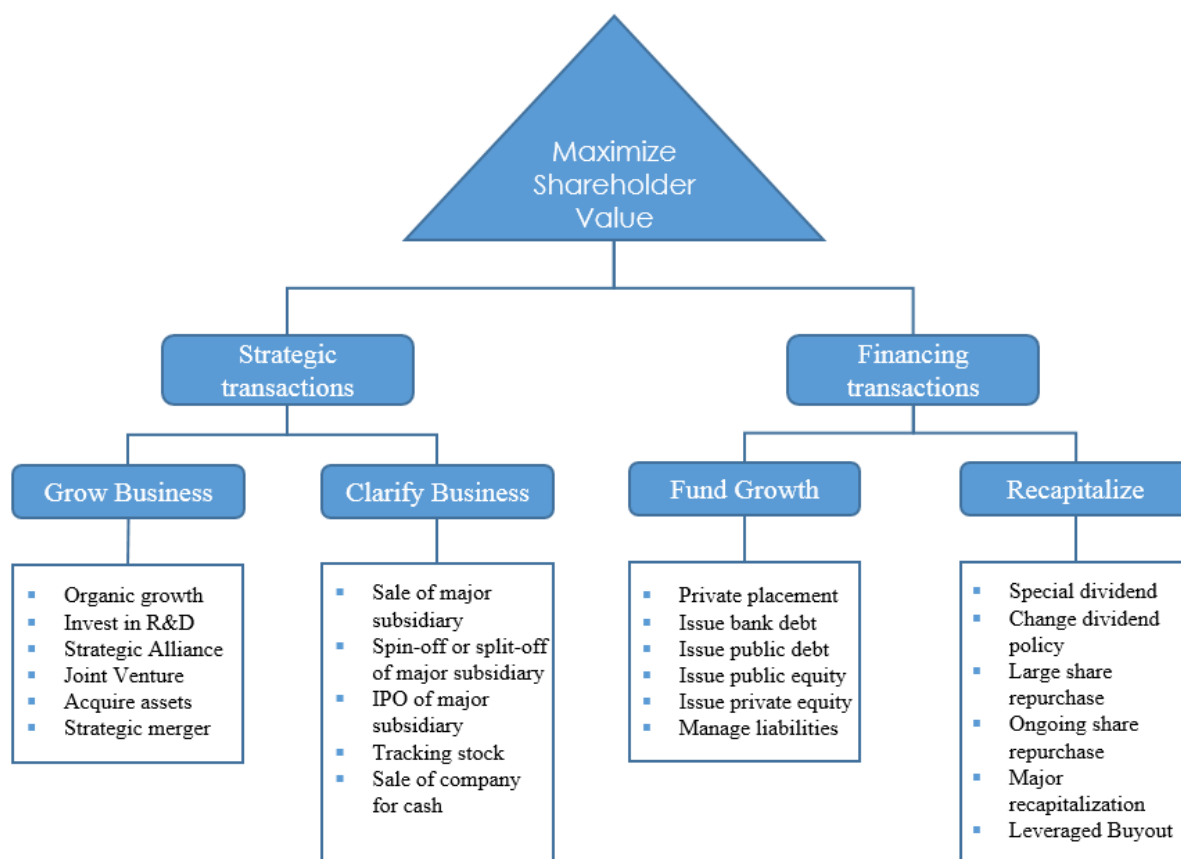


Fig.1 – Maximizing Shareholder Value. Source: Castillo, J. J., McAniff, J. P. (2007). *The Practitioner's Guide to Investment Banking, Mergers & Acquisitions, Corporate Finance*, p.74

An M&A transaction process or simply a deal process can be defined from a perspective of buyer and from a perspective of seller. Individual steps of each of the processes are depicted in detail below.



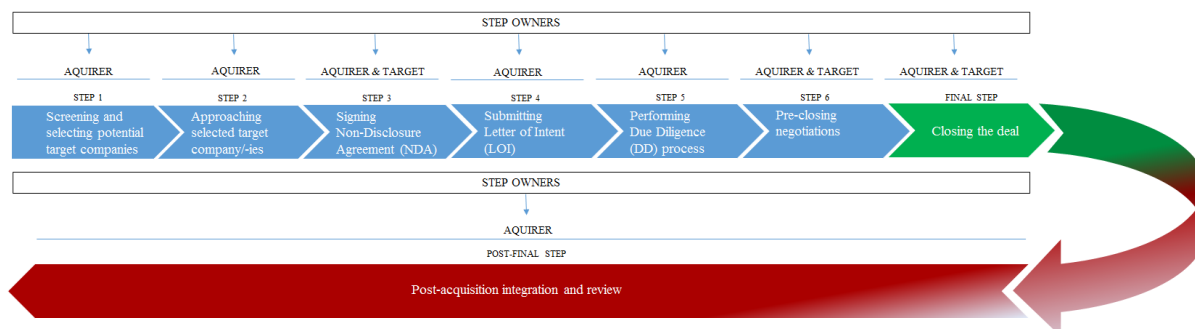


Fig.2 – Buy-Side M&A Process. Source: Author’s Research; Bragg, M. S. (2011). Mergers & Acquisitions, A Comprehensive Guide. p. 15-19; Rosenbaum, J. – Pearl, J. (2013). Investment Banking – Valuation, Leveraged Buyouts, and Mergers & Acquisitions. p. 193-232

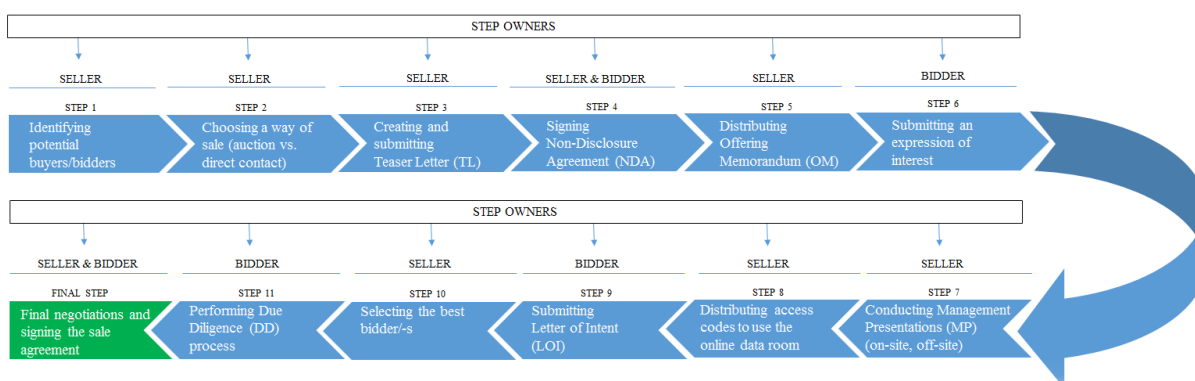


Fig.3 – Buy-Side M&A Process. Source: Author’s Research; Bragg, M. S. (2011). Mergers & Acquisitions, A Comprehensive Guide. p. 19-33; Rosenbaum, J. – Pearl, J. (2013). Investment Banking – Valuation, Leveraged Buyouts, and Mergers & Acquisitions. p. 173-192

## 2.1 Academic and professional opinions on M&A success rate

There have been many studies performed in order to identify the success rate of M&A transactions. According to Moeller, most deals do fail no matter which study you look at. The percentage ranges **from 60 to 70% for the deals that fail.** (Moeller, Max and Schiavone, 2009)

According to Grubb and Lamb, a sobering reality is that only about **20 percent of all mergers really succeed.** Most mergers typically erode shareholder wealth. The cold, hard reality is that most mergers fail to achieve any real financial returns. (Grubb and Lamb, 2000, p. 9-14)

A study on managers of acquiring companies reports that 44 % of their acquisitions do not meet their original objectives, and **about 70 % of all mergers and acquisitions are reported as failures.** (Cartwright and Schoenberg, 2006; Peng, 2013)

In addition, Cartwright reports that irrespective of the evaluation method selected, the evidence on M&A performance is consistent in suggesting that a high proportion of M&A are financially unsuccessful. US sources place **merger failure rates as high as 80%, with the evidence indicating that around half of mergers fail to meet financial expectations.** (Cartwright, 2013)

A survey and M&A success of McKinsey clients indicate that transformational value can increase the return on an acquisition from 30 up to 100 percent. Identifying transformational value opportunities and managing mergers that stretch company’s capabilities in new ways require a dramatic departure from the traditional approach to integration that has emerged as best practice over the past 10-20 years – using templates, checklists, and strong process

management to avoid risk. Even now, this approach produces **M&A failure rates of 66-75 percent.** (McKinsey & Company - Deutsch, and West, 2010)

To summarize it, many researches and studies indicate the failure rate of M&A transactions ranging between 60 and 80% which is an extremely high rate. Having said that, there are different ways of measuring success of M&A transactions and their overall performance.

## **2.2 Methods of measuring M&A performance**

One of the most common methods used in practice to measure an M&A performance and related success is looking at a shareholder return/total shareholder return (TSR)/total returns to shareholders (TRS). In this case, the shareholders of the bidding/buying company tend to underperform from a short term as well as long term perspective, meaning, they do not receive their required return. On the contrary, if you are the shareholder of target company, in majority cases, you benefit from receiving a premium over the current market price of the company's shares you own.

The other methods, also used by the M&A Research Center at Cass Business School in London, comprise looking at the growth in revenues or turnover, an increase or a decrease in margins after the transaction completion, the state of balance sheet, usually used to identify any movements in the leverage of merging company, and analyzing what has been done to the brands and sales, whether the company has been able to retain the business, which means how quickly companies do a sell-off with what they've already bought. In addition, from an underwriting point of view, Schiavone also looks at the impact of particular acquisition on the culture of merging companies and tries to identify how a particular deal would work based on a cultural aspect of merging companies. (Moeller, Schiavone, and Max, 2009)

One of the largest researches on measuring profitability of M&A transactions which have been performed so far, is the research carried out by Robert F. Bruner (2002, 2004), a distinguished professor of Business Administration and Executive Director of Batten Institute at the University of Virginia. His research is based on a summarization and consolidation of the results of 14 informal surveys and 100 scientific studies carried out during the period of 1979- 2001. The final results of his work confirm, but also disprove opinions of many executives, consultants and journalists who assert that majority of M&A destroy company's value. The research comprises the following approaches of measuring profitability of M&A:

- 1) **Event studies** – market based studies which measure abnormal shareholder returns in the period surrounding the public announcement of transaction. The abnormal return is calculated as a raw return less a benchmark of what investors required that day. The raw return for one day is the change in share price and any dividends paid, divided by the closing share price the day before. The benchmark is often represented by the capital asset pricing model (CAPM) or return on a large market index, such as the FTSE100, S&P500 etc..
- 2) **Accounting studies** which are based on assessing financial results of companies (acquirers) before and after the M&A transaction. The main source of information includes company's financial statements, management discussions and analyses reports (MD&As), and proxy statements.
- 3) **On-site surveys/Executive surveys** which comprise putting questions to executives in order to identify whether a purchase of particular entity has created value for their company. Of note, executive surveys may have the form of on-line or paper questionnaires which are directly sent out to executives.
- 4) **Clinical studies** stand for an inductive research which results from a deep analysis of one or many M&A transactions that are based on a detailed screening of facts and company's highly valuable internal information. The information is obtained from on-

site visits of the company, performing field and other knowledgeable interviews with executives and key employees of the firm.

The key outcomes of Bruner's (2002, 2004) research and overall measuring M&A profitability are summarized as follows:

- **Acquisitions are beneficial** to shareholders of target companies, the companies that are purchased. Furthermore, the studies clarify that in case of mergers, the transactions create common synergy value (joint value) for the combined company. Lastly, two third of studies indicate that for bidders alone, the value is conserved (unchanged) or created
- **Acquisitions are not beneficial** from the perspective of acquirer (buyer/bidder) and creating material and significant abnormal value. Under these conditions, this line of reasoning shows that 60-70 percent of all M&A transactions fail. However, from the economics point of view, investors should be pleased if they reach at least the returns which are just equal to their cost of the lost opportunity, defined as their required return. Therefore, the definition of failure is too extreme in this case, since the reality confirms that 60 up to 70% of all M&A transactions is associated with financial results and performance that compensate investors for their opportunity cost. Taking into account the aforementioned fact, the acquirers get at least what they deserve. (Bruner, 2002, 2004)

Despite the research outcomes, there are many other factors which can have a significant influence on the findings above. Therefore, it is difficult and it would not be correct to generalize the hypothesis, whether mergers and acquisitions create value or not, whether they are profitable or they are not beneficial at all.

M&A profitability and success is also markedly dependable on other factors, one of which is a company's strategy of diversification or centralization/focus that company's key executives decide for and apply internally, as well as the way of realization of overall M&A integration and post-integration process. In general, following the results of Bruner's (2002, 2004) research, in terms of return on capital, acquisitions of companies with a similar business strategy and product portfolio focus pay more and are more profitable (with higher returns) and successful for a buying company than acquisitions of companies with a different business and product portfolio focus and strategy.

Another finding of studies reports that investments in the firms of which core business does not relate to and is not part of the core business and strategy of buying company and has a completely different focus, are in most cases unsuccessful. After some period of time, these purchased companies, business units and/or subsidiaries become subjects to partial divestment or complete sell-off.

In addition, the studies reveal that strategic partnerships and joint ventures (JV) are more profitable and successful, if the agreement of mutual cooperation is formed between two companies with a similar core businesses and strategies.

### **3 M&A FAILURES AND WHAT TO DO TO SUCCEED**

The high rate of unsuccessful M&As is affected by many factors which have their origin in mistakes made before, during or after the realization of deal process. Therefore, top managers and executives should learn about common mistakes in order to be able to avoid them during a transaction and post-transaction process, and make right decisions and take the steps which would bring required benefits and guarantee success of entire M&A process.

### **3.1 Common mistakes and reasons behind M&A failures**

Top 10 most common errors which are made by individual participants in an M&A deal process are presented below (Snow, 2011):

**1) Wrong assumptions that the deal is done after the Letter of Intent (LOI) has been signed**

LOI is a document which contains basic information about the planned deal and essentially becomes the foundation of purchase agreement. Both parties, the seller and buyer should note and remember that LOI is not a final agreement on the deal closing, but it opens a door to the next necessary activities in the M&A process such as due diligence and contract writing.

**2) Being unprepared for Due Diligence**

This is very often the most common mistake. Basically, sellers are not ready to provide documents and materials requested by potential buyers in order to ensure a smooth due diligence process. The root of problem is usually in different expectations and thinking of buyer and seller. The buyer expects to get access to the due diligence materials the moment the LOI is signed, however, the seller thinks the deal is done after the LOI is signed. Therefore, in order to ensure a successful process, the seller should start compiling the due diligence materials in the same time he comes up with the offer to sell his company and start marketing it. This way, the buyer gets the access to the requested documents right after the LOI is signed.

**3) High Valuation with no rationale**

This is a mistake that many first-time deal-makers with no previous experience with a purchase or sale of company often make. In majority cases, sellers overvalue their companies based on their feelings and relations they have towards these companies. Their valuations have usually irrationale nature without any professional foundation. In order to avoid further problems and misunderstandings stemming from different opinions on the value of offered company, sellers should not come to buyers without any expert opinion (valuation) on the value of their company, performed by a qualified external or internal appraiser.

**4) Wrong assumptions that buyers won't discover problems in financials**

In the majority of cases, buyers hire specialized advisory and auditing companies to perform financial due diligence and analyses on potential target companies. There is a high probability that these specialists will identify any potential discrepancies or problems in the financials of these targets, if they exist. For that reason, the seller should share with the buyer all the information about problems the offered company has, which enables him to control the situation and frame the argument.

**5) Underestimating the other side's sophistication**

In practice, this mistake appears quite often with buying companies and especially, with buyers from large cities. Underestimating the sophistication of other side causes only problems. In this case, the best practice is to act reversely, which means, to be very careful and prudent with individuals that appear uneducated or unskilled at first glance, because the opposite is most probably true.

**6) Failing to understand who really has the power**

During an M&A process, power oscillates between a buyer and seller. A big mistake made by novice deal-makers is to miscalculate their power. Misplaying a strong hand is bad, but misplaying a weak hand is even worse., because if one side is in a weak position without any other options, it will have to accept the deal being offered. In such case, this side is not in a position to dictate terms.

**7) Withholding material information**

Material information is any information on lawsuits, environmental problems, a loss of important customer, and other important information which has a significant influence on the organization and its operations. An unwillingness to disclose such information indicates that the seller is acting in bad faith and is trying to mislead the buyer through the omission of important data. The seller is obligated to inform the buyer of all material events.

**8) Providing confidential information before the deal is closed**

Depending on the terms and conditions set by the LOI, providing confidential information about the deal to external individuals or any outsiders who are not a part of the deal group or deal team, can be considered as a breach of confidentiality and may represent an illegal action. Special caution needs to be applied in case of publicly traded companies. If an individual or group uses the information to trade (buy/sell) shares on stock market, this action would be considered as committing a crime of insider trading.

**9) Contacting seller's employees without permission**

In practice, there are cases, when the buyer starts contacting employees of selling company and try to inform them about new management, organizational structure or any other sensitive information, before the deal actually closes. Similarly as in previous case, this conduct is unacceptable and may cause untold devastation in the seller's business and entire M&A deal, much like breaking confidentiality can. Therefore, the buyer should only contact and speak with people who know about the deal and to whom the seller agrees to contact.

**10) Contacting seller's customers or suppliers without authorization**

Customers are one of the most important parts of business relationship for any seller. If the buyer contacts seller's customers and informs them about the pending M&A deal, there is a real threat that the contacted customers decides to find a new vendor. This kind of breach can harm the seller and destroy the deal itself. In many cases, it is caused by too hyperactive buyers trying to conduct a deal related due diligence process. In order to avoid any problems, a buyer should always ask for an authorization from a seller to contact seller's customers or vendors.

Following the most common errors, there are many other reasons and explanations why certain M&A deals go well and succeed and others fail. According to Max (Moeller, Max, and Schiavone, 2009), the following reasons stand behind vast majority of M&A failures:

- **Unrealistic expectations of current deal environment** that can give a rise of issues in negotiation process (i.e. negotiations of share price)
- **Buyers don't commit regularly enough due diligence into the early stages** in order to secure an early exclusivity, which gives the right to terminal issues at the latest stages
- **A difference between opinions of the buyer and seller with regards to some contractual points**, mostly warranties and indemnities, particularly pertain to the moment, given the fact that the seller often wants uncommitted capital as a result of the sale

Moeller and Schiavone add that **a post-merger integration (PMI) and its planning** are key factors that very often determine whether a particular M&A deal will be successful.

*„Deals don't fail because of the price, deals don't fail necessarily because of the strategy was wrong and the wrong company was bought. The deal fails after the deal closes.“ (Moeller, Max, and Schiavone, 2009)*

It happens quite often that two merging companies get to the deal closing, think about it as the end, but forget that they haven't put up enough planning into a post-merger integration period, which should include strategies on linking together two different cultures, determining who is going to manage what business, what products are going to be retained and what operations are going to be discontinued. In many cases, a time period after a deal closing is often referred to the time period in which both parties, the buyer and seller, or in case of a merger, two merging companies, can become witnesses to and participants in such things as lawsuit which does tend to happen after closing the deal.

There are plenty of companies which use inside (internal) and/or outside (external) advisors for early stages of M&A process, however, only few of them also do it for an integration process. Most of the time, companies do not even plan who is going to do the integration process or they often refer to a first 100 hundred day plan they might have in place for the period after the closing, but the issue is that an average integration takes more than a hundred days.

Cambell and Smith reveal 5 tips which should bring success and profitability to investors/acquirers/buyers in any of their acquisition processes. (Cambell and Smith, 2012) These advices are aimed to help deal-makers with the execution of their acquisition deals and can be summarized as follows:

- **Tip 1: Every deal needs to generate an incremental value**  
Every deal needs to generate some extra dollars/pounds/euros, simply, extra value from a combination of two organizations. A minimum of 50% - 100% of extra should be required as a result of the combination and related synergy. Most companies often forget that the whole purpose of doing a deal is to create an incremental value.
- **Tip 2: Listen to your advisers very selectively**  
The reason behind is that the vast majority of acquiring companies negotiate a fee with their advisers which is contingent on the deal going ahead. Most of the time, they get advisers who are motivated to do the deal, even the things begin to look bad. Consequently, the companies have to be aware that advisers are going to incline them to do the deal even if they feel it is maybe not the right thing to do. So, they have to be very carefully and listen up what advisers say.  
Cambell and Smith mentioned (2012) that in this case, Buffet's recommends that very large acquisitions should have a consultant who only gets paid (only get a bonus), if the deal doesn't go through. So, in the deal team, where there are many advisers working to put the deal through and get paid when the deal happens, there should also be at least one person who is only paid if it doesn't happen. (Cambell and Smith, 2012)
- **Tip 3: Look for the deals which are primarily driven by revenue synergies**  
The deals with extra sales from cross selling, extra sales from having a stronger position in a particular market place, extra sales from better utilization of technology or other revenue synergies, perform better than the deals that are driven primarily by cost savings.
- **Tip 4: Create an implementation plan and plan it early**  
A buyer should make an implementation plan long time in advance in order to make sure he knows who is going to be involved in delivery of the implementation process of his acquisition. On top of that, the buyer should make sure that those people are also involved in the acquisition itself. What he should try to build here is a commitment and the commitment comes when he buys in into the process. The buyer should want the same people to participate in creating the acquisition plan as well as

being responsible for delivering it on the deal later. Buying in and then being responsible for delivery is critical. Therefore, it is very important to create an implementation plan early and make sure to get delivery on it.

▪ **Tip 5: If you fail, then fail safe**

Cambell and Smith (2012) mentioned a Buffet's advice, which says that acquirers should build in a margin for errors, meaning that even if the things don't turn out as the paper work suggested, as it was initially planned, the deal still looks good. This is true for acquisitions just as it is for investing in stocks and shares. The advices for deal-makers are as follows:

- if you find yourself "scraping the barrel" to generate enough synergies, to justify the deal price, do not do it, go back
- if you find you haven't got the management that you would ideally like to have to lead the implementation process, cut off negotiations
- if you are not convinced that the other side is being completely straight forward with you and the deal is tight one, don't do the deal unless you are comfortable that the deal you are doing is going to create lots of value and has a room for it to be worse than you thought it is going to be. Otherwise you are chasing a wrong sort of deals. Most deals look much worse 3 years after than the day negotiations were closed. (Cambell and Smith, 2012)

There are many factors which stem from internal enterprise processes and its efficiency rather than external ones, that directly influence enterprise value of particular company. This is also applicable for any M&A transaction activity. If a management team of company decides to carry out the expansion of company's business through M&A activities, it does not automatically mean that by increasing the value of company's assets as a result of purchasing a target company or merging with other company, the total intrinsic value of newly created legal entity will increase as well. The reason behind is quite simple. In many cases, a synergy effect of two merging organizations is highly dependable on the overall transaction and post-transaction processes executed within these organizations. For many investment banks and consulting firms, the success of M&A transaction ends with signing a deal and cashing out benefits in the form of advisory fees, However, for merging organizations, this is just a beginning of long way towards success which can also turn out as a big failure. In general, a positive impact of particular M&A transaction and its prosperity can be identified in the first months or years right after the transaction realization and performing deep analyses and scrutiny.

## **4 CONCLUSION**

The turbulent time full of changes, accompanied by the recession which the world economy currently cope with, is not easily manageable from a management point of view since it is difficult to retain a historical sustainable growth or at least to achieve the results from before the year 2008. Nowadays, many executives have to deal with the decision making process whether to accept or deny restructuring means, one of which is M&A. There is no guidance or instruction book to achieve a 100% success of M&A transaction, however, there are general principles which if they are applied correctly, there is a high probability that the results, required by investors, managers and/or other stakeholders of company, will be reached.

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## **ASSESSMENT AND EVALUATION OF THE IMPACT OF FINANCIAL RISK ON SMALL AND MEDIUM-SIZED ENTERPRISES IN SLOVAKIA**

*Mária Hudáková, Katarína Buganová, Ján Dvorský*

### **Abstract**

The enterprise exists in the area, which is subject to permanent changes, and most of these changes are caused and evoked by the very man. The way how to deal with these changes also depends on the ability of the enterprise to adapt and accept the variability of daily life. In the interest of each enterprise, whether it is small or medium-sized, introduction of risk management and assessment of current financial situation should be in relation to the potential risks. Small and medium-sized enterprises (SMEs) in Slovakia do not pay sufficient attention to financial risks; do not make assumptions or preventive measures of the risks assessed that would prevent financial problems or financial crisis in the enterprise. The essence of the article is, based on the collected and processed data from the statistical survey, to assess and evaluate the impact of the financial risk on small and medium-sized enterprises in relation to the length of the business and the number of employees in the Žilina region of Slovakia.

*Keywords: risk, finance, management, analysis, small and medium-sized enterprise*

JEL Classification: M21, G32, L52

## **1 INTRODUCTION**

The economic performance of small and medium-sized enterprises has a major share in production capacity and employment, and how Beck, Demircus and Levine (2005) illustrate, the presence of a prosperous SME sector is one of the characteristic features of the developed economies. Small and medium-sized business is no longer perceived as a social good to be maintained despite its economic costs, but on the contrary, a significant contribution to economic development (Mukwasi, Seymour, 2012). Today, small and medium-sized enterprises are increasingly perceived as the primary tools for the development of entrepreneurship and do not contribute to the creation of job positions and socio-political stability, but to the innovation and the competitiveness of the national economy as well (Belás, et al, 2014).

The Slovak corporate economy is greatly dependent on small and medium-sized enterprises, because they create 72% of job positions and 67% of added value what extends respective averages of the EU (67% and 58%). The majority of enterprises operate in the field of services and retail trade, but the production also represents an important sector. Although it does not include a very high number of SMEs, it constitutes 25% of job positions and 22% of added value creating SMEs within the corporate economy (SBA Survey, 2014).

In particular, regional disparities represent an important issue in the framework of the Slovak Republic. Lessman (2009) noted that Slovakia had the highest level of regional disparities among the OECD countries in the five-year average for the period 1996 – 2000. On the contrary, as Habánik, Hošťák, and Kútík (2013) demonstrated that the rate of regional disparities from 2002 to 2010 deepened even more. Although economic performance of the whole country converges towards the level of the European standard, the economic growth,

however, is concentrated in Bratislava region and the economic performance, mostly of rural regions, still lags behind. In this context, there arises extremely important need to examine the economic phenomena in the Slovak Republic, not only at national but regional level as well.

**The aim of article** is, on the basis of the data obtained and processed from the statistical survey, to assess and evaluate the impact of financial risk on small and medium-sized enterprises in relation to the length of the business and the number of employees in the Žilina region of Slovakia. The length of the business and the number of employees in the enterprise are important factors, which may or may not affect the size of the financial risks and their management. The results obtained from the survey are based on the experience of business owners of SMEs, managers, and their attitude towards risk as well as their ability to manage risk.

In order to meet the stated objective, there were used **empirical methods of research** (questionnaire, interview with competent SME persons), **statistical methods** i.e. analysis of variance using quantitative tools of statistics (percentage, average values, homoscedasticity, Cochran's test, Bartlett's test, Levene's test, Kolmogorov-Smirnov test, F-test, Kruskal-Wallis test, Box-and-Whisker plot, graph of mean values) and **statistical software** Statgraphic centurion XV (Software Statgraphics Centurion XV, 2014).

## **2 IMPORTANCE OF FINANCIAL RISKS IN SMALL AND MEDIUM-SIZED ENTERPRISE**

In foreign sources is **financial risk** (Guzman, 2015) refers to the chance a business's cash flows are not enough to pay creditors and fulfil other financial responsibilities. The level of financial risk, therefore, relates less to the business's operations themselves and more to the amount of debt a business incurs to finance those operations. The more debt a business owes, the more likely it is to default on its financial obligations. Taking on higher levels of debt or financial liability therefore increases a business's level of financial risk. Holton (2004) argues that there are two ingredients that are needed for risk to exist. The first is uncertainty about the potential outcomes from an experiment and the other is that the outcomes have to matter in terms of providing utility. Risk factors play three distinct roles in financial analysis (Brammerts, et al., 2009):

1. Risk factors are drivers for the calculation of expected cash flow, for example interest rates directly influence the magnitude of interest payment cash flows, FX rates determine the value of cash payments in base currency, credit risk effects reduce expected cash flows and insurance risk causes future cash flows to be paid out.
2. Risk factors – especially interest and FX rates – determine the values within the lifetime of the contracts via discounting functions.
3. Risk factors are random variables introducing variance into the financial system.

In the opinion of Brammerts (2009) are the following main financial risks categories:

- market risk,
- credit risk,
- insurance risk,
- operational risk.

**Financial risk** belongs among economic (operational) risks with the defined impacts on enterprise finance. According to Markovič (Vlachynský, Markovič, 2001), financial risk represents the probability of the occurrence of financial loss or gap of profit as a result of operational development compared to the development expected. Financial risk is mostly

caused by movements in the financial markets and changes of subject attitudes towards individual financial tools and individual transactions (Zanická Hollá, et al., 2010). The impact on enterprise results is imminent, just as there is a bearer or source of risk in the portfolio of the enterprise. When defining the financial risk of the enterprise, Jilek (2000) talks, among others, about the losses, which may result from the financial or commodity tool, or financial portfolio. In summary, financial risks are associated with the availability of sources of funding, insolvency, indebtedness of an enterprise, adverse changes in interest rates, exchange rates, etc. They are very important for the analysis of the business plan and strategic decision making (Hudáková, et al., 2014).

According to Markovič (2007), financial risk is divided into:

- Credit (direct credit risk, credit equivalent exposure, settlement risk, large credit risk exposure)
- Liquidity risk and liquidity
- Price risk (interest rate risk, equity risk, currency risk, commodity risk)
- Operational and legal risk

There are current data in Slovakia showing that credit conditions improved in 2013 (Statistical office of the Slovak Republic, 2013), while only a small number of Slovak entrepreneurs informs about the reduced willingness of banks to provide credit and lower availability of public financial support including guarantees (Belás, 2013). The share of enterprises established (i.e. companies doing business and paying the wages of more than three and half years) is lower, suggesting a lower survival rate.

However, business plans slightly above average, whereas 16% of Slovaks wanted to establish a new business in the near future. According to "SBA Survey 2014", there is a below-average support for honest entrepreneurs in Slovakia who were not successful and want to start a business again (SBA Survey 2014). The time necessary to resolve insolvency was double in the Slovak Republic in 2014 compared to the EU.

According to a survey on business risks focused mainly on young entrepreneurs; authors – Jakubec, Sobeková Majková and Solík (2012), it was found that young entrepreneurs often face the lack of start-up capital within the financial risk. Only a third of young entrepreneurs indicated that they had sufficient capital when setting up a business. The survey revealed that young entrepreneurs growing up in the business family are more likely to have sufficient start-up capital (42%) than other population (23%). Since the outbreak of financial and economic crisis, secondary insolvency has represented a major problem chasing entrepreneurs and threatening their existence. In particular, it can cause annoying problems for young entrepreneurs who have not created sufficient financial reserves. Up to 44% of respondents participating in the survey had problems with secondary insolvency. Their problems with non-payers were severe enough to endanger their ability to pay suppliers (Májková-Sobeková, 2011).

A large international study, carried out by The Economist Intelligence Unit and Dun & Bradstreet (Customer and Supplier Risk Management, 2013) demonstrated that enterprises, not only manage the risk, but also regularly evaluate the success of its management, perform better results. Enterprises are dependent on reactive fire-fighting problems arising without a systematic approach. Financial risk management (such as currency and interest rate risk) and the risks associated with insolvency of customers are considered a matter of course abroad.

According to an international survey Treasury Risk Survey focused on global trends in enterprise risk management in 2013, which was carried out by the Association for Financial Professionals (CFO, 2013), in cooperation with Zanders Treasury and Finance Solutions,

European companies consider liquidity, currency and reputation risk to be the most serious threat for their business.

### 3 RESEARCH METHODOLOGY AND RESULTS

There was made the statistical survey of business risks for small and medium-sized enterprises in the Žilina region, within the framework of the project FaME/2013/MSPRISK: "Current trends in the area of business risks of small and medium enterprises in selected regions of the Czech Republic and Slovakia". There were 164 small and medium-sized enterprises polled in the Žilina region using the form of empirical examination (questionnaires and interviews with the competent persons of SME). The structure of enterprises was as follows: 17% was involved in production, 21% in commercial activities, 17% in construction enterprises, 6% in transport enterprises, 1% in agricultural enterprises, and the largest share was formed by enterprises, which provided business in other sectors 38% (consulting, distribution, etc.). 58.54% of the entrepreneurs in the Žilina region stated financial as the second key business risks at the moment. There are business risks analysed in Figure 1:

- blue column shows **importance or key significance of business risk** for SMEs (calculated as the ratio of the number of respondents who reported a given answer to the total number of companies),
- red column shows **average value of SME's risks identified** (calculated as arithmetic mean of values reported by entrepreneurs in the Žilina region).

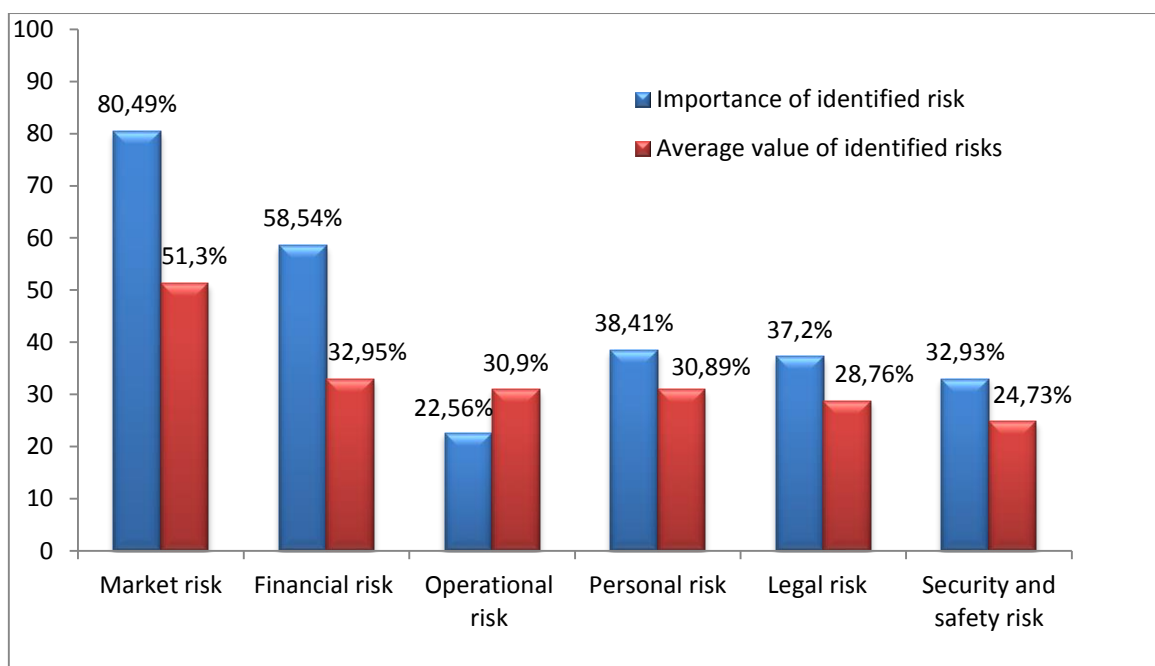


Fig. 1 – Percentage of the importance and average value of the SMEs risks identified in Žilina region Source: elaborated by authors

The survey shows that 67.68% of enterprises can largely manage financial risks, 23.17% claim they can properly manage financial risks. Only 1.83% thinks they do not know how to manage financial risks. It is admittedly a subjective assessment of their own abilities of entrepreneurs; however, we can say that this ability may be partially supported by a fairly decent educational structure of entrepreneurs.

According to the objective established at the beginning of the article, and with the use of statistical methods and tools, we examined whether the factors such as the length of business and the number of employees in the enterprise in the Žilina region caused impact on the average (mean) values of the intensities of financial risks. In order to meet the objective, there was used a quantitative method - "analysis of variance". Analysis of variance was determined by either a parametric or non-parametric test (Betáková, et al., 2010). There should be met two essential conditions for the calculation of parametric test that the resulting p-value of the financial risk of homoscedasticity test (i.e. identity of variance) and test to verify the normality of SME groups must be higher than the level of significance of 0.05.

It was divided into three groups, according to the length of the business and the number of employees in the enterprise (Table 1).

Tab. 1 – Distribution of SMEs according to the length of business and number of employees.

Source: elaborated by authors

	<i>SMEs</i>	<i>Financial risk</i>
SME groups according to the length of business	SMEs from 1 to 5 years	24
	SMEs from 5 to 10 years	34
	SMEs more than 10 years	39
SME groups according to the number of employees	Micro-enterprise (up to 9 employees)	66
	Small enterprise (10 – 50 employees)	16
	Medium enterprise (up to 499 employees)	15

Basic statistical characteristics (BSC) necessary for the analysis of variance are listed in Tab. 2:

- $\mu$  – average value of the risk to the enterprise,
- $\sigma$  – standard deviation of the risk value to the enterprise,
- $\sigma^2$  – variance of risk values to the enterprise.

Tab. 2 – Basic statistical characteristics (BSC) of the financial risk in the three groups of SMEs according to the length of the business and the number of employees. Source: elaborated by authors

	<i>SMEs</i>	<i>BSC</i>		
		$\mu$	$\sigma$	$\sigma^2$
SME groups according to the length of business	SMEs from 1 to 5 years	31.67	15.44	238.39
	SMEs from 5 to 10 years	32.79	12.92	166.92
	SMEs more than 10 years	33.77	14.02	196.56
SME groups according to the number of employees	Micro-enterprise (up to 10 employees)	31.74	13.48	181.92
	Small enterprise (up to 50 employees)	40.33	13.95	194.52
	Medium enterprise (up to 250 employees)	34.36	14.74	217.45

### 3.1 Comparison and assessment of the basic statistical characteristics of financial risk for SMEs according to the length of business

It was not possible to use the parametric test of mean risk values for the analysis of variance of financial risk. As the conditions were met, there was carried out non-parametric test of the financial risk medians in three groups of SMEs according to the length of business in the Žilina region. We have verified the condition of homoscedasticity – identity of variance of different groups using the following tests:

- Cochran's test: p-value = 0.537,
- Bartlett's test: p-value = 0.650,
- Levene's test: p-value = 0.980.

It is possible to conclude out of the results of the individual tests that the resulting p-value was greater in all the tests as the level of significance we had chosen. The condition of a normal distribution of financial risk evaluation in enterprises, according to the business times using the Kolmogorov-Smirnov test:

- p-value of enterprises with a business period from 1 to 5 years is 0.032,
- p-value of enterprises with a business period from 5 to 10 years is 0.487,
- p-value of enterprise with a business period over 10 years is 0.101.

We refuse the assumption on the surface of significance that the evaluation of the enterprises with the business period from 1 to 5 years originated from the normal distribution.

Tab. 3 – Analysis of variance of the intensity of financial risk according to the length of business. Source: elaborated by authors

	<i>Number of enterprises</i>	<i>The average in group</i>
Enterprise from 1 – 5 years	24	44.2083
Enterprise from 5 – 10 years	34	49.4559
Enterprise more than 10 years	39	51.5513

*P-value = 0,590*

In consideration of the fact that the calculated p-value of Kruskal-Wallis non-parametric test of the analysis of variance is greater than 0.05, we can say that there are no statistically significant differences among medians of intensity rate of the financial risk according to the length of the business of small and medium-sized enterprises in the Žilina region with reliability 95.0%.

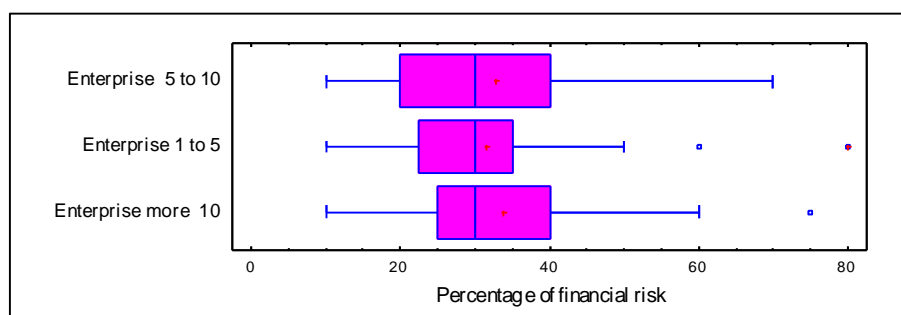


Fig. 2 – Multiple Box-and-Whisker plot of financial risk according to the length of business. Source: elaborated by authors

Graphical analysis of financial risk confirmed the results of testing using analysis of variance. We can say that the length of business did not affect the assessment of the financial risk of SMEs in the Žilina region.

### 3.2 Comparison and assessment of the basic statistical characteristics of financial risk for SMEs according to number of employees

It was not possible to use parametric test of mean risk values for the analysis of variance of financial risk. As the conditions were met, there was carried out non-parametric test of the financial risk medians in three groups of SMEs according to the length of business in the Žilina region. We have verified the condition of homoscedasticity – identity of variance of different groups using the following tests:

- Cochran’s test: p-value = 0.934,
- Bartlett’s test: p-value = 0.928,
- Levene’s test: p-value = 0.958.

It is possible to conclude out of the results of the individual tests that the resulting p-value was greater in all the tests as the level of significance we had chosen. The condition of a normal distribution of financial risk evaluation in enterprises according to the number of employees using the Kolmogorov-Smirnov test:

- p-value of enterprises with the number of employees up to 10 is 0.003,
- p-value of enterprises with the number of employees up to 50 is 0.701,
- p-value of enterprises with the number of employees up to 250 is 0.433.

We refuse the assumption on the surface of significance that the evaluation of micro-enterprises with the number of employees up to 10 originated from the normal distribution.

In consideration of the fact that the calculated p-value of Kruskal-Wallis non-parametric test of the analysis of variance is smaller than 0.05, we can say that there are statistically significant differences among medians of intensity rate of the financial risk according to the number of employees of small and medium-sized enterprises in the Žilina region with reliability 95.0%. Table 4 shows that the median of the assessment of medium-sized enterprises in respect of financial risks is on average about one-third higher than in the assessment of micro and small enterprises in the Žilina region in Slovakia.

Tab. 4 – Analysis of variance of the intensity of financial risk according to the number of employees. Source: elaborated by authors

	<i>Number of enterprises</i>	<i>The average in group</i>
Micro-enterprise	66	42.77
Small enterprise	16	61.57
Medium-sized enterprise	15	48.36

P- value = 0,042

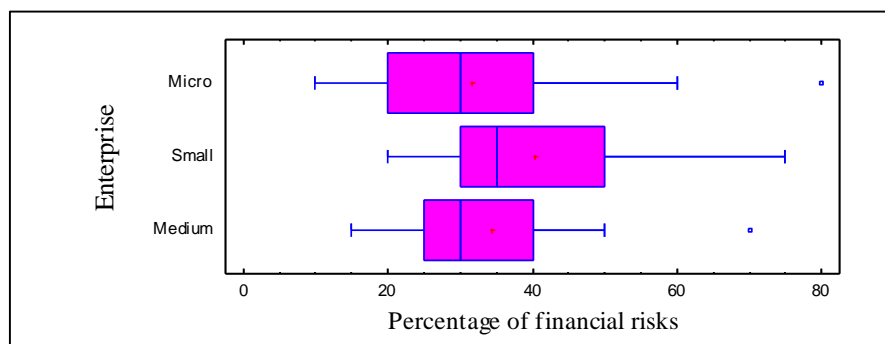




Fig.3 – Multiple Box-and-Whisker plot of financial risk according to the number of employees. Source: elaborated by authors

Graphical analysis of financial risk confirmed the results of testing using analysis of variance. We can say that the number of employees affected the assessment of the financial risk of SMEs in the Žilina region.

#### **4 ASSESSMENT OF RESULTS**

The results of the statistical survey carried out in Žilina region are based on the limited sample of respondents for SMEs in the Slovak Republic. On the basis of the results of the survey, using basic statistical characteristics and financial risk analysis of SMEs, we can conclude that the financial risk does not depend on the length of business activity in the Žilina region. In spite of the fact that the results of the survey indicate the independence of the factors assessed, financial risk may arise from various aspects of business during the whole enterprise activity. One of the most common causes of enterprise termination is incorrect calculation of start-up capital and very often underestimated calculations of unit costs, incorrectly calculated prices of goods and services, errors in accounting (taxes, levy), high initial investments and insufficiently or improperly secured funding resources (own, foreign).

From the point of view of the financial burden, the largest source of risk is high charge burden with the negative effect on the amount of the total value of the work and is challenging. As confirmed by the results of the survey. Using basic statistical characteristics and analysis of financial risk of SME, we can conclude that financial risk is dependent on the number of employees in the Žilina region. It follows that the financial risks in the form of operational risks, which are usually caused by human error or technical failure, may lead to financial losses. These are the risks that are mostly short-term in duration, but the possible negative effects of the crisis situations arising as a result may have broad and disastrous consequences (threat to property, health, life).

SMEs can manage risk in several ways. One of the options, which, however, a lot of SMEs does not use, is to create financial reserve of enterprise for a period of recession. This is due to limited financial resources. Therefore, in the field of SMEs, it is recommended to move risk to business partners. In terms of functioning of financial markets and insurance market, which provides a number of products and credit, one of the best ways how to reduce the risk is to secure or insure it. A higher level of planning requires reducing the risk by diversifying into different commercial activities. Diversification of risks into the various activities requires the combination of financial resources. Securing funding through loan products or other available resources to support SMEs requires processing of a detailed financial and cash-flow plan, taking into account the potential risks of the business.

#### **5 CONCLUSION**

Most enterprises abroad have already integrated risk management into its planning and decision-making process, i.e. they systematically consider possible risks when taking decisions in the areas such cash flow management, investing, pricing. The implementation of enterprise risk management is seen as the biggest potential for how to make risk management effective. In Particular, medium-sized enterprises in Slovakia should have integrated risk management in an effort to improve prevention of risks, i.e. to centralise risk management into a single department and create teams composed of various departments to manage different types of risks.

The biggest barriers that prevent enterprises in Slovakia to effectively manage financial risks relate to problems with the availability of information, whether internal or external data necessary to evaluation and management of risks, or integration into the decision-making process. Financial risks are identified only from the data in the accounts and internal rate of profitability, after their implementation (establishment). On the basis of existing experience, many managers are based on the knowledge of past. However, to evaluate the risk only on the basis of own experience and feelings is currently inadequate. The factors such as the length of business and number of employees surveyed revealed that their impact on the level of financial risk is not possible to ever underestimate. Therefore, the owners of SME in Slovakia and responsible managers must rethink their approach to the evaluation and management of financial risk and consider the rate of financial resources and implement steps to manage financial involved.

### **Acknowledgement**

Publication of this paper was supported by the European Union within the project No. 26110230079 Innovation and internationalization of education – tools of quality enhancement of the Zilina University in the European Education Area, FaME/2013/MSPRISK - Business risks of small and medium-sized enterprises in turbulent economic environment, the grant project KEGA no. 005 DTI-4/2014 Sectoral integration of spatial impacts of the safety management of environmental risks.

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## **CREATING MOBILITY OF RESIDENTS ON AN EXAMPLE OF MEDIUM-SIZED CITIES IN POLAND**

*Katarzyna Cheba, Maja Kiba-Janiak, Sebastian Saniuk, Krzysztof Witkowski*

### **Abstract**

The paper presents the application of selected methods of multivariate statistical analysis including factor and conjoint analyses in terms of modelling transportation preferences of urban residents. The introduced methodologies can be useful tools for local authorities while designing solutions in order to improve the competitiveness of public transport as an alternative to private transport. The results of the studies presented in the article are part of the research project implemented in 2010-2013 under the title "Reference model of city logistics and the quality of life". For the study undertaken in this paper, three medium-sized cities, located in the western part of Poland, were selected. The structure of the paper is as follows. The second section presents the determinants of change in communication behavior of urban residents, while the third section includes the significance of the applications of multidimensional statistical analysis in order to identify citizens' transportation preferences and behaviours. The subsequent section introduces the research results and the final part of the paper presents the conclusion.

*Keywords: transportation preferences, factor analysis, conjoint analysis.*

JEL Classification: R41, L51, C10.

## **1 INTRODUCTION**

Life in the city and the areas directly adjacent to cities is becoming more and more difficult. The main reason for this situation, besides environmental pollution and security threats, is the constantly increasing number of residents which causes difficulty with movement. The effect of dynamic urban development in urban and industrial agglomerations is often congestive transportation, also called congestion. The problem of congestion is the subject of numerous studies (Tulpule, 1973; Brandeau and Chiu, 1992; Kerner et al., 2000; Cooper et al., 2004; Downs and NetLibrary, 2004; Richardson and Bae, 2008; Badyda and Kraszewski, 2010; Beim, 2012).

The growing wealth of societies and consequently greater access to passenger cars is responsible for the significant increase of the motorization index with a simultaneous fall in public transportation usage (Downs and NetLibrary, 2004; Welzl, 2005, Płachciak, 2009). Forecasts of the European Commission indicate that passenger individual transportation will have increased by 51% by 2050, while the public transportation will further deteriorate (European Commission, 2012).

The impact of transport on the urban environment depends on many different factors. A special place among them is taken by the implementation of the transportation service, which is an important part of strategy for urban transport. The right choice of development strategy, especially public road transport, can help to solve the problems of traffic organization. It is important in this case the proper identification of existing and future challenges that the transport system faces and the formulation of transport development programs that meet

identified tasks in changing environmental conditions (Kerner et al. 2000; Richardson and Bae, 2008, Jurkonyte, 2009).

Factors which can motivate citizens to use urban public transport or other alternative ecological means of transport can be innovative solutions related to the transport itself as well as to creating communication behavior. The implementation of solutions which enable the improvement of transport organization in the cities requires significant financial outlays. The necessity of this kind of investment is very often the most important factor which limits the interest of local authorities in these solutions.

The purpose of the study is an attempt to model transportation preferences of urban residents in one of the medium-sized cities in Poland. In this paper the selected methods of multivariate statistical analysis including factor and conjoint analyses were proposed. The study results can be a useful tool for local authorities in order to design solutions that improve the competitiveness of public transport to private transport. The results of the studies presented in the article are part of a project implemented in 2010-2013 titled "Reference model of urban logistics and the quality of life". The structure of the paper is as follows. The second section presents the determinants of change in communication behavior of urban residents, while the third section included significance of the application of multidimensional statistical analysis in order to identify citizens' transportation preferences and behaviors. The subsequent section introduces research results and the final part of the paper presents the conclusion.

## **2 DETERMINANTS OF CHANGE IN COMMUNICATION BEHAVIOR OF URBAN RESIDENTS**

The communication behavior of urban residents of the European Union has experienced very intensive changes in the last two decades. These changes are essentially similar in nature; however a difference is seen in their pace and the identified phase of the progressive process. In many cities of Western Europe, especially in Scandinavia, Germany and Austria since more less the mid of the first decade of the 21st century there a much slower growth rate of automotive use has been observed, and even a fall has been seen. These trends are consistent with the forecasts formulated several years ago concerning the development of automotives, which implied saturation of individual vehicles. The forecasts developed by the UK government forecast centre in the 1970's assumed the occurrence of such saturation in about 2010 and, in fact, in most cases they correspond to the current situation in the major cities of the European Union (Banister and Berechman, 2003).

These trends occur differently in the cities of Central and Eastern Europe, where a sharp increase in individual automotives is being observed accompanied by a decreasing interest in other means of transport (Cheba and Kiba-Janiak, 2013). Identified related changes are the result of many factors, among which an increasingly important role is attributed to cultural and social changes. Factors that may stimulate the return of the public interest in public transport or other alternative forms of getting around the city by its inhabitants may be innovative solutions for both the transport and development of communication behavior. The rate and nature of changes in transport behavior of urban residents in both Western Europe and in Central and Eastern Europe is conditioned by many diverse factors. The findings of the communication behavior of people in most European cities indicate that primarily cultural and social factors play a major role and only later economic and environmental ones. It should be noted, however, that the intensity of the observed changes and the dominant nature of these and other factors is directly related to the wealth of society. In Western Europe, the automotive factor in major cities now typically ranges from 350 to 400 cars, whereas 5-10 years ago its level was mostly at the level of more than 400 cars per 1000 inhabitants.

Observed in the statistics of these countries that increase relates primarily to the automotive industry areas outside the cities (Cooper and al., 2004; Badyda and Kraszewski, 2010; Beim, 2012).

The situation is very different in most cities in Poland (a similar situation also applies to the Czech Republic and Hungary), in which there has been significant growth in the automotive industry. In the ten largest cities in Poland, the level of motorization in 2013 ranged from 447 (Lublin) to 598 (Warsaw) passenger cars per 1,000 inhabitants, while in cities such as Krakow, Katowice, Poznan, Wroclaw, Gdansk this level is much higher than 500 cars per 1000 inhabitants. After 1989, an accelerated process of development of the automotive industry was observed in Poland, similar to that which Western countries experienced many years before. Changes taking place as a result of it are relevant to contemporary cities. Changing social, economic, cultural, and technological conditions is a serious challenge for existing communication systems in cities in which such a rapid growth of the automotive industry was not taken into consideration.

Tab. 1 – The changes of the motorization rate. Source: own elaboration on Eurostat data.

Cities	2007	2008	2009	2011	2011/2007
Bruxelles / Brussel	483,0	485,8	479,1	451,3	-6,56%
Berlin	290,2	286,9	285,7	290,2	0,00%
Frankfurt am Main	321,5	319,6	316,9	319,9	-0,50%
Madrid	482,5	484,6	476,8	467,7	-3,07%
Barcelona	378,3	381,3	376,3	370,1	-2,17%
Paris	250	244,3	238,5	233,4	-6,64%
Sofia	475,3	518,1	570,6	654,9	37,79%
Praha	515,5	513,9	508,5	540,7	4,89%
Warszawa	510,7	555,6	533,4	564,8	10,59%

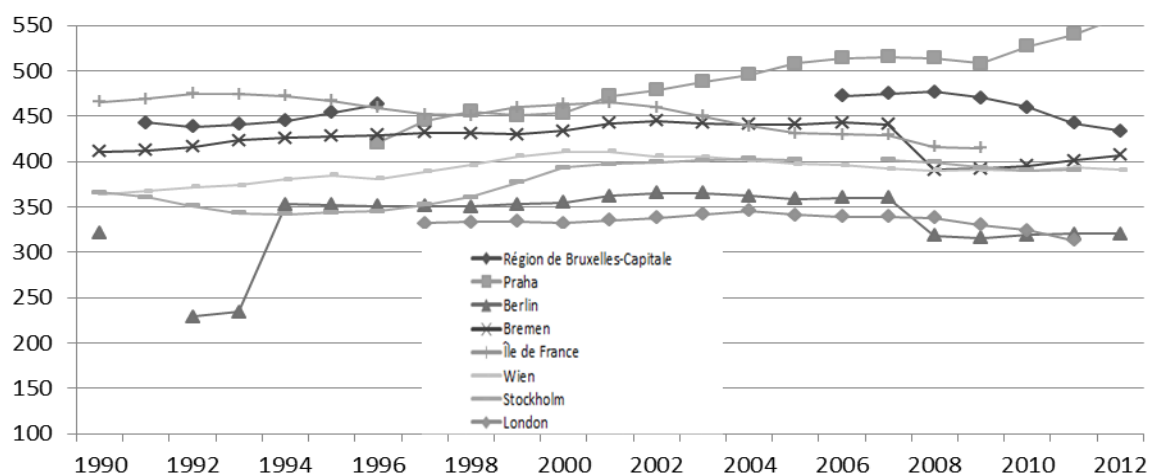


Fig. 1 – Formation of the motorization rate (the number of passenger cars per 1000 inhabitants) in selected European cities in the years 1990-2012. Source: own elaboration on OECD data.

The most important problem, apart from a rapid increase in the number of cars, is also a significant increase in road freight transport, which puts a burden on municipal systems. Free communication is becoming more and more difficult due to the development of housing in suburban areas or placement of large shopping malls outside the concentrated urban housing (Brandeau and Chiu, 1992; Potts, 2002) areas. Road congestion, especially in big cities, has caused a decline in the quality of public transport travel which is reflected in a reduction of the speed of communication, loss of regularity and punctuality of vehicles; an increase in the degree of uncertainty to reach your destination at the scheduled time (Downs and NetLibraray, 2004; Janecki and al., 2010). All these negative effects of increasing automotives were felt much earlier in Western Europe and became the drive for changes in the common transport policy of the European Union (European Commission, 2012).

The main objective of the most important documents of the EU transport policy, such as: White paper – European transport policy for 2010: time to decide" in 2001, White paper - "Roadmap to a Single European Transport Area - Towards a competitive and resource efficient transport system " in 2011 and Green Paper – “Towards a new culture for urban mobility” in 2007, is, in the case of public transport, to create the conditions for the development of competition by, among others, the liberalization of passenger transport market. To this end, EU documents require the separation of an organizer’s functions from freight carriers’ function.

Measures, that should lead to the economic growth as a result of the growth of innovation and competitiveness of the regions (thanks to regional specialization) are continued in the next strategic for the European Union document entitled Europe 2020 Strategy. This document implies the need for so-called smart specialization of regions. The strategy of smart specialization is defined as a national or regional innovation strategy, whose main goal is to build a competitive advantage due to the development of research and innovation capacity. (Europa 2020).

Sustainable transport is one of the important areas determining the the future development of the economy of the European Union. It should however be noted, that this is an area primarily supporting the development of other sectors of the economy, for which it constitutes a service industry, and its situation is strongly correlated with the condition of the economy as a whole. This information confirms the position of this field among the regional smart specializations in the European Union as the industry supporting the development of other important regions of specialization. In Poland, this sector has been indicated as one of the leading specialization in only five voivodships: kujawsko-pomorskim (Transport, logistics, trade – waterways and land routes), podkarpackim (Aviation and Space Flight), warmińsko-mazurskim (The economics of water including water transport, such as: cruise passenger, water transport of goods, transport of boats and yachts), wielkopolskim (Industrial processes and transport), zachodniopomorskim (Maritime activities and logistics). In other EU countries such specialization has been indicated in regions, such as.: Cyprus (Transportation: Marine, Shipping, Intelligent Transport Systems, road freight), Czech Republic (Transport means (automotive, aerospace, including connected ecosystem of supplying and supporting industries), Berlin (Transport, mobility & logistics), Nord - Pas-de-Calais (Transport and Ecomobility), Lithuania (Transport, logistics and ICT).

### 3 THE STUDY OF TRANSPORTATION PREFERENCES AND BEHAVIOR OF URBAN RESIDENTS

#### 3.1 Modelling assumptions

The modelling of travelers' transportation behavior is a part of a more complex modelling process of travel, which is conditioned, among other factors, by the density of urban networks and associated with the traffic interference or lengthening of the journey time. (Leea and Rivasplata, 2001; Starowicz, 2010, Szoltysek, 2011)

An important element of this process is to study the preferences of buyers, in this case travelers. Knowledge of the preferences and transportation behavior of the inhabitants is essential in the process of shaping transportation offer (Niemczyk, 2014). Particularly important in this regard are studies on: the identification and prioritization of traffic demands and satisfaction with services and comprehensive assessment of the quality of transportation services. It is assumed that the fundamental postulates reported by residents to the urban transport sector are: punctuality, directness, frequency and availability, making up the level of passenger satisfaction with the services provided. An important problem in the course of a lot of research is the correct interpretation of numerous, interlinked information. The solution to the problems with too much individual information can be e.g. a reduction in dimensionality and search for the interplay of many factors, e.g. on the basis of factor analysis.

Factor analysis is used to convert the mutually correlated system of variables into a new system of variables to be determined as common factors mutually uncorrelated, comparable with an output system (Green and Wind, 1975; Green and Srinivasan, 1990; Green, 1997).

The use of factor analysis requires fulfilling the following assumptions (Green and Carmone, 1977; Hair et al., 1995; Walesiak and Bąk, 2000):

- a) linearity and monotonicity of relationships between variables,
- b) normal or close to a normal distribution of variables,
- c) using variables with terms of at least 5-7 answers,
- d) adequate number of observations (above 100, optimally 2000 cases),
- e) the ratio of the number of variables corresponding to the number of observations (the ratio should be 1 to 3 or even 1 to 5).

The construction of the factor model proceeds in several stages. The first step is the construction and initial analysis of the correlation matrix between the original variables. The factor analysis can be applied only if there are sufficiently high correlation coefficients between the variables under consideration. The next step is to choose the appropriate factor model (orthogonal or diagonal), which identifies the method of choosing factors (in the segmentation studies the most commonly used is an orthogonal identification) and a factorial method. These methods can be divided into: methods numbered among principal component analysis (*Principal Components Analysis*) and methods of factor analysis such as a method of main factors.

Prior to testing, one can also try to assess the adequacy of the assumptions of factor analysis. For this purpose KMO statistic was used (*Kaiser-Meyer-Olkin Measure of Sampling Adequacy*). Therefore to confirm the importance of received results Bartlett's test was used. In Bartlett's test there was as a very large discrepancy. The value of chi-square statistics measuring these differences amounted to 2273,51, and the associated risk of confusion (significance), while recognizing the importance of all coefficients is less than 0,001. The



degree of adequacy of tests for the assumptions of factor analysis measured by KMO statistic was 0,898. It is a very good result (the interpretation of the value of KMO by Keiser: 0,9 - wonderful, 0,8- worth praising, 0,7 - good, 0,6 - the average, less than 0,5 - not acceptable). In the next stage of the research in order to determine the optimum number of factors (hidden variables) a method of eigenvalue greater than unity was used as well as the criterion of Cattelan's landslip (*Factor Scree Plot*).

Another method of measuring the preferences of buyers is conjoint analysis (Hair et al., 1995). The essence of conjoint analysis is to evaluate a set of profiles (real or hypothetical products and services) described with the selected attributes (explanatory variables) in order to obtain information about the overall preferences for the profiles (a set of values of the dependent variable) made by the respondents to the survey.

The complexity of the test procedure in the framework of conjoint analysis requires decision-making at every stage of research including among others determining (Walesiak and Bąk, 2000):

- a) the form of the model (depending on model variables, model preferences),
- b) the choice of how to collect data (solid profiles, pairwise comparisons, the presentation of pairs of attributes),
- c) the choice of the presentation profiles (physical product, the product model, a verbal description of figure),
- d) the scale of preferences (nonmetric, metric) estimation method: (nonmetric estimation methods: MONANOVA, PREFMAP, LINMAP, CCM; metric estimation methods: KMNK, MSAE; probabilistic estimation methods: MNW, EM,
- e) assessing the credibility of the model (rating accuracy, reliability assessment),
- f) the interpretation of the results of measurements and the sample size determined mostly on the basis of earlier research (typical test is usually from 300 to 550 respondents).

In the work the analysis of travelers' preferences was based on the research sample, which consisted of adult residents of three Polish cities of West Poland who were between 18 and 70 years of age (Kiba-Janiak and Witkowski, 2014). An attempt was selected from the population at random. The total sample size was set at 1600 inhabitants.

However, the changes may in some cases cause the decline in the quality of services provided which is a direct result of the lack of integration of activities and separation of the areas determining the quality of the services provided which are under the responsibility of the organizer and service provider. Separation of responsibilities in the lack of integration – a service provider will provide the service in the manner and under the conditions specified by the organizer of this service - perhaps in the case of perception of the service offered as a whole, which consists of both elements which the organizer and the carrier are responsible for, in the lack of common policies aimed at increasing the quality of services provided it can impact negatively on this quality.

### **3.2 The results of travelers' transport preference**

The respondents evaluated 12 different quality criteria concerning urban transport services, estimated from the available literature on the subject studies of this type. In the study of exploration the following dimensions of evaluation were considered:

- a) punctuality of vehicles (x1),
- b) frequency of vehicles (x2),
- c) travel safety (x3),

- d) the conditions of travel in vehicles ( $x_4$ ),
- e) the conditions of waiting at bus stops ( $x_5$ ),
- f) accessibility to public transport ( $x_6$ )
- g) ticket prices ( $x_7$ ),
- h) directness of connections ( $x_8$ ).
- i) courtesy of drivers ( $x_9$ ),
- j) the overall quality of the information (at bus stops, in vehicles and on vehicles) ( $x_{10}$ ),
- k) readability and simplicity of memorizing timetables ( $x_{11}$ ),
- l) the opportunity to comment on the functioning of public transport ( $x_{12}$ ).

The research found that 12 of the original criteria for the quality of services can be reduced due to the application of factor analysis to two factors. The first derived factor mainly explains determinants associated with conditions of movement within the city offered in urban transport services. The variables described by this factor include the four most frequent transport demands: travel time, convenience - access to public transport, cost and safety.

The second factor is related to the additional (supplementary) areas offered by transport services, such as courtesy of drivers, access to information about the time of service delivery and readability of timetables. The system of variables forming the defined dimensions is shown in Table 1. During the study the significantly higher impact of variables was confirmed which was described by the first appointed agent to assess the quality of transport services, mainly including: ticket prices, travel time, service frequency and distance from a bus stop to the place of residence.

For further research using conjoint analysis indicated variables (criteria) were used, described by the first factor directly connected with the ongoing transport services. The validity of these variables was assessed by most respondents. The participants of the study felt that price, time, frequency, and further distance of a bus stop from home are the most important criteria for the quality of transport services.

Tab. 1 – Results of the factor analysis. Source: own calculations.

Factor 1	Factor 2
<ul style="list-style-type: none"> <li>- punctuality of vehicles (<math>x_1</math>),</li> <li>- frequency of vehicles (<math>x_2</math>),</li> <li>- travel safety (<math>x_3</math>),</li> <li>- the conditions of travel in vehicles (<math>x_4</math>),</li> <li>- the conditions of waiting at bus stops (<math>x_5</math>),</li> <li>- accessibility to public transport (<math>x_6</math>),</li> <li>- ticket prices (<math>x_7</math>),</li> <li>- directness of connections (<math>x_8</math>).</li> </ul>	<ul style="list-style-type: none"> <li>- courtesy of drivers (<math>x_9</math>),</li> <li>- the overall quality of the information (at bus stops, in vehicles and on vehicles) (<math>x_{10}</math>),</li> <li>- readability and simplicity of memorizing timetables (<math>x_{11}</math>),</li> <li>- the opportunity to comment on the functioning of public transport (<math>x_{12}</math>).</li> </ul>

Respondents were asked to evaluate a set of 12 profiles out of 36 possible variants generated by the method of orthogonal plan. Utility values that each respondent is associated with a given level of the variable set by means of a least-squares method with artificial explanatory variables.

$$\hat{Y} = b_{0s} + b_{1s}X_{1s} + \dots + b_{6s}X_{6s}. \quad (1)$$

where:  $b_{1s}, \dots, b_{6s}$  – regression parameters;  $b_{0s}$  – intercept;  $X_1, \dots, X_6$  – artificial variables.

After estimating the relative partial utility the validity of each considered variable was specified on the basis of the following formula:

$$W_j = \frac{1}{S} \sum_{s=1}^S W_j^s \quad (2)$$

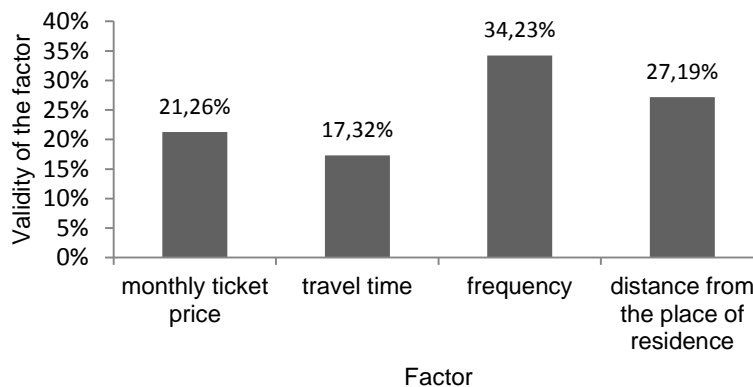
where:  $W_j^s$  – relative “importance” of each attribute to the  $s$ -respondent determined according to the formula, Hair (1995):

$$W_s^j = \frac{\max_{lj} \{U_{jl_i}^s\} - \min_{lj} \{U_{jl_i}^s\}}{\sum_{j=1}^m \left( \max_{lj} \{U_{jl_i}^s\} - \min_{lj} \{U_{jl_i}^s\} \right)} \times 100\% \quad (3)$$

where:  $U_{jl_i}^s$  – partial utility  $l$  - the level of the  $j$  attribute of the  $i$  profile for the respondent  $s$  ( $s = 1, \dots, S$ ),  $lj$  - the number of levels for the  $j$  attribute and the  $i$  profile  $i = 1, \dots, n$  – profile,  $j = 1, \dots, m$  – the number of attributes,  $S$  – the number of respondents.

The results obtained during the study confirmed the findings of other authors (Pressl and Reiter, 2003; Scheiner, 2009;). In fact, all of the criteria related to the fundamental postulates of lading are significant while choosing the public transport as a means of movement within the city. The lowest percentage was obtained for criterion: time travel.

Time of travel for residents of medium-sized cities, with relatively close distances to overcome, is not a criterion of significant influence on the preferences of the inhabitants as the other analysed variables. The highest preferences identified during the research (maximum score profile) relate to services provided by the urban public transport characterized primarily by low price, high frequency of the circulation, with close proximity to the bus stop from the place of residing (Fig. 1).



**Figure 2.** The relative importance of the attributes. Source: own calculations.

In contrast, the travel time can be as long as in the case of traveling by car. Journey duration for residents of medium-sized cities is not a decisive factor for the travelers’ preferences related to the choice of public transport.

### **3.3 Proposed solutions**

With the lengthening of the average life expectancy in the European Union and the decreasing fertility rate which does not allow for a simple replacement of generations, the proportion of older people in their pre-working age is growing in most European Union countries.

The effect of these changes is a reduction in demand for transport services (a smaller percentage of children and young people of school age which is one of the main groups using public transport) and the need to provide services to meet the needs of the elderly requiring to provide a means of transport adapted to people with reduced mobility and locating stations with greater frequency (proximity to public transport) (Żochowska, 2014).

The need for such changes is now noticed in most Western European countries. On the other hand, a decline in both population density associated with the described demographic and cultural changes (resettlement of residents of cities in the area immediately adjacent to the cities, urban sprawl, suburbanization processes) causes the decrease of the economic efficiency of public transport (Scheiner, 2009; Beim, 2012).

The need to reconcile these two contradictory aspects - high quality and economic efficiency - does not allow for the fast solutions to improve the perceived quality of the services provided (often very costly). An example of technological solutions are, e.g. conducted in Germany for nearly 10 years the study aimed at exploring alternative fuels such as crude oil e.g. using hydrogen in driving city buses.

The most important are new environmentally friendly technologies limiting emissions harmful to the environment. Much more popular are innovations of an organizational nature (Masser et al., 1993; Leea and Rivasplata, 2001; Starowicz, 2010), such as:

1. The creation of intermodal information platforms that allow for individualized travel planning.
2. Bus lines on demand.
3. Taxi services (ATS), which provide services relating to transporting passengers to interchanges.
4. Additional services, e.g. buying tickets online, Wi-Fi available in public means of transport.
5. The introduction of the so-called. calm traffic zones - for example, the zone of speed limit e.g. "speed limit 30", the residential area, shared space or cycle streets.
6. Systems which reduce the movement of cars in city centres – e.g. Park & Ride (P + R).
7. The introduction of charges for the use of roads or streets (Road Pricing), which are treated as “environmental tax” aimed at reducing the environmental burden caused by the movement of cars or so called rationalizing tax (Congestion Charge Zones), whose goal is to bring to the limited use of the common good which is “the use of a road”.
8. The development of bicycle parking facilities, including multi-story car parks.
9. Preference in the purchase of housing in areas immediately adjacent to the railway interchanges.
10. Concentration of residential areas along public transport corridors - common planning of urban development and transport.
11. Transport demand management.

## 4 CONCLUSION

According to the report (European Commission, 2013) it is estimated that urban transport generates costs of 230 billion Euros in 27 EU capital cities (without Zagreb). The main components of these costs are: congestion (80 billion EUR), accidents (80 billion EUR) and noise (40 billion EUR). The intensive growth of the automotive industry, accompanied by lack of local public transport investments, has resulted in many less affluent countries to a decline in the attractiveness of public transport, limiting its availability, regularity and frequency of running vehicles. The experience of Western European countries indicate that sooner or later the governments of cities in Poland will be forced and very often take actions today, which aim is to reduce car traffic in city centres and to increase the interest in the movement of urban public transport.

The effectiveness of actions taken, however, is conditioned by the complexity of applied solutions suited to the actual needs of the residents. It is therefore important to research on the preferences of the residents. The problem of many cities, beside the surge in the number of cars, it is also a significant increase in road freight transport, which puts a burden on municipal systems. According to the Energy & Transport in Figures 2006, European Commission Luxembourg, 2007, the number of private cars per 1,000 inhabitants increased from 15 in 1970 to over 400 in 2012.

Easy transportation within cities is also impeded due to housing development in suburban areas and placement outside concentrated urban housing large shopping centers. The solution to traffic problems of cities should be adequate to the implementation of transport policy allowing to increase the competitiveness of public transport and consequently reducing congestion, noise and pollution while increasing security.

Public transport except that reduces traffic is more environmentally friendly than individual transport by car. Due to the constantly decreasing interest in this form of travel, it is important to take proper measures to encourage residents to use this kind of transport. It is also vital to monitor the quality of service offered by the public transport services.

The presented results of the modelling transportation preferences of urban residents with the application of the methods of multidimensional statistical analysis allowed to identify the comprehensive travelers' preferences. From a practical point of view, these studies are significant because of the possibility of simultaneous comparison of many individual preferences of travelers. It is also important opportunity to introduce the proposed methods to a comprehensive and more complex modelling of transport behavior.

The results of carried out studies clearly indicate that price, frequency and distance from the main stops are the key factors affecting the assessment of the quality of public transport in medium-sized cities. Travel time due to the rather short distances turned out to be a less important factor. It will be certainly more important aspect in the case of residents of large cities, more congested and less efficient in communication.

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## **HOW DO WOMEN AND MEN FEEL SOME ASPECTS OF SATISFACTION AND LOYALTY IN BANKING SECTOR? A CASE STUDY FROM THE CZECH REPUBLIC**

*Anna Chochořáková, Lenka Gabčová*

### **Abstract**

The aim of our research was to investigate the relationship between gender and major attributes of satisfaction and loyalty of the banking clients. In this context, at the same time it was investigated whether there are statistically significant differences between the genders depending on age and education. The banks' customers' satisfaction research was conducted through a questionnaire investigation in the Czech Republic in 2014 on a sample of 459 respondents, of which 44% were men and 56% were women. The results of our research pointed to the fact that there are some differences in the attitudes and opinions of men and women in the area of satisfaction and loyalty of the banking customers. More women believe that the bank staff has a genuine interest to understand their financial needs. In our research, women have more often reported that their bank's staff would explain them the advantages and disadvantages of bank products that are of their interest. It was also found out that women are more loyal to their banks than men. Men and women thus perceive some factors that determine their level of satisfaction in different ways. For this reason in banking practice it is necessary to correctly assess the different trends and apply them to the customer care system.

*Keywords: satisfaction of banking customers, loyalty, gender approach, factors of customer satisfaction*

JEL Classification: G21

## **1 INTRODUCTION**

Commercial banks perceive retail clients as a particularly interesting segment due to the subjective preferences of clients, such as their willingness to accept higher prices of products in case of economic distress, relative disinterest in their own money, laziness, preference of other life values and lower financial literacy. (Belás, 2005)

Compliance with the consumers' needs and requirements (Bilan, 2013), comprehensive customer care and the bank customers satisfaction is currently in the centre of attention of researchers and bankers, as it represents an important marketing variable for most of the companies, especially those working in the most competitive markets (Munari, Ielasi, Bajetta, 2013; De Matos, Henrique, and De Rosa, 2013).

The current theoretical research on the satisfaction of the bank customers deals with various attributes of this process. Our aim is to find out whether there are significant differences in the satisfaction of bank customers from the gender point of view.

## **2 THEORETICAL BACKGROUND**

Customer satisfaction is an important factor in the performance and competitiveness of banks (Adolpson, Eklóf, Parmler, 2013; Choudhury, 2013; Keisidou, Sarigiannidis, Maditinos, and Thalassinou, 2013) because the bank business depends substantially on the quality of the customer service and the overall satisfaction of customers. (Chavan and Ahmad 2013)

Chavan and Ahmad (2013) have defined eight most important attributes of satisfaction: paying individual attention to each client, personnel behavior inducing customer trust, attractive bank equipment, zero fees for issuing checks, zero error records, the possibility of online banking, security of transactions, helpful staff and its readiness to answer to customer requirements regardless of occupancy.

Some authors declare that the satisfaction of bank customers is determined by their age (Baumann, Elliott and Burton, 2012; Tesfom, and Birch, 2011). On the contrary, Belás, Cipovová and Demjan (2014) argue that the overall level of satisfaction of banking clients in the Czech Republic and Slovakia was not determined by their gender, age or education.

Many authors agree that customer satisfaction has a strong positive impact on customer loyalty (for example, Seiler, Rudolf, and Krume, 2013) and mediates the impact of service quality on loyalty (Karapete, 2011). Understanding of customer loyalty requires understanding of customer satisfaction first (Fraering, and Minor, 2013). Consumers don't want to play in any games, if they feel that anything goes wrong, they go away and choose another supplier (Bilan, 2013)

The high quality of banking services determines further additional purchases of client as well as his loyalty, which means that a satisfied customer provides information about his satisfaction and future bank clients from his own environment: family, friends and colleagues. (De Matos, Henrique, and De Rosa, 2013; Choudhury, 2013). According to Terpstra and Verbeeten (2014) satisfied customers tend to be loyal and willing to purchase more of firm's services at higher prices.

Comparison of genders in the area of the satisfaction of bank customers is not very widespread topic of scientific researches. Among the renowned scientific journal databases only two works that deal with this topic were discovered by us. The satisfaction of bank customers is also determined by their gender (De Matos, Henrique, and De Rosa, 2013; Karapete, 2011). De Matos, Henrique, and De Rosa (2013) suggest that women are more likely to remain loyal to their bank, when compared to men, which can be attributed to the fact that men are more willing to take risks than are women and, socially, men are expected to behave in this way, in agreement with the social role theory. Karapete (2011) investigates customer satisfaction as a mediator of the effects of service environment, interaction quality, empathy, and reliability on loyalty. The results reported in his study suggest that all service quality dimensions have significant positive impacts on customer satisfaction. Interaction quality is the most important determinant of customer satisfaction, followed by service environment, reliability, and empathy. The impacts of empathy and reliability on satisfaction are higher among female customers than male customers. The results do not lend credence to gender as a moderator in the relationship between: service environment and satisfaction, and interaction quality and satisfaction (equally important for both male and female).

We think that it may be interesting and challenging enough to explore bank customers' satisfaction by gender and carry out a detailed analysis among men and women also in relation to the age and education.

### **3 RESEARCH AIM, METHODOLOGY AND DATA**

The aim of the research was to investigate the relationship between gender and major attributes of the satisfaction and loyalty of the banking customers. In this context in the same time there was investigated whether there are statistically significant differences between the genders depending on the age and education.

Bank customer satisfaction research was conducted through a questionnaire survey in the Czech Republic in 2014 on a sample of 459 respondents, of which 44% were men and 56% were women. The age structure of those respondents was as follows: 39% of respondents were aged under 30 years, 44% were aged from 31 to 50 years and 17% of them were customers over 50. The education level of respondents was as follows: 3% had primary education, 54% had secondary education and 43% were university educated bank customers.

The results of the study of De Matos, Henrique, and De Rosa (2013), Karapete (2011) in the context of the conclusions according to Baumann, Elliott and Burton (2012), and Tesfom and Birch (2011) have inspired us to formulate the following hypotheses:

H1: Men and women feel differently the rate of the personal knowledge and recognition by the banking staff. There are statistically significant differences between the genders and within the selected structure (when comparing women and men by age and type of education).

H2: Men and women feel their own importance for the bank differently. There are statistically significant differences between the genders and within the selected structure (when comparing women and men by age and type of education).

H3: Men and women perceive a genuine interest of the bank's staff to understand their financial needs differently. There are statistically significant differences between the genders and within the chosen structure (when comparing women and men by age and type of education). Women to a greater extent believe that the bank staff has a genuine interest to understand their financial needs.

H4: Men and women perceive differently the approach of the bank staff. There are statistically significant differences between the genders and within the chosen structure (when comparing women and men by age and type of education). Women to a greater extent feel that the bank staff will explain the advantages and disadvantages of the product in which they are interested.

H5: There are statistically significant differences between the genders and within the chosen structure (when comparing women and men by age and type of education) in the field of loyalty. Women to a greater extent state that, when they saved the money, they would put them to their bank.

Established scientific hypotheses in each table were examined through Z Test (available at: <http://www.socscistatistics.com/tests/ztest/Default2.aspx>). Z Test is a concept of statistics which compares means of two populations. P-value less than 5% leads to the rejection of the null hypothesis. Part of the quantitative analysis is the use of indicators and descriptive statistics such as weighted arithmetical average and the percentage figures.

## **4 RESULTS AND DISCUSSION**

According to the results of our research, the overall satisfaction of clients of commercial banks was at the level of 66.23% in 2014, and 16.34% of the customers report a negative attitude and 17.43% of respondents could not decide.

Similar findings were also found in another study in the year 2012 in the Czech Republic (Belás, Burianová, Cipovová, Červenka, 2013) and in Slovakia in 2012 (Belás, Holec, Homolka, 2013).

Berry (2005) states that the customer wants to be highly rated in his bank. The bank can fulfill this objective by getting to know its customers personally as it gives the client a feeling of importance, also if the bank staff have a perfect overview of client's activities in the bank, if the client is not surprised by the bank's pricing policy, if the client feels that there is helpful,

attentive and polite staff at a branch of the bank, and which can minimize errors in procedures. Author expressed his concern about the fact that in the research, which took place in the Great Britain, over 40% of bank customers are unknown for the bank and being treated like strangers; in the age group 18-29 this figure even raised to 60%. What is the situation in the Czech Republic 10 years later?

In Table 1 there are presented the results of three surveys on personal knowledge of bank customers by bank staff separated by gender and by the chosen structure within each gender group.

Tab. 1 – Personnel knowledge of the bank customers by the bank’s staff by gender and by the chosen structure within each gender group. Source: own source.

<i>I feel that the bank staff knows my name and knows who I am.</i>	Men	Women	p-value
	< 30 years > 30 years University degree Other education in %	< 30 years > 30 years University degree Other education in %	
1. Yes	34.97	31.25	0.41222
	22.58	31.45	0.20766
	41.32	31.06	0.08914
	40.00	37.04	0.67448
	30.61	27.03	0.54186
2. No	45.36	53.91	0.07672
	58.06	54.84	0.67448
	38.84	53.03	<b>0.02382</b>
	40.00	55.56	<b>0.03156</b>
	50.00	52.70	0.67448
3. I do not know	19.67	14.84	0.18352
	19.35	13.71	0.31732
	19.83	15.91	0.41222
	20.00	7.41	<b>0.00960</b>
	19.39	20.27	0.86502

The results of our research have indicated an interesting trend. Even though women place greater emphasis on the satisfaction factor of convenient and friendly service in a bank’s branch, at the same time they frequently stated that they feel that the bank personal doesn’t know them personally. This trend was statistically significant when there were compared women over 30 years old and university-educated women with the men in the same category.

Hypothesis 1 was partially confirmed.

The overall rate of personal knowledge of clients is relatively low, as only 34.97% of men and 31.25% of women reported that the bank staff knows them personally. Men under 30 years old reported the lowest perceived level of personal knowledge of 22.58%. When our results are compared with the results of Berry (2005), it is clear that commercial banks have significant reserves and room for improvement in this area. It is obvious that intensive expansion of credit cards and electronic banking has reduced the number of visits of customers to the bank offices, but the fact that the banks know their customers poorly makes them miss out on important sales opportunities.

Tab. 2 – Feelings of the client when communicating with bank’s staff. Source: own source.

<i>When visiting a bank, I feel that I am an important client for them.</i>	Men < 30 years > 30 years University degree Other education in %	Women < 30 years > 30 years University degree Other education in %	p-value
1. Yes	36.07	37.89	0.69654
	32.26	37.90	0.44726
	38.02	37.88	0.98404
	38.82	40.74	0.78716
	33.67	35.81	0.72786
2. No	32.24	30.08	0.63122
	32.26	25.81	0.35758
	32.23	34.09	0.75656
	27.06	32.41	0.42372
	36.73	28.38	0.16758
3. I do not know	31.69	32.03	0.94420
	35.48	36.29	0.91240
	29.75	28.03	0.76418
	34.12	26.85	0.27572
	29.59	35.81	0.31250

After receiving answers to this question, there have not been detected any significant differences in the responses of our respondents. Hypothesis 2 was rejected.

Our results highlight the fact that only 36.07% of men and 37.89% of women feel that they are an important clients for their banks.

Tab. 3 – Approach of the bank’s staff to financial needs of the bank’s clients. Source: own source.

<i>The bank’s staff has a genuine interest to understand my financial needs.</i>	Men < 30 years > 30 years University degree Other education in %	Women < 30 years > 30 years University degree Other education in %	p-value
1. Yes	37.16	49.61	<b>0.00960</b>
	25.81	51.61	<b>0.00080</b>
	42.98	47.73	0.44726
	40.00	50.93	0.13104
	34.69	48.65	<b>0.03078</b>
2. No	28.96	21.48	0.07346
	24.19	15.32	0.13888
	31.40	27.27	0.47152
	23.53	26.85	0.59612
	33.67	17.57	<b>0.00374</b>
3. I do not know	33.88	28.91	0.26700
	50.00	33.06	<b>0.02510</b>
	25.62	25.00	0.91240
	36.47	22.22	<b>0.02926</b>
	31.63	33.78	0.72634

According to our results, women compared with men more believe that the bank employees have a genuine interest to understand their financial needs. Statistically significant differences were found when comparing the whole set (p-value=0.00960) and also in the category up to 30 years old (p-value=0.00080) and in the category with primary and secondary education (p-value=0.03078). Hypothesis 3 was confirmed.

According to our results, 37.16% of men and 49.61% of women in the Czech Republic thought that bank employees have a genuine interest in understanding their financial needs. In this context Berry (2005) states that bank staff from the banks’ branches is often perceived as unhelpful and material, whereas the bank’s customers expect a friendly approach. Sometimes even the bank staff is unable to answer basic questions and referring customers to address those queries to the experts, however, those are not always available in the moment.

Tab. 4 – The quality of communication with the banks employees. Source: own source.

<i>Bank employees explained to me the advantages and disadvantages of products, which I am interested in.</i>	Men < 30 years > 30 years University degree Other education in %	Women < 30 years > 30 years University degree Other education in %	p-value
1. Yes	64.48	72.27	0.08186
	62.90	76.61	<i>0.05000</i>
	65.29	68.18	0.62414
	58.82	73.15	<b>0.03572</b>
	69.39	71.62	0.70394
2. No	16.39	14.84	0.65994
	14.52	12.90	0.76418
	17.36	16.67	0.88076
	17.65	18.52	0.87288
	15.31	12.16	0.47770
3. I do not know	19.13	12.89	0.07508
	22.58	10.48	<b>0.02710</b>
	17.36	15.15	0.63122
	23.53	8.33	<b>0.00338</b>
	15.31	16.22	0.84930

In our research, women have more often reported that the bank staff would explain them the advantages and disadvantages of bank products that they are interested in. A statistically significant difference was found in the categories of respondents with higher education.

Hypothesis 4 was rejected by the statistical significance, but there was found a hint of a trend that was defined in our hypothesis.

The results of our research in the field of communication of customers with the bank employees provided in Tables 1, 3, 6 show that women give more importance to other factors than men. It could be therefore agreed with opinion of Karapete (2011), which states, that his findings may be attributed to the fact that women are relationship-oriented and attach more importance to social interactions with customer-contact employees providing them with specific information about bank services and dealing with their requests and problems effectively.

The following table shows the results of research in the field of the banking customer loyalty.

Tab. 5 – Loyalty and purchasing of other products. Source: own source.

<i>When I save up some money, I put it to my bank.</i>	Men < 30 years > 30 years University degree Other education in %	Women < 30 years > 30 years University degree Other education in %	p-value
1. Yes	55.74	64.45	<i>0.06576</i>
	58.06	70.97	0.07840
	54.55	58.33	0.54186
	54.12	65.74	0.10100
	57.14	63.51	0.31732
2. No	27.87	21.09	0.10100
	27.42	18.55	0.16542
	28.10	23.48	0.40090
	30.59	25.93	0.47152
	25.51	17.57	0.13362
3. I do not know	16.39	14.45	0.57548
	14.52	10.48	0.42372
	17.36	18.18	0.86502
	15.29	8.33	0.13104
	17.35	18.92	0.75656

In our research, women have more often stated that they would be willing to make a deposit to their bank in comparison with men. Hypothesis 5 was rejected.

Even though this hypothesis has been rejected, there was found a trend indication that women tend to be more loyal than men with respect to their banks. The value of the test criteria (p-value=0.06576) was fluctuating at the critical line. In all defined social groups, women showed a higher degree of loyalty and a greater tendency to create deposits in their own banks.

## 5 CONCLUSION

The results of our research pointed to the fact that there are some differences in the attitudes and opinions of men and women in the area of satisfaction and loyalty of the banking customers.

More women believe that a bank staff has a genuine interest to understand their financial needs. In our research women have more often reported that their bank's staff would explain them the advantages and disadvantages of bank products that are of their interest. It was also found out that women are more loyal to their banks than men.

Men and women thus perceive some factors that determine their level of satisfaction in different ways. For this reason in banking practice it is necessary to correctly assess the different trends and apply them to the customer care system.

Our study has some limitations, of course, but it can be a good inspiration for bank managers to take appropriate actions to improve the financial performance of the bank through the growth of customer satisfaction and customer loyalty.



Our future research would be focused on quantifying dependence between additional purchases of the bank products and services and the satisfaction and loyalty of banking customers. The gender approach would be also a part of this research.

*The authors are thankful to the Internal Grant Agency of FaME TBU No. 005/IGA/FaME/2014: Optimization of parameters of the financial performance of the commercial bank, for financial support to carry out this research.*

*The authors are thankful to the Internal Grant Agency of FaME TBU No. 000/IGA/FaME/2015: The possibilities of the financial performance growth for commercial banks in the context of the credit risk of SME and the customer satisfaction, for financial support to carry out this research.*

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## **SAVING VERSUS INVESTING IN THE LONG TERM**

*Bozena Chovancova, Peter Arendas*

### **Abstract**

A lot of theories about financial markets have been challenged during the last two decades. A lot of financial experts and analytics focused their attention on the effectiveness of long term investing in relation to the pension systems that are by a large part dependent on the development of capital and especially stock markets. The global financial crisis has resulted not only into a slump of the economic activity but also into collapse of capital markets which has negatively affected the yields of pension funds. The aim of this article is to evaluate the long term effectiveness of saving in comparison to index investing, using the cost averaging strategy. Some specifics of the development of capital markets in various geographical areas have led us to focus on three main financial markets: the USA, Japan and Germany. The analysis shows that the indexing investment strategy supported by the cost averaging effect is superior to simple saving in the long run.

*Keywords: interest rates, index investing, long term investment strategies, cost averaging effect,*

JEL Classification: G00, G10, G11

### **1 INTRODUCTION**

Evaluation of effectiveness of long term saving and investing has been the topic of many important publications, scientific papers and analytical works. Some of the authors focus on the long term investment strategies, mostly on the buy & hold and cost averaging strategies. Other authors pay closer attention to the problematics of correct market timing or optimal stock picking strategies.

A very important author who focuses on the problematics of investing is Siegel (2014) who analysed the whole history of the American stock market. He has proven that long term investing in stocks is effective despite of some significant market crashes. Edelson (2007) analysed the long term effects of the cost averaging strategy and he came to the same conclusion as Siegel. Very interesting were studies by Malkiel (2010) and Bogle (2010) who tried to create an optimal portfolio. They concluded that index investing is on average as effective as active investment strategies in the long term. A well-known author is also Graham (2007) who is one of the most important supporters of the long term investing.

A detailed analysis of selected long term stock market investment strategies as well as the comparison of passive and active investment strategies was conducted also by other authors. For example Pastor and Stambaugh (2012) focused on the declining effectiveness of actively managed investment funds. French (2008) came to conclusion that “the typical investor would increase his average annual return by 67 basis points over the 1980-2006 period if he switched to a passive market portfolio”. Lye (2012) analysed the differences between growth and value stocks. Cambell, Polk and Vuolteenaho (2010) analysed systematic risks of stock investing.

## **1.1 Methodology**

The effects of long term saving and investing on the time horizon of the last 30 years will be examined. The American S&P 500 stock index will be used, as the American stock market is the best liquid one, with a well-documented history. It comprises of a widely diversified portfolio of stock companies across all of the sectors of the U.S. economy and it reflects the relation between the stock market and the U.S. economy very well. It is very close to the theoretical concept of the optimal portfolio. The long term investing in S&P 500 will be compared to the long term regular saving using FED main interest rates plus 1% premium.

Another stock market chosen for the analysis is the Japanese stock market represented by NIKKEI 225 stock index. Europe will be represented by Germany and its benchmark stock index DAX 30. Similarly to the U.S. case, there will be main interest rates of the Bank of Japan and the Deutsche Bundesbank (the European Central Bank respectively) plus 1% premium used for calculation of the performance of the regular long term saving.

The analysis is based on following assumptions:

- 1) Only approximately 25% of portfolio managers are able to beat the market benchmark. Most of them manage hedge funds that often undergo significant risk. It is very hard for pension funds to beat the benchmark because of various regulations that limit them. Therefore we will assume that the aim of the pension funds is not to beat but the benchmark but to reach returns similar to benchmark.
- 2) The investor invests regular amount of 100 USD per month into a pension fund that tracks the stock index (S&P 50, Nikkei 225 or DAX 30) and he saves 100 USD per month with a monthly remuneration at the key interest rate (FED, BOJ, DBB/ECB) valid at the start of the month plus 1% premium. The yields are reinvested regularly.
- 3) The stock investments are made on the monthly basis using stock index value on the first day of the calendar month. All dividends are reinvested.
- 4) The savings are remunerated using the key interest rates plus 1% premium. The premium simulates the margin offered by commercial banks to the depositors. The margin is floating according to the current market situation in real life (for example the FED key interest rate was 17,39% back in 1981 and the interest rates offered to the depositors by commercial banks were over 19%.), but we used a constant 1% margin in order to keep things simple
- 5) The analysis abstracts from the transaction costs. Fees paid to the broker or fees paid to the bank are not taken into account, as the fees were changing over time and it is impossible to quantify them properly.
- 6) The analysis also abstracts from taxes.
- 7) The results are evaluated on the nominal as well as on the real basis.
- 8) The currency used in the analysis is USD. Only one currency is used in order to enable the comparison between individual countries. The assumption is that there is a constant purchasing power parity and the changes in exchange rates are driven by inflation differential solely, so that the results in different countries can be compared more easily.
- 9) The whole 30 year time period is evaluated (1985 – 2014) as a whole and also divided by decades (1985 – 1994, 1995 – 2004, 2005 – 2014).
- 10) The investing on a regular basis leads to the cost averaging effect.

As a result, the long term effectiveness of investing and saving in three different countries can be compared.

## **2 THE EFFECTIVENESS OF SAVING AND STOCK INDEX INVESTING IN THE USA – 30 YEAR TIME HORIZON**

The first time period (1985 – 1994) was preceded by significant changes on financial markets that were a consequence of the monetary crisis in the 70's. The crisis led to the cancelation of the convertibility of USD for gold and a strong depreciation of USD. The debt crisis in early 80's was related to instability of the financial system that resulted into a strong growth of inflation and interest rates. As a result saving was as successful as stock investing, if not even more (depending on the time period).

Tab. 1 – The comparison of saving and stock investing – USA. Source: own calculations

		1985 - 1994	1995 - 2004	2005 - 2014	1985 - 2014
monthly investment		100,00	100,00	100,00	100,00
cumulative investment		12 000,00	12 000,00	12 000,00	36 000,00
final balance	deposit account	16 772,46	14 943,35	13 156,94	68 348,07
	stock investment	17 957,83	15 642,17	19 081,45	126 199,40
nominal return	deposit account	4 772,46	2 943,35	1 156,94	32 348,07
	stock investment	5 957,83	3 642,17	7 081,45	90 199,37
cumulative nominal yield	deposit account	39,77%	24,53%	9,64%	89,86%
	stock investment	49,65%	30,35%	59,01%	250,55%
cumulative inflation for the period		41,94%	26,97%	23,76%	123,04%
final balance - purchasing power (start of the period money value)	deposit account	11 816,58	11 769,20	10 631,01	30 643,86
	stock investment	12 651,70	12 319,58	15 418,11	56 581,51

The saving yielded 4 772 USD during the first decade. The final sum on the deposit account was 16 772 USD which means cumulative yield of almost 40%. The index investing brought yields of 5 957 USD or nearly 50%. This decade is typical for its high levels of inflation. The cumulative inflation reached up to 42% during the time period from 1985 to 1994. It means that saving on the deposit account resulted in a negative real return. The real return of the index investing was positive but only marginally.

The second decade (1995 – 2004) was characterized by a boom of stock investing thanks to the arrival of new technologies and the development of so called “internet economy”. The growth of the economy and the stock markets was supported also by the FED that was decreasing interest rates. Lower interest rates resulted in an expansion of margin trading. Also the inflation decreased significantly compared to the previous time period. The stock investing was able to outperform saving significantly in the late 90's. People who went on pension during those years had secured high rents. But the situation changed dramatically after 2000 when the internet bubble busted. The collapse of the stock markets resulted in huge losses for investors, including the pension funds. The situation is shown by Figure 1.

As Table 1 shows, the final results of saving and stock investing were similar also during the second decade. The deposit account yielded 2 943 USD and the index investment yielded

3 642 USD. Although the cumulative inflation was significantly lower compared to the first decade, the nominal returns were significantly lower as well and therefore the real returns were even worse in the second decade than in the first one. The deposit account finished with a slightly negative real return again. The index investment had only a miniscule positive real return again.

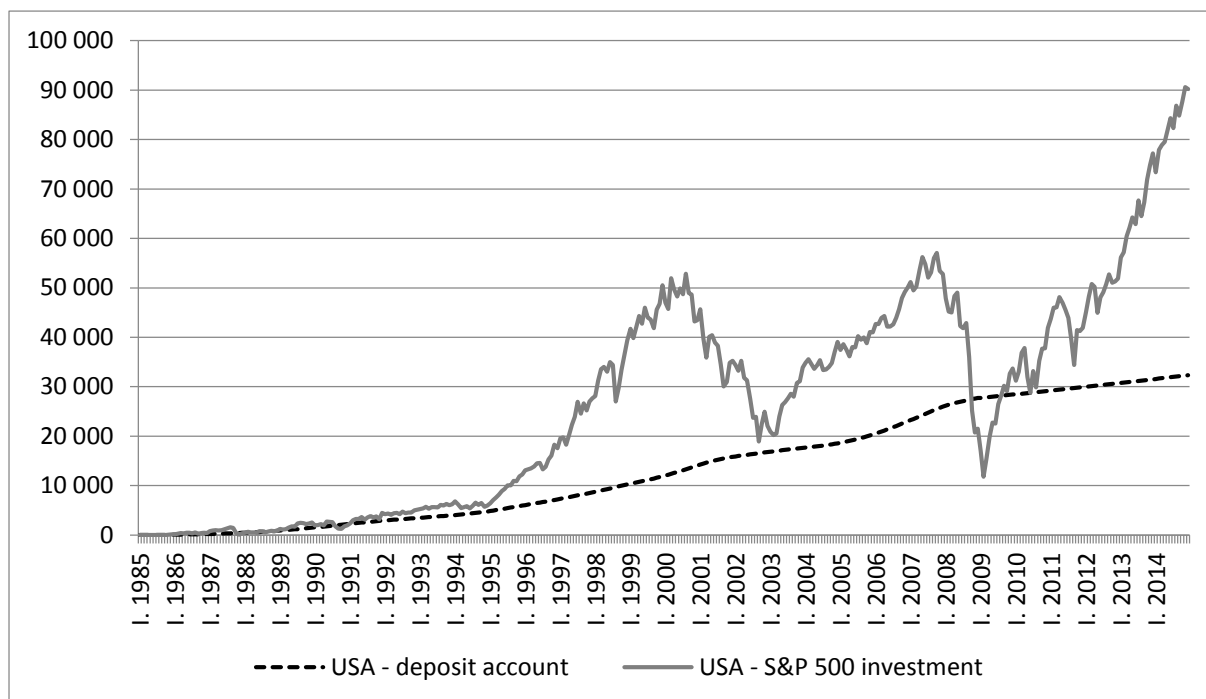


Fig. 1 – The nominal return of the deposit account and index investments – Japan. Source: own calculations

The third decade brought a significant between the performance of saving and index investing, despite the global financial crisis. The main reason is the monetary policy of the FED that has adopted measures such as nearly-zero interest rates policy and quantitative easing very quickly after the full outbreak of the financial crisis. The aim of these policies was to support the real economy and the financial markets. The biggest impact is able to see in the case of the stock markets that started to grow strongly.

The deposit account yielded only 10% while the index investments yielded more than 59% between 2005 and 2014. The disappointing results of saving were caused by the policy of extremely low interest rates that lasted for the bigger part of this time period. Despite low levels of inflation, the real yield of saving was negative once again. On the other hand index investing recorded a real yield over 28%.

A lot of things happened in the U.S. economy during the whole time period (1985 – 2014). Although there were some major stock market slumps, the analysis shows that the results of stock index investing were far superior to saving. The saving return was 32 348 USD while the investing return was 90 199 USD. In percentage terms the deposit account yielded 90% and the stock index yielded slightly over 250%. But the real yields are significantly lower due to the inflation that climbed up to 123%. The real yields of the deposit account were –15% and the real yields of the stock investing were 57%.

### 3 THE EFFECTIVENESS OF SAVING AND STOCK INDEX INVESTING IN JAPAN – 30 YEAR TIME HORIZON

Absolutely different results are shown by the comparison of saving and stock investing in Japan over the same time period. The 70's and 80's were characterised by very strong economic growth. As a result investors started to pour their capital into Japan and the Japanese stock market started to grow as well. The bull market resulted into a stock bubble in the early 80's. Also the interest rates were quite high during this time period. The collapse of the stock market bubble resulted in huge losses. This is why the saving was significantly more successful compared to stock investing during the first time period (1984 – 1995).

The calculations show that saving recorded 25% nominal yield while stock investing yielded -3,84% due to the collapse of the Japanese stock market. The inflation reached almost 16% during this time period. It means that the real yield of the deposit account was almost 8% and the real yield of the stock investing was -17%.

Tab. 2 – The comparison of saving and stock investing – Japan. Source: own calculations

		1985 - 1994	1995 - 2004	2005 - 2014	1985 - 2014
monthly investment		100,00	100,00	100,00	100,00
cumulative investment		12 000,00	12 000,00	12 000,00	36 000,00
final balance	deposit account	14 999,10	12 687,56	12 673,59	45 884,22
	stock investment	11 538,89	9 979,21	18 090,53	43 863,32
nominal return	deposit account	2 999,10	687,56	673,59	9 884,22
	stock investment	-461,11	-2 020,79	6 090,53	7 863,32
cumulative nominal yield	deposit account	24,99%	5,73%	5,61%	27,46%
	stock investment	-3,84%	-16,84%	50,75%	21,84%
cumulative inflation for the period		15,77%	-0,59%	3,30%	18,88%
final balance - purchasing power (start of the period money value)	deposit account	12 955,95	12 762,86	12 268,72	38 597,09
	stock investment	9 967,08	10 038,44	17 512,61	36 897,14

Similar results were achieved also during the second time period (1995 – 2004). The Bank of Japan pushed its key interest rates close to the zero level and it started a quantitative easing in order to avoid deflationary pressures and kick-start the economy and stock markets. The cheap money policy negatively affected the results of the deposit account that recorded nominal yield of only 5,73%. On the other hand the efforts of the Japanese central bank and government were insufficient and the bad performance of the stock market continued. The nominal yield of the stock index investing was -16,84%. The cumulative inflation was -0,59% for this time period. The deflation helped to improve the real yields slightly, to 6,36% and 16,35% respectively. The abovementioned development is captured also by Figure 2.

A little better results were achieved during the third time period (2005 – 2014). The positive results of the monetary policy started to show up in the form of reflation. The saving yielded 5,61% which is almost identical to the previous time period. On the other hand the investing yielded 50,75%. But it is important to note that the positive result of the stock index investing was achieved only due to the very good stock market performance in 2013 and 2014. The real yields were 2,23% and 45,93% respectively.

The analysis of the whole time period shows that the Japanese investor (a potential pensioner) would have better returns from saving. The deposit account yielded 27,46% while the stock index investments yielded only 21,84%. Although the cumulative inflation was only 18,88%, the inflation adjusted yields are not overly optimistic. The real yields are 7,22% and 2,49% respectively. It means that both alternatives were merely able to beat the inflation. Another problem is the high level of the Japanese government debt that is over 250% of GDP. The Japanese problems with financing the pension system will grow. Moreover the yields of the deposit as well as the stock market prove to be ineffective for capitalisation pension schemes.

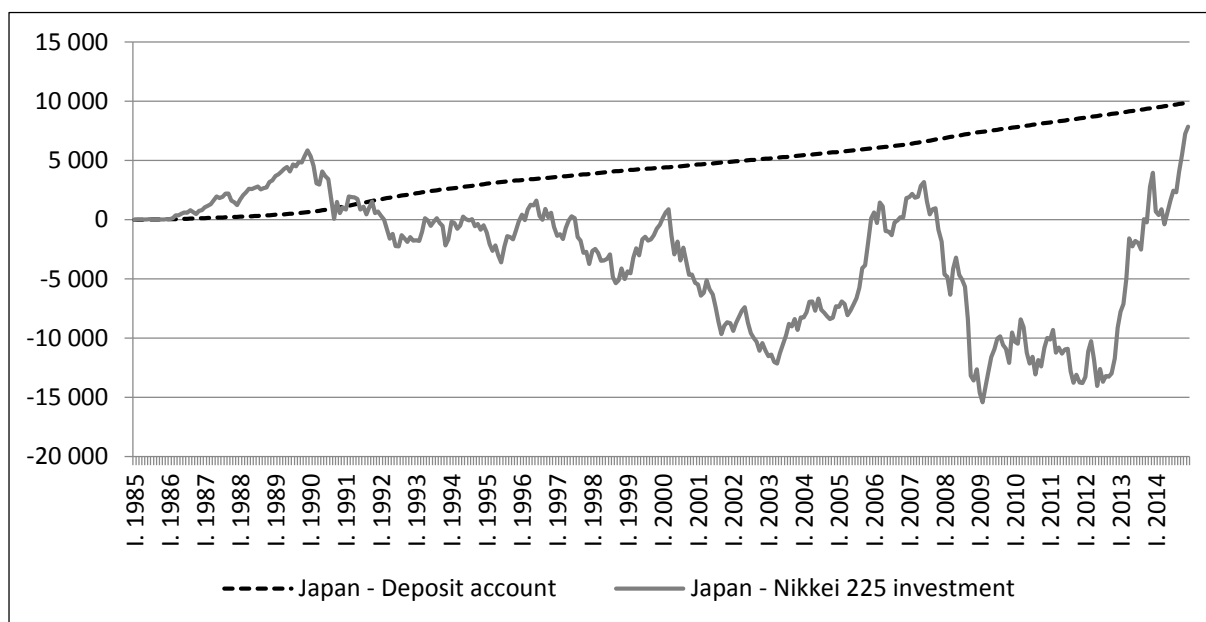


Fig. 2 – The nominal return of the deposit account and index investments – Japan. Source: own calculations

#### **4 THE EFFECTIVENESS OF SAVING AND STOCK INDEX INVESTING IN GERMANY – 30 YEAR TIME HORIZON**

Germany is an economic leader of the European Union and how the analysis shows (Table 3) the returns from its financial markets are able to beat the U.S. financial market returns on a regular basis.

There were higher interest rates during the first time period (1985 – 1994) therefore the deposit account yielded 41%. The stock index investing yielded 52%. The success of the German stock market was supported also by a restructuring of the German economy that took place in the first half of the 90's. But the inflation was relatively high, its cumulative value is 27,91%. It means that the real yield of saving was 10,6% and the real yield of investing was 18,96%.

The cheap money policy and low interest rates resulted in significantly worse results for the saving strategy in the second time period (1995 – 2004). The nominal yield was only 22,16%. The German stock market experienced a very strong growth in the late 90's followed by a stock market collapse in the early 2000's. As a result the stock investments yielded only 14,33% which is even less than the deposit account. The inflation decreased approximately by a half, to 15,68%. As a result the real yield of saving was 5,6% and the real yield of investing was -1,17%.



The third decade (2005 – 2014) was affected by the global financial crisis as well as by the European debt crisis. The European Central Bank decreased the interest rates in order to support the economy. As a result the deposit account yielded only 12,16% during this decade. The stock market collapsed in 2008 but the crash was followed by a strong bull trend that resulted in 55,62% yields for the stock investing strategy. The cumulative inflation was 15,89% during this time period which means that the real yield of saving was -3,22% and the real yield of investing was 34,28%.

Tab. 3 – The comparison of saving and stock investing – Germany. Source: own calculations

		1985 - 1994	1995 - 2004	2005 - 2014	1985 - 2014
monthly investment		100,00	100,00	100,00	100,00
cumulative investment		12 000,00	12 000,00	12 000,00	36 000,00
final balance	deposit account	16 978,08	14 659,70	13 458,81	65 767,81
	stock investment	18 259,06	13 719,27	18 674,92	136 909,00
nominal return	deposit account	4 978,08	2 659,70	1 458,81	29 767,81
	stock investment	6 259,08	1 719,27	6 674,92	100 909,00
cumulative nominal yield	deposit account	41,48%	22,16%	12,16%	82,69%
	stock investment	52,16%	14,33%	55,62%	280,30%
cumulative inflation for the period		27,91%	15,68%	15,89%	71,47%
final balance - purchasing power (start of the period money value)	deposit account	13 273,46	12 672,63	11 613,44	38 355,29
	stock investment	14 274,93	11 859,67	16 114,35	79 844,29

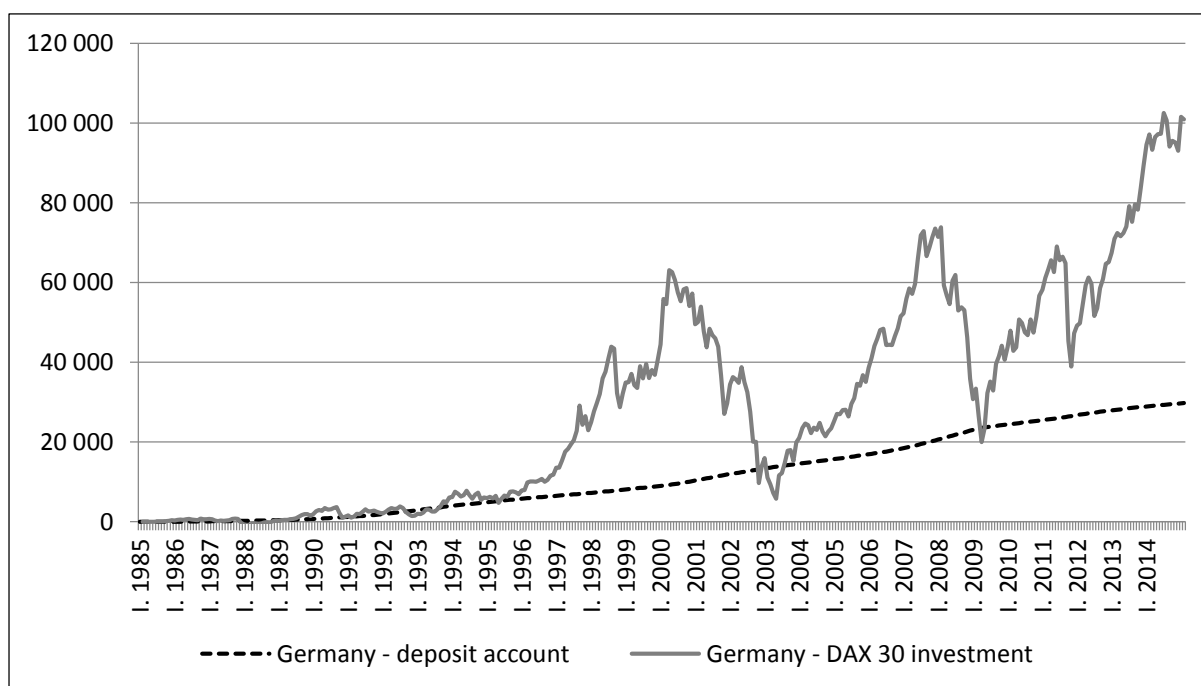


Fig. 3 – The nominal return of the deposit account and index investments – Germany. Source: own calculations

The evaluation of the whole 30-year time period shows, that the stock investing was clearly superior to saving. The development of nominal returns of saving compared to investing is shown by Figure 3. The yield of saving was 82,69% while the yield of investing was 280,3%. The cumulative inflation was 71,47%, thence resulting that the real yield of saving was only 6,54% while the real yield of investing was 121,79%.

## **5 THE COMPARISON OF EFFECTIVENESS OF SAVING AND INVESTING IN DIFFERENT COUNTRIES**

Although the financial markets are globalized we can see significant differences between results of saving and stock index investing in different countries. Especially the 30-year time horizon fully shows the magnitude of the differences.

When we compare the savings, the biggest nominal returns were achieved in the USA, followed by Germany and Japan. The final account balances were 68 348,07 USD in the USA, 65 767,81 in Germany and 45 884,22 in Japan. The results of saving in Japan are poor due to more than two decades of extremely low interest rates.

Even bigger differences can be seen when comparing results of the stock index investing in particular countries. The best results were achieved in Germany where the final balance reached up to 136 909. The final balance was slightly lower in the USA (126 199,40). By far the worst results were recorded in Japan where the two decades of stock market stagnation resulted in a final balance of only 43 863,32 which is really a very disappointing result.

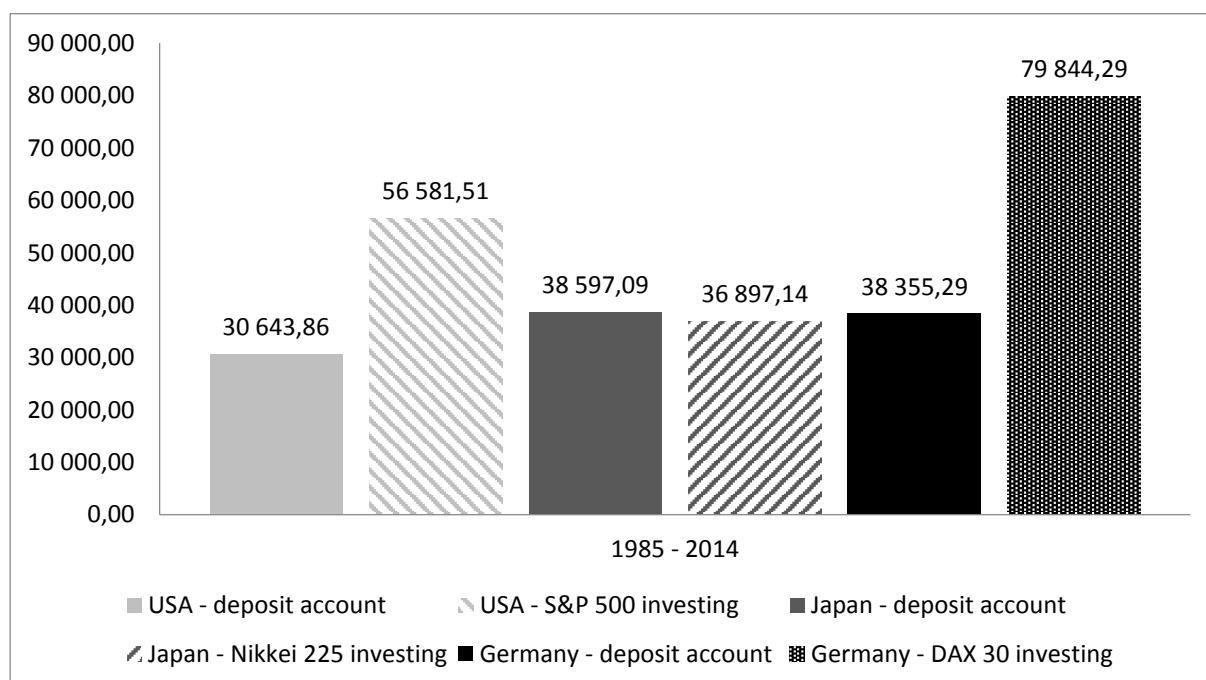


Fig. 4 – Inflation adjusted final account balances (purchasing power of 1985). Source: own calculations

But the view on the results changes significantly when the inflation is taken into account. Figure 4 shows inflation adjusted final balances. For example the final balance of the U.S. deposit account is 68 348,07. But 68 348,07 in 2014 is worth only 30 643,86 from 1985. The cumulative inflation was 123,04% in the USA, 71,47% in Germany and only 18,88% in

Japan. It means that although the nominal results were significantly better in the USA and in Germany, the differences are much smaller in the real values. As a result the saving in Japan and in Germany is comparable and the worst results were achieved by saving in the USA. By far the best results were reached by investing in Germany where the inflation adjusted final balance grew up to the 80 000 level. In the USA it is 56 581 and in Japan only 36 897.

## **6 CONCLUSION**

The analysis shows that investing is superior to saving in the long term. Although there were some huge market crashes after 2000 and 2008, the results of investing were significantly better compared to saving. There were only a couple of short time periods when the deposit account balance was higher than the investment account balance. Those time periods lasted for only a couple of months right after the huge market collapses. The only difference is Japan where the results of saving and investing were almost equal. This is an important conclusion for various pension schemes.

We used a simple indexing strategy. The results of our study have confirmed the conclusions of J.C. Bogle (2010) who says that an easy indexing strategy is able to outperform most of the actively managed portfolios that are able to beat the market only occasionally, not regularly. In other words, the indexing strategy may be negatively affected by the market turbulences but it is very effective over long time periods. Also J. Siegel (2014) says that the indexing strategy needs “stocks for the long run”. Although his studies usually use minimum time horizons of 7-10 years for stock investments, our analysis was based on 10 and 30 year time horizons. Our results show that the long term effects of the indexing strategy were further supported by the cost averaging effect. The regular monthly investments enabled us to mute the negative effects of the market cycles. We were able to buy the assets at lower prices during the market slumps, which led to a decreased average cost. Although there is some potential for the fund managers to beat the benchmark using some active investment strategies, the praxis shows that the vast majority of them are unable to do it.

It is also important to note that although the German stock market performed well over the analyzed time period, there is a real threat that it will have to face some headwinds in the coming years due to the problems of the European economy related to the still unresolved debt crisis. According to Sipko (2014) the European debt crisis was caused by a mixture of internal and external imbalances. Some of the economists talk about the possibility that the economic situation in Europe may be very similar to the Japanese lost decades in the coming years. In this case we should expect worse results of the European stock markets in the near future. But as the analysis shows the stock market returns are superior to saving. Sometimes it only takes a little more time.

### **Acknowledgements**

This contribution is the result of the project implementation VEGA (1/0124/14) “The role of financial institutions and capital market in solving problems of the debt crisis in Europe”.

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## **CAPITAL STRUCTURE DETERMINANTS AND HUMAN CAPITAL: POOLED, PANEL AND DYNAMIC PANEL ESTIMATIONS**

*Agha Jahanzeb, Norkhairul Hafiz Bajuri, Aisha Ghori*

### **Abstract**

This study provides empirical evidence about capital structure determinants and human capital in developing markets by studying non-financial Pakistani firms. The study demonstrates that the capital structure of Pakistani firms is shaped by same factors as suggested by developed markets, i.e. firm size, profitability, tangibility, age, non-debt tax shield, uniqueness and liquidity. More importantly, human capital also remained highly significant with total debt. Results of Generalized Method of Moments (GMM) also showed nearly same kind of significant findings.

*Keywords: capital structure, human capital, debt financing, leverage, panel data estimation*

JEL Classification: F65, G00, G30, G31, G32

### **1 INTRODUCTION**

For all business organizations, decisions about the capital structure are very important. In general, in the corporate business form, it is the management's job to make the decisions regarding the capital structure in a manner that the value of the firm is maximized. Though, maximization of the value of firm is a difficult task as it entails the selection of equity and debt securities in an equal proportion taking into account the different benefits and costs attached with these securities. If an incorrect decision is made in the process of selection it may result in the firm's financial distress and ultimately in bankruptcy. The association between decisions of capital structure and firm value is being widely studied in the last few decades. Usually, a firm is able to acquire funds through the financial market in order to finance its investments in the two manners: by means of issuing corporate stocks (equity market) or by means of issuing a debt instrument (credit or bond markets). In this regard, the expression "Capital Structure" denotes the manner in which a firm finances its investments by means of some combination of debt and equity. Although, equity and debt are not similar in nature, they complement one another as the sources of finance for projects of corporate investment. Therefore, for each investment, the trick is to determine the optimum combination of both. If a corporation possess debt in large amounts, it might overreach its potential to overhaul the debt and can turn out to be susceptible to business downturns and variation in rates of interest, and hence would be sighted to be financially perilous. Conversely, equity in large amounts weakens the interest of ownership, exhibits the firm to external control, and generally specifies that the business is ineffectively utilizing its cash to acquire business assets. This might be upsetting for investors, as it signifies a smaller amount of profits being dispersed to them.

It is indicated by Wald (1999) that institutions might considerably assert an influence over the capital structure decision of firms and that monitoring and agency problems, whereas staying in all countries might generate different results. Although the greater part of the research outcomes is being obtained from the expertise of the developed economies that encompass various institutional similarities (Rajan & Zingales, 1995; Wald, 1999; Bevan and Danbolt,

2002), diminutive work is being done for the purpose of advancing our knowledge about capital structure in developing countries that encompass dissimilar institutional structures.

Capital structure possesses a puzzling nature (Titman, 1984), which still remains the same. Hence, this research attempts to further explore the capital structure determinants and investigates the matter by employing human capital into it. Human capital is considered to be the most important part of any organization. Therefore, it is important to see what impact it has on leverage and external financing and how firms deal with the leverage by spending more on human capital. Furthermore, this study employs the data of non-financial firms of Pakistan. Studies on this issue in Pakistan are still rare and that even present dissimilar results. Not only this, the study investigates the relationship of firm age, uniqueness and human capital with leverage ratio for the first time. The results of this study will also help understand the nature of capital structure in other developing countries as well.

## **2 LITERATURE REVIEW**

An essential matter in corporate finance involves understanding of how firms choose their financing choices and it is apparent that there is no consensus on theories that explains a firm's perfect capital structure (Seifert & Gonenc, 2010). Modigliani and Miller (1958) initiated the first study on capital structure which hashes out that the capital structure is immaterial in a corporate world without taxes, transaction costs or other market imperfections.

### **2.1 Modigliani-Miller Theorem**

This ground-breaking study was presented by Modigliani and Miller (1958) on an assumption that there is the existence of market perfection in capital market. Therefore, the market operates without transaction costs and bankruptcy costs, and information is available for everyone in the market. Modigliani and Miller (1958), in other words, asserted that financing decisions of firms are undertaken with identical interest rate and without tax. As a result, cost of equity is same for firms which are, both, leveraged and non-leveraged. For the non-leveraged firm, premium is included for financial risk. Ultimately, these assumptions are pointing out that value of the firm is independent to its capital structure. Modigliani and Miller (1958) first began this groundbreaking work on capital structure in the field of Corporate Finance. According to MM Theorem, in perfect capital markets no impact of leverage can be seen on firm value. This theorem documented that firm's value is not affected by debt-equity ratio.

### **2.2 Trade-Off Theory**

Trade-off theory by focusing on cost and benefit analysis of debt predicts that there is an optimal debt ratio which helps to maximize the value of a firm. Optimal point can be hit when the benefits of debt issuance countervails the increasing present value of costs related to more debt issuance (Myers, 2001). Major benefit of debt is to minimize the interest payments. Such benefits stimulate firms to use debt. Miller (1977) explains this simple effect gets complicated with the existence of personal taxes and sometimes with non-debt tax shields (DeAngelo & Masulis, 1980). Moreover, equity issuance means to move away from optimum therefore this can be considered as a bad news. Myers (1984) further documented that they would opt to issue equity if they feel it is mispriced in market. On the contrary, investors become conscious that the equity issuance is fairly priced or mispriced. Consequently, equity issuance leads investors to react negatively and management doesn't show any interest to issue equity.

### **2.3 Pecking Order Theory**

Pecking order theory, proposed by Myers (1984), explains that firms most likely prefer to finance new investments, first with internally raised funds, i.e. retained earnings, then with debt, and issue equity as a final resort. This theory explains the financial decision making of the firms. According to Shyam-Sunder and Myers (1999), pecking order theory anticipates the impacts of profits correctly. Whereas, according to Fama and French (2002) and Frank and Goyal (2003), the theory has few other complications as well. As currently, it is not that much helpful in managing firms financial resources.

### **2.4 Human Capital Theory**

Adam Smith defined human capital as the skills (intellectual, physical and psychological), and the way an individual adapts to judge about different things (Smith, 1937). It is developed from both the experience and formal schooling (Naslmosavi et al., 2013). Shultz (1961) and Becker (1964) presented the concept of human capital in the mainstream academic research during 1960s. Since then, it has fuelled considerable debate among researchers.

It has been argued by Zingales (2000) that the importance of human capital has emerged as an important asset in the modern technologically oriented economy. It is no longer a reasonable approach to represent a firm by its physical capital. With respect to understanding the modern developments, it is thereby necessary to think about the other resources that help maximizing the value of a firm and how capital structure is managed. A very few studies have tried to investigate the relation between human capital and leverage, i.e. Chammanur et al. (2013) and Akyol and Verwijmeren (2013), who looked into the impact of leverage on human capital/employee wages.

## **3 INDEPENDENT VARIABLES**

### **3.1 Size**

It appears that an agreement is present between theories regarding the positive impact of size over the capital structure of firm even if their explanation varies. From the trade-off theory's viewpoint, corporations trade-off takes place between the leverage benefits for example alleviation of problems of agency or tax savings in opposition to the costs of leverage for example the bankruptcy costs. It is argued by Rajan and Zingales (1995) that the large companies tend to experience bankruptcy less frequently because they have a tendency to be more diversified. Therefore, a practical positive dependence is anticipated between the size of the firm and leverage. On the other hand, due to the information asymmetries, undersized firms have a propensity to experience higher costs to acquire external funds. Furthermore, it is argued by Bevan and Danbolt (2002) that because of the credit rating, larger firms are more prone to encompass the right to use non-bank debt financing. This, in turn, would also advocate a positive association between debt and size.

To measure the size of a firm, natural logarithm of sales will be used in this study, this measure is also consistent with many previous studies (e.g. Rajan and Zingales, 1995; Titman and Wessels, 1988; Hernádi & Ormos, 2012). This measure makes the variations smooth in the figure over the time period.

### **3.2 Tangibility**

Collateralised assets are deemed as an imperative driver that has an influence on the firm's capital structure decision. Tangible assets might be utilized as collateral. Therefore, the risk of the creditor is inversely proportional to the ratio of tangible assets i.e. creditor's risk would be lesser if the fraction of tangible assets is greater, and, consecutively, the value of assets is higher in the case of liquidation and bankruptcy. It is stated by Booth et al. (2001) that 'The more tangible the firm's assets, the greater its ability to issue secured debt and less information revealed about future profits'. Experimental researches that provides support to this association are carried out by Titman and Wessels (1988) and Rajan and Zingales (1995).

We expect positive relation between tangibility (TANG) and leverage (Rajan & Zingales, 1995; Chen et al., 2013). We use fixed assets over total assets (FA/TA) as a proxy to determine firms' tangibility, as computed by Chakraborty (2013).

### **3.3 Profitability**

Since, Modigliani and Miller (1958) much hypothetical work is being carried out, no reliable empirical results have been achieved in this regard until now. Considering the trade-off theory's viewpoint, the level of the profitability of the firm is more if the leverage is higher because of the debt tax deductibility of payment of interest. It is further argued by Rajan and Zingales (1995) that suppliers of debt must be more eager to lend to firms that are profitable.

This study expects negative relation between leverage and profitability, empirical evidence has shown that profitability is negatively related to debt ratios (Bevan & Danbolt, 2002). Profitability can be measured as earnings before interest and tax over total assets (EBIT/TA) as previously measured by Booth et al. (2001) and Shah and Khan (2007).

### **3.4 Growth**

It has been pointed out by Myers (1977) that the companies with higher growth rate will abandon investment opportunities with a positive NPV (net present value) to demonstrate increased corporate value and wealth of shareholders. Hence, growth opportunities have positive effect on corporate value (King & Santor, 2008). A negative relationship is stated between financial leverage and growth by Myers (1984) because of restrictive covenants or high rates of interest that depress debt taking. Such a negative relationship is attributed by Titman and Wessels (1988) because of bondholders' unwillingness to lend to equity-controlled firms like the latter have a tendency to invest sub-optimally to confiscate wealth from bondholders. This study also expects the negative association between growth and capital structure.

To capture firm's growth (GROW), geometric average of five-year sales growth to total asset growth will be applied (Chen, 2004; Delcours, 2007; Hernádi & Ormos, 2012).

### **3.5 Non-debt Tax Shield**

The benefit of tax shields on the utilization of debt finance might either be diminished or even eradicated when an income is reported by a corporation that is constantly low or negative. As a result, the load of payments of interest would be experienced by the firm. It is exhibited by DeAngelo and Masulis (1980) that the alternative of the tax shields on debt financing is non-debt tax shields (NDTS).

Experimental answers are mixed regarding this issue. A strong direct association between the relative amount of NDTS and debt is demonstrated by Bradley et al. (1984). In favour of an effect on debt ratios that results from non-debt tax shields, no support is discovered by



Titman and Wessels (1988). A considerable negative association is reported by Wald (1999) between NDTs and debt. Viviani (2008) has illustrated a considerable inverse association only between NDTs and short-term debt ratio. A negative yet less considerable association is shown by Bauer (2004) between the measures of leverage and non-debt tax shields.

We expect negative correlation between leverage and Non-debt Tax Shield (NDTS) (Hernádi & Ormos, 2012). Following Akhtar and Oliver (2009), we delineate non-debt tax shield as total annual depreciation expense divided by total assets' book value.

### **3.6 Firm Age**

Taking firm's age into account as a probable determinant, like in experiential studies, is not common, while a few connected to debt level can actually be revealed (Johansen & Bartholdy, 2011). It may possibly be squabbled that businesses with relationship of several years with bank are going to experience lesser borrowing costs (Michaelas et al., 1999). It is discovered by Petersen and Rajan (1994) that older companies encompass higher debt ratios as they are required to be higher quality companies.

From the perspective of Pakistan, this is the first study to compute this determinant of capital structure. Not a much literature has been seen on the firm age (AGE), but still according to the few studies, negative relationship is expected (Michaelas et al., 1999). AGE is measured by following Michaelas et al. (1999) and Akhtar and Oliver (2009) as the years from the date of incorporation.

### **3.7 Uniqueness**

The selling expenditures and Research and Development (R&D) are at the starting and the closing stages of the production value chain. Unique goods in fact encompass more selling expenses and R&D, since they are not a replica of formal monotonous things, and as they have particular demands and specific consumers. Similarly, producer of distinctiveness goods is likely to face more risk of bankruptcy; therefore, they have to pay attention towards induced expense of bankruptcy, by means of issuing debt. Because of the constraints in attaining the R&D expense data, this research like the majority of the earlier studies attempts to make use of selling expense, as a substitute for R&D; therefore uniqueness is described by selling expense divided by net revenue from sales. In line with the trade off theory, firms in the midst of unique products encompass lesser debt in their capital structure (Titman & Wessels, 1988). Hence, this study also expects negative relation.

It's hard to find any study in context of Pakistan, which has investigated this determinant with capital structure; this study might be the first to present empirical findings on this association. Empirical findings on uniqueness are still rare. Following Sporleder and Moss (2004), Yang et al. (2010) and Jahanzeb and Bajuri (2014), this study uses selling expense over sales (SE/S).

### **3.8 Risk**

As stated by Bauer (2004), volatility or business risk may be considered as the proxy for firm's risk. Leverage ratio can be less if a firm has less risky position. Therefore, generally, there is a presumption of inverse relation between capital structure and volatility. On the basis of the results presented by Hsia (1981), Huang and Song (2002) state, "As the variance of the value of the firm's assets increases the systematic risk of equity decreases. So the business risk is expected to be positively related to leverage". Huang and Song (2002) and Kim and Sorensen (1986) also confirm this association. However, Titman and Wessels (1988) and Bradley et al. (1984) demonstrated the negative relation.

This study also expects the negative relation between business risk (RISK) and debt (Dang et al., 2012). Standard deviation of return on assets over three years has been used as the proxy to measure business risk (Booth et al., 2001; Hernadi & Ormos, 2012).

### **3.9 Liquidity**

Net effect of liquidity on capital structure is unidentified and it has both the positive and negative impacts (Mouamer, 2011). Firms having high liquidity ratio may have high debt level because of their need to meet debt obligations. This suggests a positive relation between liquidity and capital structure. On the other hand, having more liquid assets, shows that these assets would be utilized as the financing source in future. Hence, this suggests negative relation between liquidity and debt.

This study hypothesizes negative relationship between the liquidity and capital structure (de Jong et al., 2008). To measure liquidity, this study employs the ratio of current assets over current liabilities (Mouamer, 2011).

### **3.10 Human Capital**

Although, the theoretical and empirical literature on the relation between human capital and capital structure is still rare, but there are quite a few recent studies available. The main finding of study presented by Akyol and Verwijmeren (2013) is that there is a positive correlation between leverage and wages paid to the employees, which means companies having higher leverage, must disburse higher wages to their employees. Chemmanur et al. (2013) conclude that a significant and positive association is present between leverage and average employee.

This study investigates the reverse relationship, i.e. impact of human capital on leverage. This kind of relation has not been tested yet, as there is no any evidence available regarding this relation in literature. In this regard, there is only one study available that was conducted by Hovakimian and Li (2011), which failed to determine the relation between employee wages and leverage. This study measures human capital by total salaries and wages of a firm (Jahanzeb et al., 2014).

## **4 METHODOLOGY**

Independent variables and dependent variable have been selected in accordance with the academic literature. Consequently, methodology has been described here to test different hypotheses and analyze those variables empirically. To construct the model, panel data techniques have been used. Panel data consists of both the time-series elements and cross-sectional elements; time-series elements reflect the time period of the study (2004-2013) and cross-sectional elements reflect (200) non-financial companies.

$$LEV_{it} = \beta_0 + \beta_1(SIZE)_{it} + \beta_2(TANG)_{it} + \beta_3(PROF)_{it} + \beta_4(GROW)_{it} + \beta_5(NDTS)_{it} + \beta_6(AGE)_{it} + \beta_7(RISK)_{it} + \beta_8(UNIQ)_{it} + \beta_9(LIQ)_{it} + \beta_{10}(HC) + \varepsilon_{it} \quad (1)$$

(Pooled model)

$$LEV_{it} = \beta_{0i} + \beta_1(SIZE)_{it} + \beta_2(TANG)_{it} + \beta_3(PROF)_{it} + \beta_4(GROW)_{it} + \beta_5(NDTS)_{it} + \beta_6(AGE)_{it} + \beta_7(RISK)_{it} + \beta_8(UNIQ)_{it} + \beta_9(LIQ)_{it} + \beta_{10}(HC) + \varepsilon_{it} + \mu_{it} \quad (2)$$

(Fixed effects model)

In accordance with Drobetz *et al.* (2013), this study follows the model that is presented by Blundell and Bond (1998) for “System GMM Estimation” and applied “xtdpdsys” STATA estimation.

$$\Delta LEV_{it} = (1 - \lambda)\Delta LEV_{i,t-1} + \lambda\beta\Delta X_t + \Delta\varepsilon_{i,t} \quad (3)$$

Where:

*LEV* = leverage ratio of a firm

*SIZE* = size of a firm

*PROF* = profitability of a firm

*GROW* = growth of a firm

*NDTS* = non-debt tax shields of a firm

*AGE* = age of a firm

*RISK* = business risk of a firm

*UNIQ* = uniqueness of a firm

*LIQ* = liquidity of a firm

*HC* = human capital of a firm

$\beta_0$  = common y-intercept

$\beta_1 - \beta_{10}$  = coefficients of the independent variables

$\varepsilon_{it}$  = error term of firm *i* at time *t*

$\mu_{it}$  = fixed effects of firm *i* at time *t*

#### 4.1 Data

Data were collected from Thomson Reuters Datastream. Financial institutions were excluded from the analysis, because of their different financial policies than those of non-financial firms. The data relates to eight non-financial sectors, i.e. automobile & parts, construction & material, chemicals, textiles, food processors, electricity, oil & gas and household goods. We conducted analysis of 200 listed Pakistani (non-financial) companies from the period of 2004 to 2013 (i.e. 10 years).

#### 4.2 Dependent Variable

Capital structure is considered a comprehensive term, which has been measured differently by different authors. However, this study measured capital structure with leverage. Following Lemmon *et al.* (2008) and Mateev *et al.* (2013), this study measures dependent variable by total debt ratio (TD), that is, total debt to total assets.

$$\text{Total Debt (TD)} = \frac{\text{Current Liabilities} + \text{Non-Current Liabilities}}{\text{Total Assets}} \quad (4)$$

## 5 EMPIRICAL RESULTS

Empirical findings have been demonstrated in this section. The table below shows the summary statistics of dependent and independent variables. The total debt ratio demonstrates that the 53.75% firm assets are financed by debt, during this period of study. However, if we compare this ratio with G-7 or other developing countries, it can be argued that firms in Pakistan seem to be more leveraged than those of Jordan, Brazil, Mexico, Malaysia, Zimbabwe and Thailand (Rajan & Zingales, 1995).

Tab. 1 – Summary Statistics. Source: Developed by authors.

<b>Variables</b>	<b>Mean</b>	<b>SD</b>	<b>Minimum</b>	<b>Maximum</b>
<b>TD</b>	0.5375	0.2408	0	1.57
<b>SIZE</b>	14.925	1.9011	6.15	20.12
<b>TANG</b>	0.5012	0.2624	0	1.09
<b>PROF</b>	0.1092	0.1507	-0.77	0.93
<b>GROW</b>	0.1108	0.4011	-1.5	1.23
<b>NDTS</b>	0.0395	0.0206	0	0.13
<b>AGE</b>	3.0027	0.6082	0	4.17
<b>RISK</b>	0.0437	0.0281	0	0.19
<b>UNIQ</b>	0.0447	0.0271	0	0.17
<b>LIQ</b>	1.0217	0.4974	-0.91	2.62
<b>HC</b>	0.0502	0.0391	0	0.21
<b>Observations</b>	2000	2000	2000	2000

Tab. 2 – Pearson Coefficient Correlation Matrix. Source: Developed by authors.

<b>Variables</b>	<b>TD</b>	<b>SIZE</b>	<b>TANG</b>	<b>PROF</b>	<b>GROW</b>	<b>NDTS</b>	<b>AGE</b>	<b>RISK</b>	<b>UNIQ</b>	<b>LIQ</b>	<b>HC</b>
<b>TD</b>	1										
<b>SIZE</b>	.071*	1									
<b>TANG</b>	.015	-.184**	1								
<b>PROF</b>	-.191**	.228**	-.112**	1							
<b>GROW</b>	-.029	.085**	-.049*	.174**	1						
<b>NDTS</b>	-.096**	-.006	.080**	.102**	-.020	1					
<b>AGE</b>	.060**	-.075**	-.034	-.071**	.066**	-.088**	1				
<b>RISK</b>	-.030	-.027	-.024	.052*	-.023	.036	-.034	1			
<b>UNIQ</b>	-.052*	-.106**	.053*	-.013	-.043	.080**	.093**	.033	1		
<b>LIQ</b>	-.327**	.211**	-.332**	.266**	-.007	-.010	-.037	-.019	-.031	1	
<b>HC</b>	-.131**	-.026	-.142**	.153**	.040	.108**	.134**	.104**	.130**	.151**	1

Table 2 demonstrates the results of Pearson Coefficient Correlation Matrix. It can be noticed that the size, profitability, non-debt tax shield, uniqueness, liquidity and human capital remained negatively significant and firm age positively significant with the total debt. However, tangibility, growth and business risk remained insignificant.

Table 3 shows the results of different models employed in this study, i.e. pooled OLS, panel, and generalized method of moments (GMM). It shows that the overall results from both the pooled and panel data estimations remained the same, however, a few independent variables remained insignificant in GMM analysis. Further discussions have been presented in the section below.

## 6 DISCUSSION AND CONCLUSION

This study tried to investigate the determinants of capital structure of non-financial Pakistani firms that are listed on Karachi Stock Exchange. The study first time employed the data of 200 listed companies (2000 observations) for the period of 10 years, i.e. 2004-2013, from eight different non-financial sectors, which have not been employed before. Most of the previous studies in this research area have been unable to collect that much data. The study employed pooled, panel, and dynamic panel data estimations.

Tab. 3 – Regression Results. Source: Developed by authors.

According to the empirical findings, liquidity and profitability remained significant and negatively correlated to debt, which supports the hypothesis of pecking order. Firm size

<b>Dependent Variable: Total Debt</b>				
<b>Independent Variables</b>	<b>Pooled OLS</b>	<b>Fixed Effects</b>	<b>Random Effects</b>	<b>GMM</b>
Debt (-1)	-	-	-	0.2857**
	-	-	-	0.000
SIZE	0.0004 (0.869)	0.0055 (0.168)	0.0047 (0.176)	0.0143 (0.023)
TANG	-0.0982** (0.000)	-0.0568* (0.023)	-0.0629** (0.006)	-0.0242 (0.000)
PROF	-0.1424** (0.000)	-0.1388** (0.001)	-0.1436** (0.000)	-0.1775 (0.007)
GROW	-0.0144 (0.256)	-0.0012 (0.914)	-0.0039 (0.717)	-0.0143 (0.456)
NDTS	-0.7602** (0.002)	-0.7673** (0.001)	-0.7551** (0.001)	-0.3508** (0.003)
AGE	0.0184* (0.029)	-0.0234 (0.133)	-0.0050 (0.684)	0.0110* (0.038)
RISK	-0.1828 (0.308)	-0.2025 (0.182)	-0.1738 (0.244)	0.0615 (0.890)
UNIQ	-0.4250* (0.024)	-0.3531* (0.044)	-0.3760* (0.027)	-0.3374* (0.049)
LIQ	-0.1586** (0.000)	-0.0815** (0.000)	-0.0968** (0.000)	-0.0151** (0.000)
HC	-0.4505** (0.001)	-0.4009** (0.008)	-0.4185* (0.030)	-0.1560** (0.000)
_CONS	0.7971** (0.000)	0.8933** (0.000)	0.8458** (0.000)	0.6321** (0.000)
Obs.	2000	2000	2000	-
R <sup>2</sup>	0.2451	0.5369	14.38	-
Sargan Test	-	-	-	0.23
Hausman Test	24.34** (0.0067)	-	-	-
F-statistics	33.76**	-	-	-
Prob. > F-statistics	0.000	-	-	-
Lagrange Multiplier Test (LMT)	9.620**	-	-	-
Prob. > LMT	0.002	-	-	-

\*\*,\* indicate significant levels at 1% and 5% respectively. Models are corrected for heteroscedasticity. Probability levels are shown in parentheses. Debt(-1) is the first lagged dependent variable. Significance of lagrange multiplier test shows the acceptance of panel data estimation over pooled analysis. However, fixed effects should be used because of the significance of Hausman Test, which shows the applicability of fixed effects over random effects. Sargan overidentifying restrictions are valid. If p-value > 0.05, we confirm the null hypothesis that the overidentifying restrictions are valid. It reveals the acceptance of model.

remained significant and positively correlated with debt, which supports the idea that the larger firms are less likely to bankrupt, hence, may easily acquire external debt financing. Firm age showed positive and significant relation with capital structure, which shows that the older firms are capable to raise their external debt financing. Growth remained significant in all models. More importantly, human capital remained negative with debt ratio in all the different models. This shows that the companies which spend more on their employees tend to decrease their debt levels to save their cost of capital, and they might have access to utilize retained earnings or other internal debt financing. Further studies may be conducted by categorizing the data into sectors, which will assist the investors and managers to apprehend the complications related to any particular sector, because every sector might behave differently towards capital structure.

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## **EVALUATION OF INVESTMENT STRATEGIES CREATED BY MULTIOBJECTIVE GENETIC PROGRAMMING**

*Martin Jakubáci*

### **Abstract**

Genetic programming became very popular in the last years, because it offers an automated way of creating tree like solutions to many problems, also in the area of financial investing. Although there are many publications about these applications, proper evaluation is mostly missing. The solutions are mostly compared only to the most basic buy and hold strategy. We propose a set of strategies that can be used to evaluate the rules created by genetic programming. Our implementation of multiobjective genetic programming is creating stock evaluation rules based on historical prices and internet term popularity and these rules are used in investment strategies for stock portfolio creation. Goal is to compare the returns and risk of this implementation with the proposed strategies. It is shown, that our implementation outperforms the other strategies in most of the cases.

*Keywords: genetic programming, investment strategy, stock portfolio*

JEL Classification: G11

## **1 INTRODUCTION**

Financial markets are complex systems, which are hard to predict. Investors create portfolios of assets to achieve high profit and minimize the risk. Low prices of hardware and data availability caused high interest in computer modelling in the area of investing. Popular group of algorithms, that are used for modelling are the evolutionary algorithms. One of them is genetic programming, which uses operators inspired by the evolution theory to generate tree programs. These programs can represent also stock evaluation rules, which can be used in investment strategies to create portfolios. Most of the research in this area compares the results only with the most simple buy and hold strategy, although wider evaluation should be done.

## **2 INVESTMENT STRATEGIES**

There are multiple models and strategies. Efficient market hypothesis believes, that financial markets are effective and every information is immediately absorbed. The price of the asset reflects all information and is equal to the real value (Beechey, Gruen & Vickery, 2000, p. 2). Changes in price are random fluctuations around this value and can be described as a random walk (Alexander, 2008, p. 134).

When investing, there is always some risk. Modern investment strategies are based on diversification, investing in multiple assets (Bohdalová & Greguš, 2011, p. 2). This was formalized by Harry Markowitz as multiobjective problem, where the objectives are revenue maximization and risk minimization. Investment strategy is a rule, which specifies investor's position on every asset in time  $t$ . The position is chosen based on the available information, without the knowledge of the future (Bohdalová & Greguš, 2012, p. 21). When optimizing this multiobjective problem, there is no single best solution. Multiple optimal solutions are found, which are called Pareto optimal and form the Pareto front. Value of none of the

objectives of these solutions can be increased without sacrificing value of a different objective (Hassan, 2010, p. 10).

Investors opposing the efficient market hypothesis believe, that the market can be outperformed and high returns can be achieved. Many strategies are based on the fundamental analysis. Its main idea is that real value of a stock and its price on the market can differ and it should be invested into undervalued companies. Finding the real value is not an easy task, it requires analysis of financial and other data (Thomsett, 2006, p. 2).

Other group of strategies is based on the technical analysis. The future prices are predicted from the historical prices. It is based on three principles. The first one is that the price reflects everything, the second one is that prices move in trends and the last one is that history repeats (Chovancová, 2006, p. 315). The strategies are based on the study of charts or technical indicators, for example moving averages, which are used to smooth the time series by averaging the data from previous points (Chovancová, 2006, p. 327-328).

In the recent years research is done also in the area of forecasting based on Internet activity data. Big interest was caused by the article dealing with market index changes correlated with Google Trends changes of different terms (Preis, Moat & Stanley, 2013). Similar research was done also with:

- Page views on Wikipedia (Moat et al., 2013).
- Terms in Facebook statuses (Karabulut, 2013).
- Twitter posts (Ruiz, Hristidis, Castillo, Gionis, & Jaimes, 2012).

### **3 GENETIC PROGRAMMING**

Genetic programming is an evolutionary optimization algorithm, which is searching for problem solutions. Solution is a program represented by a tree structure. First generation of solutions is created randomly. Every next generation is created by stochastic transformation of the previous generation. Transformation is done by applying operators, which are inspired by the evolution theory. These operators are mostly selection, mutation and crossover. Every next generation is expected to be better, the quality of the solutions is evaluated by the fitness function (Poli, Langdon, & McPhee, 2008, p. 2).

The most frequently used representation of a solution is a syntactic tree. The solution is in fact a program, which can be split into commands, organized as a tree. Programs can be represented also in the prefix form, which is known from the functional programming.  $max(x+x, x+3*y)$  is written as  $(max (+ x x) (+ x (* 3 y)))$ . The relation between commands and subcommands is more obvious in the prefix form.

The tree based solutions are formed from 2 different sets of vertices. The first group are terminal symbols, for example inputs, constants or any method calls, which do not accept any parameters. Those are leafs of the tree structure. The second set are nonterminals, or functions, that accept parameters. For example arithmetic operators, logical operators, conditions etc. They are expected to be type and run safe, so that the solutions can be executed to transform inputs to outputs. The first vertex in the tree is called root and the depth of every vertex is defined as the distance from the root.

First step during the run of the genetic programming is the initialization of the population (the set of the solutions). This done by creating random solutions. Two common methods are the full method, where every leaf has the same depth, equal to the maximum depth specified for the solutions. The other method is the rising method, where terminals and nonterminals are

applied randomly and the depths are different, but never more than the maximum depth. Maximum depth is important to avoid very large trees, which are too time consuming.

The other generations are created by applying genetic operators. Part of the new generation is created by copying best solutions from the previous generation. The other operator is the mutation, where a random subtree or leaf is replaced by a random subtree or leaf. Crossover is similar, but two solutions exchange their random subtrees or leaves (Poli et al., 2008, p. 9-27).

As already mentioned, the quality of the solution is evaluated by the fitness function. Solution is filled with inputs, executed and the output is evaluated. When dealing with multiobjective optimization, there are multiple fitness functions required, one for every objective. There are many algorithms to handle multiple objectives in evolutionary algorithms, overview can be found in (Ghosh & Dehuri, 2005). SPEA2 was chosen, because it overcomes some issues in other algorithms. It's based on elitism, Pareto dominant solutions are kept in a separate archive with fixed size (Hassan, 2010, p.20). The algorithm works this way (Zitzler, Laumanns, & Thiele, 2001, p. 5):

1. Initialization - Generate an initial population and create the empty archive (external set). Set  $t = 0$ .
2. Fitness assignment - Calculate fitness values of individuals in population and archive.
3. Environmental selection - Copy all nondominated individuals in population and archive to the new archive. If size of the new archive exceeds  $M$  then reduce new archive by means of the truncation operator, otherwise if size of new archive is less than  $N$  then fill new archive with dominated individuals in population and archive.
4. Termination: If  $t \geq T$  or another stopping criterion is satisfied then set  $A$  to the set of decision vectors represented by the nondominated individuals in the archive. Stop.
5. Mating selection: Perform binary tournament selection with replacement on the new archive in order to fill the mating pool.
6. Variation: Apply recombination and mutation operators to the mating pool and set new population to the resulting population. Increment generation counter ( $t = t + 1$ ) and go to Step 2.

#### **4 RELATED RESEARCH**

Muller & Beling (1998) used genetic algorithm to find the weights of a linear combination evaluating stock, with 9 objectives. They compared the results with a polynomial network without definitive conclusion. Becker, Fei & Lester (2007) were able to outperform the market with their genetic programming solutions for picking stocks from S&P300 index with 3 objectives. Huang, Chang, Chang & Cheng (2011) outperformed the market with their single objective genetic algorithm, which was used to tune the parameters of their fuzzy model. Then they improved the results by implementing a twoobjective NSGA II algorithm (Chen, Huang & Hong, 2013) and adding domain knowledge (Chen, Huang & Hong, 2014).

Another area of research deals with generating trading rules. These are tree structures, which return a logical value, which decides whether to enter or leave the market. Allen & Karjalainen (1999) were first to experiment on S&P 500 index, but failed to beat the market. Neely (1999) and other researchers added risk as a second objective, but still failed to beat the market. Potvin, Soriano & Vallée (2004) were only able to beat a stable or falling market. Becker & Seshadri (2003) made some modifications to the typical approach and beat the

market. They used monthly data instead of daily, reduced the number of functions, increased the number of precalculated indicators (so in fact increasing domain knowledge), coevolved separate rules for selling and buying, penalized more complex solutions and took into account the number of profitable periods instead of the total revenue. Lohpetch & Corne (2009, 2010) were analyzing the differences between the different approaches and found out, that longer trading periods (monthly instead of daily) and introduction of a validation period are causing better results. Their NSGA II implementation was able to beat the singleobjective solution and also market and US bonds (Lohpetch & Corne, 2011). Briza & Naval (2008) used the multiobjective particle swarm algorithm with revenue and Sharpe ratio as objectives and outperformed market and 5 indicators (moving averages, moving average convergence - divergence, linear regression, parabolic stop and reverse and directional movement index) on training period, but failed to outperform market on testing period.

A lot of research was done in the typical problem of portfolio optimization, where the optimal weights of stocks in a portfolio are searched. Many single and multiobjective evolutionary algorithms were used and compared, an overview was done for example by Tapia & Coello (2007) and Hassan (2010).

Chen & Navet (2007) criticize the research in the area of genetic programming usage in investment strategies and suggest more pretesting. They compare strategies with random strategies and lottery training without getting good results. Genetic programming should prove its purpose by performing better than these random strategies, according to them.

## **5 GOAL**

Our goal is to evaluate our implementation of genetic programming by comparing its result with a set of investment strategies. To prove its usability, it should outperform most of the strategies in the experiments. Our hypothesis is that our algorithm will have the highest rate of return in most of the cases.

## **6 METHODS**

Our implementation of genetic programming is compared with a set of investment strategies. To compare them, we run an investment simulation and calculate:

- Rate of return (RoR)  $r = \frac{R_t - R_0}{R_0}$ , where  $R_0$  is the initial value and  $R_t$  is the final value, after.
- Standard deviation of returns  $\sigma_i = \sqrt{\frac{1}{T} (\sum_{i=1}^T (r_i - \mu)^2)}$ , where T is the number of periods,  $r_i$  is the return rate at time i and  $\mu$  is the average rate of return.

### **6.1 Implementation**

Genetic programming is used to generate stock evaluation rules using internet popularity data from Google and Wikipedia (of the company names as terms), together with historical prices, as described in (Jakubeci, 2014). The rule is then used for daily investing in the 30 Dow Jones Industrial Index companies. Used fitness methods are rate of return and standard deviation of returns. These functions were used:

- arithmetic operations: addition, subtraction, multiplication, division, negation and exponentiation,
- logical operations: conjunction, disjunction, negation,

- equality: higher, lower, equal, or any combination,
- trigonometric operations: sine, cosine,
- condition,
- list operations: lag, moving average.

Implementation was done in the C# language, which has a high performance but is still easy to use. The language integrated many features from dynamic programming, for example the expression trees, which allow working with an algorithm as a data structure. This is important for the genetic programming algorithm, because it allows modifications in the solutions and application of the evolutionary operators. The Metaling library was used, to simplify these modifications (at <http://metaling.codeplex.com/>).

## **6.2 Compared strategies**

Strategies created by the genetic programming implementation were compared with a number of strategies:

- Lottery trading is doing decisions randomly. That means, that it always gives a random evaluation of a stock.
- Random strategy is a randomly created strategy. Such strategies are created also in the first generation of the genetic programming simulation.
- Risk free investment is represented by 3 year US treasury bonds.
- Buy and hold strategy means that the asset is bought on the beginning of the period and sold at the end. It is the most basic strategy and it was applied to the DJI index.
- Dogs of the Dow strategy is investing to 10 companies from the DJI index with the highest dividend yield (Domiana, Loutonb & Mossman, 1998, p. 1).
- Simple moving averages (SMA) is calculated as an average of previous days, when the price rises above the moving average, stock should be bought, when it falls under the moving average, it should be bought (Kirkpatrick & Dahlquist, 2010, p. 280-281).
- Exponential moving averages (EMA) is similar to the SMA, but with decreasing effect of the older days in the calculation (Kirkpatrick & Dahlquist, 2010, p. 282).
- Moving average convergence divergence (MACD) is calculated as a difference between 26-period EMA and 12-period EMA, when it crosses the signal line (EMA of MACD) from below, it is a buy signal (Kirkpatrick & Dahlquist, 2010, p. 432-433).

## **6.3 Data**

Rules from genetic programming are trained on data of DJI companies from years 2010-2013 and evaluated on data from year 2014. We used different data sources:

- historical prices were downloaded from Yahoo Finance, at <http://finance.yahoo.com/>
- Google term popularity was downloaded from Google Trends service, at <http://www.google.com/trends/>
- Wikipedia article popularity was downloaded from Wikipedia article traffic statistics, at <http://stats.grok.se/>

## 7 RESULTS

We present the results of training and evaluation runs. The results representing the genetic programming implementation are from the averages of Pareto front from 20 runs. Lottery trading is called Random or Rnd, random strategy is called RandomTree or RndTree in the charts and tables, buy and hold is called DJI and Dogs of the Dow is DOG. We present the results separately for the training period and evaluation period.

### 7.1 Training

Distribution of the rules created by genetic programming can be seen on fig. 1, yearly average rate of return is on the y axis and standard deviation on the x axis. The Pareto front can be seen in the upper left area. This is the result of one simulation run on the training period of 2010-2013. Separate comparisons without transaction costs and with transaction costs of 0,5% were done.

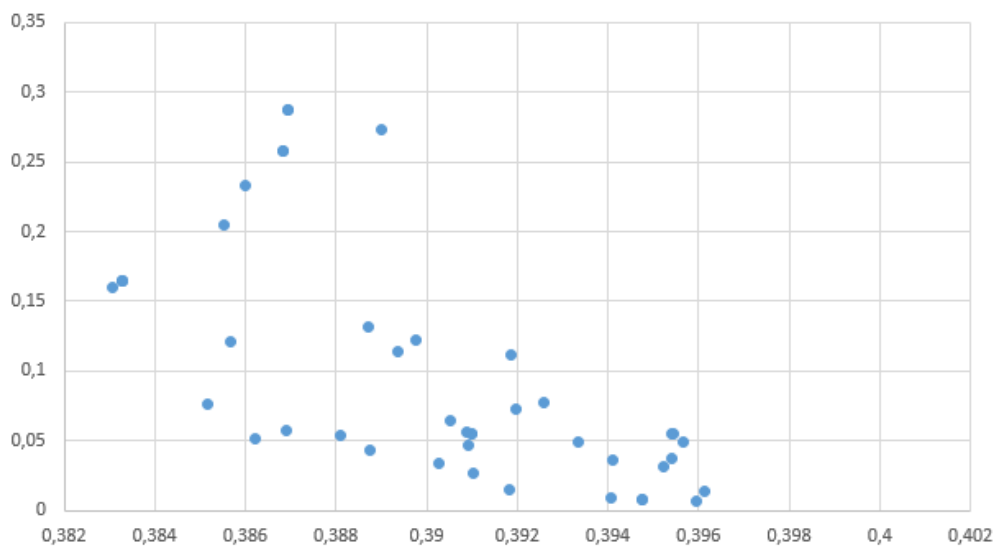


Fig. 1 – Results of return and risk distribution of the rules created by genetic programming in one of the training runs.

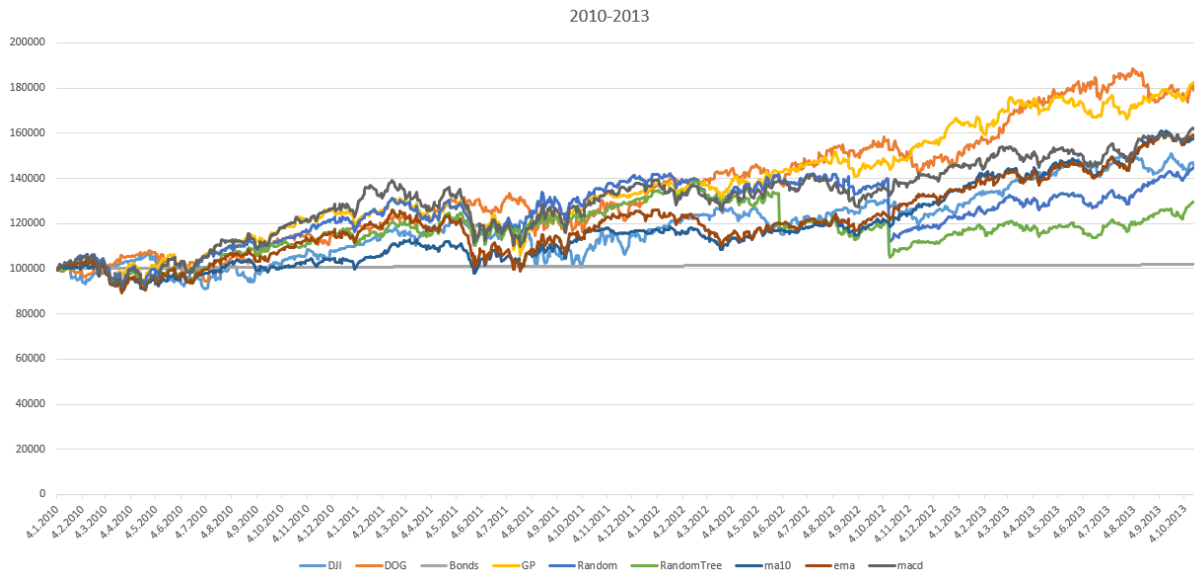


Fig. 2 – Portfolio value results of the strategies on the training data set, without trans. costs.

Tab. 1 – Results of the strategies on the training data set, without transaction costs.

	DJI	DOG	Bonds	GP	Rnd	RndTree	ma10	ema	macd
RoR	0,458	0,788	0,018	0,824	0,446	0,296	0,573	0,587	0,619
StdDev	0,128	0,187	0,004	0,174	0,104	0,086	0,150	0,134	0,128

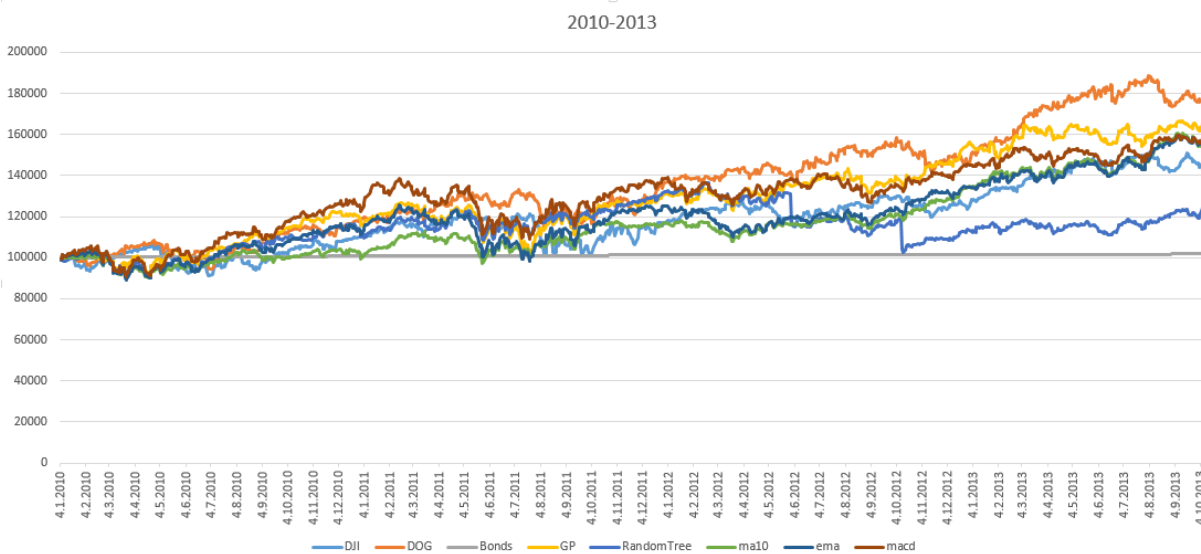


Fig. 3 – Portfolio value results of the strategies on the training data set, with 0,5% transaction costs.

Tab. 2 – Results of the strategies on the training data set, with 0,5% transaction costs.

	DJI	DOG	Bonds	GP	RndTree	ma10	ema	macd
RoR	0,458	0,788	0,018	0,692	0,267	0,568	0,582	0,614
StdDev	0,128	0,187	0,004	0,157	0,083	0,150	0,135	0,128



Genetic programming outperformed all strategies, when transaction costs were ignored. With 0,5% transaction costs, it was outperformed only slightly by Dogs of the Dow. Standard deviation was lower for genetic programming than for Dogs of the Dow in both cases. Performance can be seen on fig. 2 and 3 and in tab. 1 and 2. Lottery trading was removed because of very poor results with transaction costs.

## 7.2 Evaluation

Evaluation was done on the data from the first half of 2014. Separate comparisons without transaction costs and with transaction costs of 0,5% were done.

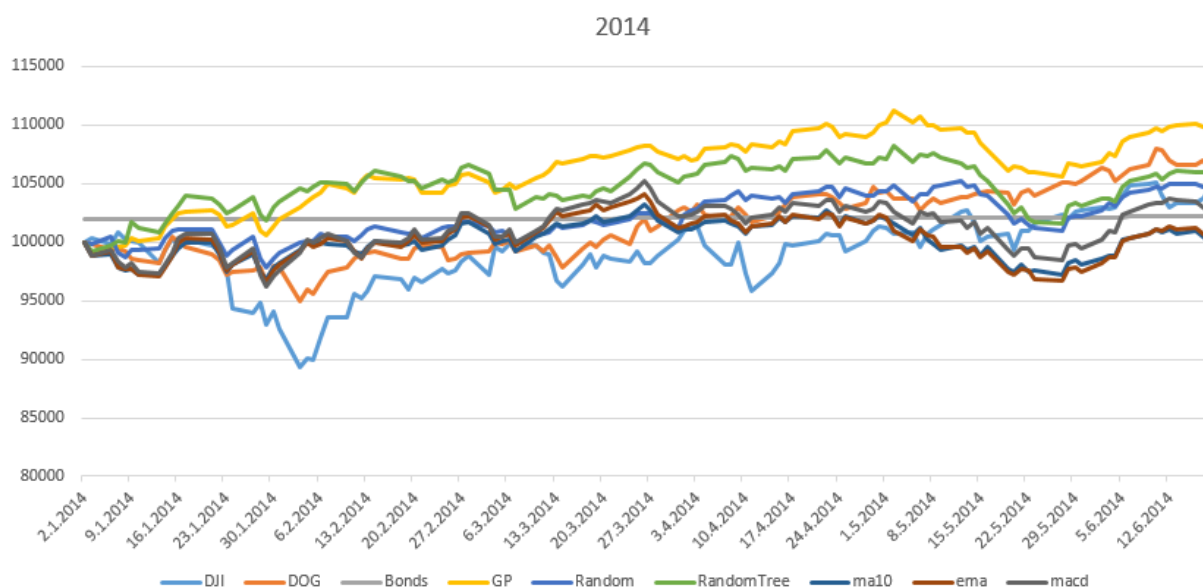


Fig. 4 – Portfolio value results of the strategies on the training data set, without transaction costs.

Tab. 3 – Results of the strategies on the evaluation data set, without transaction costs.

	DJI	DOG	Bonds	GP	Rnd	RndTree	ma10	ema	macd
RoR	0,046	0,063	0,022	0,097	0,049	0,060	0,001	0,002	0,026
StdDev	0,031	0,03	0,001	0,029	0,018	0,019	0,015	0,018	0,019

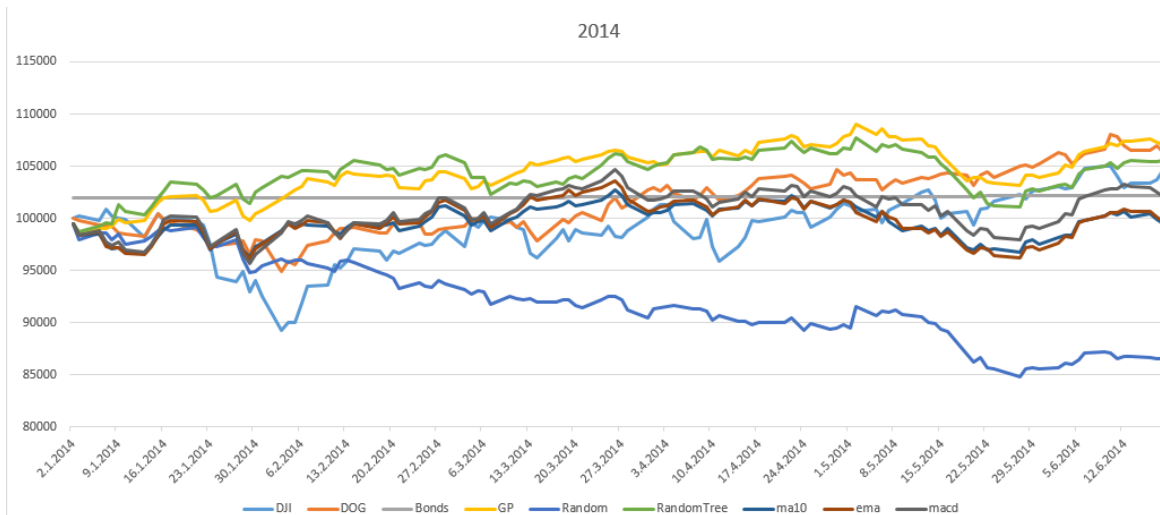


Fig. 5 – Portfolio value results of the strategies on the evaluation data, with 0,5% transaction costs.

Tab. 4 – Results of the strategies on the evaluation data set, with 0,5% transaction costs.

	DJI	DOG	Bonds	GP	Rnd	RndTree	ma10	ema	macd
RoR	0,046	0,062	0,021	0,070	-0,134	0,055	-0,005	-0,003	0,021
StdDev	0,031	0,029	0,001	0,024	0,042	0,018	0,015	0,017	0,019

Strategies created by genetic programming were able to outperform all strategies, even with transaction costs. Performance can be seen on fig. 4 and 5 and in tab. 3 and 4.

Genetic programming strategies give the best results, but buy and hold strategy used on market indexes is quite strong as well. Random solutions are hurt by the transaction costs. Lowest level of standard deviation is held by bonds, but that is logical, it has also very low rate of return. Strategies based technical analysis keep low levels of standard deviation but are hurt probably by the short period of evaluation.

## 8 CONCLUSION

The performance of rules created by genetic programming was compared to different strategies, consisting of random approaches, bonds, buy and hold and some well-known strategies. They compete very well and were outperformed only by the Dogs of Dow on the training set with transaction costs. Our implementation has the highest rate of return in most of the cases, so our hypothesis was confirmed.

We think that such evaluation proves the usability of our implementation and that similar evaluation should be done with all similar approaches in the area of financial investing. Outperforming only buy and hold strategy on one period is not enough to prove usability.

Experiments were done only in the period of 2010-2014, which was a typical rising period. Interesting experiments could be done also on different types of periods, for example before and during the financial crisis. This was a typical falling period and it would be interesting to see the results. It would be also interesting to compare different combinations of training and evaluation periods, for example training before the crisis and evaluation during crisis.

The experiments could be in future enhanced also with other strategies and longer periods.

### **Acknowledgement**

This research has been supported by a VUB grant no. 2015-3-02/5.

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## **PHILANTHROPY IN TERMS OF TAX POLICY IN THE CZECH REPUBLIC**

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### **Abstract**

Funding non-profit sector is a current issue in the Czech Republic, because the non-profit sector plays an irreplaceable role in the economy. It fulfills a number of tasks in the areas of public interest such as social, cultural, environmental, educational, sports, etc., where the main goal is not to make a profit, but the public benefit. The aim of the paper is to show support for philanthropy with the help of government fiscal instruments and explain the process of how these options are used by taxpayers.

*Keywords: non-profit sector, tax policy, income tax, donation, tax deductions*

JEL Classification: E62, H2, M1

### **1 INTRODUCTION**

The aim of the non-profit sector is to consolidate its position in a society. Nonetheless, raising funds to meet the goals and objectives is not easy. Possibilities of obtaining funds from their own activities are limited in non-profit organizations (membership fees, admission, advertising, etc.). Therefore, external resources represent a principal source of funding, particularly in the form of subsidies whether they are obtained from the government or within various EU programs. Subsidies represent a substantial part of all resources for a large number of NGOs.

Another possible source of funding besides subsidies is a donation while the form of legislative support varies in individual countries. The promotion of donation is realized in the form of tax relief in most countries (European Commission, 2014). Basically, there are three types of preferential schemes (Klik, 2001):

- Item reducing the tax base (tax deduction), when the value of donation is deducted as a tax deductible item from the tax base (this form is used in the Czech tax law).
- Item reducing the tax payment (tax credit), when a taxpayer has the opportunity to decide on the levy of taxes in favour of non-profit sector. However, they have no possibility to determine the beneficiary directly, i.e. a specific recipient of a gift. This is the main difference compared to tax assignment (but this form does not occur in European countries).
- Tax assignment (tax rebate) this is a possibility to remit a part of tax liability to a directly appointed subject without additional costs (e.g. it is used in tax systems in Slovakia, Hungary, Poland, Lithuania, Portugal).

Support of the non-profit sector, provided in the form of tax relief, depends not only on a form of tax relief but also on the method of income taxation (Příbyl, 2006), respectively on a model of personal income tax. Tax relief should have a lower impact on a taxpayer, a donor, in the system with a linear tax rate than in the case of a progressive tax rate.

The nature of tax incentives should lie in the rate of proportionality between the taxpayer and the extent to which they will transfer the tax burden to the state using tax savings. Stimulation

is relatively strong in case of tax assignment. This is because the taxpayer has the opportunity to provide support without any strain on their donation. Particularly, it depends mainly on their willingness to support a given non-profit organization and to take required steps for that purpose. The general attitude of the society towards the non-profit sector plays an important role.

## **2 FISCAL INSTRUMENTS IN THE CZECH TAX LAW**

There is the support of donation in the form of itemized deduction from the tax base in the Czech tax legislation for many years. A minimum deductible amount is established as well as a maximum one, both for physical and legal persons (Trezziová, 2006). In practice, it is necessary to be careful and do not confuse donations with sponsoring, or providing promotional or advertising services through non-profit organizations. A donor, unlike a sponsor, lets a non-profit organization know that they support the organization's activities, regardless of other possible advantages for the company.

The gift is newly understood as a “gratuitous performance” in the context of recodification of civil law, starting in 2014. In terms of income, donations are categorized into gratuitous income.

Hence, the gift can be perceived as gratuitous performance given to selected non-profit organizations (respectively individuals), which is based on a donation contract. Owing to taxation relief, it is necessary to state the purpose of the dedicated gift. A claim to tax credits arises if the purpose is in accordance with the Income Tax Act. Donors are divided from this point of view into two basic groups:

- Individual (physical person) - which may be an ordinary citizen, an employee, or a person who has income from independent activities or lease, or from other activities.
- Legal entity - business entity.

The tax regime with the possibility to deduct donations and thus reduce the tax base is different for the above-mentioned groups (Act No.586/1992 Coll. on Income Tax as amended). According to the Income Tax Act, a donor - physical person may deduct the value of a gift from their tax base if the total value of donations in a given year is greater than 2 % of their tax base, or is at least CZK 1,000. However, it is possible to deduct the maximum of 15 % of the tax base. At the end of 2013 there was the maximum limit of 10 % of the tax base.

Tax regime for legal entities is somewhat different. A donor - legal entity is entitled to deductibility if the value of one gift (or all gifts of one organization) is at least CZK 2,000. In the case of a donation, the donor may apply a deductible item decreasing the adjusted tax base. In contrast to the individual, legal entity reduces the tax base of the item deductible from the tax base (§ 34 of the ITA) as a tax loss deduction, support of research and development, or deduction for vocational training. The value of the gifts can be applied if they conform to the rules laid down by law. If the donor is subject to VAT and gives a gift, it is necessary to pay VAT based on the value of the gift. Financial donations are not subject to the value added tax. For a donor, the VAT is a further cost associated with the gift. Even with legal entities, there is an increase since 2014 and the limit for deduction of donations to the maximum of 10 % of the tax base is unified at the same time.

The gratuitous income of beneficiaries, i.e. public-benefit taxpayers (the definition of which is amended for the purposes of the Income Tax Act) is tax exempt if it is used for the given purposes or as a capital contribution for the taxpayer.

### **3 OBJECTIVES AND METHODOLOGY**

The paper deals with the issue of donations in the context of legislative support for tax reliefs. It points out promoting philanthropy through the fiscal policy of the government and using the options by taxpayers.

The problem is associated with the abolition of tax progression and introduction of the single tax rate of 15 % when the effect of deductibles, mostly used by middle classes, was lessened (Janoušková, 2012). It is also associated with economic recession, when companies seek to reduce costs and willingness to corporate philanthropy is dropping. However, we cannot forget the fact that socially oriented non-profit organizations, which offer the aid to citizens experiencing negative effects of the crisis, are growing in importance in difficult economic situations.

The paper is based on the analysis and subsequent evaluation of secondary statistical data of the Tax Office in the Czech Republic. It is supported by aggregate data derived from filed tax returns (hereinafter referred to as TR) for the period 2000 - 2013. Nonetheless, mathematical calculations have limited explanatory power because many taxpayers, particularly employees, do not file tax returns. They apply tax deductions within the annual settlement of advances of their employers. Alternatively, the taxpayer may be at a loss, or the value of the gift does not meet the above limits and therefore it cannot be claimed as a tax-deductible item. The subject of this research is rather corporate donations that are divided into physical and legal persons.

Furthermore, the paper is based on the results of a primary research focused on corporate philanthropy. The research was carried out in the Moravian-Silesian region of the Czech Republic within the project TA CR in August 2014 with the help of a questionnaire survey. 300 subjects represented the sample size. Calculations were performed according to data of the Czech Statistical Office to 31 December 2012 according to organizational statistics of entities in the Moravian-Silesian region. Only entities with at least one employee were included into calculating quotas. There are 26,718 such entities in the region. The survey results in relation to donations, which are linked to applied fiscal instruments in the Czech Republic, are published in this paper.

### **4 OVERVIEW ON DONATIONS OF INDIVIDUALS AND LEGAL ENTITIES**

Taxes in the society do not function only as a tool of fiscal policy, but they reflect a range of social goals. The purpose of majority of deductibles, contained in the Income Tax Act, cannot be justified by solvency or vertical equity. The aim is to support public policies such as promotion of science and research, promoting old age security, and also supporting philanthropy.

The following calculations indicate a trend in donations in the years 2000 - 2013 in relation to data that can be analyzed and then summarize from TR divided into individuals and legal entities. Calculations are based on countrywide data in relation to data in the Moravian-Silesian region.

#### **Individuals' donations**

There is a growing trend of increasing the total amount of stated donations which can be seen in Table 1 below. In comparison with the year 2000, the total value of donations increased by 127.4 % in 2013. Individuals claimed donations worth CZK 1.5 billion within the tax deduction (the total value of donations amounted to CZK 0.7 billion in 2000). The total value of gifts already remains at CZK 1.4 – 1.5 billion since 2007.



Although the total value of donations in the observed period increases, the average donation per one taxpayer has not such a clear trend. The increase of the value of gifts is accompanied by an increase in the number of taxpayers filing tax returns. The number of taxpayers, claiming a tax deduction for gifts, has increased by 94.4 % in 2013 in comparison with the year 2000. Yet nowadays, the average value of a gift is ranging between CZK 11.000 and 13.000.

Tab. 1 – Development of donations for individuals according to tax returns between the years 2000 – 2013 in the Czech Republic (CR). Source: Tax Office CR, own calculations

Period	Number of individuals TR filed in the CR			Σ Value of gifts (in CZK)	Average value of gifts per 1 TR (in CZK)
	Number TR Σ	TR with gifts	%		
<b>2000</b>	1 448 084	71 494	4,9	669 873 274	9370
<b>2001</b>	1 535 281	78 188	5,1	759 839 513	9718
<b>2002</b>	1 592 244	102 811	6,5	994 675 138	9675
<b>2003</b>	1 598 164	89 275	5,6	911 562 640	10211
<b>2004</b>	1 524 649	92 886	6,1	981 806 435	10570
<b>2005</b>	2 036 101	121 477	6,0	1 192 078 432	9813
<b>2006</b>	2 246 839	132 470	5,9	1 341 090 197	10124
<b>2007</b>	2 348 299	141 093	5,8	1 469 092 117	10412
<b>2008</b>	1 739 241	110 614	6,4	1 425 191 599	12884
<b>2009</b>	1 794 573	113 928	6,3	1 493 532 379	13109
<b>2010</b>	1 834 136	116 959	6,4	1 510 644 604	12916
<b>2011</b>	1 901 065	121 216	6,4	1 466 341 688	12097
<b>2012</b>	1 913 452	124 096	6,5	1 562 469 708	12591
<b>2013</b>	1 937 120	138 966	7,2	1 523 212 081	10961

It is necessary to note that the increase in the number of tax returns between the years 2005 – 2007 is not associated with the emergence of new businesses but with potential application of so called taxation of married couples. For this reason, the data are not used in a comparison in Graph 1. Moreover, there was an increase in the value of gifts in 2002, especially in the context of the devastating flood.

The negative aspect in the development can be probably considered little tax incentives in connection with donations. The average number of taxpayers, claiming a tax deduction for gifts, has not increased and it is around 6.5 %. The following chart shows how many taxpayers - individuals have used the possibility of tax deduction compared with the total number of taxpayers who filed a tax return.

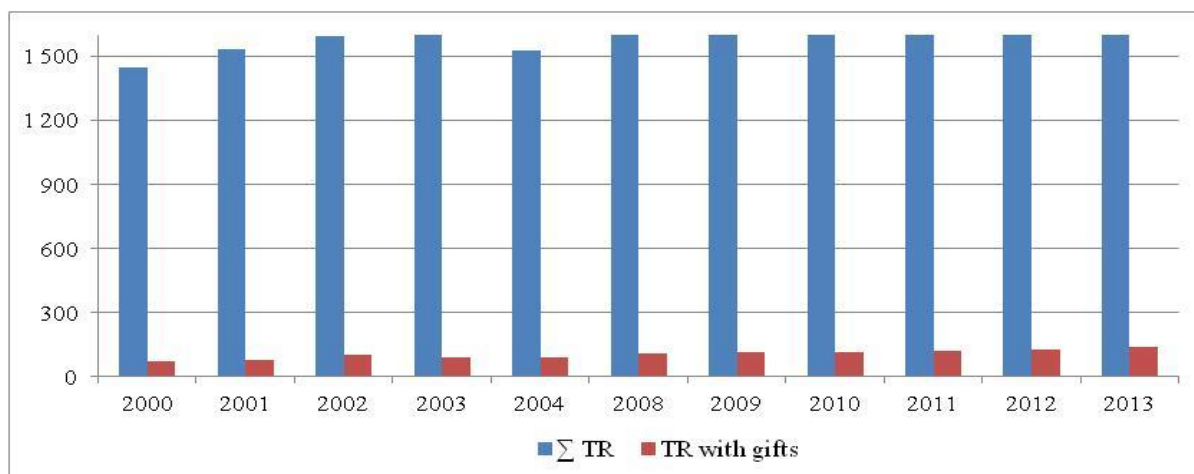


Fig. 1 – Number of taxpayers who use the option of applying donations compared to the total number of tax returns in the Czech Republic - physical persons (in thousands). Source: own calculations.

### Legal entities

Trends in corporate philanthropy are shown in the following table. It is possible to observe that there were 184 million less tax deductibles on donations than the previous year. It can be attributed to the recession of the Czech economy in previous years when companies were searching for cost savings in particular. Yet, compared to the year 2000, almost more than CZK 1.7 billion were applied within adjusted tax basis on donations in 2013. The value of donations has been increased by 224 %. The average value of donations per one entity amounted to CZK 138 thousand in 2013. It represents an increase of almost 74 % since 2000. For individuals, the average value of the gifts did not increased significantly for the given period.

Tab. 2 – Development of donations for legal entities according to tax returns between the years 2000 – 2013. Source: Tax Office CR, own calculations

Period	Number of legal entities TR filed in the CR			Σ Value of gifts (in CZK)	Average value of gifts per 1 TR (in CZK)
	Number TR Σ	TR with gifts	%		
<b>2000</b>	223 307	9 418	4,2	746 389 302	79251
<b>2001</b>	242 164	10 614	4,4	1 017 522 284	95866
<b>2002</b>	265 813	13 845	5,2	1 950 402 720	140874
<b>2003</b>	270 968	12 220	4,5	1 545 325 983	126459
<b>2004</b>	279 964	13 940	5,0	2 068 487 263	148385
<b>2005</b>	296 271	15 839	5,3	2 158 619 224	136285
<b>2006</b>	307 986	16 804	5,5	2 508 014 912	149251
<b>2007</b>	329 481	18 815	5,7	2 508 883 799	133345
<b>2008</b>	347 457	19 223	5,5	2 415 230 148	125643
<b>2009</b>	370 709	17 094	4,6	2 383 775 172	139451
<b>2010</b>	359 084	17 578	4,9	2 460 657 776	139985
<b>2011</b>	365 488	17 765	4,9	2 644 566 577	148864
<b>2012</b>	383 776	17 571	4,6	2 601 867 155	148077
<b>2013</b>	350 370	17 505	5,0	2 417 654 501	138112

The number of entities applying a tax deduction on donations in their tax returns increased by 85.9 % in 2013 compared to 2000. However, as in the case of individuals, less favourable phenomenon is the fact that tax incentives are not sufficient in the context of donations. The number of taxpayers with applied gifts has not increased in comparison with the total number of filed tax returns since 2000. It is about 5 % and the number is even lower compared to donors-individuals.

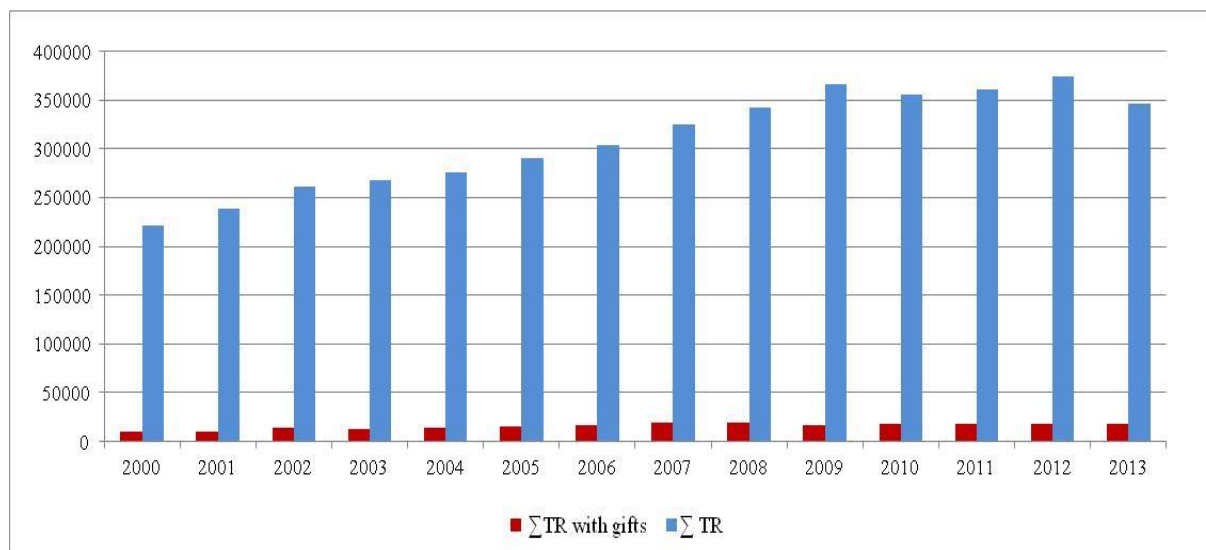


Fig. 2 – Number of taxpayers (DS) who use the option of applying donations compared to the total number of tax returns in the Czech Republic – legal entities. Source: own calculations.

## **5 DONATIONS DEVELOPMENT IN THE MORAVIAN-SILESIAN REGION**

There has been a substantial change in the industry structure in the Moravian-Silesian region (hereinafter MSR) in recent years. The region belongs to the areas with a low level of employment and deals with problems of creating conditions for new investors. As for developments of filed TR, where the non-taxable portion of the tax base has been applied in the form of donations within the Moravian-Silesian region in comparison to the total TR filed for the whole Czech Republic, the average number of donors is stable in percentage terms over the period concerned, both with individuals and legal entities. It ranges between 9 – 10 % with individuals. Even here it is possible to record an increase in filed TR in connection with taxation of married couples. As for legal entities, it can also be observed that the development of filed TR is stable at around 10 % due to the countrywide number of TR with applied gifts.

Tab. 3 – Development of donations for individuals according to tax returns between the years 2000 – 2013 in the Moravian-Silesian region. Source: Tax Office CR, own calculations

Period	Individuals		Legal entities	
	TR with applied gifts in the MSR compared to TR with applied gifts in the CR (in %)	Average value of gifts per 1 TR (in CZK)	TR with applied gifts in the MSR compared to TR with applied gifts in the CR (in %)	Average value of gifts per 1 TR (in CZK)
<b>2000</b>	9,1	10461	8,8	64352
<b>2001</b>	9,2	10778	9,8	75818
<b>2002</b>	8,9	11189	8,7	90564
<b>2003</b>	9,5	11895	10,1	109197
<b>2004</b>	9,3	12285	9,7	110552
<b>2005</b>	11,4	10512	9,8	171244
<b>2006</b>	11,7	10862	10,3	216331
<b>2007</b>	11,8	10885	10,7	166695
<b>2008</b>	10,1	13158	10,6	162150
<b>2009</b>	9,8	13120	10,2	120157
<b>2010</b>	9,8	13812	10,2	61735
<b>2011</b>	9,7	13830	10,1	55149
<b>2012</b>	9,6	14688	10,2	53546
<b>2013</b>	9,5	12696	9,9	48067

If we take into account the average value of donations per one taxpayer (individual), the Moravian-Silesian region participates in donating significantly and is first in comparison with other regions. And this is despite its problems associated with restructuring. The region was only surpassed by the Plzen and Central Bohemian regions between the years 2010 – 2012 (see Fig. 3).

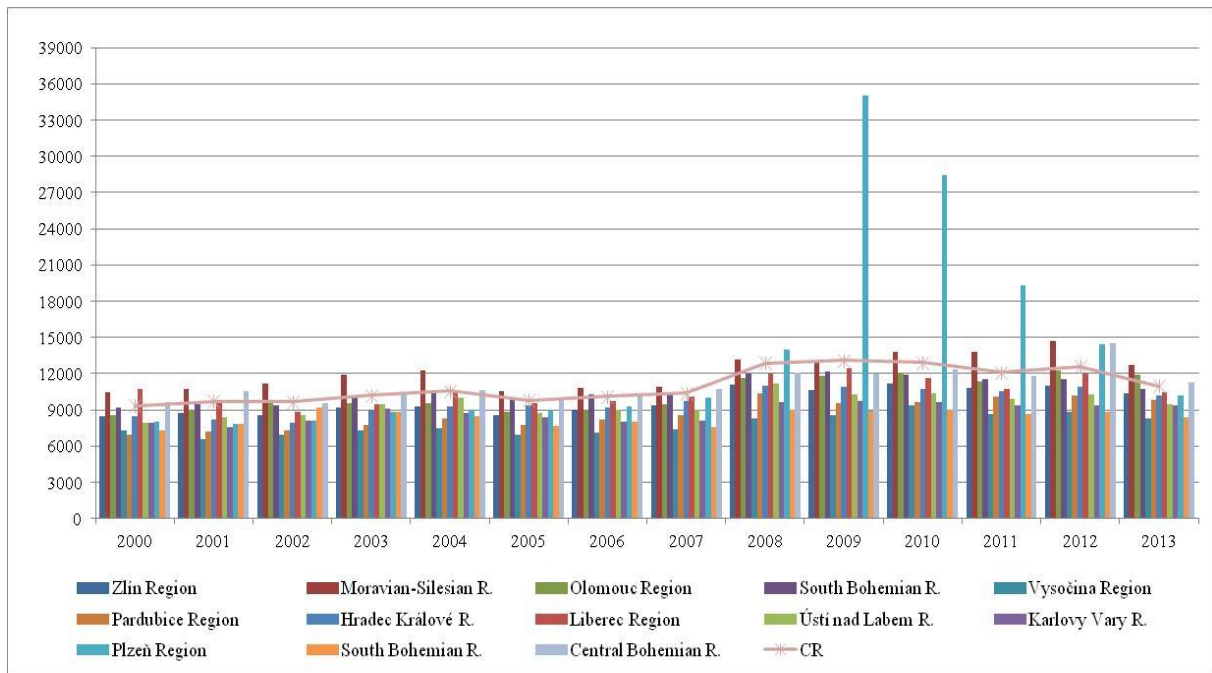


Fig. 3 – Development of donations with individuals according to tax returns between the years 2000 - 2013 in individual regions in CR (average value of the donation per one TR with applied gifts). Source: own calculations.

A similar trend can be seen also in the development between the years 2000 - 2013 with donors - legal entities. If we compare the average value of a gift per one legal entity - a donor, then the Moravian-Silesian region occupies top positions (see Fig. 4).

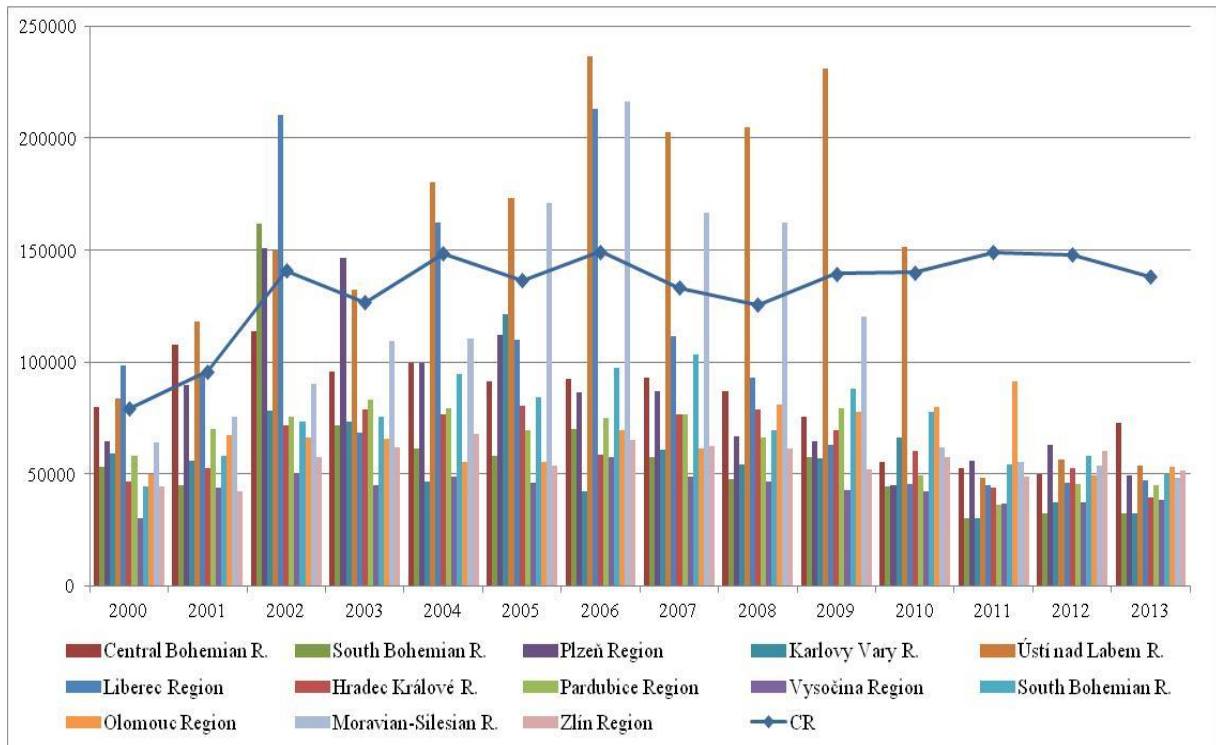


Fig. 4 – Development of donations with legal entities according to tax returns between the years 2000 - 2013 in individual regions in CR (average value of the donation per one TR with applied gifts). Source: own calculations.

As it was already mentioned in connection with negative economic developments, a decline of donating may be expected. Nonetheless, the change can be recorded only with legal entities. The average value of the donation per one donor filing a tax return was sharply reduced in the Moravian-Silesian region from 2010 and it is even lower than in 2000.

This phenomenon does not occur with donations of individuals and the average value of the donation is approximately EUR 13 thousand since 2008. The average value of applied donations per individual (physical person) is even higher than the national average.

Primary research (Scientific research "Philanthropy Moravian-Silesian Region companies", 2014) also confirmed the evolutionary trend based on aggregate data from filed TR in the whole Czech Republic. Analysis results show that the annual value of the aid and the specific amount of contributions is determined by companies and mostly they are based on negotiations of a decision-making body in an organization (44.1 %). Subsequently, it is determined according to the profit achieved (30.0 %) and with more than one-sixth of companies it is a subjectively determined constant amount (17.9 %). Tax deductible donation (7.7 %) and other strategies (e.g. collections) amounting to just 6.3 % in the surveyed companies is the least decisive factor. Respondents could give multiple answers. Therefore, the totals do not give 100 %. Results are shown in the following chart.

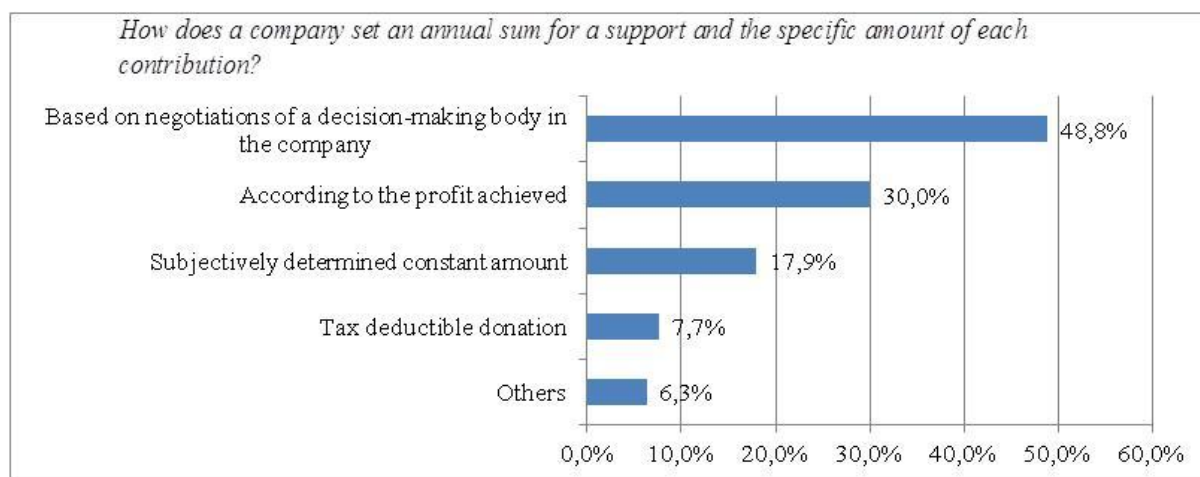


Fig. 5 – Determination of the annual amount for the support and the specific amount of a contribution. Source: Scientific research "Philanthropy Moravian-Silesian Region companies"

The measure of importance of individual factors for corporate strategy was identified with the use of loads of items. Respondents rated individual factors on a scale from 1 to 4. Tax factors are less important for corporate strategy according to the surveyed companies. Detailed results are presented in the following Fig. 6.

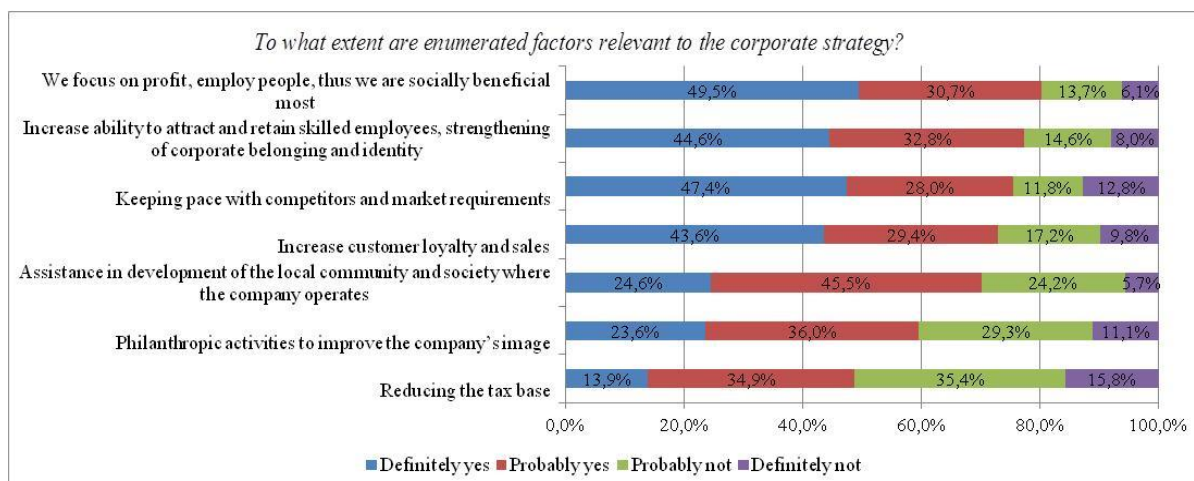


Fig. 6 – Measure of the importance of the given factors for corporate strategy. Source: Scientific research "Philanthropy Moravian-Silesian Region companies"

Several possible solutions were identified within the open-ended questions (without offered options of answers) regarding the aid to corporate philanthropy either at the regional level or at the state level. The most commonly surveyed companies have indicated examples that could be helpful, such as raising of public awareness, better promotion and greater awareness (27.4 %), tax benefits, increasing the tax deduction limit for donations, sophisticated policy of tax credits (26.0 %).

## 6 CONCLUSION

The aim of this paper was to highlight the tax policy of the state, which is intended to encourage philanthropy. In addition to their description, it was explained how the options are used by taxpayers. Most EU countries motivate taxpayers to fund the non-profit sector and employ various tax preferential approaches. These approaches may consist in several facts such as deductible donation amount, the amount of a required minimum donation, or the form of deduction either from the tax base, or tax credit. The countries introduce the possibility of tax assignments and strive for longevity and sustainability of both corporate and individual altruistic behavior.

An approach to the use of fiscal instruments has been stable in the Czech Republic for many years. The support is realized by deducting the value of the donation from the tax base. Progressive taxation of personal incomes was ended in 2008. The abolition of tax progression and introduction of a single tax rate of 15 % has reduced the effect of deductible items used predominantly by middle classes. Initial concerns that the legislative change will reflect in a decline in donations by individuals have not been fulfilled as illustrated by the analysis in the paper. Follows from the above, the trend in growing willingness to donate is rather obvious, despite the adverse economic situation, which affected the Czech Republic in previous years. Steps were taken to increase support for community activities in 2014. The maximum limit of the amount of donations deductible from the tax base for legal entities and individuals was increased.

Corporate philanthropy, especially at small and medium-sized companies, depends on the stability of the economy. Furthermore, the economic downturn exerts the pressure on reducing all costs of companies. Particularly, decline in the average value of donations per one legal entity is noticeable almost in all regions compared since 2009.

The number of donors does not increase on average which is evident from the data concerning legal entities. The countrywide average value of donations per one taxpayer is stable and has a higher value than that of individuals. The comparison of the Moravian-Silesian region, which exhibits companies' greater involvement in relation to donation, is remarkable.

The existing tax credits represent a positive aspect in the tax law, but merely this will not provide more financial resources for NGOs. Tax benefits are not such strong impact on incentives to corporate and individual commitment. However, they may affect the amount of donations, especially in smaller companies and major individual donors.

As revealed from the research, tax deductible donations are used by a relatively small number of taxpayers, both individuals and legal entities. The form of a single donation is used rather for individual donations in the Czech Republic. This indicates the need to build a base of individual donors for the non-profit sector which would become a stable source of income.

It is apparent from analysis performed that the state policy in the Czech Republic could encourage a long-term approach to philanthropy more and could strengthen areas that become a priority for some reason, or they have long been underfinanced. From the above, it can be concluded based on the situation in the Czech Republic that the barrier to the financing of NGOs from private sources represents, in addition to a lower amount of donations, their one-off in particular.

Altogether, the welfare state strives for social justice. It is impossible to eliminate all social inequality, but it is possible not to place obstacles and, in the best case, endorse selected practice to achieve the effects of fair distribution. Taxes in the society fulfil a number of functions in order to promote public policy, for example through the support of philanthropy.

### **Acknowledgment**

*The research behind this paper was supported by the project "Specialized maps and systems to support seniors and cooperation between participating actors for the development of volunteering" TA CR: TD020048*

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## **ECONOMIC GROWTH AND INNOVATION: MEASURABLE INDICATORS OF ECONOMIC PERFORMANCE**

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### **Abstract**

In general, national innovation performance significantly influences the economic growth of a country. For understanding patents as results of innovation process they must be able to enter national economy and influence economic growth rate in terms of gross domestic product. If not, patents may be on the other hand understood as a barrier of competitiveness what means that they slow down national economy and create negative effects. This article deals with the comparison of national innovation performance of selected world countries that are considered as the most advanced in terms of the number of patents and relationships of above mentioned indicators. Discussion part of this study includes the summary of gained results based on previous research activities. The scope of future research focused on consequent factors of innovation performance influencing the economic growth is outlined at the end of the article.

*Keywords: patent, patent application, economic growth, gross domestic product*

JEL Classification: M21, O47

### **1 INTRODUCTION**

There is no doubt that economic growth is based on knowledge economy. Innovation and new technologies itself are the key factors of an economy and stimulate its growth. The analysis of the most developed world economies shows that these economies also achieve great results in the field of innovation. They are leaders of innovative activities.

From the viewpoint of knowledge management, technological progress is a determining factor of growth and innovation performance. According to study of Romer (1990), the technological change is key factor of income and economic growth of the countries. Other studies following Romer (Slobodyan, 2007, Arnold, 2000; Lau and Sin, 1997; Tamai, 2009 and many others) developed his model into different variants and modified it to present conditions and changes in conditions. This model identified key factors important for complex technological change followed by economic growth basically. The influence of innovation performance is further evolved in study of Galindo and Méndez (2014) who analyzed feedback effect between innovation, economic growth and entrepreneurship. The study works with Schumpeterian model and confirms positive interaction between innovation and entrepreneurship. The authors also confirmed a driving force of these factors leading to economic activities and ending into economic performance. The positive effect of these elements is also supported by studies of Bel (2008), Kim et al. (2011) and Hasan and Tucci (2010).

This paper focuses on interaction of innovative activities and factors presenting an economic growth of the most innovative countries in the world. The part of this study also discusses a situation in patent activities of these innovative leaders and considers a context of solved problem in further influencing factors. The main aim of this article is to show basic calculations of applied patents trends compared to economic performance of leading economies in the world.

The paper is structured as follows: following this introduction, Section 2 offers a theoretical background and literature review. Section 3 explains the methodology and data sources used. The main results are presented in Section 4, and discussed in Section 5. Section 6 offers the main conclusions of the study and explains the limitations of the analysis.

## **2 THEORETICAL FRAMEWORK**

The question of economic growth is very complicated and hard to answer. Many factors have been influencing this very important indicator of economy condition and entrepreneurship. It is not easy to identify main elements influencing entrepreneurship and competitiveness and determine definite factors of the economic growth. The heart of the running and growing economy must be innovation and technological change. The definition of innovation is not explicitly given. The definition of Statistical Office of the European Communities (2005) explains innovation as the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations. Valenta says (2001), any change in the industrial structure of the industrial production organism will be regarded as an innovation. This technical concept includes all factors which have impact on innovation and constitute it as well. Valenta explains innovation as a complex process jointed with change in innovation factors and their impact to orders of innovation classification. According to Schumpeter (1934) the innovation is the critical driver of economic growth and depends on knowledge, creativity and further factors (Popescu at al., 2012; Williams and McGuire, 2010 and Vaz and Nijkamp, 2009).

As we understand innovation as a result of innovation process, the final output is possible to measure as an indicator of innovation activities. We analyse this indicator of innovation performance from macroeconomic point of view and compare it to economical factor reported by selected countries and obtained from accessible databases.

### **2.1 Economic growth and performance**

Economic growth of a country represents its increasing economic performance. It is influenced by many factors. One of them is innovation performance. Based on all available studies, noticed in the text below, innovation can be considered as a major source of technological progress, economic growth and growth of living standard.

According to Popa and Vlasceanu (2013) the innovation is described as an important factor and option for economic growth, Batabyal and Nijkamp (2014) studied a role of innovation in a Schumpeterian model of economic growth. The clear role of innovation in economic models shows us a correlation of these two macroeconomic indicators.

### **2.2 Patent activity as a measurable indicator**

There is a lot of indicators that can be considered when comparing innovation performance of individual countries. One of them is a number of patents. If patent is understood as a result of innovation process and realised idea, it is possible to identify with the definition of World Property Intellectual Organization which characterises invention as a product or a process that provides, in general, a new way of doing something, or offers a new technical solution to a problem (WIPO, 2015a). Afterwards, this activity requires some kind of protection in form of the highest level of legal barrier – patent. From the macroeconomic point of view, number of patents is considered as an indicator of innovation performance which is securely comparable with other macroeconomic indicators.

## 2.3 Hypothesis

The literature review leads us to following hypothesis:

H: The innovation activities of companies lead to higher economic growth and better results in economic performance of selected countries.

This hypothesis is based on assumption of close correlation between applied patents as a result of innovation process of companies and economic growth of particular country as a macroeconomic indicator of economic performance.

## 3 METHODOLOGY

In order to compare indicators between different countries, it is necessary to set up absolutely transparent and clear indicators and define limitations for statistical purposes. It is very difficult to explain the innovation as a product result or process output; the meaning could be understand in a board sense of the word from the different point of view.

For the purpose of this paper this very broad concept of innovation had to be defined more precisely. We understand innovation as a final output of innovation process which should be specific and definable. It is offered to use an appropriate database of comparable results of country's innovation performance. The data set was constructed from several number of sources.

### 3.1 Definition of sample data

For purpose of this study we make use of patent database to get relevant, comparable and measurable parameters of innovation performance. So the panel of data was obtained in World Intellectual Property Organization database, of which mission is to lead the development of a balanced and effective international intellectual property system that enables innovation and creativity for the benefit of all (WIPO, 2015b). Patent data of WIPO are obtained from national patent offices and we decided to analyse results of the five best countries in patent application statistics, based on rank in 2013.

Panel data from 5 countries (Germany, China, Japan, Republic of Korea and United States of America), for the period of 2004 to 2014, has been ordered to the best results in 2013 and present almost 79% of applied patents worldwide. Tab. 1 shows basic data for analysis, noticed in period of 2004-2013.

The increasing trend in patent applications shows us the importance of innovative activities in selected countries. Displayed data show a large gap between innovative leaders presented by China and the United States of America and rest of countries in top five world's innovators, more information in Table 1.

Tab. 1 – Trend in patent applications for top 5 world offices. Source: Economics, 2014

Year	Germany	China	Japan	Republic of Korea	USA	Total
2004	82 280	130 384	423 081	140 115	356 943	1 574 400
2005	84 020	173 327	427 078	160 921	390 733	1 702 900
2006	85 461	210 501	408 674	166 189	425 966	1 791 200
2007	86 175	245 161	396 291	172 469	456 154	1 876 900
2008	89 077	289 838	391 002	170 632	456 321	1 929 200
2009	84 695	314 604	348 596	163 523	456 106	1 861 700
2010	86 599	391 177	344 598	170 101	490 226	1 996 800
2011	85 674	526 412	342 610	178 924	503 582	2 157 900
2012	88 625	652 777	342 796	188 915	542 815	2 356 500
2013	89 743	825 136	328 436	204 589	571 612	2 567 900

The next source, which was used for comparison, is database of Organisation for Economic Co-operation and Development (OECD) which includes economic results of its 34 members – the most powerful world economies. Gross domestic product per capita was used for comparison in order to achieve results by work force, not just by economy size and structure. The analysis was based on data shown in Tab. 2. This table displays GDP of these countries and stable trend in its development. GDP of China increased from 4 362 US dollars per capita in 2004 to 12 247 US dollars in 2014. The growth is almost 280 %, China is the country with the fastest GDP growth in this group.

Tab. 2 – Gross Domestic Product, total, US dollars per capita. Source: OECD, 2015

Year	Germany	China	Japan	Republic of Korea	USA
2004	30 668	4 362	29 384	22 968	41 857
2005	32 144	5 015	30 446	24 220	44 237
2006	34 672	5 886	31 795	25 863	46 369
2007	36 737	6 685	33 319	27 872	47 987
2008	38 378	7 458	33 500	28 718	48 330
2009	37 082	8 305	31 861	28 393	46 930
2010	39 563	9 060	33 748	30 465	48 307
2011	42 089	10 006	34 312	31 327	49 732
2012	42 730	11 126	35 501	32 022	51 435
2013	43 108	12 247	36 069	33 062	52 985

### 3.2 Statistical methods

We compared data achieved across the countries and made basic statistical calculations to get details about situation. The baseline equation includes mean and middle value of monitored indicator and its percentage in total value. Then we follow trends in indicators and increasing values in number of applied patents.

In a body of literature there are many theoretical works researching and comparing this area in detail. The study of Zekos (2014) analyses influence of patents on GDP and economic growth, Biglu (2010) investigates the relation between selected countries and patent applications used linear correlation as a statistical method. This study confirms a hypothesis of close relationship a give us a data about regression coefficient and tightness of these factors interdependence.

Statistical calculation in detail we expect in our other study which will be done in a context of more innovation performance indicators. The indicators will be understood as broad factors based on OECD statistics and World Bank data mostly.

## 4 MAIN RESULTS

### 4.1 Patent application and its trend in selected countries

In result part of our paper we would like to present basic calculations of researched area. We see in Fig. 1 trend in number of applied patents in the best ranked countries.

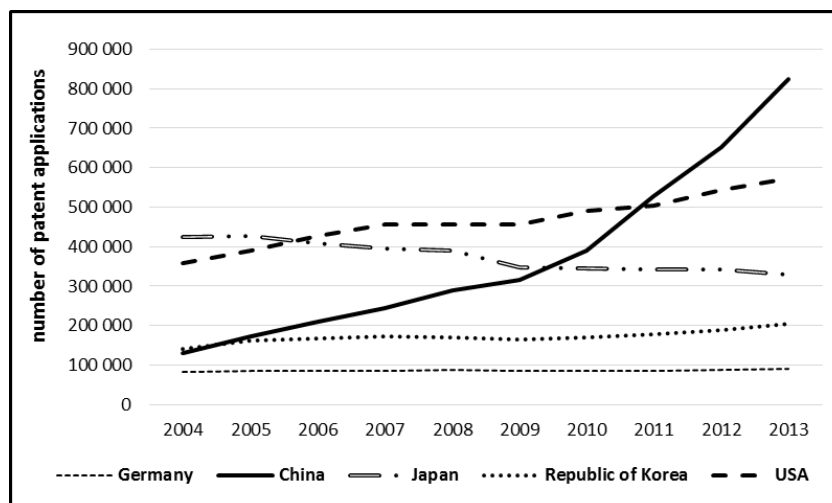


Fig. 1 – Number of applied patents in selected countries. Source: Authoress’s elaboration based on data from Economics, 2014

As we see in a graph, the number of applied patents increased from 2004 to 2013. The highest level of this indicator was noticed in China, United States of America was placed in the second position. These two countries we can consider as leaders and countries determining future development of this indicator. Their position is absolutely ingrained.

Basic calculations show us the mean, middle value and standard deviation are displayed in Tab. 3.

Tab. 3 – Patent applications in selected countries and basic statistical calculations. Source: Authoress’s calculations based on data from Economics, 2014

Country	Mean	Middle value	Standard Deviation	Max	Min	Standard Error
Germany	86 235	85 925	2 238	89 743	82 280	707,57
China	375 932	302 221	214 077	825 136	130 384	67 697,00
Japan	375 316	369 799	35 696	427 078	328 436	11 288,08
Republic of Korea	171 638	170 367	16 265	204 589	140 115	5 143,45
USA	465 046	456 238	62 044	571 612	356 943	19 620,00

It is shown in Fig. 1 and Fig. 2, the trend in Germany has not changed during the selected period. China noticed very dynamic increase in a number of applied patent. In 2004, Chinese applicants submitted only 130 384 patents to patent office, but the trend turned to 825 136 applications in 2013. China became a leader in patent and innovative activities in the world in 2011. The USA were skipped over in ranking and took the second position almost with 600 000 patents.

Fig. 2 presents statistical data calculated Tab. 3. We see amounts of average values gained by particular countries and calculations of standard deviation. It is evident that Chinese results are scattered and the speed of increasing of this indicator is growing up. Noticed variance between values is huge during the period of 2004-2013, see minimum and maximum values, displayed in Tab. 3.

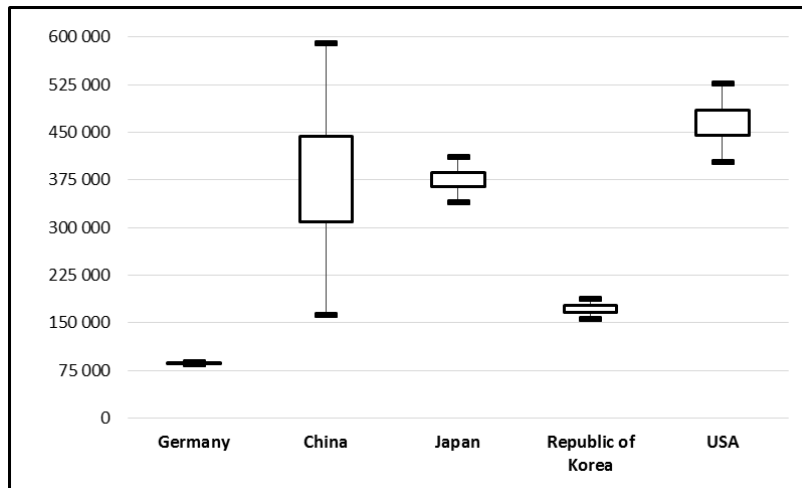


Fig. 2 – Statistical calculations graphically displayed. Source: Authoress’s own calculations based on data from Economics, 2014

These result shows us how the position of China has changed in last 5 years. China became a leader in patent application very fast also driving force of worldwide increase in this area of innovation performance. The position of China is going strengthen and this country is becoming a leader in intellectual property indicators for further years. This data we have to understand in a wider context of Chinese patenting system of technical inventions. Patents are also granted to non-technical inventions which do not correspond to generally accepted definition of innovation and it is very easy to obtain it. Up to 40 % of patent applications is usually granted and the patents used to be granted without any detailed analysis of patent origin.

#### 4.2 Statistical analysis of GDP as an indicator of economic performance

Gross domestic product is the second indicator of our analysis. As it is displayed a trend of increasing GDP for selected countries in a period of time, see Fig. 3.

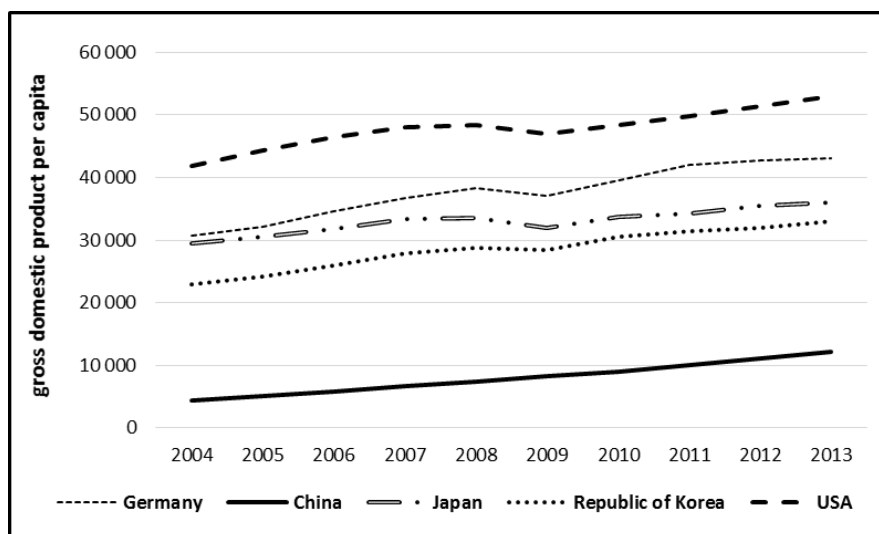


Fig. 3 – Gross domestic product per capita. Source: Authoress’s own elaboration based on data from OECD, 2015

It is noticed in a graph, that USA is a leader in economy's productivity. The trend has increased since 2004 and is stable. Germany is placed on second position, Japan on third position in this category. China closes this rank of five most innovative countries in the world. Gross domestic product per capita in China is on lowest level of all selected countries in our study. This we have understood with problems of educated human capital in China, internal problems of market economy and other factors influencing economy together with future growth perspective.

Statistical calculations of this indicator are displayed in Tab. 4

Tab. 4 – Gross domestic product in selected countries and basic statistical calculations.  
Source: Authoress's calculations based on data from OECD, 2015

Country	Mean	Middle value	Standard Deviation	Max	Min	Standard Error
Germany	37 717	37 730	4 105	43 108	30 668	1 298,21
China	8 015	7 882	2 484	12 247	4 362	785,40
Japan	32 994	33 410	2 016	36 069	29 384	637,60
Republic of Korea	28 491	28 556	3 184	33 062	22 968	1 006,96
USA	47 817	48 147	3 086	52 985	41 857	975,80

Tab. 4 shows average values of all selected countries. USA reached the highest average value from all considered years, namely 47 817 US dollar per capita. There are not significant differences between minimum and maximum values. The table also shows that US economy reaches quite stable results while China (which can be considered as the weakest economy according to this indicator) increases its growth rate. All other countries reached relatively stable economic results without any significant deviations in considered values.

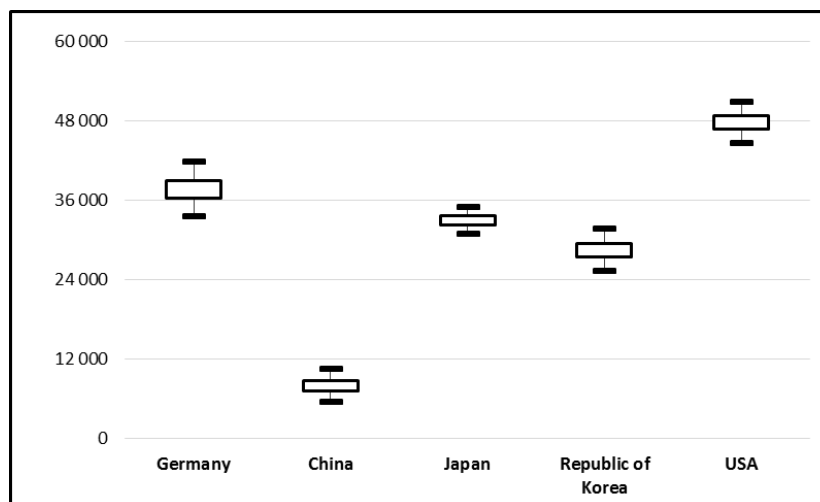


Fig. 4 presents a graph of calculated statistics information. Source: Authoress's calculations based on data from OECD, 2015

Figure 4 includes graphical interpretation of gained results which also illustrates relatively stable values of this indicator with low level of standard deviation. You can see really small differences between lowest and highest values.



## **5 DISCUSSION**

The obtained results clearly show an increasing trend in the number of patents in all considered countries. Countries, which lead ranking of innovation performance, have accelerated growth rate of this indicator and reached more than 80 % of total number of patents applied in 2014.

Number of applied patents of selected countries is increasing faster and faster year by year and confirms growth of innovative activities and their role in performance of economies. The study of Iwaisako and Futagami (2013) investigated an influence of patent protection in an endogenous growth model and its effect to capital and economic growth. They confirmed that the stronger patent protection raises innovation and has positive effect to economies. If we understand patents as an innovation protection, the relationship among these two indicators is done and influenced by tightness of itself dependence. Frietsch at all (2014) examined the linkage between patenting behaviour of selected countries based on level of technology knowledge compared to their economic success in international markets. They confirmed very strong correlation between these two indicators and sense of innovative activities protection. Patent rights and economic growth were studied by Hu and Png (2013), who established the hypothesis that stronger patents rights lead to faster growth in higher-income countries. They connected this effect to accumulation and raising productivity of industrial economies.

If we compare data of analysis, we confirm a dependency of these two parameters of economic performance. The economic growth of china has really huge impact to patent activities of this country. Development of trade with China puts pressure on patent applications that are not internationally acceptable and need to be registered separately by Chinese patent office. The comparison of individual structures of applied patents according to their owner shows that the majority of applications are submitted by residents what is related to China's trade policy. The increasing Chinese investment in science and research confirms its growing trend in innovative activities and awareness of the importance of technological progress and productivity improvement. This Chinese policy is compatible with economic growth of this country, expressed in total values compared to growth rate. Despite of a problem with patent policy and open market economy in China, it exists close correlation between these two factors. Political and economic situation in China initiate a pressure on patent activities on new inventions in connection of production changes from simple job activities to production high added value.

Along with China's awareness of the importance of protecting results of their research, development and innovative activities USA achieve continuous growth of patent protection. USA as a leader of global progress shows a steady increase in the number of applied patents in response to the economic results. The comparison of the structure of patent applications confirms the importance of non-residents investment and patents applied abroad. It refers to the stability of economic growth and attractiveness of US economy for foreign investment. Despite the problems related to economic crisis the United States has become the guarantee of return on investment with a quality system of intellectual property protection what attracts investors and make innovation growth stronger. Regardless of all actual problems of US economy, it is still one of the most developed world economies in the field of innovation. It reaches stable growth of innovation activities, innovation environment and investment in science and research activities.

From the European perspective the most comparable results are achieved by German economy. Germany is the only one from all European countries that is able to keep up with world leaders. It reached fifth position in gross domestic production (in absolute values) in 2014. The German innovation performance is stable and it determines the growth of economic

performance in Europe. Around 80% of owners of applied patents are residents – German owners requiring legal protection of their technical inventions. On the other hand, it is unquestionable that economic and innovation performance are influenced by more factors than just basic performance values. A limitation of this study lies in the incompleteness of the problem which should also consider the influence of human resources, level of technology, investment in education, access to capital and financial resources for innovation etc. The above mentioned factors significantly affect innovation activities of companies and influence economic performance as well. However, this study is not focused on describing the whole problem. Its goal is only to highlight the interdependence of selected parameters and their importance for solved problem.

## **6 CONCLUSION**

In this study we shown a relationship between two indicators of motors of selected economies, ie. applied patents and gross domestic product as an indicator of economic growth, in a period of 2004 to 2013. We confirmed results of other studies which compared economic development and technology from data on patents (Ortiz-Villajos, 2009; Zeira, 2011; Chen and Iyigun, 2011). Our approach is based on basic data from OECD and WIPO databases and hypothesis that innovation activities of companies lead to higher economic growth and better results in economic performance of selected countries.

As we see in a study, the main results show us the relationship between considered indicators based on simple comparison of gained results from the viewpoint of economic growth.

Despite the fact that the results of this study confirm positive relationship of examined indicators, the other theory can understood innovations as a barrier to the new technological discoveries what slows down economic growth.

It is understand as a legal dogma today's approach of patent owner to use the patent protection. In reality, it is impossible to use the knowledge, protected by patent, for higher exploration and development of innovation. Are patents barriers of innovative activities and economic growth? This idea is connected to global inventions and growth of economies compared to protected knowledge and prohibited areas of new changes and cognitions. This question is asked to further research of innovative activities blocked by barriers and further factors influencing innovation process. This assumption is for further study and deeper analysis.

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## **MOBILE BANKING IN THE CORPORATE SEGMENT OF THE CZECH BANKING SECTOR**

*Blanka Kameníková*

### **Abstract**

The aim of this article is to evaluate the current importance of mobile banking in the Czech banking sector, namely in the corporate segment and the possible influence of mobile banking busage on the customer satisfaction and subsequently on the financial performance of a bank. After the general theoretical study of the issue, realised by review of current research papers available, the study tested the level of mobile banking usage and satisfaction with this service in the corporate segment. For this purpose, we distributed a survey among 251 of Czech companies. Research proved that the overall level of usage of mobile banking is 21 % among companies. Companies are overall satisfied with mobile banking, when they use it. The most important reason, why companies do not use mobile banking is overall satisfaction with services provided via general communication channels. The survey results are accompanied by a market study of the current mobile banking applications available in the Czech Republic, focusing on their functionalities, specific features and price conditions.

*Keywords: Mobile Banking, Security, Corporate Segment, Customer Satisfaction, Cross-selling*

JEL Classification: G21

### **1 INTRODUCTION**

As the usage of mobile devices, such as smart phones and tablets has increased dramatically in the last few years, it has influenced many areas of one's everyday life, banking including. The ubiquitous presence of the Internet means people can, and are willing to, manage their financial issues much easier than they did in the past, even easier than with the online banking (using personal computers or laptops). According to the Board of Governors of the Federal Reserve System (2013), mobile banking can be defined as a sum of services allowing consumers to obtain financial account information and conduct transactions with their financial institution. It does not provide customers with the full range of services as the online banking or visiting the branch do, but the number of services available in their mobile version is growing. The most frequent activities in mobile banking are checking account balances, requesting a cheque book, sending payment reminders or viewing the last transactions. Since more and more people are using mobile devices, the potential of mobile banking is huge. Nevertheless, there is also a question of security. Many people do not use mobile banking because they do not trust in it. However, the security itself is not a problem; it is more about the customers' feelings. Thus the main challenge for banks in the coming years is to educate their clients and show them mobile banking is secure. In fact, there was about the same fear releasing online banking and in the end it has turned into the favourite distributional channel for many customers. The reason why banks should pay attention to mobile banking is that it can boost the customer satisfaction and thus cross selling to them. As a result, banks can improve their financial performance adapting to mobile world trends.

## **2 THEORETICAL BACKGROUND**

### **2.1 Smartphone usage as a prerequisite of mobile banking**

The potential of mobile banking is based on the usage of mobile phones, namely smart phones. These gadgets are being widely used by the majority of people in developed countries, such as the USA, Europe or eastern Asia. Many papers, e. g. that of Rooney (2013), Board of Governors of the Federal Reserve System (2013) or ING (2013), show the spread of smart phones has increased dramatically in the last few years. That is the first prerequisite of the mobile banking success. In the Federal Reserve System's publication, 37 % of consumers indicate that getting a smartphone was the main reason why they started using the mobile banking (Board of Governors of the Federal Reserve System, 2013).

As the use of mobile banking increases, mobile phones are also becoming tools for managing personal finances and controlling spending. For example, 64 % of mobile banking users report using their mobile phone to check financial account balances or available credit before making a large purchase in the past 12 months. Of those who checked their balance or available credit, 53 % report that they decided not to buy an item because of the amount of money in their bank account or the amount of available credit. Since so many consumers have almost constant access to their mobile phones, these devices have the potential to provide proper information likely influencing consumer financial behaviour and help them to make different, and perhaps smarter, financial decisions. The actions consumers take in response to the receipt of text message notices from their financial institutions demonstrate some of the potential effects of this technology for encouraging consumers to engage in different financial behaviours that may in the end prove to have beneficial outcomes (Board of Governors of the Federal Reserve System, 2013).

According to The Wall Street Journal, Europe is projected to dominate global smartphone penetration by 2017. Seven of the top 10 countries by penetration will be in Europe (in order: Norway (1), Denmark (2), The Netherlands (3), Sweden (4), Finland (6), the U.K (7). and Germany(9)). South Korea (5), Australia (8) and Japan (10) are the only non-Europeans to break in, whereas the U.S. is 11th. Furthermore, only three countries are predicted to achieve more than 90% penetration and all are European — Norway, the report claims, will have achieved 97.6% penetration by 2017. In the same year penetration in the Middle East and Africa will be only 37%. However, even though the relative penetration in Europe is supposed to be the highest, the Asia-Pacific region is expected to dominate the smart phone market in raw numbers. The analysts predict that while the region currently outsells Europe by about 500 million units (609 million units to 125 million units), by 2017, the Asia-Pacific region will be selling almost a billion more devices (1,266 million to 277 million), and will account for almost half of all smartphones sold globally (Rooney, 2013).

### **2.2 Mobile banking current usage**

According to a survey conducted by ING last year, mobile banking is getting more and more attention among customers. The results of this survey show more than a third (37%) of almost 12,000 internet users surveyed in 12 European countries is already using mobile banking. The biggest share of Internet users who use mobile banking is in Turkey (49 %), Spain (44 %) and the Netherlands (44 %). The major reason why respondents use mobile banking is that it allows to better control their money issues: 84 % say they check the account balance more often, 73 % have more control over spending and 62 % say they pay bills on time more often with mobile banking. It means banking on the go helps people control their accounts more effectively. This survey also suggests mobile banking is going to gain even more popularity in next few years: the uptake of mobile banking is stronger for under 35s, and for people

frequently using social media, which are the groups seen to indicate future trends. Thus, the usage of mobile banking is expected to grow. (ING, 2013)

Similar data is available for the United States. Nearly 28 % of mobile phone users in the survey of the Federal Reserve System report that they used mobile banking in the past 12 months. (Board of Governors of the Federal Reserve System, 2013) Although the number is lower than the current usage of mobile banking in Europe, it cannot be compared that easily. Firstly, the methodologies of the surveys of the Federal Reserve System and ING differ. Secondly, the ING survey was carried out more recently, i.e. by now the current usage of mobile banking in the U.S. could be actually higher than in Europe.

As for the age structure of typical mobile banking users, Samaad (2014) states 57 % of Generation Y use mobile banking. The ING research (ING, 2013) has found out the age group most using mobile banking is the one between 25 and 34 years. 50 % of respondents in this group stated they use mobile banking (46 % of people aged 18-24 and 44 % of people aged 35-44). Finally, the Federal Reserve System's 2012 survey show individuals between ages 18 and 29 account for approximately 39 % of mobile banking users, whereas this age group represents only 22 % of all mobile phone users (Board of Governors of the Federal Reserve System, 2013).

The Federal Reserve System's study also states that the usage of mobile banking is generally not related to a household income. On the other hand, it is supposed to correlate with education. 72 % of mobile banking users have at least college education, which is far more than their 60 % share of all mobile phone users. As for the frequency, a reported median is 6 times a month, whereas the share of mobile bankers reporting that they used it more than 10 times per month increased to 35 % (Board of Governors of the Federal Reserve System, 2013).

### **2.3 Security Dimension**

However, Yoon and Occeña (2014) also point to the fact that consumers have shown reluctance to complete simple online transactions due to security concerns and perceived risk, which is posited as a critical obstacle to consumer acceptance of Internet banking. Therefore, despite an increase in the number of Internet users and advantages of Internet banking for customers, the growth rate of those who adopt Internet banking has not risen as strongly as expected. Therefore, they expected that customers' perceived security negatively influences mobile banking use with a smart phone. The most common banking activities available at smart phones are retrieving an account balance, transferring money between a user's accounts, and making a payment.

Authors as well state that in the context of mobile banking, threats can be made either through network and data transaction attacks or through unauthorized access to the account by ways of false or defective authentication. Rose (2012) adds another common technique that is called "repackaging." This means hackers take a legitimate app, modifying it to include malicious code and then republishing it to the app market or alternate sites. This usually works because the average user cannot tell the difference between the legitimate app and the modified malicious version. Sometimes the hackers will even take a paid app, modify it to include malicious code and then offer it for free. The user, thinking it is the legitimate trusted app will grant the app permission to access various system resources which allows the malicious code free reign over one's device.

Consequently, consumer-perceived security might be concerned with many issues from financial losses to privacy problems. Yoon and Occeña (2014) argue the Internet banking using a smart phone tends to be more vulnerable to malicious attacks than the regular Internet

banking using a personal computer. In order to prevent security problems, advanced techniques including strong authentication procedures, encrypted transactions, and privacy seals can be considered for utilization in Internet banking systems.

Rose (2012) has found out that the software of mobile devices could be problematic itself. Some 76 % of the apps tested actually stored cleartext usernames on the devices, and 10 % of the tested applications, including popular apps LinkedIn and Netflix, were found storing passwords on the phone in cleartext. The security testing on Apple and Android in multiple categories, ranging from social networking applications to mobile banking software found that Apple's iOS based apps consistently scored higher marks than Android apps in security tests. This is because Apple's Keychain security architecture for storing user credentials is supposed to be stronger than Android's Account Manager System.

Also the study of Board of Governors of the Federal Reserve System (2013) concludes the security is a big issue for bank clients. In their survey, consumers reported less confidence in the security of mobile banking and payments technology in the 2012 survey than they did in the 2011 survey. In 2011, approximately 38 % rated the mobile banking service "very safe" or "somewhat safe". In 2012, the share reporting that mobile banking was "very safe" or "somewhat safe" declined to 34 %. The share of consumers indicating that they "don't know" how safe it is to bank with a mobile phone rose from 33 % in 2011 to 40 % in 2012.

However, there are authors arguing that the security of mobile banking is just the same as the security of other distributional channels. For instance Srivastava (2013) suggests that security issues in the minds of customers are here only because of their lack of awareness about this facility. All the messages originating from mobile banking applications are encrypted end to end using 128-bit AES encryption, i.e. passwords are protected up to 128 words. Another method to boost the security is account masking. This technique blocks users from seeing full account numbers. According to Srivastava, there is no solid empirical evidence that the mobile banking is a bigger threat than anything else.

In the Czech banking sector, the main regulating authority- the Czech National Bank, deals with the electronic banking security. Its webpages contain information about the potential threats of electronic banking and provide all clients with advice on how to use the electronic banking in a safe way. (Czech National Bank, 2014)

## **2.4 Benefits of mobile banking**

Various authors, such as Andera (2012), Srivastava (2013) or Samaad (2014) agree on these benefits to be the most important: faster transaction speed, little to no cost for transaction fees, and increased information transparency.

Andera (2012) also pointed out that the Federal Reserve Bank's study, Consumers and Mobile Financial Services, released in March, 2012, stated that the most common use of mobile banking - by 90% of mobile banking users - is to check account balances or recent transactions. Transferring money between accounts is the second most common use (by 42% of users) of mobile banking. But within that total number of online visits, the portion that comes from mobile phones and tablet devices has grown dramatically - by 269% from 2010 to 2012.

## **2.5 Pitfalls of mobile banking**

One reason for not using mobile banking is clear; it is the above mentioned security. According to the ING survey, 33 % of respondents who are not currently using mobile banking say it is because they find mobile banking not secure enough. However, the main



reason for not using mobile banking is that people do not possess the proper technology (i.e. a smart phone or tablet). 37 % of respondents stated this. Only 11 % of respondents say they are not using mobile banking because they can meet their needs easily without interacting in mobile way. (ING, 2013)

## **2.6 Mobile banking for corporate segment**

According to the paper of Stuhldreher (2010), just 5 % of small business owners have used a smart phone for banking functions such as paying bills, but a majority expresses interest in doing so. Mobile services are handy in general, and especially when transactions require dual approval. Such cases typically require a senior executive to sign off on transactions prepared by lower-level employees. With mobile banking, an alert can be sent to the executive's mobile device when a transaction is ready for review. That means he or she can be elsewhere handling other matters without the risk of delaying an important transfer of funds. Small business owners are a natural market for mobile banking because of the convenience factor. They have so many responsibilities to juggle that quick, easy banking becomes a way to manage their time more efficiently and thus an important priority.

## **2.7 Paying for mobile banking?**

Hernandez (2009) opines that though financial institutions have not charged their customers for online or mobile banking, some small-business owners might be willing to pay for such services. This opinion is based on a survey done by Aite LLC (Boston) on a sample of 283 U.S. small businesses. Roughly 50% of surveyed small-business owners stated it would be acceptable for financial institutions to charge fees for some online and mobile-banking services, states the report. Specifically, 27% of respondents would be willing to pay for mobile-banking services, 35% for remote-deposit services and 31% for electronic invoicing. Of the respondents willing to pay for mobile-banking capabilities, 15% would be willing to pay between \$5 and \$10 per month, 3% would pay between \$11 and \$15 per month, 4% would pay between \$16 and \$20 per month, and 5% would pay between \$21 and \$26 per month.

On the other hand, Stuhldreher (2010) suggests that retail customers have come to expect free online and mobile services. Basic corporate banking will likely be free as well, but he agrees that research indicates corporate customers may be willing to pay for advanced functions. Moreover, at present, mobile banking is mostly a retention tool. Business customers are not likely to choose a bank just because it offers mobile banking; although in a couple of years they may abandon banks that do not.

## **2.8 Cross-selling with mobile banking**

Graham (2014) states an interesting example of how mobile applications can boost the cross-selling of a bank. There is an app providing capabilities to search for houses for sales, take and record photos and videos, calculate monthly mortgage payments and finally, connect to a mortgage banker. In such a way a bank is driving more upstream from the transaction element to engage prospects and customers. Moreover, some banks have begun to roll out merchant-funded rewards program, which allows customers to receive coupons from retailers by clicking on offers sent directly to their online banking accounts.

Valentine (2011) adds that mobile banking customers seem likely to be more profitable, and studies are bearing that out. Mobile banking users maintain higher average balances (\$64,303 versus \$59,384) and have higher net worth (\$341,017 versus \$281,263) compared to average

consumers. A customer who actively uses mobile is an engaged customer who a bank can continue to build loyalty with and hopefully cross-sell to.

## **2.9 New trends**

Mobile banking can be considered as a new trend in the banking sector. Thus there are still plenty of opportunities how to bolster its power. According to Belás (2014) the bankers themselves believe the mobile banking will use more mobile devices available, namely cameras, geo location or social awareness capabilities.

The above mentioned survey of ING (2013) also asked respondents about their attitude to social media banking, i.e. carrying out some of the banking activities through social media. Generally, a third of all Europeans (33 %) stated they expect their banks to enable them to make payments through social media. The most agreeing attitude was found in Romania (57 %) and Turkey (51 %). 70 % of respondents expect their banks to give them tips for saving through social media. Currently, customers use social media in relation to their bank for getting general information (39 %), complaining about products and services (32 %) and getting in contact with a bank employee (31 %).

## **2.10 Mobile banking and sustainable growth**

Srivastava (2013) goes a bit further and suggests that in some places, mostly in developing countries, mobile banking can be a tool of financial inclusion and thus a sustainable growth. He defines mobile banking as a secure banking operation by which services of banks like banking, credit card loan, bill payment and pre-paid mobile recharge can be accessed from customers mobile phone anytime and anywhere. According to his paper, rural areas are having enough potential regarding wireless telephone market. If telecom service providers move towards rural market they will get enough business and this can work as a boon regarding financial inclusion too. The results of his research showed that people use mobile banking for these activities: requesting a cheque book (7,5 %), sending payment reminders (7,3 %), seeing the status of cheques/ demand drafts (8,7 %), viewing the last three transactions (11,87 %) and checking account balances (15,9 %). The Federal Reserve System's survey adds locating an in-network ATM, remote deposit capture (i.e. depositing a check by phone) and making online bill payments from a bank account using a mobile phone (Board of Governors of the Federal Reserve System, 2013).

Moreover, there are three different models of mobile banking in different countries:

- **Alternative banking model:** in this model, banks use mobile phone as a mediator between bank and its customer. A customer needs to register his mobile number with the bank. The main functionalities of this model are balance enquiry, alerts, funds transfer etc.
- **Virtual banking model:** here banks have no role to play, i.e. the entire service is provided by Mobile Service providers by acting as a virtual bank. Mobile service providers charge for these services on pre-paid cards or post-paid bills. Mobile service providers use mobile balance too as a virtual currency. This model can as well help in financial inclusion in the third world countries if it is accepted by their central banks by doing proper amendment in banking regulation acts. It is suitable for all banking services.
- **Bank on mobile model:** it is also suitable for all banking services. It is proposed that mobile service providers should have a tie up with banks. Such models of connections already exist in some third world countries, such as India.

## **2.11 Czech banking sector and mobile banking**

As the popularity of smartphones and tablets has been substantially growing recently, all major Czech commercial banks already offer their own applications for these gadgets (for iOS, Android OS and Windows Phone OS). The most innovative bank in this issue was Fio banka, launching its first app for iPhones in May 2011. In August of the same year, it also revealed the app for Androids, and was soon followed by other banks (mBank, Equa bank, UniCredit or GE Money Bank, all of which managed to introduce their apps in 2011). According to Mind Bridge Consulting (2013), users in the Czech republic consider as the most important features of a smartbanking app access security, data transmission security, availability of app for free, account balance and possibility to make payments. The perception of security is noticeably higher if an app allows blocking a payment card in case of loss or stealing. As less useful functionalities were evaluated those which are used rarely, by limited group of users or are available through various alternative information sources. These are for example exchange rates or payment order in foreign currency. The results of the mentioned research showed that the best apps were provided by Poštovní spořitelna, Fio banka and ČSOB. Their applications were the most user-friendly in the comparison of 10 different banks' applications. The basic elements for the evaluation were respondents' subjective evaluation, difficulty of tasks fulfilment, demands on time and number of clicks. On the other side, three banks with the least user-friendly apps were mBank, UniCredit and Equa bank. Although the functions are theoretically the same, the users' experience is what matters in smartbanking apps. The apps have to be fast, easily navigable, safe and not complicated. That is why some of them win competitions even though the apps look basically similar.

The Czech commercial banks are compared on a yearly basis in yet another survey, even more popular, called Golden Coin (Zlatá koruna). In that one, Fio banka won the Golden Coin 2014 in the Online applications category. The jury appreciated above all the fact that Fio banka was the first one in the Czech banking market to offer a smartphone app, free transactions in the Czech republic and Slovakia, possibility to locate the nearest branch or ATM, QR code payments or possibility of priority payments in Euro currency. (Zlatá koruna, 2014)

The specific feature of the Smartbanking of Fio banka is that it offers two levels of access, an open and an authorized one. The first one is open to the public, does not require any login and includes the fees calculator, exchange rates, branch/ATM localisation function and important contacts. The authorised part requires the authorisation of a client and enables to manage their accounts afterwards (payments, transactions, orders, QR codes, cards or patterns). (Fio banka, 2014)

Generally, the apps do not differ much as for the functions offered across the Czech smartbanking market. Almost all of them include account management (payment orders, transaction history, statements, details etc.), QR payments or locating the nearest branch or ATM. However, almost every bank offers some extra service aiming to gain a competitive advantage over all the other banks. In such way, ČSOB offers predictive reading for blind or partially sighted persons and travel insurance arrangement possibility, the portal of Poštovní spořitelna is able to recognise what has been purchased and through this categorisation helps to manage better the family budget, MojeBanka 2 (Komerční banka) also includes the possibility of travel insurance, in the mobile banking of Air Bank clients can use an extra password to authorise payments or can find ATMs of all banks (not only the ones of Air Bank itself), Servis24 of Česká spořitelna enables clients to scan cheques and thus make a payment order in an instant, with mBank P2P mobile payments are possible, the ZUNO app makes

clients able to open a bank account just with their smartphone or tablet and through the app of Raiffeisenbank clients can even apply for a personal loan. (Google, 2014)

As for the price of mobilebanking, the vast majority of Czech banks do not charge any fees for setting or running this service. It is logical: this way to interact with clients reduces the banks' costs (mostly of running a real branch). Nevertheless, some exceptions can be found. Although Česká spořitelna does not require any fee for getting the service, it does charge clients with a monthly fee of 100 or 200 CZK for using mobile and telephone banking. Another bank with the same pricing strategy is UniCredit Bank. The monthly fee for its smartbanking is 100 or 140 CZK for entrepreneurs and firms. (Česká spořitelna, 2014; UniCredit Bank, 2014). Other services, such as sending a confirmation SMS is generally charged in all banks.

### **3 METHODOLOGY OF OUR RESEARCH**

New trends in the banking sector always need more time for publicity and for general subconscious. Especially in the different region of the Czech Republic that is Prague. For those reasons, a questionnaire survey has been used as a method of data collection to analyze usage of mobile banking among of companies in county of Zlin. The questionnaires contained questions on number of employees, years of the company on the market, factors of satisfaction, communication channels and factors of mobile banking.

On the basis of the review of the current theoretical knowledge realised above and experts' estimation, we have formulated these scientific assumptions (SA) and hypotheses (H):

*SA1: Mobile banking is used less than 30 % of companies in county of Zlin.*

*H1: Usage of mobile banking is affected by the size of the company measured by number of employees.*

*SA2: The main reason why companies do not use mobile banking is high concerns about security.*

*SA3: Charging for services would reduce usage of mobile banking.*

Obtained data was analyzed by descriptive statistics and also Pearson's chi-square on significance level is 5 % (0.05).

### **4 RESULTS AND DISCUSSION**

In the questionnaire survey, we contacted a total of 251 respondents, where 28 companies was less than 3 years on the market, 21 between 3 to 5 years and 202 more than 5 years. With less than 50 employees were 190 companies, between 51 – 100 employees 19 companies, 29 companies have 101 -500 employees and 13 companies have more than 500 employees.

Table 1 below gives the results on the level of usage, which is shown as percentage among the companies in the county of Zlin. The results are analyzed according to size measured by number of employees and duration on the market.

Table 1 Overall usage of mobile banking among companies (own source)

Do you use mobile banking?	In total	Number of employees				How long have you been on the market		
		up to 50	51 - 100	101 - 500	more than 500	less than 3 years	3 - 5 years	more than 5 years
Yes in %	21,01 %	26,32 %	10,53 %	3,45 %	7,69 %	32,14 %	47,62 %	17,33 %
No in %	78,99 %	73,68 %	89,47 %	96,55 %	92,31 %	67,86 %	52,38 %	82,67 %
Critical values of $\chi^2$		7,81				5,99		
Calculated values of $\chi^2$		11,02900675				12,4461529		

According to obtained results, only 21 % of companies use mobile banking, which responds to scientific assumption SA1. Also as per the survey, mobile banking is used more than 26 % by relatively small companies with less than 50 employees and also by 47 % of companies, which were on the market more than 3 and less than 5 years.

Statistically significant differences were found, which confirms statistical hypothesis H1 that usage of mobile banking is influenced by the size of the company. Large companies with more than 101 employees do not use mobile banking.

It was also found out that mobile banking is used accordingly to duration on the market.

Reasons, why companies in the county of Zlin do not use mobile banking is shown in the next Table 2.

Table 2 Reasons behind no usage of mobile banking (own source)

For what reason do you not use mobile banking?	In total	Number of employees				Number of years on the market			
		up to 50	51 - 100	101 - 500	more than 500	less than 3 years	3 - 5 years	more than 5 years	
		critical value 7,81				critical value 5,99			
	%	28,87%	30,00%	29,41%	14,29%	41,67%	42,11%	18,18%	27,54%
Security issues	$\chi^2$	3,964300099				2,37854725			
Smartphones and tablets are not used	%	38,66%	37,86%	35,29%	35,71%	50,00%	36,84%	36,36%	38,32%
	$\chi^2$	0,848546494				0,030281362			
Mobile banking app of	%	3,09%	1,43%	5,88%	3,57%	16,67%	0,00%	9,09%	2,99%

the bank does not contain required elements	$\chi^2$		9,268830691					1,959704579		
	%	48,97%	41,43%	70,59%	67,86%	50,00%	36,84%	36,36%	50,30%	
Satisfied without it	$\chi^2$		10,33238186					1,893619223		

Through the obtained results, our scientific assumption SA2 has not been verified. The most important reason, why companies do not use mobile banking is overall satisfaction about 49 % among companies with services provided via general communication channels. Moreover this assumption is strengthened by statistical significance among size of companies measured by the number of employees. That reason was stated by the companies (70 %) with more than 51 and less than 100 employees, respectively 68 % for companies with more than 101 and less than 500 employees.

However, another more important reason than security issue is simple fact that smartphones and tablets are not so common in companies and entrepreneurs do not use them for communication with bank with almost 40 %. Especially in the companies (50 %) which have got more than 500 employees.

Security reasons were provided only by 29 % of companies as key factor why they do not want to communicate with bank through mobile banking. Security question is mostly asked by companies (42 %), which have been on the market for less than three years.

Table 3 Charging for mobile banking and willingness to pay (own source)

Use of mobile banking	Willingness to pay				Total
	yes		no		
yes	22	41%	32	59%	54
no	16	8%	181	92%	197
total	38		213		251

Table 3 is giving us answer on scientific assumption SA3, whether companies would be able to willing to pay for mobile banking services provided by bank. In the survey, companies using mobile banking stated, that they are very satisfied (20 %) respectively overall satisfied (61 %). However there has been strong pressure on banks and their charging policy in the recent years that there has been a logical assumption, that company would not be willing to pay fees for mobile banking.

This assumption was confirmed in the research, where from total of 54 companies, which use mobile banking, only 41 % would be willing to pay for mobile banking. However 32 companies (59 %) stated that they would not like to pay for mobile banking. And 92 % companies, which do not use mobile banking stated, that would not be willing to pay for online service such as mobile banking.

## 5 CONCLUSION

The purpose of this research was to look at usage of mobile banking among companies in the county of Zlin in the Czech Republic. As number of smartphones rises in the hands of the general and mobile banking is considered to become a tool of financial inclusion and thus a sustainable growth. The questionnaire survey was contacted a total of 251 respondents, where

the size and number of employees of the company were used to analyse usage of mobile banking among companies, reasons why companies do not want to use mobile banking, overall satisfaction and willingness to pay for mobile banking services.

The overall level of usage of mobile banking is 21 % among companies in the county of Zlin. That has confirmed our scientific assumption SA1, where mobile banking is used more than 26 % by relatively small companies with less than 50 employees and also by 47 % of companies, which were on the market more than 3 and less than 5 years. The most important reason, why companies do not use mobile banking is overall satisfaction about 49 % among companies with services provided via general communication channels. Moreover this assumption was strengthened by statistical significance among size of companies measured by the number of employees that is why scientific assumption SA2 was not verified.

Research proved that companies are very satisfied (20 %) respectively overall satisfied (61 %) with mobile banking, when they use it. However scientific assumption SA 3 was confirmed, when from total of 54 companies, which use mobile banking, only 41 % would be willing to pay for mobile banking. And 92 % companies without use of mobile banking stated, that they would not be willing to pay for online service such as mobile banking.

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## **THE EXCHANGE INTERVENTIONS AS A TOOL OF THE CENTRAL BANK AGAINST DEFLATION IN THE CZECH REPUBLIC**

*Blanka Kameníková, Vanda Nevřelová*

### **Abstract**

Banking sector has always been the area of great interest, but since the outbreak of the global financial crisis in 2007, the focus on this area has been multiplied. As the economies of euro area, as the global economy, robust recovery still have not been seen. The purpose of this article is to examine the effectiveness of how Czech national bank fights against imminent deflation. Among basic monetary policy tools include short-term interest rates, but since these interest rates are on the technical zero from 2012, the Czech national bank could not use this tool to effectively combat the impending deflation. For this reason were used in this struggle the FX interventions. With the use of correlation analysis, we tested the influence of these FX interventions on the macroeconomic indicators, such as inflation and GDP.

*Keywords: central banking, FX interventions, interest rates, inflation, GDP*

JEL Classification: G10

### **1 INTRODUCTION**

Regarding the European economy, year 2014 in eurozone was in the sign of imminent deflation which wasn't averted despite the introduction of different measures, neither economic growth showed a rebound. Among those measures from ECB have belonged cutting its interest rates on the historical minimum, making unprecedented amounts of cheap loans for banks and embarking on asset purchase programs as aim to pumping liquidity into financial system (Morgan, 2014). Imminent deflation was a bogey for the Czech economy as well and because of level of interest rates of the central bank which are on the so called technical zero, the Czech national bank introduced FX interventions in November 2013. Particularly disquieting developments are recorded in European strong economies such as Germany, French and Italy. According to the outlooks, interest rates in euro area are not expected to rise at least to the end of 2015. Weak economic growth, the imminent deflation plus unconventional tools from ECB are the factors which have an impact on those rates (CNB, 2014).

The reason why we deal with this topic from monetary policy is because it is currently a very actual topic. Probably everyone registered the exchange intervention to weaken the Czech crown, which the Czech National Bank underwent in autumn 2013, for the first time since 2002. Opinions on this procedure vary. Representatives of the two major economic institutions (IMF and OECD) agree in their position statement that the CNB was surely correct. By the words of Johann Prader, an executive director representing the Czech Republic in the Executive Board of the IMF: "If a persistent and large undershooting of the inflation target is in prospect, additional tools should be employed. Foreign exchange (FX) interventions would be an effective and appropriate tool to address deflationary risks in the context of inflation targeting framework. This is expected to quickly increase the price level and help increase inflation expectations toward the target". (IMF, 2013) Regarding the exchange interventions, the OECD commented on this in the OECD Economic Outlook as following: „Low demand-side pressures and decelerating food prices are containing inflation pressures in the near term. With interest rates technically at zero and excess liquidity in the

banking sector, the Czech National Bank has started foreign exchange interventions to prevent a long-term undershooting of the inflation target. Foreign exchange interventions should continue until inflation rises into the boundaries of the inflation target range and conventional Monetary policy tools become effective again". (OECD Economic Outlook, 2013)

Even the former Prime Minister of a caretaker government Jiri Rusnok has a positive attitude to exchange interventions. In his opinion, the foreign exchange intervention will help the Czech economy and increase its competitiveness, the weaker koruna is especially helpful for exporters. Interventions by Rusnok should also help the state budget, because higher economic growth was expected and some income taxes are based on the price rise. However the former neither current president are not fans of currency interventions. Former President Vaclav Klaus considers it as wrong and risky step, which has "very questionable effects, but very undisputed costs", which include rising the prices of importation and pressure on the domestic price level. According to the current president of Milos Zeman, the central bank intervention has never helped anything and vice versa they led to losses. Deflation, which is a bogey for the CNB, according to Zeman does not threaten. (Pololánik, 2013)

## **2 THEORETICAL BACKGROUND**

According to Belás (2013) and Revenda (2011) a monetary policy is one of the stabilization instruments of economic policy by which the national bank can ensure and significantly affect the country's macroeconomic balance. For monetary policy in the broadest sense, we can consider the conscious activity of an entity that is through monetary instruments seek to regulate the amount of money in circulation, and thus achieve certain goals. Economists' views on monetary policy are different. Some say that its effect is only short-term (Espinosa, 1998). According to Friedman (1968) behind this conviction is the existence of money illusion and wage (price) rigidities when individual subjects hardly recognize promptly whether it is inflation or the change in real prices. For this reason, the central bank monetary policy can through its unexpected changes in money supply affect short-term cyclical fluctuations in the economy. The most important and at the same time the fundamental objective of monetary policy is to ensure price stability. The central bank's monetary policy deal with the question of what amount of notes is adequate for the needs of the national economy (Mishkin, 2007). From a practical standpoint price stability means that expected changes in the general price level are small enough and sufficiently gradual, and thus do not affect the decisions of firms and households (Revenda, 2011). According to Jílek (2013), instruments of monetary policy represent implementation of monetary policy and operating target of monetary policy is a tactic. Intermediate and final objective of the monetary policy is a strategy. The way in which operational objective effects on the final objective, is called the transmission mechanism of monetary policy. According to Polouček (2009) the monetary policy transmission mechanism is defined as a string of economic ties through which changes in the monetary policy instruments adjustment ponder to changes in macroeconomic variables. At the beginning of the transmission mechanism thus emerge changes in měnovopolitických instruments that change the behavior of intermediate markets, which consequently through another intermediary markets leads to changes in target markets. Their development the central bank wants to influence.

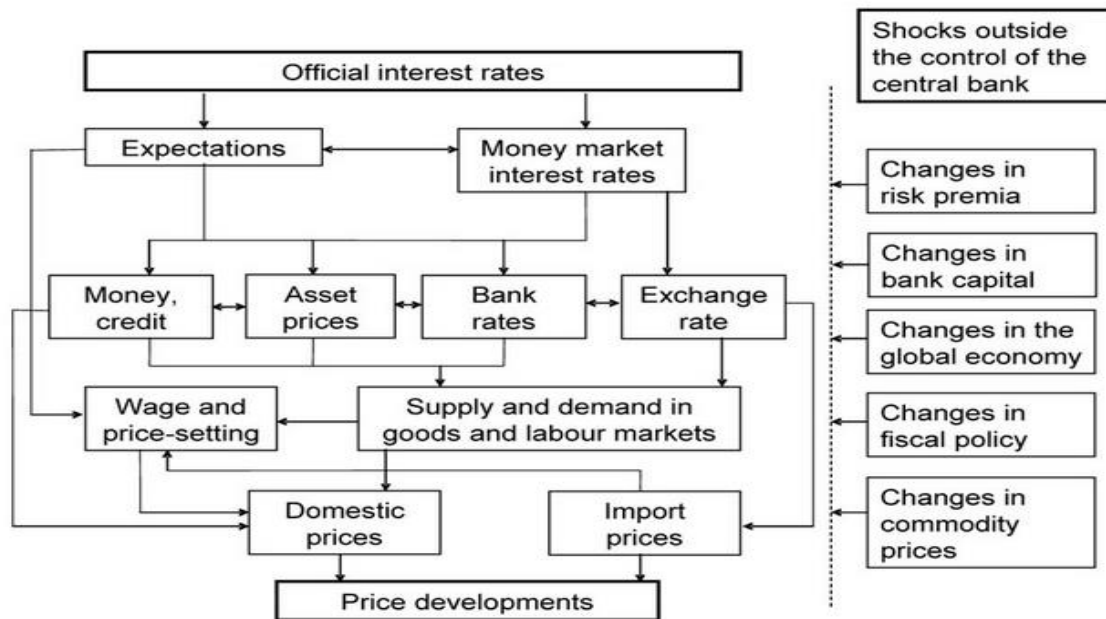


Fig. 1 – Transmission mechanisms of monetary policy. Source: ECB, 2015.

According to Mandel (2008) the process of inflation targeting includes the following system components:

- determination of the inflation target,
- creation of conditional and unconditional inflation forecasts,
- operational management through short-term interest rates of central banks (i.e. repo rate).

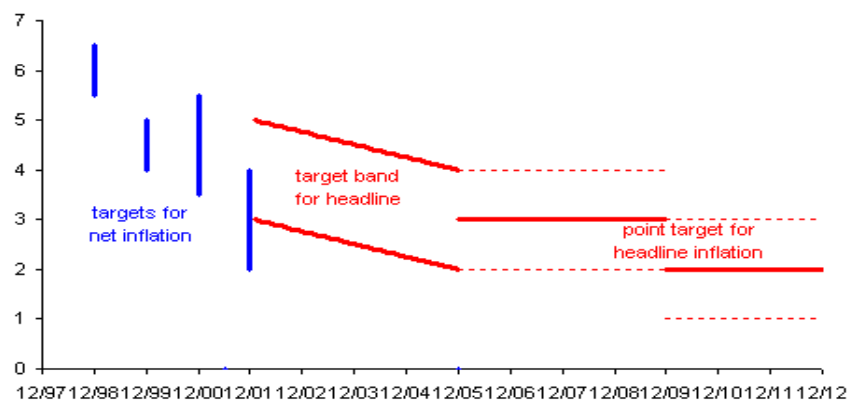


Fig. 2 – Inflation target in European Union. Source: ČNB, 2014.

Since January 2010 the ČNB announced a new inflation target as annual increase in the CPI at 2%. The ČNB strives to ensure that actual inflation does not differ from the target by more than one percentage point in both directions. (ČNB, 2007)

Revenda (2011), Polouček (2006) and even Espinoza-Vega (1998) states as the basic monetary policy instrument interest rates in promoting short-term inflation targets money market, because these rates the central bank is able to best affect. As reported by Mandel (2008), until 2002 the CNB published so called conditional inflation forecast. The validity of these forecasts was conditioned by no changes in interest rates of central banks throughout the forecast period. In mid-2002, however, the CNB acceded to the so-called unconditional forecasts, which already include presumed changes in interest rates. Since 2008, the CNB in its "Inflation Reports" started publishing the interest rate path consistent with the inflation forecast in numerical and graphical form. Bank interest rates are derived from interest rates on the interbank market. These in turn react to setting key of interest rates by the central bank. Central bank influences the short-term interest rates by the 2W repo rate, which the central bank remunerated deposits, which has from commercial banks. The higher the rate is, the greater motivation banks have to deposit money in the central bank, instead of lending them to companies and households. The economy will thus get less money and its rate of growth slow down. Another key interest rate of the central bank is discount rate, which remunerated deposits that banks impose overnight. It is also a lower limit for short-term interest rates. The third interest rate announced by the central bank, is lombard rate. It is the interest rate charged by commercial banks for loans, which provide them the central bank overnight. Banks can borrow at this rate usually when the interbank market can no longer borrow.

The use of foreign exchange intervention as an exceptional tool of monetary policy in their work has suggested McCallum (2000) and Svensson (2001) in the context of discussions of the Japanese experience with deflation and its overcoming difficulty. They pointed to the many advantages that using the exchange rate as of unconventional monetary policy instruments has. Of course the biggest risk for central bank is that intervention will not be successful. For example RBNZ (Reserve Bank of New Zealand) několikrát Central Bank unsuccessfully intervened against the growing NZD in the summer of 2007. The NZD had reached new maximums almost every day. Sales of NZD, which RBNZ held, however, only allowed investors to buy NZD at lower levels. Demand for NZD was so great that the market RBNZ literally "roll over". Therefore RBNZ did not achieved its intended targets and spent significant financial resources unnecessarily. (Paez-Farrell, 2007, Bollard & Cullen, 2004)

The potential negative impact of interventions on the monetary base, tmay be sterilized by central bank through open market operations. Sterilized intervention occurs when the operations in the domestic money market and foreign exchange market will compensate each other. If central bank increase the amount of money in circulation through interventions, it can lead to inflation. To compensate each other markets, the domestic central bank must download money from circulation, e.g. by sale of securities to commercial banks. Effectiveness of sterilized intervention is covered by many economists for decades. However, most of empirical studies recorded only weak or no influence between sterilized intervention and exchange rate changes. (Dominguez & Frankel, 1993)

### **3 RESEARCH AIM, METHODOLOGY AND DATA**

The purpose of this paper is to analyze the CNB's monetary policy. For the reason that primary mission of this policy is monitoring and active influence on the rate of depreciation of money, thus inflation, the core of the analysis is to examine the impact of currency intervention of the CNB on macroeconomic indicators, specifically to the above-mentioned inflation. This analysis will be performed by using the tools of statistics, specifically a correlation. The aim of this study is therefore to group, analyze and evaluate data from

monetary policy and its impact on macroeconomic indicators and try to predict the possible future impact of interventions on the Czech economy.

In this study is examined the degree of dependence between the decisions related to the CNB's monetary policy and their influence on macroeconomic indicators. The dependency ratio is examined by correlation analysis in the program XLStatistics while Pearson's correlation coefficient has the following prescription:

$$r_{xy} = \frac{\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^n (x_i - \bar{x})^2 \sum_{i=1}^n (y_i - \bar{y})^2}} \quad (1)$$

Intervention in the foreign exchange market should favor the export trade and the situation in the Czech economy. These measures are supposed to have an impact on competitiveness, profitability and investment capability of Czech businesses. According to the model of the Czech National Bank the hit to exchange rate should create 35,000 job vacancies in the Czech market. According to the objectives of the Czech National Bank the weakening of the crown and holding exchange rate close to the level of 27 CZK/EUR should accelerate a return to inflation of 2%. This target was set by the end of 2014. According to the development of inflation a Governor of the Czech National Bank Miroslav Singer assumes extension of the system of foreign exchange interventions until at least 2016. For these reasons, it is interesting to find out whether there is a correlation between these indicators. These values were compared for the period from 1 January 2013 to 1 September 2014. The dependence of these variables were compared and evaluated through correlation analysis. For investigation was determined the following hypothesis:

H<sub>1</sub>: Inflation is not affected by monetary interventions of CNB.

For analysis of the CNB's monetary policy in the period 2013-2014, we need to start from the date of November 2, 2012, when the CNB cut the 2W repo rate by 20 basis points to a record low of 0,05 %, the lombard rate was reduced by 50 basis points to 0,25 % and the discount rate was lowered by 5 basis points to 0,05 %, as can be seen in Fig. 3. The 2W repo rate has been reduced to the so-called technical zero and therefore it is no longer possible to influence inflation through this tool. (ČNB, 2012)

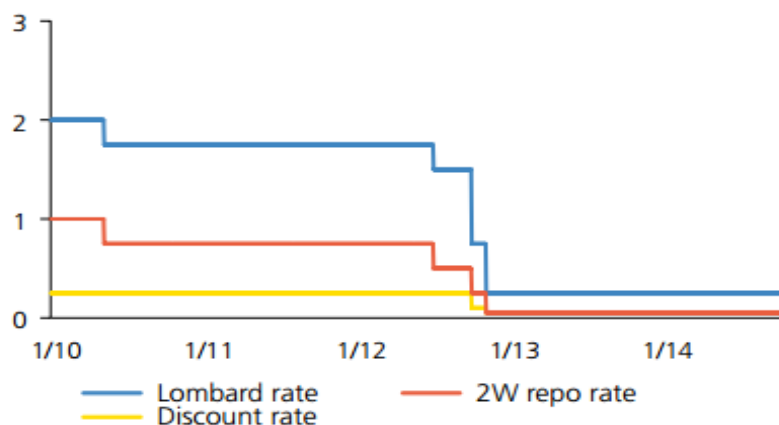


Fig. 3 – CNB key rates. Source: CNB, 2014.

Fig. 4 shows the evolution of inflation since the end of the year. 2012, when inflation has trended generally downward trend. To fulfill inflation expectations, the CNB introduced as the main deterrent to support its decision the deflation-recessionary spiral, which means the following: If the value of money is increasing, society does not have the propensity to consume, which cause a drop in demand, the companies must lay off, household incomes are declining and companies are pushing prices down. The history shows that deflation is bad tame once it gets going, therefore the CNB decided for prevention than any aftercare. The CNB decided to help fulfill the inflation target of 2 % through currency intervention, since the interest rates were not an effective instrument of monetary policy any longer.

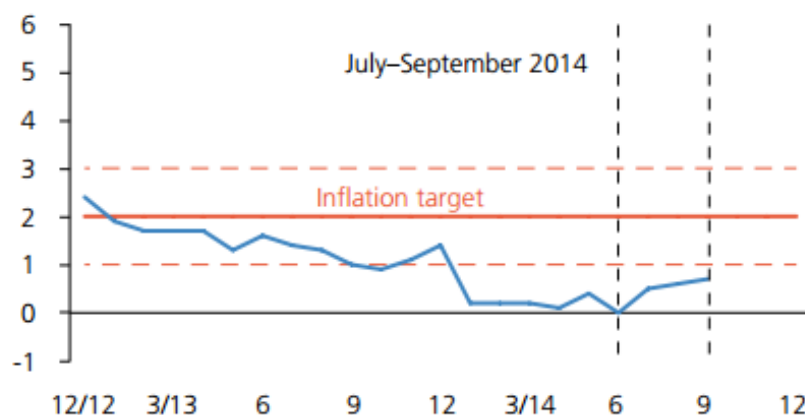


Fig. 4 – Fulfilment of the inflation target. Source: CNB, 2014

Inflation has increased, though, whether this was done due to the CNB is quite different question. The Eurostat data shows that the intervention of the CNB reflected mainly in the evolution of food prices - while in October 2013, food prices in the CR and SR were broadly similar (in October 2013 2,9 % vs. 1,9 %), from November it was otherwise. In SR the first half of last year was followed by a sharp slowdown in food prices, in the Czech Republic the food prices continued in growth, and so the Czech Republic is now the only country in the region where food prices are rising year on year (in SR there is a decline since April 2014).

$$CPI = \frac{P_t - P_{t-1}}{P_{t-1}} \cdot 100 (\%) \quad (2)$$

Regarding the Eurozone, annual inflation in October rose to 0,4 % from 0,3 % in September, which was the minimum for nearly five years. In the EU price growth also accelerated slightly, at 0,5 %. This follows from the final data from statistics office Eurostat.

A year earlier, inflation in the euro area and 0,7 % in the EU was 0,9 %. The rate of growth has long been deeply below level of less than 2 % which the European Central Bank (ECB) has set as a medium-term inflation target.

This gradual move towards deflation strengthens EU problems that devastates the confidence of investors and has a negative impact on the debt burden. Markets can be heard and protest that with short-term interest rates just above zero would be appropriate to to respond more dramatically, as in the US, Japan and the UK.

Prognosis of the year 2014 expected gradual increase of inflation from the third quarter of 2014 and the return of inflation to the 2% target by the CNB in the second half of 2015. In the 2% inflation zone of the CNB's the inflation should keep well in 2016. The CNB announced that using the exchange rate CZK/EUR as an instrument of monetary policy will not be finished earlier than in 2016. On the fig. 5 can be seen inflation in the Czech Republic including the CNB forecast.

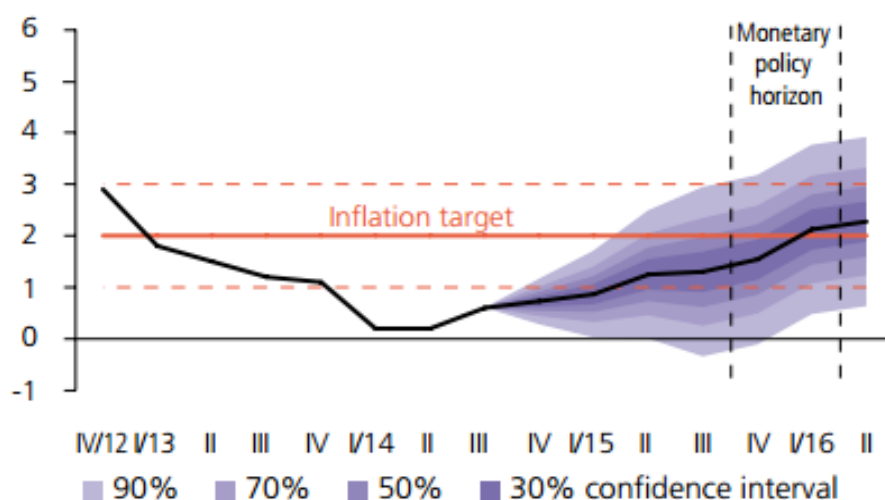


Fig. 5 – Headline inflation forecast. Source: CNB, 2014.

The benefits of the weak crown:

- Economic growth has accelerated, all key indicators of condition of the economy have been improved.
- Exports increased, contrary to expectations, the prices of imported food did not increase.
- Positive effect of artificially weakened crown yet has not exhausted
- According to some estimates, the intervention helped increase the GDP by half a percent and reduced the number of unemployed by 10,000.

Risks of the weak crown:

- Prices may start to decline because of cheap oil, sanctions in Russia and excess of food.
- A recession in the eurozone is not excluded, when the ECB has been still vainly struggling with the threat of deflation. (CNB, 2003-2015)

The onset of currency intervention to weaken the exchange rate CZK/EUR can be seen in the fig. 6.

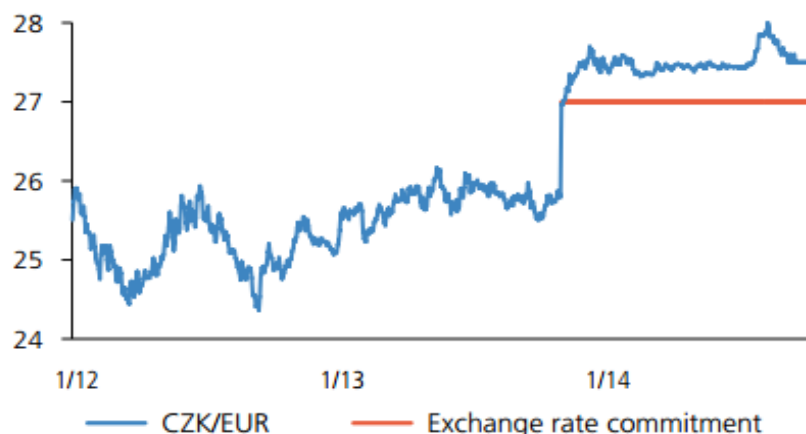


Fig. 6 – CZK/EUR exchange rate. Source: CNB, 2014.

Gradual slowdown in economic growth in 2007 and especially in 2008, has been replaced by more than 4% decline in economic activity in 2009 due to the global financial crisis. The ongoing plight of the global economy and particularly the European economy prevented a faster recovery in 2010. Emerging debt crisis in the eurozone led to a further significant slowdown in economic growth during 2011 and the economic downturn in the next two years, as can be seen from the fig. 7.

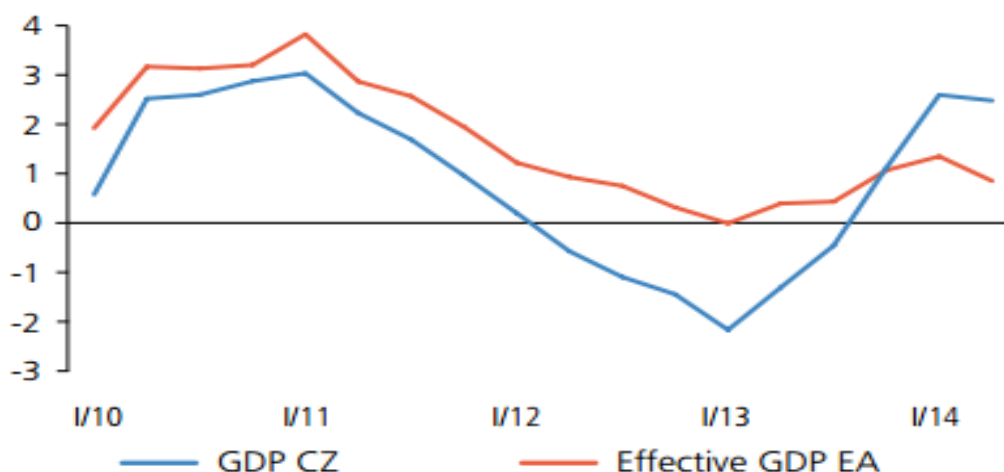


Fig. 7 – GDP in the Czech Republic and effective Euro area. Source: CNB, 2014.

Czech Republic is currently very strongly linked to the European Union which leads the Czech National Bank to take account of developments in European Union countries and their monetary policy. The CNB thus mostly “followed” by direction of the European Central Bank but also responds to domestic specifics.

#### **4 RESULTS AND DISCUSSION**

For correlation analysis was used data with changes in inflation depending on the value of the Czech currency against the euro (against the euro for the reason that we are export-oriented country, largely tied to the economy of Germany). Values were used for the last 21 months (from January 2013 until September 2014). Obtained data was converted into the program XLS Statistics. With this program, the values were converted into scatterplot, which indicates



a linear relationship between inflation and the value of currency. This relationship is expressed in the following function:

$$\text{inflation} = -0,837 * \text{hodnota měny} + 23,874$$

The scatter chart in the fig. 8 shows the regression line, which allows to estimate the dependence of the examined variables and their level of changes.

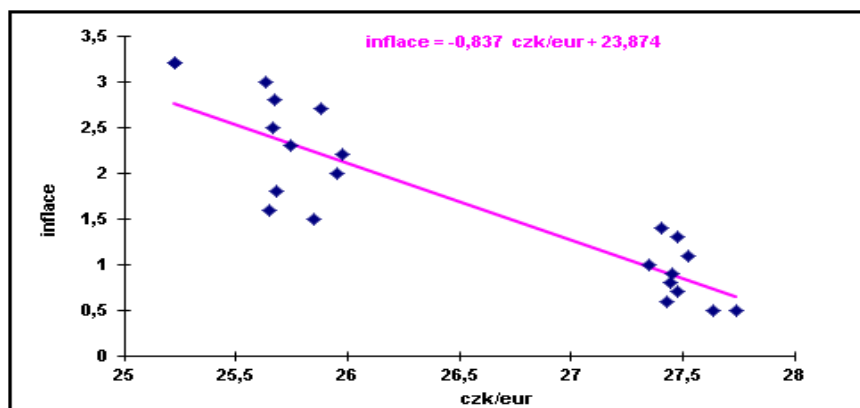


Fig. 8 - scatter chart with regression line. Source: own processing.

To determine the value of the correlation coefficient was used again statistical program XLS Statistics again. The result is given below:

<b>Correlation Coeff</b>	
<b>Correlation</b>	<b>-0,88802</b>

Fig. 9 – Correlation coefficient.  
Source: own processing.

The entire calculation was also verified in Microsoft Excel, both results are identical. The coefficient of determination was also detected while this coefficient reflects the degree of fit of the model and indicates that part of the variability which could be explained by the model.  $R^2 = 0,78858$ , which means that more than three quarters of variance are explained by the regression function, therefore the remaining quarter  $0,21142$  of variance is caused by errors.

Finally, by using of analysis of variance was verified whether there is a statistically significant relationship between the studied phenomena. A null hypothesis was defined (no statistically significant relationship between the quantities exist) and the alternative hypothesis (there is a statistically significant relationship between the studied variables). From the table below (fig. 10), it is clear that the critical value is equal quantile  $F_{1-\alpha}(v_1, v_2)$ , a division of F degrees of freedom, which can be found in the tables,  $\alpha = 0,05$ ,  $F_{1-\alpha}(2, 19) = 3,52$ . Our value F statistic is equal to  $70.8 > 3.52$ . It means that we can reject the null hypothesis. P-value  $0,00000007796$  has a lower value than the significance level alpha of  $0.05$  therefore we can reject the null hypothesis. Among the examined variables there is a relationship.

Analysis of Variance					
ANOVA Table					
Source	DF	SS	MS	F	p-value
Regression	1	11,91509	11,91509	70,869109	7,796E-08
Residual	19	3,1944342	0,1681281		
Total (corrected)	20	15,109524			
Mean	1	56,350476			
Total (uncorrected)	21	71,46			

Fig. 10 - Analysis of variance. Source: own processing.

## 5 CONCLUSION

The aim of this study was to analyze the central bank monetary policy by using the tools of statistics, namely by correlation analysis. At the beginning, one hypothesis was formulated which is related to inflation depending on currency intervention of the CNB. Statistically significant dependence was proved at the defined hypothesis. Thanks to this, therefore, the research has shown that the exchange rate has an impact on inflation.

As mentioned above, short-term interest rates are located at the technical zero from year 2012, therefore the CNB can no longer use them to inflation targeting. To avoid imminent deflation, which would not indicate to economy (which could lead to falling prices and wages and growing unemployment), the CNB decided to use the exchange interventions. However the steps of the CNB are not taken positively from all, as currency intervention can have side and unpredictable effects on the rest of the economy. Given intervention is also quite extensive (in November 2013 CNB purchased about 7,5 billion EUR) and therefore adverse side effects may be higher.

For example, on a server Eurofound.eu (2014) is an article criticizing the CNB's monetary intervention, which, according to the Czech-Moravian Confederation of Trade Unions, seems to be problematic, for example, because it will hit particularly households with low and middle income, because of increased import costs, such as electronics and some food prices. Although households ventured to increased purchases of electronics and other consumer goods after the initiation of interventions, nevertheless it was only a short-term effect, since the pressure for further raise price will dampen household consumption again. The impact of interventions are such that on the one hand, there is an increase in prices of imported goods, which averts deflation and therefore for the CNB it is the fulfillment of its objectives and positive effect, but for households it is a negative, because of a depreciation of their current wealth.

Economic stagnation accompanied Czech economy for five years. The question remains whether currency intervention will not contribute in the longer term to increase our dependence on EU markets. To the Czech economy would help to begin to focus on other territories with rapidly growing economies, such as the Asian country. Fixation of the exchange rate, which is one of the key economic factors, may have except positive short-term results also a negative impact on long-term factors. Movements of economic course are an economic necessity, and therefore experts do not recommend fixated rate for an extended period. In the long run, this fixation is losing his goal and turn causes negative impacts. The CNB presumes to maintain a low rate of the koruna against the euro until 2016. The question is whether interventions for such a long time are still beneficial, but also what happens to

them when the CNB ends with them. What will be the reaction of the markets and how will be downloading excess crown back to the CNB? Because the Czech Republic is a small open economy, these interventions have had a strong impact on export, although smaller than expected CNB. However at the same time these interventions evident in import. If there is a raise the price of imported products, such as fuel and consumer goods, which are important for so energetically and product-dependent country as the Czech Republic is, it will cause a lot of problems in the future. In the short term, many companies and households draws supplies for their production. In the long run, however, these supplies run out, and companies and individuals are forced to buy new goods from abroad at a higher price. Due to this fact the prices of new goods manufactured in the Czech Republic will rise as well, and thus it becomes more expensive even in the context of export. The first year of intervention had a positive impact on our economy. Many economists now criticize the CNB that this step did not have previously. However, this tool is considered to be short-lived. Whether it is a wise decision of the CNB to continue in these interventions, it will appear in the future.

Kalach in his open letter to Singer states that one of the arguments of the CNB is wrong and that is that when it comes to greater consumption by households and firms, and thus provide more space for investment, these investments will lead to industry to modernize production processes and it will be followed by the dismissal of employees (Kalach, 2013). With this we agree, according to our experience and knowledge, we see an effort to minimize the cost and labor costs, and these costs are in each company, if not the greatest, so at least a substantial part of the costs, so companies try to get as much work on the machines and computer programs that control them. Equally he mentioned that you can not increase a demand for goods and services by reducing the value of money, especially when declining purchasing power.

Kohout treats even more detail. He states that price deflation is the result of monetary deflation and that it is in the false correlation with the economic downturn, therefore, they depend only apparently. We have to agree with the assertion that it is difficult to believe that consumers will respond to inflationary expectations by speculative manner. Most citizens do not even know what a deflation means and what the weakening of the crown means, so higher expectations will not affect food consumption, electricity, water, gas, medicines and most other services. Also, we fully agree that the price drop does not result in postponing of consumption. Kohout makes assertion that a price deflation and a decline in GDP is due to monetary and credit deflation. (Kohout, 2013)

In an earlier study, we have encountered a situation in which Milton Friedman proposed a solution, which was based on main thesis of monetarism, the quantity theory of money and their importance for growth and balance of the market economy. He was always for the strict regulation of money in the economy. The main instruments for him were the growth of the interest rates and the growth of the discount rate (restrictive monetary policy). In our opinion, this is one of the cures on inflation, but deflation? After what the CNB cut the interest rates to a minimum, so there was no longer the possibility of using this tool to handle the deflation (which has recently been a major deterrent in the whole world, not just here). Seemingly it would therefore appear that the CNB made the right move, but but has not been another way?

Thus, the solution to which Milton Friedman came in the 70s, when there was a crisis in Japan, according to him, was simple. Bank of Japan must buy government bonds until the amount of money refresh the economy and until it will hold enough power, so that wants the expansionary monetary policy. Friedman also shows how the rates are unreliable as an indicator of appropriate monetary policy. To us this seems to be the right solution, money stay

at home, there is no loss from fall of unstable currencies and there is no redistribution of funds between exports and imports. While the purchase of government bonds could provide enough money to use even fiscal instruments for economic recovery through government spending, they could possibly help revive the economy and even the velocity of money and thus put pressure on inflation.

Current data suggest that the decline in inflation is stopped and the threat of deflation has managed to keep within the limits of sustainability, but was it really caused by the intervention to weaken the crown? Cannot it be that the threat of deflation in the entire EU is now in decline even in those states that did not take intervention? Another fact appropriate to consider we see in marked contrast between the forecasts for inflation and how inflation is actually developed.

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## **THE COMPARISON OF LEVEL OF FINANCIAL LITERACY IN FOUR COUNTRIES**

*Liběna Kantnerová*

### **Abstract**

This paper shows the situation of young population educated in financial lectures at Universities in different countries. The knowledge of students was evaluated with the help of questionnaire and statistical methods. This survey was made in the co-operation with some universities in EU, which were co-operative to author's call. Our students will work after their study often in financial departments and manage not only their private finance, but financial budget of the enterprise too. Financial markets have become more complex and individuals are faced with a proliferation of new investment products, many of which are new and often fairly complex. Investment opportunities have expanded beyond national borders, permitting individuals to invest in a broad range of assets and currencies. Financial systems connected with housing become, more and more, an important part of the whole economy. Housing loans will increase, because urban expansion is intensifying.

*Keywords: students, skills, finance, questionnaire.*

JEL Classification: B21, E44, E50, F60, G02, G2, I25

## **1 INTRODUCTION**

### **1.1 World**

In recent years lot of countries have become increasingly concerned about the level of financial literacy of their citizens. This has stemmed in particular from shrinking public and private support systems, shifting demographic profiles (including the ageing of the population), and wide-ranging developments in the financial marketplace. As a result, financial literacy is now globally acknowledged as an important element of economic and financial stability and development (INFE, 2009).

Individuals are increasingly in charge of securing their own financial well-being after the retirement. With the shift from defined benefit to defined contribution pensions, today's workers have to decide both how much to save and how to allocate their retirement wealth. Financial markets have become more complex and individuals are faced with a proliferation of new investment products, many of which are new and often fairly complex. Investment opportunities have expanded beyond national borders, permitting individuals to invest in a broad range of assets and currencies. On the other side some banks are too big to fail (TBTF), but in the situation of globalisation the connection of them can start collapse of global financial system (Roubini, Mihm, 2011).

Renaud (2009) emphasises that for the first time in world history more people live in urban areas than in rural areas. As a result, financial systems connected with housing become an important part of the whole economy. Housing loans will increase, because urban expansion is intensifying.

The debate on the links between housing and macroeconomics dates back to Fischer (1933) and his debt deflation theory is opened again in the following statement. Residential capital stock plays an important role in the economy, housing expenses constitute an important part of household expenditures, etc. (Chetty, Szeidl, 2004; Greenwood, Hercowitz, 1991; Skinner, 1994). The relationship between macroeconomics and the housing market has been extensively studied for developed countries (for example: Davis, Heathcote, 2005; Hwang, Quigley, 2006; Seko, 2003; Wen, 2001).

Aside from the “crisis effect”, a series of tangible trends underpin the rising global interest in financial literacy as a key life skill. These can be summarised as follows: risks shift, individual responsibility, increased supply and demand of a wide range of financial products and services (PISA, 2012).

In the USA, the financial situation of today's youth is characterized increasingly by high levels of debt. Between 1997 and 2007, average undergraduate student loan debt rose from \$9,250 to \$19,200—a 58% Family's education was strongly associated with financial literacy, especially if a youth's parents graduated from college. Each of the proxies for family wealth and family financial sophistication were also associated with financial literacy (Lusardi, 2012). 33 % (more than 77 million Americans do not pay their bills in time, only 59 % of Americans have savings and 39 % carry credit card debt from month to month by survey made in 2012 ([http://: finance.yahoo.com](http://finance.yahoo.com))).

Financial literacy, as a new field for a researcher, does not have any determination in the literature sources available. The author will try in the next chart to show, how the negotiation among sciences will look and should be in the co-operation in the solution of any problem connected with financial literacy. Psychology can help in questions of: the choice of methods; which is the best way to influence the media to individuals; how to do parental guidance; how to help any individual in some difficult financial situation; or how to change the financial behaviour of anybody which is not good.

Math is the way to calculate any profit from financial products. It can help in preparing financial plans, and how to choice the best financial product. Its importance is connected with pedagogy, which can find the method to explain and teach children or adults the basis of such a calculation.

The next function of pedagogy is the findingof methods of teaching about existing financial products, their basic functions and dangers, which is connected with the teaching of finance.

Finance describes the different financial products, their functions and methods of using or obtaining profit and increasing the personal wealth of everybody.

Behavioral economics helps in the identification of common ways in the behavior of society in the negotiation of the economy of any country.



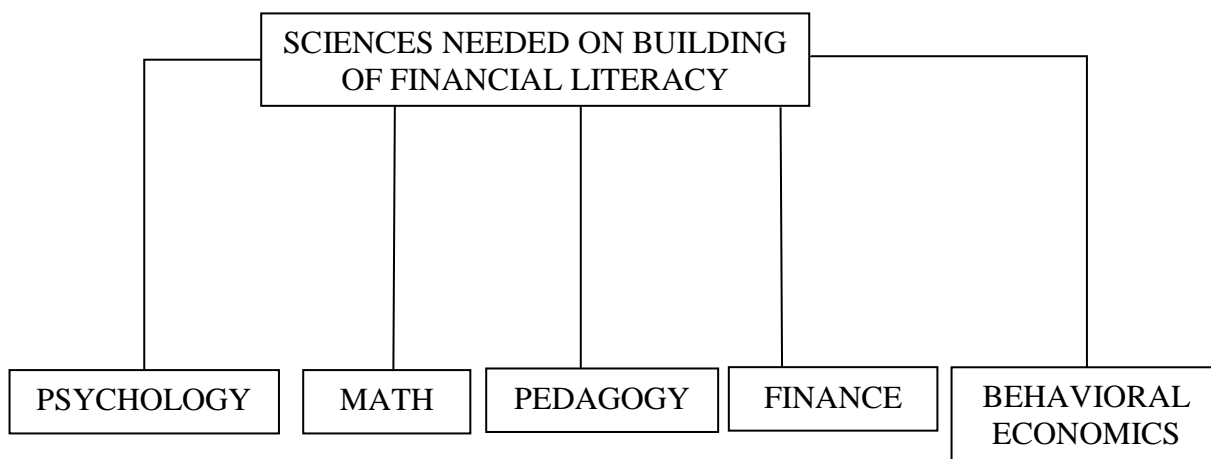


Fig. 1 - Sciences needed on building of financial literacy. Source: own work.

The next chart highlights the negotiation, function and influence among institutions and enterprises connected in the system of one country, their co-operation and influence.

The leader of all should be a government. Their members, through different ministries, should manage the right building of the law system – clear and transparent. For education and the right financial behaviour, the media can be used.

The central bank plays the second most important role. It should co-operate on the creation and function of the law system. The government, through the Ministry of Education, manages the right methods, content and needed results of the teaching of financial lessons. The last role is played by the central banks in financial markets, where they take over responsibility of the right functions of regulatory compliance.

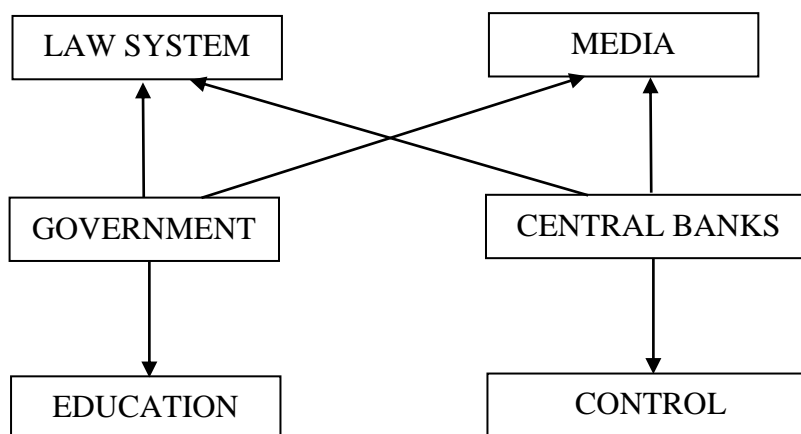


Fig. 1 - The co-operation, influence and negotiations among institution within one country. Source: own work.

The right side includes neutral or deposit operations on finance, which are not so problematic or which are even wanted – like planning for retirement or saving (to create some reserves for a not-so-good time).

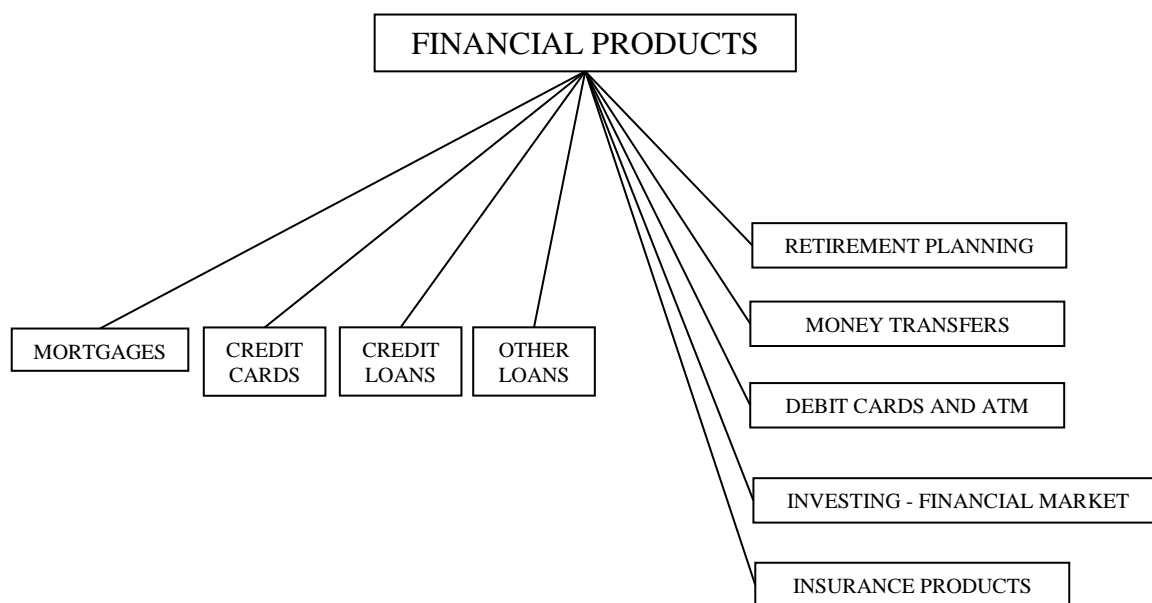


Fig. 2 - Financial products. Source: own work.

## **1.2 The situation in the Czech Republic**

There has been a lot of debate about the definition of financial literacy and many definitions are accepted.

The OECD (INFE) has defined financial literacy as follows: a combination of awareness, knowledge, skill, attitude and behaviour necessary to make sound financial decisions and ultimately achieve individual financial wellbeing.

The Czech Republic brings financial literacy into being in our lives in 2008 in the Standards (Ministry, 2007) of the Ministry of Education, Youth and Sports. There it is stated, that financial literacy is a set of knowledge, skills and behaviour of citizens needed to ensure the finances of the family and its active role in the financial market. One should be oriented in the problems connected with money, prices and be able to manage home households, including the managing of financial assets, and credits and loans with regard to changeable conditions. Financial literacy is composed of three components – currency, prices and the budget of the home.

Nowadays, the situation is changing everywhere. The financial crisis after 2008 and the following economic crisis led banks to decrease the price of money. People in our changing society wanted to reach the level of West-European countries as soon as possible in their lifestyles, and this situation led Czech citizens from their more conservative behaviour to the general belief that it is better to have loans, than to save money. This general idea was announced by lots of economic experts in the Czech media. In the beginning of 2015, the

level of deposit was nearly 1 billion of CZK by central Czech bank ([http://www.cnb.cz/cnb/STAT.ARADY\\_PKG.VYSTUP?p\\_period=1&p\\_sort=2&p\\_des=50&p\\_sestuid=1538&p\\_uka=1%2C2%2C3&p\\_strid=AAD&p\\_od=200511&p\\_do=201411&p\\_lang=EN&p\\_format=4&p\\_decsep=.](http://www.cnb.cz/cnb/STAT.ARADY_PKG.VYSTUP?p_period=1&p_sort=2&p_des=50&p_sestuid=1538&p_uka=1%2C2%2C3&p_strid=AAD&p_od=200511&p_do=201411&p_lang=EN&p_format=4&p_decsep=.)). In the comparison of the total cost of loans for Czech citizens - what is now about 2.6 billion of CZK. This result can be seen as good, because the biggest part of its mortgages and they are the best loan from the point of view of any financial specialist.

It looks like the economic and financial crisis meets the crisis of morality, but not only in financial markets. But the finance is topic of this paper. The current financial crisis has highlighted the need for financial education, education focused on practical life skills associated with administration of personal or family budgets, which are a prerequisite for the financial security of citizens and families. Various forms of investment and return on investment require a certain measure of determination and education. The willingness to take risks requires detailed mapping of the product to know before the signing of any agreement ways of calculation and estimation of possible difficulties. This situation creates the need to teach and educate a new generation by more sophisticated and practical methods. It is necessary to give lectures on practical topics, and their connection with practice, and not only on the theory about the function of something.

## **2 THE AIM AND METHODOLOGY**

Research conducted by author of the article was based on a questionnaire survey. In this article was investigated the state of the financial literacy in some countries of European Union. There was conducted a survey, in which 1062 participants answered to six questions aiming to discover their financial literacy. The questions included: the knowledge of one's own money balance, personal financial planning, knowledge of the relevant information, which describe a loan, financial product for the retirement, the knowledge of the availability of help, when one cannot pay his instalments and finally the purpose of a loan. Further, the survey gathered demographic data on the participants, age, gender, education and financial education.

The aim of this paper was to show the level of financial literacy in different countries and find, if there is any, some methods, differences or connecting matters, what can be used for the improvement of the situation, if needed.

Statistical method was used for its evaluation. The questionnaire contained some questions used by the Ministry of Finance of the Czech Republic, in very short versions. Furthermore, respondents were questioned on their information sources on managing money. "Knowledge" was assessed according to answers to questions.

Data were collected in 2014 at four different universities - in Ceske Budejovice, at University of Maribor, Uniwersytet Łódzki in Lodz and Aristotle University of Thessaloniki.

## **3 RESULTS**

The number of students participated in the questionnaire survey is showed in the next table 1. The total was 1062. Their age was from 18 to 50 years with the majority between 18 and 30.

Small number of students in higher age is caused by the system of education. There are two group of students in the samples, which participated – the majority of presenting studying, usually in the age about 20 and the small number of student is mature students. In this part are few students older, from 30 – 50 years.

Tab. 1 - Number of respondents in the survey. Source: own work.

Country	Number of students
The Czech Republic	486
Poland	250
Slovenia	253
Greece	73

There were from 21 to 38 % of men in the sample. In the level of education, the high school students were in the absolute majority – from 30 to 93 % depending on the country.

Their answers are showed in following tables.

Tab. 2 - Do you have knowledge about your financial situation, do you follow your bank balance? Source: own work.

Country	The Czech Republic	Poland	Slovenia	Greece
Yes, but not regularly – 1a	15.7 %	17.2 %	21 %	18 %
Yes, when needed – 1 b	29.4 %	39.6 %	41 %	29 %
Yes, regularly – 1c	54.5 %	42.8 %	37 %	47 %
No – 1d	0.4 %	0.4 %	1 %	7 %

Answers are acceptable if students are honest in their replies. The differences among countries are not big.

Tab. 3 - Do you plan your financial needs, incomes, outcomes, i.e. budget? Source: own work

Country	TheCzech Republic	Poland	Slovenia	Greece
Yes, but not regularly – 2a	58.2 %	24 %	No answer	7 %
Yes, when needed – 2b	5.9 %	42.4 %	No answer	30 %
Yes, every week – 2c	29.7 %	12.8 %	No answer	41 %
Yes, every month – 2d	3.5 %	9.2 %	No answer	15 %
Yes, every quarter – 2e	0.7 %	2 %	No answer	3 %
Other periodicity	1.7 %	0 %	No answer	0
No	0.3 %	9.6 %	No answer	4 %

Answers from this table are not so satisfactory, because the answers – when needed – are too close to the answer – no. There are lot of respondents, who do not plan their financial budget and too much students do not do it often or regularly.

Tab. 4 - Are you in possession of or thinking of a financial product which will support you in retirement? Source: own work.

Country	The Czech Republic	Poland	Slovenia	Greece
I have something prepared already – 4a	57.7 %	2 %	22 %	No answer yet
I am thinking about some product – 4b	22.7 %	34.9 %	33 %	No answer yet
I do not have any and do not think about it – 4c	19.6 %	63.1 %	45 %	No answer yet

These answers were a big surprise, because of the age of the majority of respondents. But there are big differences among countries involved in the research. Probably the good situation in the Czech Republic is arranged by parents of students.

Tab. 5 - Do you know who can help you if you are in the situation that you are not able to pay your instalment? Source: own work.

Country	The Czech Republic	Poland	Slovenia	Greece
Yes - 5a	82.9 %	65.9 %	59 %	67 %
No – 5b	17.1 %	34.1 %	41 %	33 %

More than half of students know what to do in the situation of debt. This situation is good because of the growing number of people fallen in debt.

From the next table, it follows that if the number in the previous table corresponds with number of students without financial education, then it is not caused by the educational system of schools.

Tab. 6 - Did you graduate in some financial studies? Source: own work.

Country	The Czech Republic	Poland	Slovenia	Greece
Yes	79.7 %	74.6 %	No answer	78 %
No	20.3 %	25.4 %	No answer	22 %

We can say that the number corresponds to „no knowledge“ from the previous table and it probably cannot be caused by not enough education.

The next two requests are oriented to loans and credits. The first one gives us a picture of what is so very important for students that they will buy it from money borrowed from the bank. Some respondents did not reply to this question. Probably it is too hard for them to imagine this situation or they do not want to think about it. The most often objects of their dream are cars and own houses. Lot of answers was oriented to the answer that is not a good aim, to have any credit, what is very positive answer for future.

The last request shows the situation in most preferred criteria for the choice of credit lines.

Nearly all students decided for costs of credit. It is nice. It is only a pity that they often do not know about the best comparison of costs (and the existence of this criterion) – APRC, which is an innovation in the law system of some countries (incl. the Czech Republic) and not so well known.

The next figure shows the results of Canonical Correspondence Analysis (CCA) made on the results of the sample of Czech respondents.

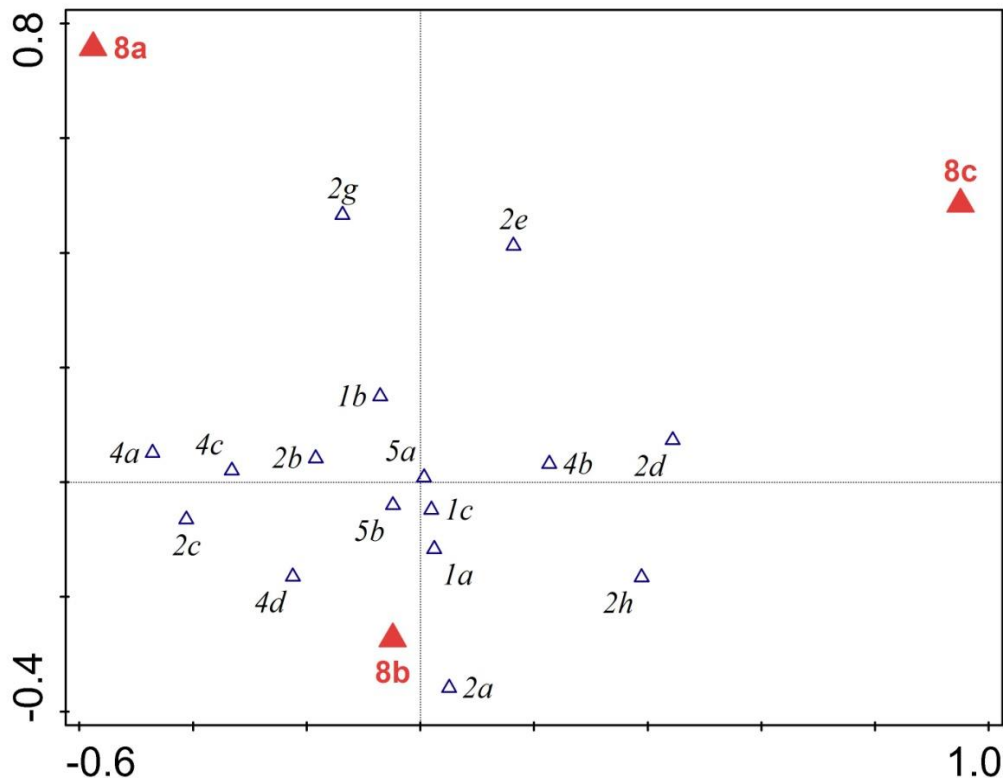


Fig. 1 - Ordination diagram of Canonical Correspondence Analysis (CCA) of Czech students (the other universities did not complete their search yet). Source: own work.

Empty points express those answers from the questionnaire about financial behaviour of respondents (see tables 2 – 5 for legend to labels). Points numbered 8a – 8c represent age of respondents (8a – up to 20 years, 8b – 21 to 30, 8c – 40 and more). The first axis shows 1.6 % of variability, the second axis shows 0.3 % of variability. The effect of age is significant ( $F = 2.7, p = 0.002$ ).

There is a gradient of financial literacy ranging from people with prevalingly right answers (2d – preparation of financial budget regularly, 4a – have financial product for safe pension, 1c – regular information about financial situation, 5a – knowledge about help in debt), to people with wrong answers (4c – no financial product for a safe pension, 2h – no budget, 5b – no knowledge about help in debt, 1d – no information about their financial situation). Only the age of respondents had a significant effect on the composition of answers ( $F = 2.7, p = 0.002$ ).

#### 4 CONCLUSION

In the current world of economic development, the issue of financial literacy is being discussed and scrutinised more frequently. It is undeniable that an increasing number of countries choose to deal with the financial literacy needs in their populations through the design and implementation of tailored, articulated and coordinated National Strategies for Financial Education.

This paper was focused on the level of financial literacy among the young and working Czech population between 18 and 50 years of age. This group of people was specifically chosen because of the importance of knowing the level of financial literacy of this generation, as it is the time of starting life, along with all of its difficulties, and out of which will arise the next

generation. The results can be used by the Ministry of Education, Youth and Sports as the basis for the evaluation of the level of financial education of this generation and for the possible adaptation of the Strategy. The results show that there follows an area of change in the educational process in the raising of young people, because not all are educated enough.

What is surprising is only in the difference in the time doing of a household budget and the answers of the very young and not so very young students (age difference). What matters more is education and care at home, and in the family, than at the school. Education, gender and even taking a financial course did not have a significant effect on respondents' behaviour in this survey.

It can be assumed that family experience and parental guidance are the most frequent sources of information on how to manage and handle finances. The correct model of financial behaviour, which includes discussion of a household budget and the preparation of financial strategies for a family by all its members, is very useful.

From preliminary results looks to be the financial literacy in Poland not good. A majority of Poles (62 %, by Stan wiedzy finansowej Polakow) assess their finance-related knowledge as very weak or weak, what correspond with the evaluation made at the university in Lodz – 58.8 % of their respondents see the situation as very poor. In Slovenia and Greece the level of financial literacy of students is relatively low, on average, when is compared with other students participating in PISA 2012 project. By journal Finance 2014 in Slovenia is average financial knowledge of a Slovene sufficient only for grade 2 from 5. Czech students in the majority refused to evaluate their level, but by lot of other searches (ING, ČNB and MFČR) is not the best.

In all countries is missing linkage between financial theory and its practical application in everyday life. The risk of over-indebtedness or falling into a spiral of debt as well as lack of awareness of the necessity of saving up for retirement were the other aspects strongly emphasized by respondents in all countries. There is space for the building of better educational financial system in all participated countries.

The main goal of this paper is the co-operation of lecturers from different universities and countries and the possibility to exchange information in the following research and help.

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## **ARE THE BANKRUPTCY PREDICTORS SPECIFIC FOR A GIVEN TIME OR BRANCH? THE EVIDENCE FROM THE CZECH MANUFACTURING AND CONSTRUCTION COMPANIES**

*Michal Karas, Mária Režňáková*

### **Abstract**

Bankruptcy is still an up to date topic, as still many companies go bankrupt. Many scientific efforts have been dedicated to creating a more accurate model by to analyzing different sets of predictors (variables of the model) or a different set of methods. Previous work showed that these models are less effective in application in alternative branch or time.

In this paper we test a smof several ratios used in bankruptcy prediction models on a large sample of Czech companies from two branches – manufacturing and construction. We found that the predictor's significance varies considerably between the analyzed branches. In other word we found that some predictors are specific for a given branch. In addition, we found only one predictor significant in both branches for a given moments prior bankruptcy.

The results suggest that a different or modified set of predictors should be used for predicting bankruptcy in alternative branch.

*Keywords: bankruptcy prediction models, financial ratios, model robustness, manufacturing, construction*

JEL Classification: G33, C51

### **1 INTRODUCTION**

The neo-classical economic theory postulates that bankruptcy permits the company to free its poorly used economic resources and deploy them more effectively (see Lízal, Schwarz, 2012). In the short term though, this translates into large economic losses for investors and other stakeholders, as well as significant social and economic costs (Shuai, Li, 2005). For Smrčka, Strouhal, Schönfeld (2012), the societal costs of bankruptcy are mainly higher unemployment, loss of workers' qualifications, greater burden on the country's social system, and dissipation of the company-specific know-how.

By Wu (2010), the internal enterprise causes of bankruptcy may be seen in insufficient management skills, marketing, and inability to compete. They are reflected in the company performance as recorded in the books. For this reason, accounting data or rather financial ratios are a frequent source of information for assessing the stability and viability of an enterprise.

The scientific efforts of predicting corporate bankruptcy based on the analysis of financial ratios dated back to 1960's. Beaver (1966) and Altman (1968) were among the first authors who had the idea of predicting bankruptcy only from financial indicators. They found that the signs of bankruptcy can be traced back for five years. Using a discrimination analysis, Altman (1968) created the first bankruptcy model. According to many authors Altman's model still represents an effective tool to predict bankruptcy (see Li, Ragozar, 2012, Satish, Janakiram, 2011, El Khoury, Al Beaño, 2014, Alkhatib, Al Bzour, 2011). To establish its parameters, Altman compared the data on active companies with the data on bankrupt companies. This data reflected the status as it was one year before the bankruptcy. For variables, Altman chose 5 of the 26 possible financial indicators, the combination of which showed the best

discriminatory capability. This technique is known as creating a reduced-form model, and it is presently the most frequent approach to modeling. It was used, for example, in the studies conducted by Lin Liang, Chen (2011); Wang, Lee (2008); Niemann, Schmidt, Neukirchen (2008); Tseng, Hu (2010); Psillaki, Tsolas, Margaritis (2009); and Cheng, Chen, Fu (2006). Overview of existing models could be found in Čámská (2013). The research on bankruptcy prediction could be divided into two lines:

**1) Testing various methods that can improve the prediction accuracy of models.**

Historically, various algorithms have been employed to devise models of bankruptcy. The first was the linear discrimination analysis (LDA) method (Altman, 1968), developed by Fisher (1936). In reaction to its shortcomings, other algorithms were applied. A number of parametric methods exist, such as the probit model (Zmijewski, 1984) the logistic regression or logit model (Martin, 1977; Ohlson, 1980) and the Cox model (Henerby, 1996; Shumway, 2001). Over time, nonparametric methods were also tried, such as artificial neural networks (ANN) (Al-Shayea, El-Refae, 2012, Back, Laitinen, Sere, 1996; Kim, Kang, 2010, Cút, 2014), Data Envelopment Analysis (DEA) methods (Cielen, Peeters, Vanhoof, 2004; Ding, Song, Zen, 2008), and even some combinations of parametric and non-parametric methods (Andres, Lorca, De Cos Juez, Sanchez-Lasheras, 2011; Chen, Hsiao, 2008). Nevertheless, the LDA method remains the most widely used classification algorithm (Aziz, Dar, 2006). One of the reasons may be the prevalent opinion that the choice of classification method does not offer much potential to improve the bankruptcy model (Niemann, Schmidt, Neukirchen, 2008), i.e. that there is not a statistically significant difference in accuracy between the individual methods (Aziz, Dar, 2006). When speaking about the methods that can be used, one should be aware that there is a trade-off between method accuracy and the interpretability of its outcomes (see James et al., 2013). The advantage of models based on LDA is that outcomes are ease to interpret. This is possibly why the LDA method still remains the most widely used method (see Aziz, Dar, 2006) and why previous models based on LDA (such as Altman's) are still widely used and discussed.

**2) Identifying suitable variables of a model (so called predictors).** The literature (Chen, Hsiao, 2008) categorizes the companies undergoing business crises as follows:

- Companies lacking capital to manage the business and starting to have problems meeting their short-term monetary obligations (Deakin, 1972; Gilson, 1989). Financially, this condition is detectable in the values of current liquidity, quick liquidity, accounts receivable, cash flow, total asset turnover, and other factors.
- Companies with a negative value of non-distributed profit for two consecutive periods or a negative growth for at least 1 year. The signs of financial problems appear in the following indicators (Altman, 1983): asset profitability, sales receipts, profits before and after taxes, and operating profit margin.
- Companies whose shares on a public stock market show an overall drop, are excluded from trading, or withdrawn from the market.

A timely recognition of signs pointing to potential bankruptcy provides a chance to avert it. That is why the economic research has been on a long quest for indicators that could signal the threat of bankruptcy at the earliest possible time. In devising a model, it is rather difficult to collect sufficient data on bankrupt companies, as bankruptcy is relatively rare in business. The first models (Altman, 1968; Ohlson, 1980; Zmijewski, 1984, and others) were designed on the basis of financial ratios calculated using company data one year prior bankruptcy (t+1 period). One of the methods of increasing the accuracy of a model is to use indicators covering several years before bankruptcy (e.g. Perry et al., 1984). The models so designed

included only those indicators (predictors) whose bankruptcy-predicting ability had been established for a single interval only, specifically one year before the bankruptcy. Deakin (1972) found that the ranking of predictor significance changes with the receding time. Deakin's conclusion was confirmed by the work of Grice and Dugan (2001). Shumway (2001) criticizes the earlier bankruptcy models (of Altman, Zmijewski and Ohlson) as static since the time factor is ignored. These issue were also considered by Henerby (1996) who, aided by the Cox's model (see Cox, 1972), analyzed the appropriateness of cash flow-based indicators for predicting bankruptcy, and concluded that these indicators are statistically most significant 3 years before the event and can therefore serve as early indicators. Lin, Liang, Chen (2011) summarize this problem in following way: *“Early studies tend to treat financial ratios measuring profitability, liquidity and solvency as significant indicators for the detection of financial difficulties. However, reliance on these financial ratios can be problematic. The order of their importance, for example, remains unclear as different studies suggest different ratios as the major indicators of potential financial problems.”*

From a different point of view authors such as Platt and Platt (1990), Grice and Dugan (2001), Niemann et al (2008) and Wu, Gaunt and Gray (2010), have pointed out this problem and indicated that the predication accuracy of bankruptcy models (their ability to differentiate correctly between a company threatened by bankruptcy and a prospering company) falls markedly when they are applied to a different branch, period or economic environment than original environment.

Such arguments motivate efforts aimed at creating new bankruptcy prediction models. In this context, Thomas Ng, Wong and Zhang (2011) point out the need of creating models for branches such as construction, as the existing models are inappropriate for this branch. In general, Kaplinski (2008) claims that bankruptcy prediction models should be adjusted to the economic conditions of the given country or even branch.

The possible explanation could be that the significance of bankruptcy predictors is not stable over time or these predictors are specific for given time, place and branch.

The aim of this paper is to analyze the significance of a set of financial ratios in different time periods and two branches. Moreover to answer the question whether is possible to find such predictors that are not specific for given time period or branch. The financial ratios, in this research, were analyze on a univariate base, as this is a starting point of search for a more robust bankruptcy models, next step will be performing the analysis on multivariate base.

## 2 SAMPLE AND METHODS

The sample under investigation is comprised of 34,533 companies in two branches in Czech Republic, namely, Manufacturing and Construction. There are 34,229 active (or financially healthy companies) and 304 bankrupt companies (a year before bankruptcy), for more details see following table.

Tab. 1 – Numbers of investigated companies. Source: Our own analysis of data from the Amadeus database

<b>Branch</b>	<b>Active</b>	<b>%</b>	<b>Bankrupt</b>	<b>%</b>	<b>Total</b>	<b>%</b>
M – Manufacturing	27748	80,35	161	0,47	27909	80,82
C– Construction	6481	18,77	143	0,41	6624	19,18
<b>Total</b>	<b>34229</b>	99,12	<b>304</b>	0,88	<b>34533</b>	100,00

Taking into consideration, that bankruptcy of a company is a rare phenomenon, the branches with a relatively high number of bankrupt companies were chosen for the purpose of the research. Even though the proportion of bankrupt companies in the sample is relatively low, only 0,88%.

The data were obtained from AMADEUS (Analysis Major Database for European Sources). The bankrupt companies in our sample declare bankruptcy during years 2008 and 2013, although data on these companies was monitored over 5 time intervals. In the case of the bankrupt companies, the first interval studied is the year before bankruptcy, which is referred to as period  $t+1$ . The period studied is then the period between the years 2003 and 2013.

As there is insufficient number of observation of bankrupt companies in the branch of Transportation and storage, this data were not further analyzed.

We test a set of 17 financial ratios covering several aspects of company's financial health. These ratios are often used in studies on bankruptcy prediction problems (see Beaver, 1966; Altman, 1968, Karas, Režňáková, 2013, Čámská, 2013, Cút, 2014)

Tab. 2 – Numbers of investigated ratios. Source: Beaver (1966), Altman (1968), Karas, Režňáková (2013), Čámská (2012, 2013)

No.	Ratio	Shortcut
1.	Current ratio	CR
2.	Working capital/total assets	WC/TA
3.	Working capital/sales	WC/S
4.	EBIT/total assets	EBIT/TA
5.	EBITDA/total assets	EBITDA/TA
6.	EAT/equity	ROE
7.	Current liabilities/total assets	CL/TA
8.	Long-term liabilities/total assets	LTL/TA
9.	Debt-equity ratio	DER
10.	Sales/total assets	S/TA
11.	Sales/Stock	S/St.
12.	Sales/Debtors	S/Deb.
13.	Sales/Current liabilities	S/CL
14.	EBIT/Interest	EBIT/Int.
15.	EBITDA/Interest	EBITDA/Int.
16.	Fixed assets/total assets	FA/TA
17.	Sales/Operating revenue	S/OR

For identifying potential predictors we used a two sample t-test with equal or rather unequal variances. The test procedure can be described in following way.

Let there be two independent random samples ( $X_1, \dots, X_n$ ) from distribution  $N(\mu_1; \sigma^2)$  respectively ( $Y_1, \dots, Y_m$ ) from distribution  $N(\mu_2; \sigma^2)$ . We assume that  $n \geq 2; m \geq 2; \sigma^2 > 0$ .

The t-test tests a null hypothesis, that the difference between the means of both groups ( $\mu_1, \mu_2$ ) is equal to some constant ( $\Delta$ ), in most cases to zero ( $\Delta=0$ ), i.e:

$$H_0 : \mu_1 - \mu_2 = \Delta \quad (1)$$

Against the alternative hypothesis

$$H_1 : \mu_1 - \mu_2 \neq \Delta \quad (2)$$

The test criterion, under assumption of **equal** variances can be written in following form:

$$|T| = \left| \frac{\bar{X} - \bar{Y} - \Delta}{\sqrt{(n-1) \cdot S_x^2 + (m-1) \cdot S_y^2}} \cdot \sqrt{\frac{nm \cdot (n+m-2)}{n+m}} \right| \geq t_{n+m-2}(\alpha) \quad (3)$$

where

$\bar{X}, \bar{Y}, S_x^2, S_y^2$  are characteristics of the two random samples.

The test criterion, under assumption of **unequal** variances can be written in following form:

$$\frac{|\bar{X} - \bar{Y}|}{S} \geq \frac{v_x t_{n-1}(\alpha) + v_y t_{m-1}(\alpha)}{v_x + v_y} \quad (4)$$

where

$$S_x = \frac{1}{n-1} \left( \sum_{i=1}^n X_i^2 - n\bar{X}^2 \right), S_y = \frac{1}{m-1} \left( \sum_{i=1}^m Y_i^2 - m\bar{Y}^2 \right) \quad (5), (6)$$

$$S = \sqrt{\frac{S_x^2}{n} + \frac{S_y^2}{m}}, v_x = \frac{S_x^2}{n}, v_y = \frac{S_y^2}{m} \quad (7), (8), (9)$$

Financial ratios were defined for each analyzed company in the sample of active and in the sample of bankrupt companies. The ratios were calculated according to status of the company (i.e. active or bankrupt), the last reported year (2008, 2009, ..., 2013), i.e. in case of bankrupt companies the year of bankruptcy and finally according to the number of years prior bankruptcy (t+1, t+2, ..., t+5).

The F-test and t-test were applied to test the potential differences between the samples of active and bankrupt companies ratios and the p-values of these tests were analysed.

### 3 RESULTS

The following table shows a descriptive statistics of the first analyzed ratio, the current ratio (CR) based on the 2013 year results. The following designation for branch or rather the status: C – Construction and M – Manufacturing. Active companies are denoted with (A), bankrupt ones with (B).

For examples CR M (A) is the indicator of current ratio calculated for active companies from the branch of manufacturing. All ratios are calculated at moment t+1.

Tab. 3 – Descriptive statistics of the current ratio indicator Source: Our own analysis of data from the Amadeus database

<b>Ratio</b>	<b>Mean</b>	<b>Median</b>	<b>Std. Dev.</b>	<b>Quant. (1%)</b>	<b>Quant. (99%)</b>
CR C (A)	11,28752	1,48375	195,3601	-0,06849	146,5467
CR C (B)	17,91368	1,085861	50,46679	-44,62	196,1683
CR M (A)	11,28752	1,48375	195,3601	-0,06849	146,5467
CR M (B)	17,91368	1,085861	50,46679	-44,62	196,1683

The following steps were taken to identify potential predictors respectively to identify those predictors that are or are not specific for given industry or time.

- 1) To identify the predictors that are significant at 5% level of t-test for each of the analysed branches, **regardless the number of years prior the bankruptcy and the last year**.
- 2) To divide the set of predictors from point 1 into the set of predictors that are specific for a given **time** (i.e. they are significant in only at one moment prior bankruptcy) and on a set of predictors that are significant in more than moment prior bankruptcy (t+1, t+2,..., t+5).
- 3) To divide the set of predictors from point 1 into the set of predictors that are specific for a given **branch** (i.e. they are significant in only one branch) and on the set of predictors that are significant in more than one **branch** (2, 3 or 4).

The following table shows the summary of results of t-test and F-test for the indicator of current ratio (CR) for companies that bankrupt in 2013 (i.e. 2013 is theirs last year). The ratios were tested separately for every year prior bankruptcy (t+1, t+2,...t+5). For example CR C1 is the current ratio calculated using the data on construction companies one year prior bankruptcy.

The statistical significance of the t-test results was highlighted by using the following designation: \*statistically significant at the 10 % level, \*\*statistically significant at the 5 % level, \*\*\* statistically significant at the 1 % level.

Tab. 4 – The t-test and F-test results for the current ratio indicator Source: Our own analysis of data from the Amadeus database

<b>Ratio</b>	<b>t-stat. (eq. 3)</b>	<b>df</b>	<b>p-val.</b>	<b>t-stat. (eq. 4)</b>	<b>df</b>	<b>p-val.</b>	<b>F-stat.</b>	<b>p-val</b>
CR C 1	0,2514	4728	0,801503	0,8978	74,69144	0,372178	14,9851	0,000000
CR C 2**	2,5282	4263	0,011501	2,4312	53,21465	0,018451	1,0836	0,634200
CR C 3*	1,7203	3834	0,085463	1,6615	47,06880	0,103256	1,0738	0,680777
CR C 4*	2,9240	3389	0,003478	2,1602	45,66608	0,036038	1,8649	0,000872
CR C 5	0,2033	2933	0,838931	0,4988	47,78218	0,620182	6,5660	0,000000
CR M 1	8,11320	6959	0,000000	1,45176	54,02082	0,152351	41,32208	0,000000
CR M 2*	3,82548	6494	0,000132	1,83688	53,19809	0,071816	4,48973	0,000000
CR M 3	0,31869	6045	0,749974	0,74480	57,40045	0,459432	5,72898	0,000000
CR M 4**	-2,2590	5639	0,023920	-1,99902	51,74238	0,050871	1,28292	0,170933
CR M 5	0,25840	5189	0,796106	0,66865	57,35427	0,506401	7,16042	0,000000



When analysing only the year 2013 as the last year, we found that the current ratio is a statistically significant predictor in five observations. In the branch of construction, the mentioned ratio is significant at 5% level in the moment t+2 and at 10% level even in the moment t+3 or t+4.

Furthermore, there are two significant observation of the mentioned ratio in the branch of manufacturing, namely at 5 % level in moment t+2 and at 10% level even in moment t+4.

When analysing the whole period (not only 2013), we found that only 38% (i.e. 65 of 170) of analyzed ratios are significant bankruptcy predictors at least at one moment prior bankruptcy (t+1, ... , t+5) regardless the last year. The next table show which predictors are significant in which moment prior bankruptcy for analyzed branch.

The following tables show the results of t-test (in form of p-value) of all analyzed predictors. The p-values lower than 5% are highlighted.

Tab. 5 The statistical significance of predictor (p-value of t-test) according to moment prior bankruptcy – manufacturing branch Source: Our own analysis of data from the Amadeus database

<b>Ratio</b>	<b>Manufacturing</b>	<b>Construction</b>	<b>Ratio</b>	<b>Manufacturing</b>	<b>Construction</b>
EBIT/TA 1	0,199454	0,149817	S/TA 1	0,000135	0,000145
EBIT/TA 2	0,035439	0,100805	S/TA 2	0,000896	0,064748
EBIT/TA 3	0,352682	0,277934	S/TA 3	0,009301	0,000009
EBIT/TA 4	0,092542	0,250519	S/TA 4	0,000098	0,000000
EBIT/TA 5	0,054294	0,191814	S/TA 5	0,010579	0,001738
CR 1	0,152351	0,055702	S/St. 1	0,000000	0,000012
CR 2	0,000001	0,011501	S/St. 2	0,000206	0,001614
CR 3	0,028500	0,003190	S/St. 3	0,000183	0,000000
CR 4	0,023920	0,036038	S/St. 4	0,000000	0,000007
CR 5	0,000515	0,003782	S/St. 5	0,000311	0,000101
WC/TA 1	0,165825	0,118766	S/Deb. 1	0,000028	0,051489
WC/TA 2	0,095520	0,252885	S/Deb. 2	0,000006	0,055761
WC/TA 3	0,038697	0,239034	S/Deb. 3	0,006823	0,013411
WC/TA 4	0,193863	0,134736	S/Deb. 4	0,000147	0,010382
WC/TA 5	0,058560	0,048847	S/Deb. 5	0,098064	0,027532
WC/S 1	0,180329	0,013953	S/CL. 1	0,000873	0,000000
WC/S 2	0,322218	0,175934	S/CL. 2	0,000000	0,000000
WC/S 3	0,283108	0,038336	S/CL. 3	0,000001	0,000003
WC/S 4	0,226366	0,149575	S/CL. 4	0,003385	0,005279
WC/S 5	0,150053	0,081621	S/CL. 5	0,000003	0,000015
EBITDA/TA 1	0,005693	0,015499	EBIT/Int. 1	0,002204	0,000165
EBITDA/TA 2	0,013128	0,001497	EBIT/Int. 2	0,001800	0,007598
EBITDA/TA 3	0,001929	0,048971	EBIT/Int. 3	0,000032	0,004468
EBITDA/TA 4	0,005311	0,019051	EBIT/Int. 4	0,000267	0,000044
EBITDA/TA 5	0,041901	0,000066	EBIT/Int. 5	0,000105	0,000001
ROE 1	0,111154	0,275890	EBITDA/Int. 1	0,000185	0,000017
ROE 2	0,229190	0,263001	EBITDA/Int. 2	0,000417	0,011431
ROE 3	0,059983	0,215649	EBITDA/Int. 3	0,000209	0,000340
ROE 4	0,335522	0,149374	EBITDA/Int. 4	0,000006	0,000521
ROE 5	0,264448	0,046411	EBITDA/Int. 5	0,000090	0,000001
CL/TA 1	0,162639	0,118789	FA/TA 1	0,000000	0,000018

CL/TA 2	0,088035	0,237282	FA/TA 2	0,000090	0,000001
CL/TA 3	0,035468	0,223075	FA/TA 3	0,000000	0,000147
CL/TA 4	0,189074	0,144197	FA/TA 4	0,003983	0,019113
CL/TA 5	0,054970	0,072719	FA/TA 5	0,010347	0,030389
LTL/TA 1	0,319567	0,176218	S/OR 1	0,001215	0,000000
LTL/TA 2	0,166911	0,201373	S/OR 2	0,000000	0,000004
LTL/TA 3	0,200211	0,328683	S/OR 3	0,000000	0,000049
LTL/TA 4	0,276662	0,321930	S/OR 4	0,000000	0,000024
LTL/TA 5	0,277591	0,379485	S/OR 5	0,000000	0,004709
DER 1	0,000107	0,030306			
DER 2	0,102801	0,349476			
DER 3	0,034032	0,130705			
DER 4	0,007769	0,142695			
DER 5	0,447906	0,051779			

As the tested predictors were significant in several analyzed years (2008-2013), the table shows only the lowest p-values (i.e. the most significant value) achieved by the given predictor in the analyzed period.

## 4 DISCUSSION

The accuracy of bankruptcy prediction models is determined by the effectiveness of its predictors. Studies as Platt and Platt (1990), Grice and Dugan (2001), Niemann et al (2008) and Wu, Gaunt and Gray (2010) have pointed out that the predication accuracy of bankruptcy models falls markedly when they are applied to a different branch, period or economic environment than that from which the data on which they were developed was taken often. These studies often present this problem on the example of Altman's model (see Altman, 1968, 1983). Three of here the analysed predictors were included in Altman's model too, i.e. the relative size of working capital (WC/TA) measuring liquidity, the return of assets (EBIT/TA) measuring profitability and the total assets turnover (S/TA) measuring the intensity of assets use. It is worth to mention that Altman's model was designed for manufacturing companies. We found that the WC/TA, EBIT/TA and CL/TA are time specific in the branch of manufacturing. The S/TA ratio works well in manufacturing and construction. In our previous research, although by using different approach, we found that the total assets turnover (S/TA) represents a very significant ratio in predicting corporate bankruptcy (see Karas, Režňáková, 2013).

From the table 5 is it obvious, that the analyzed set of predictors is more effective in the branch of manufacturing. The potential explanation could be that most of the previous studies were focused on the manufacturing companies.

But on the other hand 5 of 17 predictors are **specific for a single moment prior bankruptcy in one of the branches**. These predictors are, in the branch of manufacturing, the relative size of net working capital (WC/TA), the return on assets (EBIT/TA) and the short-term indebtedness (CL/TA). And in the construction branch, such predictor is represented by return on equity (ROE) and the debt-equity ratio (DER).

While the first two mentioned ratios (i.e. WC/TA and EBIT/TA) are often used in bankruptcy prediction models, especially those by Altman (see Altman, 1968, 1983). The return on assets ratio (EBIT/TA) is additionally specific for the branch of manufacturing.

Most of the predictors **are not specific for a single moment prior bankruptcy, i.e. they are significant in more periods prior bankruptcy**. Even predictors significant in all five year prior bankruptcy could be found. Such predictors are, in **manufacturing** branch, the total assets turnover (S/TA), stock turnover (S/St.), the current liabilities turnover (S/CL.), the proportion of tangible assets (FA/TA), the ratio of sales and operating revenue (S/OR) and the interest cover calculated by using EBIT or EBITDA, (EBIT/Int. or EBITDA/Int.), see details table 5. Furthermore, same set of ratios, with the exception of total assets turnover (S/TA) is also significant five year prior bankruptcy in the **construction** branch.

Remarkable is the finding that the return on assets calculated using EBIT (i.e. EBIT/TA) and the short-term indebtedness (i.e. CL/TA) are not a significant predictors in the **construction** branch. What is more, the long term indebtedness (LTL/TA) does not represent a significant predictor in **any of the analyzed branches in any analyzed moment prior bankruptcy**.

## 5 CONCLUSION

According to Perry et al., (1984) one of the methods of increasing the accuracy of a bankruptcy prediction models is to use indicators covering several years before bankruptcy. In this research we analyze the significant of bankruptcy predictors in the context of the branch and time prior bankruptcy. We found there ratios that represents a significant bankruptcy predictor in just one branch, i.e. they are specific for this branch. Moreover, we found that only 8 of 17 analyzed predictors were significant in all of the analyzed five year prior bankruptcy, 8 of them in the branch of manufacturing (i.e. EBITDA/TA, S/TA, S/St., EBIT/Int., EBITDA/Int., FA/TA, S/OR and S/CL.), same set (with exception of S/TA) is also significant in the construction branch. As same predictor are time specific, or even not significant at all, this lead us to conclusion, that **only some** predictors could be used as early warning indicators or used to predict bankruptcy more years ahead.

As the branch specific ratios are often incorporated in bankruptcy models, they can be a cause of model's lower accuracy in application in different field.

### Acknowledgement

*This paper was supported by grant FP-S-13-2064 'Research of Internal and External Value Drivers' from the Internal Grant Agency at Brno University of Technology. Next students: Jana Andryšková, Zuzana Baranovičová, Lukáš Cihlář, Pavla Fajtová, Jana Hružová, Marie Kandráčová, Lucie Košvicová, Zuzana Szováková, Karel Štoll and Pavlína Ždárská, i.e. the students of the master's study program "Accounting and financial management" attended the research.*

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## **BANKS FROM THE SOCIETE GENERALE GROUP AND THEIR SENSITIVITY TO THE BANK RUN**

*Pavla Klepková Vodová*

### **Abstract**

The aim of this paper is to measure the sensitivity of commercial banks from the Societe Generale Group to the bank run and to compare their sensitivity with average sensitivity of banks in particular countries. We have used the methodology of scenario analysis for the liquid asset ratio. During first years of the analyzed period, almost all banks would be able to face the bank run. However, only depositors of three banks would be able to withdraw 20% of their funds during and after the financial crisis. The group of the most vulnerable banks consists from SKB Banka from Slovenia, Euro Bank from Poland and Banka Societe Generale Albania. Banks from the Societe Generale Group are mostly more sensitive to the bank run than corresponding banking sectors. Except of three banks in 2004, all subsidiary banks are more sensitive to the bank run than the parent bank.

*Keywords: liquid asset ratio, scenario analysis, bank run, Societe Generale Group, financial conglomerate*

JEL Classification: G21, G32, G01

### **1 INTRODUCTION**

The emergence of financial conglomerates is one of the major trends in the financial sector in recent years. There are many motives for conglomeration; however, it should not be omitted that financial conglomerates are very often linked also with higher risks. As liquidity problems of some banks during global financial crisis re-emphasized, liquidity is very important for functioning of financial markets and the banking sector. From the variety of risks of banking business, we will therefore focus on liquidity risk. The insufficient liquidity of a bank may lead to a situation when the majority of depositors intend to withdraw their funds which will cause a bank run. Even if such situation may be perceived as exceptional, extreme or simply unexpected, it is still a plausible event, therefore in accordance with the recommendation of the Basle Committee for Banking Supervision financial institutions should gauge their potential vulnerability to such events by conducting of stress tests (BIS, 2000).

We will therefore use the methodology of sensitivity analysis which will enable us to address this issue. With banks in eleven countries of the Central and Eastern Europe (CEE countries), Societe Generale Group belongs to the largest financial conglomerates in this geographic area. The aim of this paper is to measure the sensitivity of commercial banks from the Societe Generale Group to the bank run and to compare their sensitivity with average sensitivity of banks in particular countries.

The paper is structured as follows. Next section gives theoretical background of liquidity risk and bank runs. Then we focus on methodology, data and results of scenario analysis. Last section captures concluding remarks.



## **2 THEORETICAL BACKGROUND**

Liquidity risk and the phenomenon of bank runs are intensively interconnected because the insufficient liquidity of a bank may lead to a bank run.

Bank for International Settlements (BIS, 2008) defines liquidity as the ability of bank to fund increases in assets and meet obligations as they come due, without incurring unacceptable losses.

According to Nikolau (2009), the term liquidity risk includes central bank liquidity risk, funding liquidity risk, and market liquidity risk. Central bank liquidity risk is a risk that a central bank would not be able to supply the liquidity needed to the financial system. This risk is highly unlikely because a central bank can only be illiquid to the extent that there is no demand for domestic currency, e.g. in case of hyperinflation or an exchange rate crisis. Funding liquidity risk is the risk that the bank would not be able to efficiently meet both expected and unexpected current and future cash flow and collateral needs without affecting either daily operation or the financial condition of the bank (BIS, 2006). It is the risk that over a specific horizon the bank will become unable to settle obligations with immediacy. Market liquidity risk is the risk that a bank cannot easily offset or eliminate a position at the market price because of inadequate market depth or market disruption (BIS, 2006).

Liquidity risk arises from the stochastic nature of the bank liquidity: although the bank can be liquid at any given time, there may be quite unpredictable situations such as unexpected utilization of credit lines, unforeseen deposit withdrawals, untimely loan redemption, a liquidity need resulting from asset price developments or failed or delayed payments by sellers of credit risk protection which can threaten bank liquidity (ECB, 2002).

Unforeseen deposit withdrawals, mentioned in the previous definition, may be a result of bank run. Banks have been always plagued by the problem of bank runs. Freixas and Rochet (1997) define bank run as a situation when depositors observe large withdrawals from their bank, they fear bankruptcy and respond by withdrawing their own deposits. Withdrawals in excess of the current expected demand for liquidity generate a negative externality for the bank experiencing the liquidity shortage, since they imply an increase in the bank's probability of failure. Banks are vulnerable to runs that can lead to closure and liquidation because they issue liquid liabilities in the form of deposit contracts, but invest in illiquid assets in the form of loans. A banking panic then occurs when depositors at many or all of the banks in a region or a country attempt to withdraw their funds simultaneously (Allen & Gale, 1998). Bank run is very dangerous even for healthy banks.

The theoretical literature on bank runs is based mostly on the study of Bryant (1980) and the model of Diamond and Dybvig (1983). Both papers accentuate that bank runs are self-fulfilling prophecies. Many authors build on these two papers. Among the newest papers, we can mention e.g. Brown et al. (2014), Gertler and Kiyotaki (2013), Goedde-Menke et al. (2014) or Wang and Lin (2014).

As bank runs are typically perceived as costly and negative for the banking sector and the whole economy, most economists, regulators in particular, try to seek the best way how to prevent bank runs. One of the possibilities is to establish a functional deposit insurance scheme. In spite of the fact that in most European countries, deposit insurance covers nowadays 100% of the deposit amount up to the limit EUR 100,000, it may be useful to measure the sensitivity of banks to bank run (as it still remains to be a plausible event).

### **3 METHODOLOGY AND DATA**

Scenario analysis is one of the possible tools how to assess the vulnerability of banks to the bank run (for other possibilities, see e.g. Teplý et al, 2012). Therefore we will describe scenario analysis based on selected liquidity ratio in the first part of this section, and then we will focus on data used.

#### **3.1 Liquid asset ratio**

Liquidity ratios are used for liquidity risk measurement and it is a stock-based approach which can help to identify main liquidity trends (Vodová, 2013a). The liquid asset ratio belongs to the most commonly used liquidity ratios. Equation 1 shows the principle of its calculation.

$$LIA = \frac{\text{liquid assets}}{\text{total assets}} * 100(\%) \quad (1)$$

The liquid asset ratio (LIA), i.e. the share of liquid assets in total assets, should give us information about the general liquidity shock absorption capacity of a bank. It shows which part of the total assets can be readily converted to cash. As a general rule, the higher the value of this ratio, the higher the capacity to absorb liquidity shock, given that market liquidity is the same for all banks in the sample. Nevertheless, high value of this ratio may be also interpreted as inefficiency since liquid assets yield lower income liquidity bears high opportunity costs for the bank. Therefore it is necessary to optimize the relation among liquidity, profitability and efficiency (see e.g. Řepková, 2014, or Řepková, 2013).

As we use the BankScope measure of liquid assets, the term “liquid assets” includes cash, government bonds, short-term claims on other banks (including certificates of deposit), and where appropriate the trading portfolio. BankScope harmonizes data from different jurisdictions to arrive at a globally comparable indicator. This is particularly advantageous in this case when we compare banks from different countries.

#### **3.2 Scenario analysis based on liquid asset ratio**

Stress testing plays a complementary role in risk management practices of banks. Liquidity stress test should identify and quantify the potential lack of liquidity for specific stress scenario and determine the way how to close this lack at predefined costs. Three types of stress scenarios are usually applied: idiosyncratic, market, and combination of both. The idiosyncratic scenario typically represents a simulation of an outflow of deposits or a decline in the rating of the bank. The market shock usually assumes the decline in the value of certain assets or disturbances in the money or credit markets. These two scenarios are accompanied by other macroeconomic shocks, such as the decline in economic activity, growth of loans in default or deterioration of the sovereign rating (Komárková et al., 2012).

Several central banks and other supervisory authorities have applied stress tests of liquidity, e.g. in Netherland (Van den End, 2008), in the Czech Republic (Komárková et al., 2011) or in Romania (Negrila, 2010). However, their tests are not possible to repeat with publicly available information. Therefore we will focus also on other less complex studies which measured the impact of bank run on bank liquidity on selected liquidity ratios. Komárková et al. (2011) simulated the deposit withdrawals on average to 11% of total deposits. Negrila tested the impact of sudden drawing of 20% from deposits of individuals and 10% from deposits of corporate clients. Boss et al. (2004) stressed liquidity ratios by the scenario in which nonbank customers withdraw 20% of their deposits; they continued their scenario

analysis by the test of impact of withdrawal of 50% of nonbank deposits (Boss et al., 2007). Jurča and Rychtárik (2006) considered the scenario of decline in clients' deposits by 20%. Rychtárik (2009) measured the sensitivity of Luxembourg banks to withdrawal of 20% of clients' deposits.

Based on these studies and on available data, we will simulate a run on a bank by the withdrawal of a certain volume of clients' deposits. We simulate a 20% withdrawal of deposits; this haircut is applied on the total deposits not taking into account agreed maturities of different types of deposits. This is the way how to model an outflow of primary sources from the bank. To calculate the stressed value of the liquid asset ratio, we have to deduct the volume of withdrawn deposits, i.e. 20% of clients' deposits, from liquid assets. Bank must use liquid assets to be able to repay deposits. At the same time, volume of total assets is also decreasing as a result of this operation. Equation 2 captures these modifications.

$$LIA_S = \frac{\text{liquid assets} - 0.2 \cdot \text{deposits}}{\text{total assets} - 0.2 \cdot \text{deposits}} \cdot 100(\%) \quad (2)$$

$$\Delta LIA = \frac{LIA_S - LIA_B}{LIA_B} \cdot 100(\%) \quad (3)$$

As a next step, we will compare this stress value of the liquid asset ratio ( $LIA_S$ ) to the baseline value of this ratio ( $LIA_B$ , i.e.  $LIA$ ). The percentage change will be calculated according to the Equation 3. The results will show the magnitude of the relative changes between the stress and baseline values which will enable us to find out which bank is the most vulnerable, if banks from the Societe Generale Group are more or less sensitive to bank run than it is typical for banks in particular countries and if the parent bank is more or less sensitive to the bank run than subsidiary banks.

### **3.3 Data used**

With a presence in 76 countries, more than 148,000 employees and 32 million individual customers, Societe Generale is one of the leading financial services groups. Measured by the sum of total assets, the parent company Societe Generale is the third biggest bank in France and the eightens biggest bank in the world (Tab. 1). Societe Generale (hereinafter also SG) is a universal bank which split its businesses into three main divisions: Retail banking in France, International retail banking, financial services and insurance and Corporate and investment banking, private banking, asset management and securities services.

Focusing on the group of CEE countries, eleven banks from eleven countries belong to the Societe Generale Group. Tab. 1 provides more details about these banks which are included in our sample. Although globally they cannot be seen as very large banks (as we can see from its worldwide rank), these banks belong mostly to leading banking institutions in the region of CEE countries.

We used unconsolidated balance sheet data, mostly over the period from 2004 to 2013 (with the only exception of Euro Bank), which were obtained from the BankScope database (data for Euro Bank for 2004 were missing).

Tab. 1 – Information about banks in the sample. Source: Author’s processing.

Bank	Country	Bank size (country/world)	Period
Societe Generale (parent company)	France	3. / 18.	2004-2013
Banka Societe Generale Albania	Albania	7. / 6152.	2004-2013
Societe Generale Expressbank	Bulgaria	8. / 2871.	2004-2013
Societe Generale - Splitska banka	Croatia	6. / 2121.	2004-2013
Komerční banka	Czech Republic	3. / 514.	2004-2013
Ohridska Banka	Macedonia	3. / 6181.	2004-2013
CB Mobiasbanca	Moldova	6. / 8385.	2004-2013
Societe Generale Banka Montenegro	Montenegro	3. / 7274.	2004-2013
Euro Bank	Poland	20. / 2438.	2005-2013
BRD - Group Societe Generale	Romania	2. / 1068.	2004-2013
Societe Generale Banka Srbija	Serbia	4. / 2986.	2004-2013
SKB Banka	Slovenia	5. / 2395.	2004-2013

## 4 RESULTS AND DISCUSSION

The first part of this section shows the baseline values of the liquid asset ratio. The second part of this section focuses on the stress values of the liquid asset ratio. The last part of this section analyzes the severity of the stress scenario.

### 4.1 Baseline values of liquid asset ratio

The baseline values of liquid asset ratio (Equation 1) for all banks and all countries (average values for individual banking sectors) are presented in Appendix 1. Fig. 1 shows the value of the liquid asset ratio for parent bank. Median values of liquid asset ratio for individual banks from the Societe Generale Group and median values for corresponding countries (banking sectors) are included for comparison.

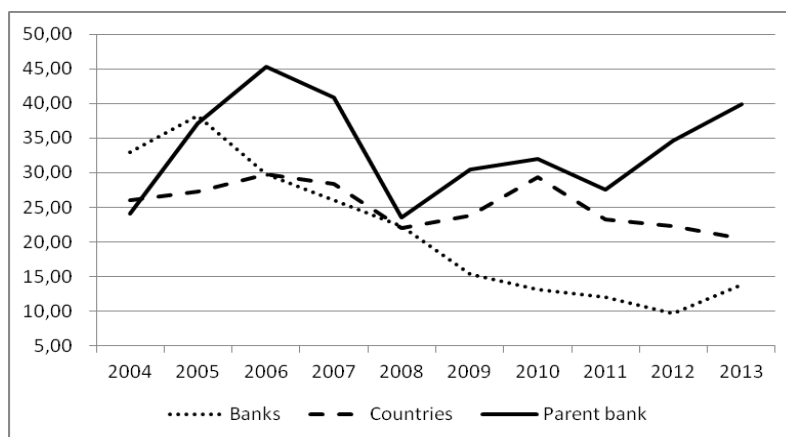


Fig. 1 – Baseline values of liquid asset ratio. Source: Author’s calculation.

As higher values of the liquid asset ratio means higher liquidity, it is evident that, with the only exception of the year 2004, the liquidity of parent bank is higher than liquidity of its subsidiary banks. Moreover, the gap between these two values is increasing in recent years. Focusing on individual banks from the group (see Appendix 1), Euro Bank, CB Mobiasbanca and SKB Banka are less liquid for the whole analyzed period; SG Expressbank and SG - Splitska banka for the period 2005-2013; and SG Banka Montenegro for the period 2006-2013. It is evident, that beginning in 2007, the majority of banks belonging to the Societe Generale Group became less liquid than the parent bank.

If we compare the values of liquid asset ratio of subsidiary banks with average values in corresponding banking sector, we get very similar results. In most cases, liquidity of banks belonging to the Societe Generale Group is below average of the banking sector. The only exception is BRD - Group Societe Generale from Romania for the whole analyzed period. Exceptions are also banks from Albany, the Czech Republic, Macedonia and Serbia, but only for the first part of the analyzed period.

The decreasing liquidity of most banks in the sample, and the fact that their liquidity is much lower than in corresponding banking sectors, may suggest that maybe we should take into account also the possibility of intra-group support. The probability that at least some subsidiary banks could provide some liquidity support to the parent company can be also confirmed by the survey of Bank for International Settlements. According to findings of this survey (BIS, 2012), financial groups which encountered problems between 2007 and 2009 during the financial crisis typically had to consider the question of intra-group support. The level of intra-group support and interconnectedness of legal entities within the group affects the extent to which the failure of one entity poses contagion risk for other entities within the group. Intra-group liquidity support consists of various types of support measures, such as (a) a credit or a credit line provided by one entity to another entity within the group; (b) intra-group cross shareholdings; (c) trading operations whereby one group entity deals with or on behalf of another group entity; (d) central management of short-term liquidity within the group and (g) guarantees and commitments provided to or received from other companies in the group. Support measures may exist in two forms: upstream support (support provided by a subsidiary to its parent) and downstream support (support provided by a parent to its subsidiary). Both types of support typically increase the risk of loss to the provider and adversely affect its solvency, liquidity and profitability. Values of liquid asset ratio of parent bank and its subsidiaries indicate the higher probability of upstream support.

As values of liquid asset ratio are quite low in some cases, it is useful to measure the vulnerability of banks to possible bank run with the use of scenario analysis.

#### **4.2 Stress values of liquid asset ratio**

We have calculated stress value of the liquid asset ratio for parent bank, subsidiaries and corresponding banking sectors. Detailed values are provided in Appendix 2, value for parent bank and median values for subsidiaries and banking sectors (countries) are presented in Fig. 2.

As we can see, although the values are lower, the development trend is logically the same as in case of baseline values of liquid asset ratio. Liquidity of parent bank after the withdrawal of 20% of client's deposits is the highest, followed by liquidity of individual banking sectors (countries). Subsidiary banks are the less liquid. As the median value of the stress liquid asset ratio is negative in 2010 and 2012, it is obvious that some banks would not be able to finance such deposit withdrawals. During first years of the analyzed period, with the only exception of Euro Bank in 2005, all banks would be able to face the bank run. However, the situation

has completely changed during the financial crisis. Only depositors of SG - Splitska banka, Komerčni banka, CB Mobiasbanca and BRD – Group Societe Generale would be able to withdraw 20% of their funds in the whole period 2008-2013. Other banks would not have enough liquidity to meet their requirements, at least in some years, which is proved by negative LIA<sub>s</sub> value (Appendix 2).

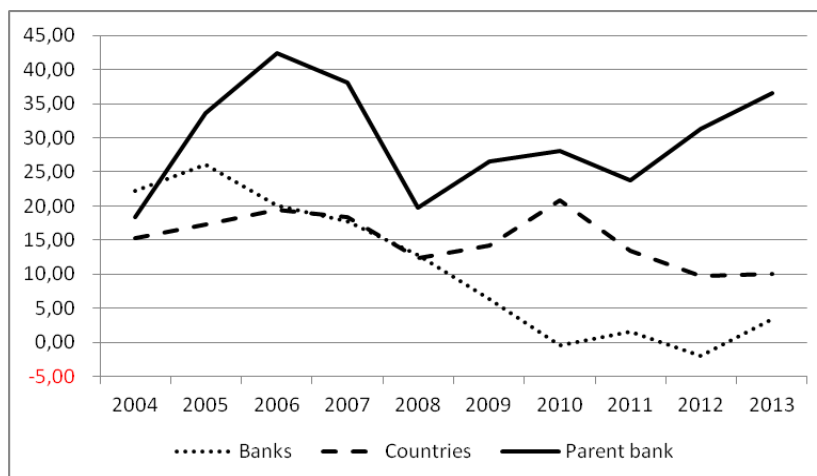


Fig. 2 – Stress values of liquid asset ratio. Source: Author’s calculation.

### 4.3 Severity of the stress scenario

It is useful to calculate also the percentage decreases of the liquid asset ratio caused by the scenario “Bank run”. Results of Equation 3 are presented in Tab. 2 (median values for banks and individual countries) and in Appendix 3 (more detailed results). The decrease of LIA can inform us: (i) which bank (and which banking sector) is the most vulnerable, (ii) if banks from the Societe Generale Group are more or less sensitive to bank run than it is typical for corresponding banking sectors, and (iii) if the parent bank is more or less sensitive to the bank run than subsidiary banks.

Tab. 2 – Severity of the scenario “Bank run”. Source: Author’s calculation.

	04	05	06	07	08	09	10	11	12	13
Banks	-33.4	-26.2	-28.9	-37.7	-43.0	-62.6	-103	-87.6	-121	-76.8
Countries	-41.6	-36.5	-34.3	-35.1	-43.8	-40.4	-29.2	-42.7	-53.8	-50.0
Parent	-24.0	-9.4	-6.4	-6.9	-15.9	-13.2	-12.4	-13.6	-9.7	-8.3

As we can see from data in Tab. 2, banks belonging to the Societe Generale Group were as a whole less sensitive to the possible bank run during the first three years. However, the year 2007 was a turning point and banks became more vulnerable than corresponding banking sectors. The parent bank is on average much less sensitive than both subsidiary banks and banking sectors.

Focusing on the more detailed results in Appendix 3, the dispersion of the values of  $\Delta LIA$  is indeed significant as it ranges from 9 to 353% for individual banks and from 5 to 139% for

corresponding banking sectors. Answers to three defined research questions are presented in following text.

Which bank (and which banking sector) is the most vulnerable to the bank run? When it comes to the most vulnerable banking sectors, it was the Slovenian in the period 2004-2006 and the Polish banking sector in 2007-2013. In Poland, the liquidity started to decline in 2007 because of several reasons. Banks financed increased demand for loans also by the reduction of liquid assets; however, also some important structural weaknesses occurred: Polish banking sector as a whole became net borrower on the interbank market in 2008; household debts in foreign currency grew rapidly; and a very high loan-to-deposit ratio signalled that many banks are dependent on sources from the interbank market, while financing their lending activity. Also the impact of the financial crisis on the level of liquid asset ratio for Polish banks is statistically significant (Vodová, 2013b). Structural weaknesses for Slovenian banking sector at the beginning of the analyzed period were very similar: due to the high demand for foreign currency loans, banks restructured short-term foreign currency investments into long-term loans, which weakened the liquidity position of banks. The second adverse effect on the liquidity of the Slovenian banking sector was caused also by the shortening of average deposit maturity. These two factors together increased banks' dependence on the interbank funding (Bank of Slovenia, 2005, 2006). If we want to identify the most vulnerable banks, results are not surprising, as it mostly corresponds with the most vulnerable banking sectors. SKB Banka from Slovenia is the most sensitive bank in years 2004, 2006-2007, 2011 and 2013. Polish Euro Bank had the largest decline of LIA in years 2005, 2010 and 2012. Banka Societe Generale Albania complemented the group of most vulnerable banks in 2008 and 2009.

Are banks from the Societe Generale Group more or less sensitive to bank run than it is typical for corresponding banking sectors? Generally speaking, banks from this group are more sensitive to the bank run than corresponding banking sectors. This is especially true for Bulgaria, Macedonia, Moldova, Montenegro and Slovenia. On the contrary, less sensitive are only BRD - Group Societe Generale from Romania for the whole period and Komerční banka from the Czech Republic in period 2004-2009. This is consistent with our finding in Section 4.1 that, in most cases, liquidity of banks belonging to the Societe Generale Group is below average of the banking sector. If banks are less liquid, logically they are more vulnerable to any stress scenario, such as bank run.

Is the parent bank more or less sensitive to the bank run than subsidiary banks? Except of three banks in 2004 (SG - Splitska banka, Komerční banka and Ohridska banka), all subsidiary banks are more sensitive to the bank run than the parent bank. It again supports the hypothesis about intra-group support measures within Societe Generale Group, mentioned in Section 4.1.

## **5 CONCLUSION**

The aim of this paper was to measure the sensitivity of commercial banks from the Societe Generale Group to the bank run and to compare their sensitivity with average sensitivity of banks in particular countries.

We have used the methodology of scenario analysis for the liquid asset ratio. The results of the baseline values of the liquid asset ratio showed that beginning in 2007, the majority of banks belonging to the Societe Generale Group became less liquid than the parent bank. Moreover, subsidiaries banks are mostly less liquid than it is typical for corresponding banking sectors.

Then we have focused on the stress values of the liquid asset ratio. During first years of the analyzed period, with the only exception of Euro Bank in 2005, all banks would be able to face the bank run. However, the situation has completely changed during the financial crisis: only depositors of SG - Splitska banka, Komerčni banka, CB Mobiasbanca and BRD – Group Societe Generale would be able to withdraw 20% of their funds in the whole period 2008-2013. Other banks would not have enough liquidity to meet their requirements, at least in some years.

Finally, the results of the percentage change of the liquid asset ratio after the application of the stress scenario “bank run” enable us to answer three important questions:

Which bank (and which banking sector) is the most vulnerable to the bank run? When it comes to the most vulnerable banking sectors, it was the Slovenian in the period 2004-2006 and the Polish banking sector in 2007-2013. Both banking sectors suffered very similar structural weaknesses. The group of the most vulnerable banks consists from three banks: SKB Banka from Slovenia (in 2004, 2006-2007, 2011 and 2013, Euro Bank from Poland (in 2005, 2010 and 2012) and Banka Societe Generale Albania (in 2008 and 2009).

Are banks from the Societe Generale Group more or less sensitive to bank run than it is typical for corresponding banking sectors? Banks from this group are more sensitive to the bank run than corresponding banking sectors; this is especially true for Bulgaria, Macedonia, Moldova, Montenegro and Slovenia. On the contrary, less sensitive are only bank from Romania (for the whole period) and from the Czech Republic (in period 2004-2009).

Is the parent bank more or less sensitive to the bank run than subsidiary banks? Except of three banks in 2004 (SG - Splitska banka, Komerčni banka and Ohridska banka), all subsidiary banks are more sensitive to the bank run than the parent bank. These results may suggest that probably there were any types of upstream intra-group support measures.

## **Acknowledgement**

*This paper was supported by the Ministry of Education, Youth and Sports Czech Republic within the Institutional Support for Long-term Development of a Research Organization in 2015.*

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**Appendix 1: Baseline values of liquid asset ratio**

	04	05	06	07	08	09	10	11	12	13
Parent bank	24.1	37.1	45.2	40.9	23.5	30.5	32.0	27.5	34.6	39.8
Banka SG Albania	33.5	45.9	65.8	69.7	8.4	5.2	9.8	9.5	9.6	11.4
Albania	23.5	20.9	31.7	28.4	22.0	23.6	21.4	19.7	21.0	21.1
SG Expressbank	25.3	31.5	22.4	15.6	13.9	12.4	7.1	10.8	9.6	9.1
Bulgary	26.1	27.3	29.7	23.9	40.1	38.9	35.4	36.1	39.3	40.6
SG - Splitska banka	32.6	31.3	24.5	26.0	22.6	15.4	19.6	19.6	19.6	16.3
Croatia	37.5	33.4	32.0	32.8	31.6	30.3	30.6	23.5	24.8	17.5
Komerční banka	53.6	51.2	39.9	33.1	26.6	23.2	20.8	16.6	15.9	21.4
Czech Republic	25.4	30.4	25.1	20.5	17.9	17.4	17.2	16.7	17.8	24.4
Ohridska Banka	43.6	59.5	38.1	62.5	31.9	13.1	13.1	31.6	31.3	32.8
Macedonia	50.3	52.4	49.9	49.7	43.6	42.2	40.5	35.3	37.5	31.7
CB Mobiasbanca	21.0	32.7	25.1	20.9	33.8	21.9	28.3	15.1	14.0	16.8
Moldova	40.1	38.1	32.8	38.4	41.5	44.8	33.0	39.2	41.7	46.9
SG Banka Montenegro	25.4	48.8	23.1	22.5	9.9	17.9	16.9	8.1	8.0	10.9
Montenegro	39.5	53.5	48.8	31.6	18.3	23.8	29.4	23.3	22.3	20.4
Euro Bank		8.8	29.7	19.6	13.4	6.7	4.3	4.4	3.5	8.2
Poland	21.1	24.2	21.6	17.4	14.2	12.3	9.0	8.9	9.8	11.0
BRD - Group SG Rom.	33.3	42.2	31.3	30.1	29.1	21.6	21.5	20.9	20.8	23.3
Romania	27.2	23.1	23.8	23.1	17.4	16.0	12.3	10.6	10.2	14.4
SG Banka Srbija	34.8	38.2	45.3	36.9	22.2	17.5	5.7	12.0	9.2	13.8
Serbia	17.8	18.7	24.1	61.5	49.4	49.6	38.6	41.6	38.8	18.5
SKB Banka Slovenia	13.5	19.0	12.3	9.3	8.1	10.4	6.8	3.5	4.5	6.3
Slovenia	14.3	16.5	16.0	13.8	12.5	13.4	11.7	10.7	9.2	11.8

Source: Author's calculation

**Appendix 2: Stress values of liquid asset ratio**

	04	05	06	07	08	09	10	11	12	13
Parent bank	18.3	33.7	42.3	38.0	19.8	26.5	28.0	23.8	31.3	36.5
Banka SG Albania	22.7	33.9	58.3	63.3	-9.0	-13.3	-8.6	-8.5	-8.3	-5.7
Albania	15.3	12.2	23.6	18.4	12.4	14.0	10.7	8.5	9.7	11.6
SG Expressbank	11.8	19.4	9.2	4.0	5.0	3.4	-4.6	-1.2	-2.6	-4.7
Bulgary	15.2	17.3	19.5	14.9	33.7	32.1	28.0	28.2	31.6	32.8
SG - Splitska banka	26.5	25.0	17.5	17.8	14.5	6.4	10.4	10.1	8.6	3.8
Croatia	28.4	24.2	22.6	23.4	24.1	23.0	23.4	15.7	16.8	6.4
Komerční banka	44.9	42.5	28.3	20.0	12.7	8.7	6.4	2.1	1.6	8.1
Czech Republic	13.4	19.4	12.8	8.1	6.9	6.3	5.9	5.6	7.1	12.2
Ohridska Banka	33.9	52.1	27.4	55.2	18.2	-0.6	-0.4	20.5	19.0	22.0
Macedonia	44.7	46.6	43.4	43.9	37.0	35.6	33.9	28.6	30.6	22.4
CB Mobiasbanca	10.6	21.2	13.5	8.1	26.1	11.1	17.0	2.8	2.1	4.1
Moldova	31.8	29.0	23.7	30.2	36.4	40.6	27.4	33.9	36.2	42.8
SG Banka Montenegro	14.7	41.6	13.6	10.6	2.3	9.0	8.9	-0.9	-6.2	-4.4
Montenegro	33.2	48.2	42.7	24.5	8.2	14.2	20.8	13.4	9.8	6.5
Euro Bank		-6.4	22.2	14.1	9.6	-1.7	-4.7	-4.3	-6.6	-2.0
Poland	10.5	13.2	10.3	5.3	3.3	0.3	-3.6	-3.4	-3.0	-2.6
BRD - Group SG Rom.	21.9	31.7	20.1	18.8	20.0	10.7	10.8	10.0	8.9	9.8
Romania	14.4	9.9	11.6	12.5	6.9	7.4	2.8	0.8	-0.1	1.7
SG Banka Srbija	25.0	26.1	35.8	27.8	13.3	9.8	-1.5	1.6	-2.0	3.4
Serbia	8.2	8.4	12.2	58.1	45.3	45.6	33.7	37.3	34.4	10.0
SKB Banka Slovenia	1.4	9.4	2.8	0.3	-0.8	1.7	-3.7	-8.4	-7.6	-8.3
Slovenia	1.9	5.2	5.8	5.7	4.8	5.5	3.2	1.5	-0.2	1.0

Source: Author's calculation

**Appendix 3: Severity of the scenario “Bank run” (decrease of liquid asset ratio in %)**

	04	05	06	07	08	09	10	11	12	13
Parent bank	-24.0	-9.4	-6.4	-6.9	-15.9	-13.2	-12.4	-13.6	-9.7	-8.3
Banka SG Albania	-32.4	-26.2	-11.4	-9.2	-206	-353	-188	-189	-185	-150
Albania	-34.7	-41.7	-25.5	-35.1	-43.8	-40.7	-50.0	-57.0	-53.8	-45.1
SG Expressbank	-53.5	-38.2	-58.9	-74.6	-63.8	-72.3	-165	-110	-127	-151
Bulgary	-41.6	-36.5	-34.3	-37.8	-15.9	-17.6	-21.1	-21.8	-19.8	-19.1
SG - Splitska banka	-18.7	-20.1	-28.7	-31.7	-36.2	-58.4	-47.0	-48.3	-56.1	-76.8
Croatia	-24.2	-27.5	-29.2	-28.6	-23.7	-24.1	-23.4	-32.9	-32.2	-63.6
Komerční banka	-16.2	-16.9	-28.9	-39.6	-52.1	-62.6	-69.3	-87.6	-90.0	-62.0
Czech Republic	-47.3	-36.2	-49.0	-60.6	-61.7	-64.1	-65.9	-66.3	-60.4	-50.0
Ohridska Banka	-22.4	-12.3	-28.2	-11.6	-43.0	-104	-103	-35.2	-39.4	-33.1
Macedonia	-11.2	-11.0	-13.0	-11.8	-15.2	-15.8	-16.3	-19.2	-18.3	-29.4
CB Mobiasbanca	-49.6	-35.1	-46.3	-61.1	-22.7	-49.1	-39.9	-81.4	-85.1	-75.7
Moldova	-20.6	-23.9	-27.8	-21.6	-12.3	-9.3	-16.9	-13.5	-13.1	-8.6
SG Banka Monten.	-42.1	-14.7	-41.3	-52.7	-76.4	-50.0	-47.2	-110	-177	-140
Montenegro	-16.1	-10.0	-12.4	-22.4	-55.0	-40.4	-29.2	-42.7	-56.2	-68.4
Euro Bank		-172	-25.3	-28.2	-28.2	-124	-208	-197	-290	-124
Poland	-50.1	-45.5	-52.4	-69.5	-76.8	-97.4	-139	-138	-130	-123
BRD - Group SG R.	-34.3	-24.7	-35.8	-37.7	-31.3	-50.6	-50.1	-52.4	-57.1	-58.1
Romania	-47.0	-57.1	-51.4	-45.9	-60.4	-54.0	-77.0	-92.2	-100	-88.2
SG Banka Srbija	-28.1	-31.9	-20.9	-24.7	-40.1	-44.1	-126	-86.4	-121	-75.4
Serbia	-53.8	-55.3	-49.1	-5.4	-8.3	-8.1	-12.5	-10.4	-11.4	-45.8
SKB Banka Sloven.	-89.8	-50.5	-77.6	-96.4	-110	-84.0	-155	-338	-269	-230
Slovenia	-87.0	-68.3	-63.9	-58.8	-61.5	-59.3	-72.6	-86.3	-102	-91.4

Source: Author's calculation

## **PRACTICAL USE OF THE BOX-JENKINS METHODOLOGY FOR SEASONAL FINANCIAL DATA PREDICTION**

*Petr Klímek*

### **Abstract**

Many economic/financial processes exhibit some form of seasonality. The agricultural, construction, and travel sectors have obvious seasonal patterns resulting from their dependence on the weather. Similarly, the Christmas holiday season has a pronounced influence on the retail trade. In fact, seasonal variation of a series may account for the preponderance of its total variance. Forecasts that ignore important seasonal patterns will have a high variance. One of the possibilities to implement quality forecasts in the seasonal data is to use the Box-Jenkins methodology, which seems to be a useful tool for this purpose. The research study of this paper is devoted to application of ARIMA/SARIMA models to the seasonal financial data that are sensitive to the mean shifting while calculating the autocorrelation in the data. Results are compared with other common models with appropriate commentary.

*Keywords: Box-Jenkins Methodology, autocorrelation, partial autocorrelation function, seasonality, SARIMA models.*

JEL Classification: C29, C49, C58

### **1 INTRODUCTION**

Most financial data analysis processes and their conclusions are dependent on some fulfilled conditions. If they are not fulfilled all other calculations of means, confidence intervals, quantiles, statistical tests, Shewhart's charts, capability indices are questionable and not really correct (Kovarík & Klímek, 2012). These calculations usually offer incorrect and inaccurate results and conclusions. Therefore one should be very careful about above mentioned conditions (data normality, symmetry, etc.). Violations of assumptions for the application in different technologies are displayed in (Meloun & Militky, 2006). Mentioned conditions should be verified by the help of statistical tests. For instance, one can meet data asymmetry by the physical quantities such as strength or viscosity. Strong autocorrelation (dependence) can be met in continuous processes in finance, chemistry, pharmacy, food and metals. Quality of input process material can result into the mean shifting (Kovarík, 2012b).

Not normally distributed data can be seen in processes very often (Stephens, 2009). Data are very asymmetric with usually lognormal distribution. Classical regression concept assumes that the measured data are not auto-correlated. Even very low degree of data autocorrelation causes failure of classical regression analysis. This phenomenon is not unique in the case of continuous processes in time (financial processes, economic processes, climate processes, etc.). Autocorrelation of data becomes increasingly frequent phenomenon in terms of discrete processes, in economic and financial processes with short cycles (Kovarík, 2013). One of the ways to tackle auto-correlated data is the concept of stochastic modeling of time series using autoregressive integrated moving average models, the ARIMA model. The concept of linear stochastic autoregressive models (models AR), moving average (models MA), mixed models (the ARMA models), ARIMA models, or seasonal SARIMA models based on Box-Jenkins methodology is seen as a time series realization of a stochastic process (Montgomery & Friedman, 1989). The main aim of this paper is demonstrate practical usage of the Box-Jenkins methodology on case study of seasonal data prediction (monthly data will be given).

## 2 METHODOLOGY

The Box-Jenkins (Box & Jenkins, 1976) approach involves three basic activities:

1. Identifying the tentative model.
2. Determining the models parameters.
3. Testing/applying the model.

If the model developed in steps 2 and 3 does not meet expectations, the process is repeated and a new model is chosen and tested. The Box-Jenkins approach is more complicated than the other time series models, but this approach is also capable of handling almost any type of time series financial data. A number of studies comparing forecasting models indicate that the Box-Jenkins approach provides some of the more accurate short-range forecasts (one to three periods out) of any time series models.

The main features of the Box-Jenkins model are (Brockwell & Davis, 1996):

- 1) Its complexity discourages many forecasters and managers from using it.
- 2) It is best suited to short-range (i.e. daily, weekly or monthly) forecasts.
- 3) It requires a large amount of data (some authors feel at least sixty periods of data).
- 4) It is usually necessary to develop a new model whenever new sales data appear.

The linear models AR, ARMA and MA are modeling tool for the stationary processes. These models have a typical shape of the autocorrelation function (Autocorrelation Function – ACF) and partial autocorrelation function (Partial Autocorrelation Function – PACF), which are an essential tools for providing information about the stochastic process. ACF and PACF estimates are used to identify the time series model. Stationarity means that stochastic process has a constant mean value, constant variance and covariance structure of the second order invariant with respect to shifts in time (lags  $k$ ). Another desired property is called invertibility (interchangeability between different processes) (Dyer et al, 2003).

One can meet non-stationary processes in financial data very often. Nonstationarity can be present due to the mean value changing over time or process variance changing over time. It is a typical case of financial data (Enders, 2010).

ARIMA (Autoregressive Integrated Moving Average) is based on the principle of finding suitable time series model (Kovarik, 2011). The following part of methodology was also discussed in (Klimek, 2013). The general shape of the model ARIMA ( $p, d, q$ ) is

$$\Phi_p(B) \cdot \nabla^d \cdot x_t = \Theta_q(B) \varepsilon_t, \quad (1)$$

where  $\Phi_p(B) = (1 - \phi_1 B - \phi_2 B^2 \dots - \phi_p B^p)$  is autoregressive polynomial of  $p$ -th order,

and  $\Theta_q(B) = (1 - \theta_1 B - \theta_2 B^2 \dots - \theta_q B^q)$  is moving averages polynomial of  $q$ -th order,

$\nabla$  is an operator of backward difference (this term is introduced when the model exhibits non-stationarity of the process),

$d$  is difference order,

$t$  is time,

$B$  is back shift operator  $B \cdot x_t = (x_{t-1})$ ,

$\phi_1, \phi_2, \dots, \phi_p$  are parameters of autoregressive model,

$\theta_1, \theta_2, \dots, \theta_q$  are parameters of moving averages model,

$\varepsilon_t$  is called white noise, which is unpredictable fluctuations in the data, has a normal distribution with mean equal to zero and constant variance, and its values are not correlated. Residuals of model  $e_t = x_t - \hat{x}_t$  will be uncorrelated and normally distributed random variables (Kovarik, 2012a).

Most commonly used in applications are ARIMA models. Let us consider the model

$$x_t = \xi + \phi x_{t-1} + \varepsilon_t \quad (2)$$

where  $\xi$  and  $\phi$  are unknown parameters and  $\varepsilon_t$  is normally distributed and uncorrelated variable with the mean equal to zero and the constant standard deviation  $\sigma$ . This model is called autoregressive model of the first order and is denoted as AR (1). The values of the reference mark of quality which are mutually shifted of  $k$  time periods ( $x_t$  and  $x_{t-k}$ ) have the correlation coefficient  $\rho^k$ . This means that autocorrelation function ACF should fall exponentially. If the previous equation is expanded in the form

$$x_t = \xi + \phi_1 x_{t-1} + \phi_2 x_{t-2} + \varepsilon_t \quad (3)$$

One can get equation of second order autoregressive model AR (2). Generally, variable  $x_t$  is directly dependent on the values preceding  $x_{t-1}$ ,  $x_{t-2}$ , etc. in the autoregressive model AR (p). If the dependence of data using the random component  $\varepsilon_t$  is modeled, then moving average model MA (q) can be defined. Moving average model first order has an equation:

$$x_t = \mu + \varepsilon_t - \theta \varepsilon_{t-1} \quad (4)$$

There is some correlation only between two values  $x_t$  and  $x_{t-1}$ . It can be described as follows  $\rho_1 = -\theta / (1 + \theta^2)$ . This corresponds to the shape of the autocorrelation function ACF (Brooks, 2008). For the modeling of practical problems is often suitable a model compound containing both the autoregressive component and the moving averages component. This model is generally known as ARMA (p, q). Model ARMA of the first order, i.e. ARMA (1, 1) is described by the equation:

$$x_t = \xi + \phi x_{t-1} + \varepsilon_t - \theta \varepsilon_{t-1} \quad (5)$$

This model is often suitable for chemical and other continuous processes, where many quality characteristics can be easily modeled by the model AR (1). Measurement errors are described by random component of the model, which is assumed to be random and uncorrelated. The ARMA model assumes stationarity process i.e., that the character quality reference values are around a stable mean. There are also processes (e.g. in chemical industry, finance), where the values of monitored variable are running away. Then it is convenient to model processes using appropriate model with the operator of backward difference  $\nabla$ , such as the ARIMA model (0, 1, 1), the equation is

$$x_t = x_{t-1} + \varepsilon_t - \theta \varepsilon_{t-1} \quad (6)$$

Another important step in the use of ARIMA models is the choice of the appropriate type. When residuals testing determined that they are not auto-correlated and come from a normal distribution it is possible with them to verify whether or not the process is statistically stable (Klimek, 2013). Following Table 1 shows how to choose a right ARIMA model.



Tab. 1 – How to Choose a Right ARIMA Model. Source: (Arlt, 1999).

Model	Conditions		ACF	PACF
	Stationarity	Invertibility		
ARIMA (1,0,0) or AR (1)	$ \phi_1  < 1$	none	declining	1 significant PAC
ARIMA (2,0,0) or AR (2)	$\phi_1 + \phi_2 < 1$ $\phi_2 - \phi_1 < 1$ $-1 < \phi_2 < 1$	none	declining	2 significant PAC
ARIMA (0,0,1) or MA (1)	none	$ \theta_1  < 1$	1 significant AC	declining
ARIMA (0,0,2) or MA (2)	none	$\theta_1 + \theta_2 < 1$ $\theta_2 - \theta_1 < 1$ $-1 < \theta_2 < 1$	2 significant AC	declining
ARIMA (1,0,1) or ARMA (1,1)	$-1 < \phi_1 < 1$	$-1 < \theta_1 < 1$	declining	declining

Often time series possess a seasonal component that repeats every  $s$  observations. For monthly observations  $s = 12$  (12 in 1 year), for quarterly observations  $s = 4$  (4 in 1 year). In order to deal with seasonality, ARIMA processes have been generalized: SARIMA models have been formulated as follows:

$$\Phi(B)\Delta^d X_t = \Theta(B)\alpha_t \quad (7)$$

Where  $\alpha_t$  is such that

$${}_s\Phi(B^s)\Delta_s^D \alpha_t = {}_s\Theta(B^s)a_t \quad (8)$$

Hence

$$\Phi(B)_s \Phi(B^s)\Delta_s^D \Delta^d X_t = \Theta(B)_s \Theta(B^s)\alpha_t \quad (9)$$

And we write  $X_t \sim \text{ARIMA}(p, d, q) \times (P, D, Q)_s$ . The idea is that SARIMA are ARIMA  $(p, d, q)$  models whose residuals  $\alpha_t$  are ARIMA  $(P, D, Q)$ . With ARIMA  $(P, D, Q)$  we intend ARIMA models whose operators are defined on  $B^s$  and successive powers (Arlt, 1999).

Concepts of admissible regions SARIMA are analog to admissible regions for ARIMA processes they are just expressed in terms of  $B^s$  powers.

Now, consider some examples (special cases):

1.  $X_t = a_t - {}_s\Theta_1 a_{t-12}$  is ARIMA  $(0, 0, 0) \times (0, 0, 1)_{12}$ . There is only one seasonal MA component, specified by  $s = 12$ ,  $Q = 1$ . So, the ACF is characterized by finite extension and takes value only at lag  $k = 12$ . The PACF is infinite extended with exponential decay, visible at multiple 12 lags, which is alternate or monotonic according to the sign of  $\Theta_1$ .
2.  $X_t = {}_s\Phi_1 X_{t-12} + a_t$  is ARIMA  $(0, 0, 0) \times (1, 0, 0)_{12}$ . The seasonal AR component is specified by  $s = 12$ ,  $P = 1$ . So, the ACF is characterized by infinite extension. The PACF is with finite extended and takes value only at lag  $k = 12$ . (Arlt, 1999)

The last note is about advantages and disadvantages of the Box-Jenkins methodology.

The advantages:

- Stochastic models of ARMA are very flexible, so they are also applicable for time series very general forms.
- Can demonstrate a lot of successful applications.
- Software appearance of this methodology is now easily available in most econometric and statistical software systems.
- There is no better tool for routine analysis of serially correlated observations.

The disadvantages:

- Box-Jenkins methodology requires a longer time series (the minimum length of 50 observations is recommended, but this is not a problem for financial time series).
- Box-Jenkins methodology is essentially unworkable without a PC with corresponding software and without specific instruction.
- Practical interpretation constructed models can be difficult. The argument here are often numerical outputs (such as forecast) achieved using these models. (Cipra, 2008)

### **3 RESEARCH ON PRACTICAL USE OF BOX-JENKINS METHODOLOGY**

The task is to find a suitable model for the time series of **monthly** turnover of company XY (77 observations were available). The aim is to predict the future values of turnover for the next year – 12 forecast will be calculated using the Box-Jenkins methodology. Given results will be compared with other possible models.

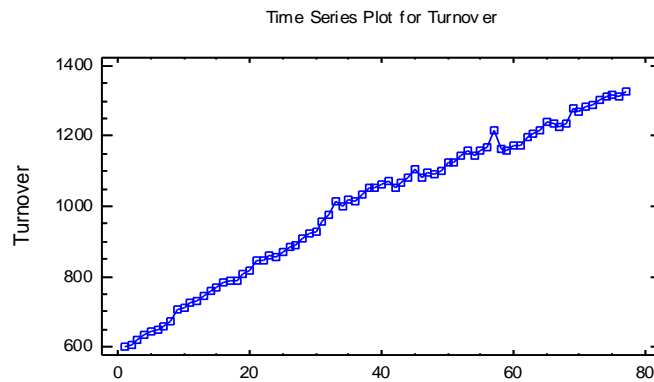


Fig. 1 – Time Series of Turnover. Source: Own Processing.

The time series is shown on the previous Fig. 1. All calculations are processed in Statgraphics Centurion 15 software tool. It is obvious from following figures that the time series is nonstationary, which is also confirmed by the shape of the ACF and PACF (Fig. 2) and periodogram (Fig. 3). At first sight, no seasonality in data is present.

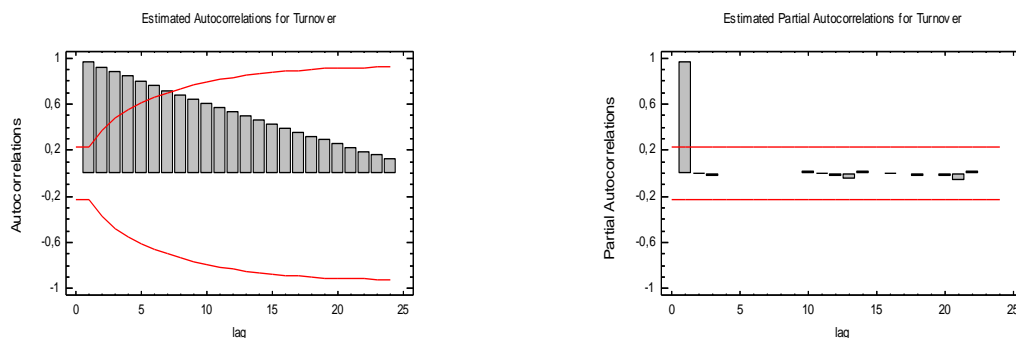


Fig. 2 – ACF and PACF of Original Time Series. Source: Own Processing.

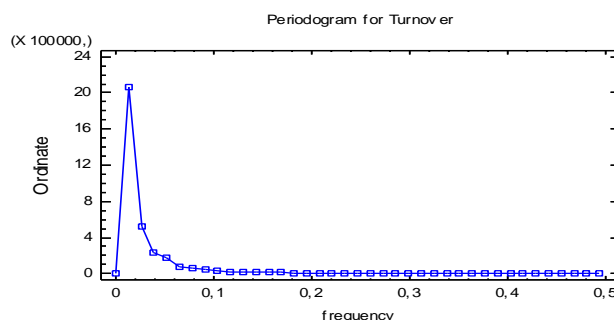


Fig. 3 – Residual Periodogram of Original Time Series. Source: Own Processing.

As the values of ACF are declining slowly, the first values by ACF and PACF are very close to one and the periodogram has a significant peak at zero (not seasonal) frequency, we can assume that the time series is of  $ARIMA(0, 1, 0)_c$  and therefore must be stationarized by the first differences. This conclusion is confirmed by the graph of turnover periodogram (Fig. 3), as well as the residual ACF and PACF of the model (Fig. 2), whose values lie outside the tolerance limits. Therefore the model  $ARIMA(0, 1, 0)_c$  (with constant) will be calculated first. Results are depicted in Fig. 4 and Fig. 5, and also in Table 2.

Tab. 2 – Output Table of Model  $ARIMA(0, 1, 0)_c$ . Source: Own Processing.

Data variable: Turnover				
Number of observations = 77				
Length of seasonality = 12 (monthly)				
<b>Forecast Summary</b>				
Nonseasonal differencing of order: 1				
Forecast model selected: $ARIMA(0,1,0)$ with constant				
Number of forecasts generated: 12				
Number of periods withheld for validation: 0				
<b>ARIMA Model Summary</b>				
<i>Parameter</i>	<i>Estimate</i>	<i>Std. Error</i>	<i>t</i>	<i>P-value</i>
Mean	9,57895	1,72243	5,5613	0,000001
Constant	9,57895			
Backforecasting: yes				
Estimated white noise variance = 225,474 with 75 degrees of freedom				
Estimated white noise standard deviation = 15,0158				
Number of iterations: 1				

<p><b>Tests for Randomness of residuals</b>                  Data variable: Turnover                  Model: ARIMA(0,1,0) with constant</p> <p>(1) Runs above and below median                  Median = 1,42105                  Number of runs above and below median = 48                  Expected number of runs = 35,8857                  Large sample test statistic <math>z = 2,80598</math>                  P-value = <b>0,00501645</b></p>	<p>(2) Runs up and down                  Number of runs up and down = 53                  Expected number of runs = 50,3333                  Large sample test statistic <math>z = 0,596607</math>                  P-value = <b>0,550767</b></p> <p>(3) Box-Pierce Test                  Test based on first 24 autocorrelations                  Large sample test statistic = 77,2008                  P-value = <b>1,68813E-7</b></p>
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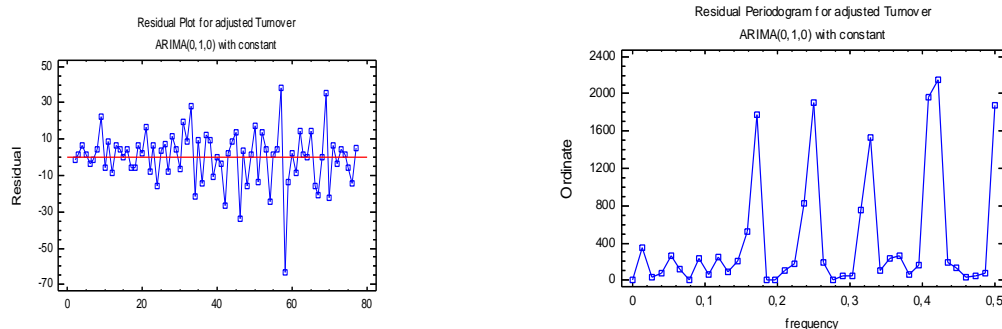


Fig. 4 – Residuals and Residual Periodogram of Model ARIMA (0, 1, 0)<sub>c</sub>. Source: Own Processing.

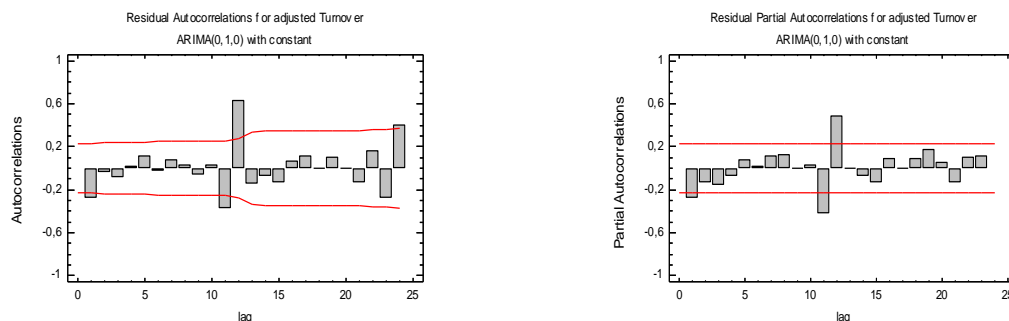


Fig. 5 – Residual ACF and PACF of Model ARIMA (0, 1, 0)<sub>c</sub>. Source: Own Processing.

Residuals and residual periodogram of time series for nonseasonal difference appear in the Fig. 4. It is evident that the time series is stationary after nonseasonal difference. This is also confirmed by the periodogram (Fig. 4). It is clear from the Fig. 4 that the time series contains significant **seasonal** component. The presence of a seasonal component is also confirmed by the residual ACF and PACFs (Fig. 5). Both functions have a statistically significant every negative eleventh value, and every positive twelfth value and at the same time it is also significant the first value. For this reason, the model must be extended for a part of the AR (1). The model ARIMA (1, 1, 0)<sub>c</sub> will be estimated. The results are shown in Table 3.

Tab. 3 – Output Table of Model ARIMA (1, 1, 0)<sub>c</sub>. Source: Own Processing.

<b>Forecast Summary</b>				
Nonseasonal differencing of order: 1				
Forecast model selected: ARIMA(1,1,0) with constant				
<b>ARIMA Model Summary</b>				
Parameter	Estimate	Std. Error	t	P-value
AR(1)	-0,283789	0,111562	-2,54378	<b>0,013053</b>
Mean	9,5715	1,2994	7,36607	0,000000
Constant	12,2878			
Backforecasting: yes				
Estimated white noise variance = 210,128 with 74 degrees of freedom				
Estimated white noise standard deviation = 14,4958				
Number of iterations: 1				
<b>Tests for Randomness of residuals</b>				
Data variable: Turnover				
Model: ARIMA(1,1,0) with constant				
(1) Runs above and below median			(2) Runs up and down	
Median = 0,813684			Number of runs up and down = 53	
Number of runs above and below median = 38			Expected number of runs = 50,3333	
Expected number of runs = 39,0			Large sample test statistic z = 0,596607	
Large sample test statistic z = 0,11548			P-value = <b>0,550767</b>	
P-value = <b>0,908059</b>			(3) Box-Pierce Test	
			Test based on first 24 autocorrelations	
			Large sample test statistic = 57,143	
			P-value = <b>0,00097804</b>	

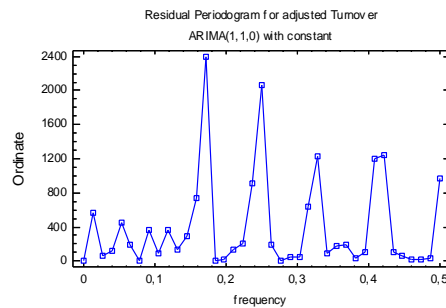
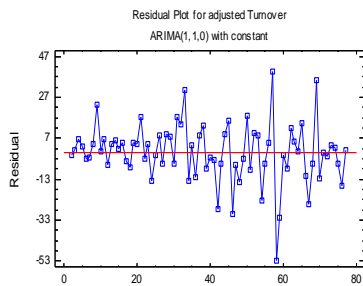


Fig. 6 – Residuals and Residual Periodogram of the Model ARIMA (1, 1, 0)<sub>c</sub>. Source: Own Processing.

Figure 6 shows residuals and residual periodogram of the model ARIMA (1, 1, 0)<sub>c</sub>.

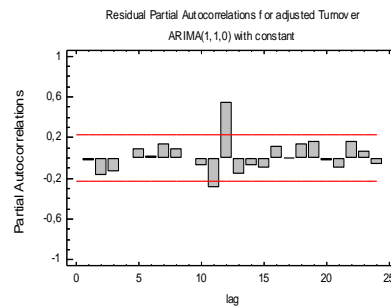
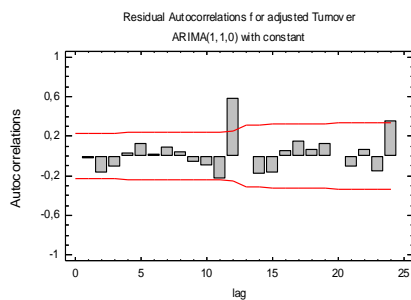


Fig. 7 – Residual ACF and PACF of Model ARIMA (1, 1, 0)<sub>c</sub>. Source: Own Processing.

It is clear from the graphs ACF and PAFCs (Fig. 7) that by extending the model of the AR (1) seasonality still remains in the time series. Therefore model **SAR (1)** will be specified. Table 4 shows the estimate of the model SARIMA (1, 1, 0) (1, 0, 0)<sub>c</sub>.

Tab. 4 – Output Table of Model SARIMA (1, 1, 0) (1, 0, 0)<sub>c</sub> Source: Own Processing.

<b>Forecast Summary</b>				
Data variable: Turnover				
Number of observations = 77				
Length of seasonality = 12				
<b>ARIMA Model Summary</b>				
<i>Parameter</i>	<i>Estimate</i>	<i>Std. Error</i>	<i>t</i>	<i>P-value</i>
AR(1)	- 0,0104036	0,122462	- 0,0849536	<b>0,932531</b>
SAR(1)	0,796795	0,0875298	9,10313	0,000000
Mean	8,84126	4,3119	2,05043	0,043914
Constant	1,81528			
Backforecasting: yes				
Estimated white noise variance = 114,16 with 73 degrees of freedom				
Estimated white noise standard deviation = 10,6846				
Number of iterations: 4				
<b>Tests for Randomness of residuals</b>				
Data variable: Turnover				
Model: ARIMA(1,1,0)x(1,0,0)12 with constant				
(1) Runs above and below median Median = -0,710711 Number of runs above and below median = 42 Expected number of runs = 39,0 Large sample test statistic z = 0,577402 P-value = <b>0,563665</b>		(2) Runs up and down Number of runs up and down = 51 Expected number of runs = 50,3333 Large sample test statistic z = 0,0458928 P-value = <b>0,96339</b>		
		(3) Box-Pierce Test Test based on first 24 autocorrelations Large sample test statistic = 17,2375 P-value = <b>0,750122</b>		

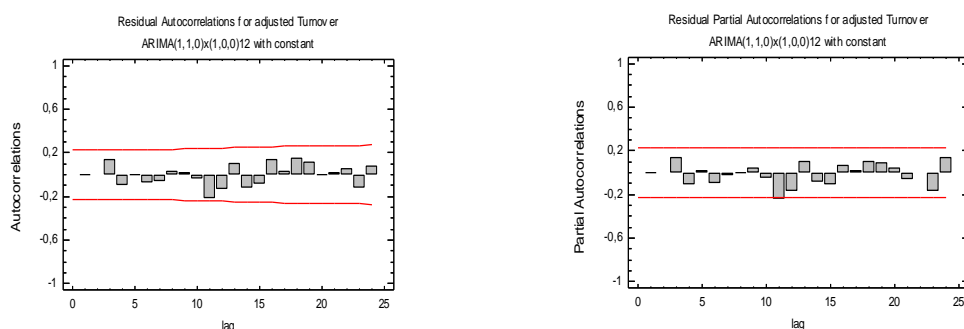


Fig. 8 – Residual ACF and PACF of Model SARIMA (1, 1, 0) (1, 0, 0)<sub>c</sub>. Source: Own Processing.

Although the values of residual ACF and PAFCs (Fig. 8) decreased, and the value P-value Box-Pierce test increased (0.750122) we can conclude from t-tests (Tab. 4) that the part AR (1) does not belong to estimated model (P-value = 0.932531) and therefore should be excluded from model. Therefore the model SARIMA (0, 1, 0) (1, 0, 0)<sub>c</sub> without AR(1) will be next estimated in Table 5.

Tab. 5 – Output Table of Model SARIMA (0, 1, 0) (1, 0, 0)<sub>c</sub> Source: Own Processing.

Data variable: Turnover				
Number of observations = 77				
Length of seasonality = 12				
<b>ARIMA Model Summary</b>				
Parameter	Estimate	Std. Error	t	P-value
SAR(1)	0,798634	0,082449	9,6864	<b>0,000000</b>
Mean	8,75332	4,46792	1,95915	<b>0,053863</b>
Constant	1,76262			
Backforecasting: yes				
Estimated white noise variance = 112,591 with 74 degrees of freedom				
Estimated white noise standard deviation = 10,6109				
Number of iterations: 4				
<b>Tests for Randomness of residuals</b>				
Data variable: Turnover				
Model: ARIMA(0,1,0)x(1,0,0) <sub>12</sub> with constant				
(1) Runs above and below median			(2) Runs up and down	
Median = -0,745545			Number of runs up and down = 53	
Number of runs above and below median = 42			Expected number of runs = 50,3333	
Expected number of runs = 39,0			Large sample test statistic z = 0,596607	
Large sample test statistic z = 0,577402			P-value = <b>0,550767</b>	
P-value = <b>0,563665</b>			(3) Box-Pierce Test	
			Test based on first 24 autocorrelations	
			Large sample test statistic = 17,2589	
			P-value = <b>0,796356</b>	

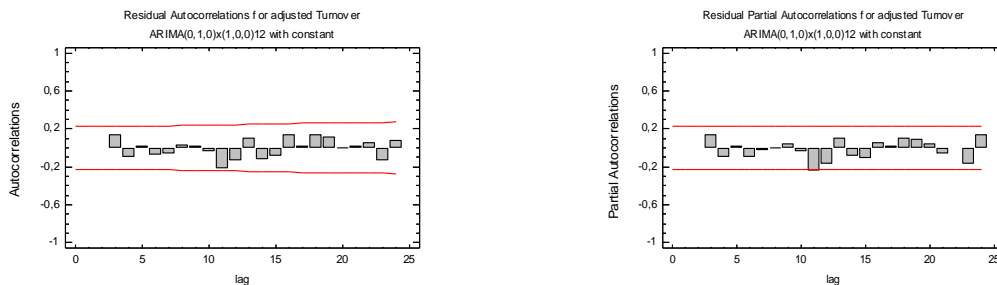


Fig. 9 – Residual ACF and PACF of Model SARIMA (0, 1, 0) (1, 0, 0)<sub>c</sub>. Source: Own Processing.

The residual ACF and PACFs (Fig. 9) has not been significantly reduced compared to Fig. 8, but it can be assumed that the residuals have stochastic character. It confirms also the P-value of the Box-Pierce test (0.796356) and other test of randomness. Partial t-test shows that P-values of parameters  $\Phi_1$  (0.00000) and  $\mu$  (0.053863) are lower than a significance level  $\alpha$  (0.05). Table 5 shows that all parameters are significantly different from zero (statistically significant) and the estimated model has the form

$$(1 - 0.798634^{12}) \times (1 - B)y_t = 1.762612 + a_t \quad (10)$$

It can be expressed alternatively as:

$$y_t = 1.762628 + y_{t-1} + 0.798634y_{t-12} - 0.798634y_{t-13} + a_t \quad (11)$$

Table 6 contains the point and interval forecasts of the monthly time series for the next year.

Tab. 6 – Forecasts, Model SARIMA (0, 1, 0) (1, 0, 0)<sub>c</sub>. Source: Own Processing.

		<i>Lower 95,0%</i>	<i>Upper 95,0%</i>
<i>Period</i>	<i>Forecast</i>	<i>Limit</i>	<i>Limit</i>
78,0	1324,97	1303,83	1346,11
79,0	1317,95	1288,05	1347,85
80,0	1327,7	1291,08	1364,32
81,0	1365,4	1323,11	1407,68
82,0	1356,78	1309,5	1404,06
83,0	1371,32	1319,53	1423,11
84,0	1377,87	1321,94	1433,81
85,0	1390,82	1331,02	1450,62
86,0	1401,37	1337,94	1464,79
87,0	1406,32	1339,46	1473,18
88,0	1404,09	1333,97	1474,21
89,0	1417,83	1344,59	1491,07

Forecasts are shown in Fig. 10 and a time series plot with smoothed values and forecasts with 95% limits are shown in Fig. 11.

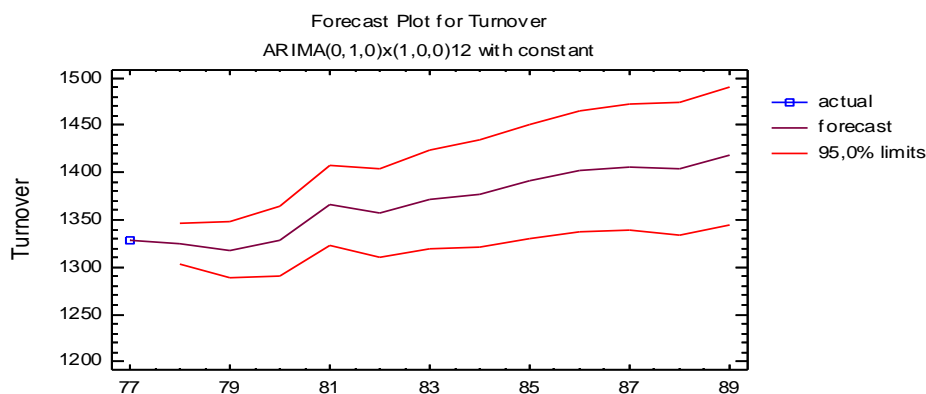


Fig. 10 – Forecasts for Periods 78–89. Source: Own Processing.

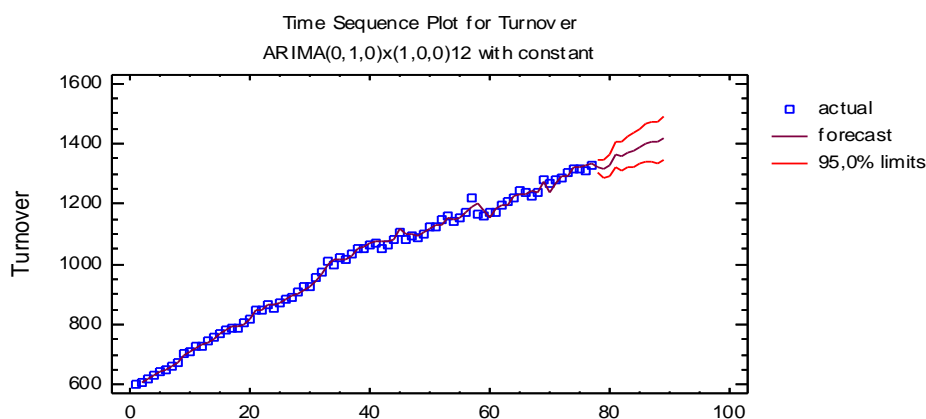


Fig. 11 – Time Series with Forecasts and 95% limits. Source: Own Processing.

## 4 RESULTS AND DISCUSSION

The Box-Jenkins data approach was applied to seasonal financial data of turnover of company XY (totally 77 observations were given). The time series given was non-stationary, which



was confirmed by the shape of the ACF and PACF and also by the shape of residuals periodogram. The original time series was stationarized by the first differences. Final model SARIMA (0, 1, 0) (0, 1, 0)<sub>c</sub> was chosen according to Box-Jenkins methodology. Comparison with other models is shown in Table 7. Model SARIMA (0, 1, 0) (0, 1, 0)<sub>c</sub> was detected as the best model among compared ones (linear trend, simple exponential smoothing and Brown's exponential smoothing). The other models were chosen automatically by statistical software as appropriate to given data. All SARIMA model parameters were considered as statistically significant. As well as the value of P-value of the Box-Pierce test and test of randomness were very high. That values indicated that the model residuals were of white noise (main condition of use this method). Therefore this model can be used for the forecasting purpose. The process can be regarded as if it is stationary.

Tab. 7 – Model Comparison. Source: Own Processing.

<b>Model Comparison</b>					
Data variable: Turnover					
Number of observations = 77					
Length of seasonality = 12					
<b>Models</b>					
(A) ARIMA(0,1,0)x(1,0,0) <sub>12</sub> with constant					
(B) Linear trend = 633,764 + 9,43593 t					
Seasonal adjustment: Multiplicative					
(C) Simple exponential smoothing with alpha = 0,9999					
Seasonal adjustment: Multiplicative					
(D) Brown's linear exp. smoothing with alpha = 0,5892					
Seasonal adjustment: Multiplicative					
<b>Estimation Period</b>					
<i>Model</i>	<i>RMSE</i>	<i>MAE</i>	<i>MAPE</i>	<i>ME</i>	<i>MPE</i>
(A)	<b>10,565</b>	7,63222	<b>0,711802</b>	-0,369181	- <b>0,0251995</b>
(B)	31,0063	23,622	2,47717	- 0,00490717	-0,203619
(C)	13,8293	11,1484	1,16115	9,30716	1,00733
(D)	10,5782	7,34392	0,745923	0,48169	0,0994422
<i>Model</i>	<i>RMSE</i>	<i>RUNS</i>	<i>RUNM</i>	<i>AUTO</i>	<i>MEAN</i>
(A)	<b>10,565</b>	<b>OK</b>	<b>OK</b>	<b>OK</b>	<b>OK</b>
(B)	31,0063	***	***	***	OK
(C)	13,8293	OK	OK	**	*
(D)	10,5782	OK	OK	**	OK
<b>Key:</b>					
RMSE = Root Mean Squared Error					
RUNS = Test for excessive runs up and down					
RUNM = Test for excessive runs above and below median					
AUTO = Box-Pierce test for excessive autocorrelation					
MEAN = Test for difference in mean 1st half to 2nd half					
OK = not significant (p >= 0,05)					
* = marginally significant (0,01 < p <= 0,05)					
** = significant (0,001 < p <= 0,01)					
*** = highly significant (p <= 0,001)					

This Table 7 compares the results of four different forecasting models. Looking at the error statistics (RMSE, MAE, MAPE, ME, and MPE), the model with the smallest root mean squared error (RMSE) during the estimation period is model A. The model with the smallest mean absolute error (MPE) is model A. The model with the smallest mean absolute percentage error (MAPE) is also model A. These results can be used to select the most appropriate model for researcher's needs. Model A is the best among tested models. The Table 7 also summarizes the results of four tests run on the residuals to determine whether each model is adequate for the data. An OK means that the model passes the test. One asterisk means that it fails at the 95% confidence level. Two asterisks mean that it fails at the 99% confidence level. Three asterisks mean that it fails at the 99.9% confidence level. It can be concluded that the currently selected model, model A (SARIMA (0, 1, 0) (1, 0, 0)<sub>c</sub>), passed all 4 tests.

It can be summed up that the model SARIMA (0, 1, 0) (1, 0, 0)<sub>c</sub> was detected as the best model among compared ones in Table 7. The values of RMSE, MAPE, and MPE were the smallest and all tests about randomness of residuals were fulfilled satisfactory (OK in all columns).

Therefore SARIMA model can be regarded as suitable statistical tool for forecasting of seasonal financial data (turnover).

## 5 CONCLUSION

The traditional regression procedures are grounded on the assumption that the process observations being monitored are independent and identically distributed. The assumption of independence is usually violated. Autocorrelation among measurements becomes an inherent characteristic of a stable process. This autocorrelation causes significant deterioration in regression analysis. To address this problem, several approaches for handling auto-correlated processes have been proposed. The most popular procedure utilizes ARIMA or SARIMA model. The Box-Jenkins methodology represents a modern concept analysis of stationary and non-stationary time series based on probability theory. This paper mainly focused on the detection of seasonality of auto-correlated processes.

This paper dealt with stochastic models applications in seasonal financial data. This kind of data is very sensitive to mean shifting and strong autocorrelation appears very often. The Box-Jenkins methodology containing ARIMA and SARIMA models was applied to given seasonal financial data as satisfactory model for forecasting.

Totally, 77 observations were available. The requirement of minimal size of data (50) was fulfilled. Results were compared with other common models (linear trend, simple exponential smoothing and Brown's exponential smoothing). The Box-Jenkins methodology was detected as the best model for seasonal financial data due to its ability to fit given data.

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## **CURRENT TRENDS IN THE FACTORING MARKET IN THE WORLD AND IN THE SLOVAK REPUBLIC**

*Koišová Eva, Ivanová Eva*

### **Abstract**

For all enterprises, whether small, medium or large, the issue of financing their business activities is very significant. Apart from standard forms of financing, enterprises can use alternative methods such as leasing, venture capital, factoring and forfeiting. The purpose of the paper is to analyse and assess the current state and development of factoring market in the world and in the Slovak Republic. In section 1, key terms in factoring are defined and main characteristics are provided which draw upon theoretical background regarding factoring as an alternative source of financing. In the empirical part, factoring activities in the world and in the Slovak Republic are analysed. The main data sources are the databases of the Factors Chain International and Association of Factoring Companies in the Slovak Republic. Research data reveal that factoring increased by more than 73% worldwide in 2013, and factoring business has not yet experienced economic crisis. From a regional perspective, Europe is the largest factoring market. VÚB Group was the leading factoring company in the Slovak Republic whose share in the total turnover amounted to more than 48% in 2013.

*Keywords: factoring, domestic factoring, international factoring, recourse factoring, factoring without recourse, forms of factoring.*

JEL Classification: G21, G23

### **1 INTRODUCTION**

Factoring is a modern tool to finance an enterprise on a short-term basis by accelerating the breakdown of liabilities, while not raising the debt of an enterprise. The history of factoring dates back to the days of moneylenders in the middle ages. It has taken on a new life in recent years as a financing method for many businesses in the world. (Mazurek, 2010)

This tool is used by enterprises when financial resources are needed before the maturity of their receivables. Sedláčiková, Volčko, Jelačić (2014) write that this method mainly includes protection before customers' insolvency, management of receivables, as well as the opportunity to dispose with the funds before the end of the maturity of receivables.

Factoring is an advantageous tool since it is also available for enterprises that do not qualify for a bank loan, such as enterprises with a higher risk level profile or start-ups. When using factoring, the credit debt of enterprises is not increased and enterprises' assets do not have to be secured. The disadvantages of factoring include its higher cost. Factoring is usually more costly than the traditional borrowing. Factoring is used to refinance domestic market liabilities with maturity of 180 days. (Ukey, 2014)

Recently, factoring service companies have been increasingly focusing on small and medium-sized enterprises (Belanová, 2012). Large-sized companies offer a high turnover, yet a smaller margin for factoring service companies. It is the small and medium-sized enterprises using factoring services to finance their operational needs; therefore they represent a great potential for factoring service companies. On the other hand, the primary criterion to choose the factoring service company is currently its funding limit. Thus, the amount of finance to be

provided by a factoring company is of primary concern, while the price comes second. It is, however, not common for Slovak enterprises to use factoring services. Factoring as a percentage of GDP stands at around 6% abroad, compared to a mere 2% in Slovakia. The purpose of the paper is to analyse and assess the current state and development of factoring market in the world and in the Slovak Republic.

## **2 MATERIALS AND METHODOLOGY**

The main purpose of the paper is to analyse and assess the current state and development of factoring market in the world and in the Slovak Republic. In addition, theoretical approaches to and characteristics of factoring are discussed. Moreover, worldwide factoring turnover in the period of 2009-2013 and the situation in the Slovak factoring market over 2012-2014 are analysed.

Statistical methods were utilized to analyse the use of factoring services worldwide and in the Slovak Republic. Moreover, base index and percentage indicators were used to make a more thorough analysis of the issue. In addition to analysis as the main research method, synthesis, comparison and compilation were employed. The methodology closely corresponds to the objective of the paper. The main data sources are the databases of the Factors Chain International, Association of Factoring Companies in the Slovak Republic, and knowledge compiled from several authors.

## **3 CHARACTERISTICS OF FACTORING**

Factoring has played an important role in the market economy. The word “Factor” means the broker, agent, intermediary. (Adamova, K., 2013) The term has been defined in a number of ways in technical; some authors consider factoring as one of the alternative sources of finance for business growth (Belás, 2010); while others discuss individual financing methods under various circumstances. (Kislingerová, E. et al., 2007)

Belás et al. (2010) and Vlachynský et al. (2012) define factoring as the purchase of short-term trade receivables prior to their maturity date. In principle, it is dealt with the provision of a short-term loan by a factor (bank). Kislingerová (2007) delineates factoring as “...a regular purchase of short-term receivables by a factoring company.” Hyránek, Jánošová (2009) as well as other authors (2000) view factoring as an option to finance businesses on a short-term basis in a both domestic and international trade based on the contractually agreed purchase of short-term receivables associated with the provision of unsecured business loans. In their definitions, Slovak and Czech authors draw upon the definitions discussed in foreign literature.

There are three parties involved in factoring, such as the factor, the one who sells the receivable and the debtor as illustrated in Figure 1. The contract of factoring is accomplished between one party whose main activity is to be the supplier of goods and another party who is a factor.

As a matter of fact, factoring is the purchase of outstanding receivables which arise from the sale of products and services by a factoring company (factor). By purchasing receivables, the factor finances the client and assumes the risk associated with the collection of the receivable. (Vlachynský et al., 1999, p. 170) Transactions are performed in the form of cession of receivables from the original creditor (supplier) to a factoring company. This is normally performed by transferring invoices from the original creditor to a factoring company. Thus, the sale of invoices transfers the deed of the invoices to the factor. The original creditor will receive cash advance to settle the receivable in question by the factor, who will also assume

responsibility for the receivable collection and in some cases the credit risk. The amount of advance varies, but normally it is 60-80% of the invoiced sum. Cash advances can be received almost immediately; upon receiving the necessary documentation to purchase the receivable. Once the customer (debtor) pays the account receivable in full to the factoring company account, the account receivable is settled with the supplier while the sum paid is reduced by the interest, factoring fee and commission. Factoring depends on various circumstances (in particular financial) affecting factoring services, and demonstrated in the cooperation between a supplier and factor.

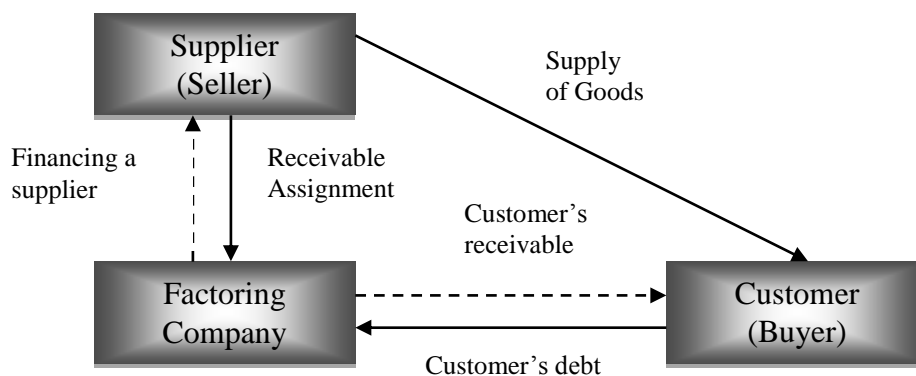


Fig. 1 Accounts receivable factoring flow Source: Elaborated by authors according to Smejkal, V. – Rais, K. (2010)

In practice, there are various factoring forms. The key aspects to classify factoring are as follows: risk of non-payment the receivable, notification on the receivable assignment, scope of cooperation between the factoring company and the enterprise, and the territorial aspect.

There are two types of invoice factoring to choose from; real factoring (factoring without recourse) and false (recourse) factoring. In a non-recourse agreement, the factoring company takes on any unpaid debts, and is usually concluded with established suppliers. The factor must look at the creditworthiness and financial situation of the customer as the factor completely assumes the risk of non-payment by the customer. Non-recourse factoring insulates enterprises from the cost of bad debt and the factor is more concerned with the creditworthiness and overall financial indicators related to the supplier's asset structure. Under non-recourse factoring, the factor bears the complete risk of bad debts arising from non-payment -payment of dues by the customer. For bearing this risk, the factor charges an additional del credere commission. Recourse (false) factoring is fit for manufacturing industries and businesses that need to stabilize their cash flows and extend the due dates of invoices for their customers. Under recourse factoring, the supplier cooperates with the customer on a long-term basis, knows their payment behaviour and intends to improve their business terms and conditions. After the expiry of the receivable due date, the factor may assign the receivable back to the supplier. Thus, the risk of non-payment is borne by the enterprise, and if the customer fails to pay, the enterprise must pay back the purchased amount of the receivable.

According to the debtor's awareness regarding cession, two types of factoring are mainly distinguished. In the open factoring, the customer is informed about the cession of the claim to the factor. Open factoring is quite common, whereas the other type – closed factoring – is

not so popular. Under closed factoring, the customer is not informed regarding the cession of the claim and pays to the account given on the supplier's invoice being already the factor's account. According to the country of location of the parties involved in the transaction, domestic factoring and international factoring are distinguished. In the case of international factoring, supplier, customer and factor are not registered in the same state.

In summary, suppliers use factoring services for several reasons. Suppliers opt for factoring services when they want a factoring company to maintain their accounts in respect of customers' invoices, funding, granting credit to the suppliers, etc. Factoring companies provide services related to refinancing commercial loans. Before the factoring companies accept the assignment of receivables, they verify the debtor's capability to settle the debt, creditworthiness of debt as well as its size.

#### **4 DEVELOPMENT OF THE FACTORING TRADE VOLUME AND ITS ANALYSIS**

In the sixties of the twentieth century, there was a sharp increase in the usage of factoring when various types of services regarding the purchase of goods "on credit" became widespread. Purchases by credit cards, leasing, forfaiting and factoring also became very popular. Moreover, new ways of doing business activities and their funding, including using computer technology in banking helped accelerate the strides in the factoring market. Slovak enterprises have discovered the advantages of this method of financing. The factoring added value is still not quite understood, meaning that factoring is not just about financing of receivables. (Sedliačiková, Volčko, Jelačić, 2014)

##### **4.1 Development of factoring in the world**

Factoring penetrated into Europe in the early seventies. At around the same time, factoring companies started to form chains with international scope. One of the biggest is the Factors Chain International (FCI). FCI brings together factoring organizations from all over the world cooperating in performing various types of factoring transactions. Currently, an increasing growth of factoring trades has been observed. The growth of factoring business can be attributed to the ever increasing number of factoring chain members, thus a growing awareness of factoring in the world. The latest statistical data indicate that there was a slight increase of factoring turnover compared to 2012 in the world which stood at approximately 5%. From 2009 to 2013, factoring turnover rose by 73.75%. While in 2009 the overall factoring turnover was €1,284 billion, it rose to €2,231 billion in 2013. It follows that the factoring turnover rose moderately despite the economic crisis. The development of factoring turnover is shown in Fig. 2.

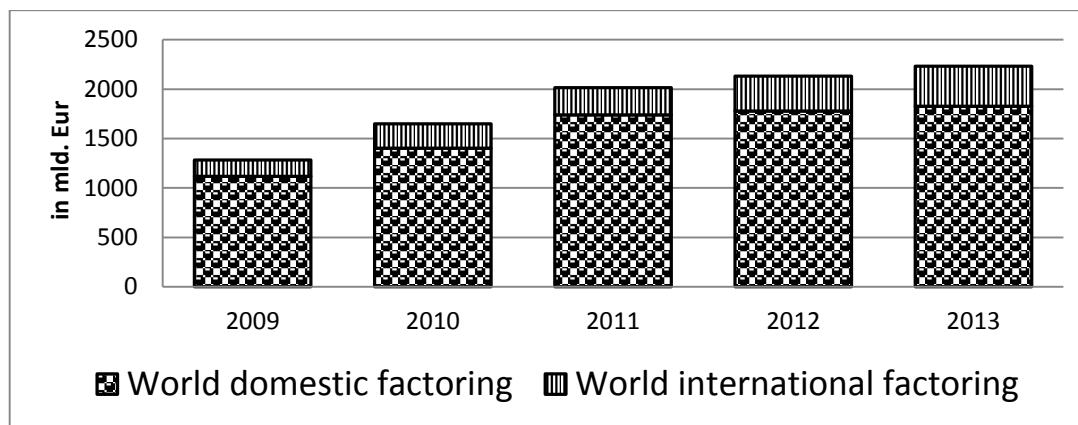


Fig. 2 Development of the world factoring turnover in 2009-2013 in billion Euro. Source: Elaborated by authors according to Table 1.

It follows from Table 1 that a significant share of the world factoring turnover was world domestic factoring, and the highest turnover was of € 1,828 billion in 2013. The world international factoring was on the rise over the period 2009-2013, and its share in the world factoring turnover was 13% in 2009 and reached even 18% in 2013.

Tab. 1 Development of the world factoring turnover in 2009-2013 in billion Euro. Source: Authors' calculations according to FCI data available on <http://www.fci.nl/news/detail/?id=502>

Year	Domestic	International	Total	Base index in %
<b>2009</b>	1,118	166	<b>1,284</b>	100.00
<b>2010</b>	1,402	246	<b>1,648</b>	128.35
<b>2011</b>	1,741	274	<b>2,015</b>	156.93
<b>2012</b>	1,779	353	<b>2,132</b>	166.04
<b>2013</b>	1,828	403	<b>2,231</b>	173.75

From the geographic point of view, Europe has the most important share of world factoring whose volume amounted to more than 60%. It has to be noted, however, that international factoring increased by more than 242%. Thus, the international factoring activity is more dynamic than the domestic factoring activity which rose by 163.5% compared to 2009. China played a major role in factoring business whose percentage share in factoring turnover amounted to approximately 54%, thus becoming one of the leaders in the worldwide factoring market.



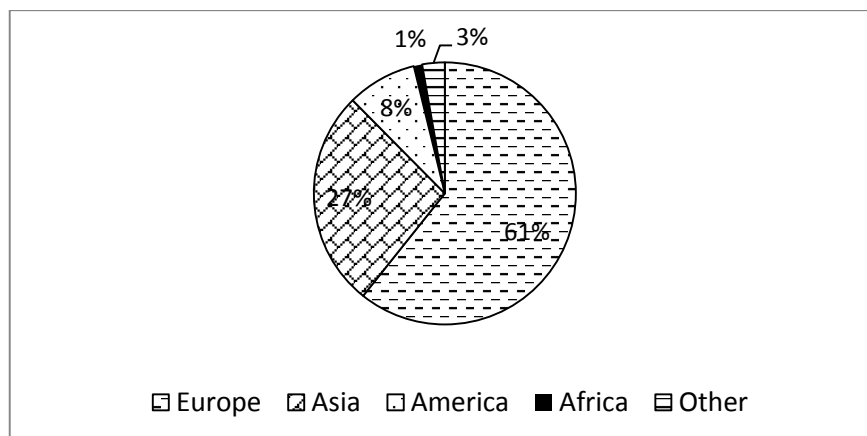


Fig. 3 Development of factoring trades by continents in 2013. Source: Elaborated by authors according to FCI data available on <http://www.fci.nl/news/detail/?id=502>

The volume of factoring transactions in the world factoring is highest in Europe (61%), followed by Asia (27%) and America (8%) as shown in Figure 3. Other important European representatives in the factoring market include the United Kingdom, France, Italy, Germany and Spain.

Even though domestic factoring turnover constitutes a significant share of the world factoring turnover, the world factoring activity lessens its importance since the global capital blurs the boundaries of individual economies, which affect the commercial transactions made by individual enterprises. This is why the world factoring is growing in such a dynamic and fast way. The strongest players in the global factoring market are Asian countries, mainly China, Japan, Taiwan and Hong Kong.

#### **4.2 Development of factoring activity in the Slovak Republic**

In the Slovak Republic, factoring companies are members of the Association of the Factoring Companies of the Slovak Republic (AFS SR) that was founded in March, 2003. Their founding members include VÚB Factoring, Transfinance Slovakia, Tatra banka, OB Heller, Factoring Slovenskej sporiteľne (SLSP) and OTP Factoring Slovakia.

According to the data provided by the Association of the factoring companies of the Slovak Republic over the period of 2012-2014, factoring services were provided by VÚB Group, Tatra banka, ČSOB Group, SLSP Group, Bibby Factoring and Eximbanka. The data on the total factoring turnover in the Slovak Republic are listed in Table 2 and illustrated in Figure 4. Cumulative data for 1Q and 2Q were available for 2014.

Tab. 2 Total turnover from factoring services in the SR in billion Eur. Source: Elaborated by authors according to AFS data

Company	2012	2013	2014*	Share in % in total turnover in 2012	Share in % in total turnover in 2013	Share in % in total turnover in 2014
VÚB Group	705	749	195	39.36	48.17	32.55
Tatra banka	455	378	228	25.40	24.31	38.06
ČSOB Group	231	211	69	12.90	13.57	11.52
SLSP Group	375	168	93	20.94	10.80	15.53
Bibby Factoring	25	31	14	1.40	1.99	2.34
Eximbanka		18	0		1.16	0.00
<b>Total</b>	<b>1,791</b>	<b>1,555</b>	<b>599</b>	100.00	100.00	100.00

\*Data for 2014 are cumulative data for Q1+Q2

From 2012 to 2013, VÚB Group was the leading factoring company whose share in the total factoring turnover amounted to 48.17% in 2013. VÚB Group managed to increase its year-to-year market share by 9%, which indicates that it financed almost every second trade receivable in Slovakia. A slight drop was registered with Tatra banka, whereas SLSP Group registered a dramatic drop from 20.94% in 2012 to 10.80% in 2013. In 2014, Tatra banka was the leading factoring player with total turnover of €228 million, followed by VÚB Group with a mere €195 million. According to available data, Eximbanka had no turnover.

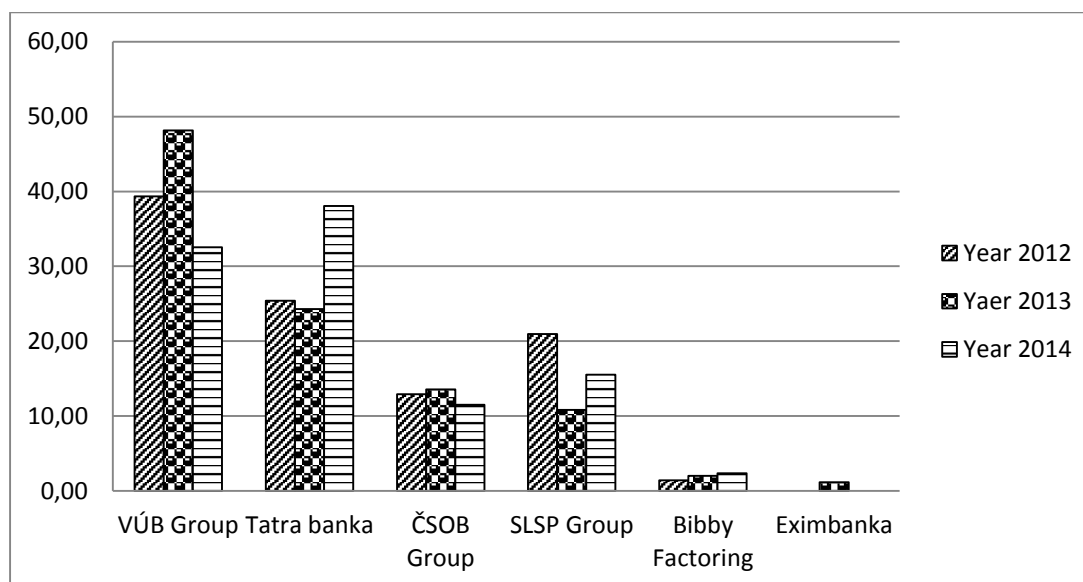


Fig. 4 Share in the total factoring turnover by Slovak factoring companies in 2012-2014 in %.  
Source: Elaborated by authors according to Table 2

Overall, however, the factoring business was the most prosperous in 2012, while there was a decrease by 13.18% in 2013 compared to 2012 and there will apparently be a slight decline according to available statistical data in 2014. In Slovakia, factoring services are mainly

provided by banking institutions. The only Slovak non-banking company is the Bibby Factoring company. Factoring services are primarily used by small and medium-sized enterprises, yet their use is still lagging behind the use in developed countries. Slovak companies are only learning how to use this alternative source of funding.

While investigating factoring turnover in terms of non-payment risk, we looked at the development of recourse and non-recourse factoring (Tab. 3 and 4). Under recourse factoring, the biggest turnover over the period 2012-2014 was reached by Tatra banka, followed by VÚB banka and ČSOB Group. Sale volume was the highest in 2012 and amounted to €534 million Eur. In 2013, there was a decline in sale volume by approximately 10% and according to the data available for the Q1 and Q2 2014, further decline can be expected.

Tab. 3 Development of recourse factoring in million Euro

Company	2012	2013	2014*
VÚB Group	122	135	44
Tatra banka	280	199	160
ČSOB Group	73	94	22
SLSP Group	43	39	24
Bibby Factoring	16	21	10
Eximbanka	0	0	0
<b>Total</b>	<b>534</b>	<b>483</b>	<b>260</b>

*\*Data for 2014 are cumulative data for Q1+Q2*

Under the factoring without recourse, the situation is different. In 2013, factoring without recourse reached €515 million, which is by 19.5% higher than in 2012 and the factoring turnover might be higher in 2014. Under the factoring without recourse, the leading company is VÚB Group. In 2013, VÚB Group increased their turnover even by 236.8% compared to 2012. Sound development is registered in Q1 and Q2 2014.

Tab. 4 Development of factoring without recourse in million Euro

Company	2012	2013	2014*
VÚB Group	87	206	116
Tatra banka	201	126	67
ČSOB Group	55	98	46
SLSP Group	2	77	69
Bibby Factoring	8	9	4
Eximbanka	0	0	0
<b>Total</b>	<b>431</b>	<b>515</b>	<b>302</b>

*\* Data for 2014 are cumulative data for Q1+Q2*

In the Slovak Republic, there are no major differences in the development of both types of factoring, even though factoring without recourse tends to grow faster. Factoring services are not that widespread among enterprises in the Slovak Republic when compared to developed countries, or even the Czech Republic, Poland and Hungary. The low level of factoring activity in the Slovak economy might be ascribed to insufficient financial literacy of small and medium-sized enterprises that prefer using more traditional financing methods. Additionally, Pavlát and Schlossberger (2014) point out that small and medium-sized

companies face informational opacity regarding factoring terms, conditions as well as fees and charges.

## **5 CONCLUSION**

Rising importance of factoring services and differences in factoring turnover across countries can be attributed to economic performance of the respective country. The stronger and developed economy, the more frequently alternative methods to finance companies are utilized. Factoring services are becoming more widespread and provided almost exclusively by banks. According to the Association of the Factoring Companies there is only one non-bank institution providing factoring services – Bibby Factoring Slovakia – reaching the lowest turnover in the factoring industry.

From 2012 to 2013, VÚB Group was the leading factoring company whose share in the total turnover amounted to 48.17% in 2013. VÚB Group managed to increase its year-to-year market share by 9%, and is the leader in factoring without recourse. A slight drop was registered with Tatra banka, whereas SLSP Group experienced a dramatic drop from 20.94% in 2012 to 10.80% in 2013. In 2014, Tatra banka was the leading factoring player with the total turnover of €228 million, followed by VÚB Group with a mere €195 million.

From the geographic point of view, Europe has the most important share of the world factoring whose volume amounted to more than 60%. It has to be noted, however, that international factoring increased by more than 242%. Thus, the international factoring is more dynamic than the domestic factoring which rose by 163.5% compared to 2009. Europe is composed of many industrialized countries where the volume of factoring activity is high. Important European representatives in the factoring market include the United Kingdom, France, Italy, Germany and Spain.

The volume of factoring activity is low in the former communist countries. The highest factoring turnover was reached in large countries, namely Poland in 2011 (€12,000 million) and Russia (€8,580 million). The lowest factoring turnover was reached in Bosnia and Herzegovina, Bulgaria and Serbia. In terms of the number of factoring companies, the Slovak Republic is comparable with the Czech Republic (8), Lithuania (8), Latvia (7), and Serbia (9). In terms of factoring turnover, Slovakia is lagging behind the Czech Republic (€3,760 million) and Lithuania (€1,755 million).

Following the data from 2011, the factoring activity in America is lower than in Europe. This is mainly due to the rapid rise in factoring only in Brazil and Chile. In addition, factoring activity is growing in Canada, Columbia and Mexico, although the leading country with the highest factoring turnover remains the USA (€80,000 million).

African countries do not play a significant role in the factoring market. Factoring activity, however, is quite widespread in the Republic of South Africa (turnover of €13,500 million). The strongest players in global factoring market include Asian countries, mainly China, Japan, Taiwan and Hong Kong.

Even though factoring transactions are becoming more popular, the main disadvantages regarding factoring are the following:

- availability of other types of financing enterprises,
- established traditional forms of financing, such as bank loans,
- customer's consent with factoring services is required (assignment clause on the invoice),

- minimum limits on the volume of the assigned receivables - this hinders mainly small and medium-sized enterprises which are unable to reach the minimum annual limit of financial resources,
- higher costs associated with factoring services when compared to a bank loan.

### Acknowledgement

The paper is the part of VEGA project No. 1/0208/14 „Poistný trh a efektívnosť poisťovní“.

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## **ANALYSIS OF CZECH COMPANIES' DEPARTURES TO TAX HAVENS AND THEIR EFFECT ON CZECH ECONOMY**

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### **Abstract**

The minimum taxation and the maximum anonymity of owners and managers are the reasons why to move a company to a tax haven. States strive to legally make it more complicated to transfer incomes to tax havens but they are not very successful. According to the World Bank, almost a half of the global GDP is in tax havens. The research deals with the analysis and consequent evaluation of Czech companies' departure to tax havens. It deals with numerous comparisons of values but especially with the number of tax payments and time exigency.

*Keywords: tax haven, tax planning, income tax of legal entities*

JEL Classification: H 26

### **1 INTRODUCTION**

Taxhavens originated with tax collection as early as in Antique Greece. At the Medieval merchants with the seat in the London City were exempt from tax in London. Flanders in Belgium was the tax haven from the 16<sup>th</sup> to the 18<sup>th</sup> century. Tax havens are most frequently used for transferring the income from a country with high taxes.

Tax havens and off-shore centres are currently one of the essential obstacles for the development both at the international and the Czech Republic level. According to the data of Jens Martens and Wolfgang Obenland (2011), German experts, published in the Um Steuern study, the Czech Republic belongs among the countries with the highest capital outflow. This value is not counted according to the number of inhabitants, but in absolute numbers. Between 2000 and 2008 CZK 140 billion in average disappeared from the Czech Republic without being taxed. According to the cautious estimates the Czech Republic lost CZK 30 billion on taxes (HAMPL, 2013). We also have to include the loss of the multiplication effect of money which was withdrawn from the economy without taking part in the creation of further values, and also the payment of the excise tax at the minimum amount of CZK 10 billion. In general, we can state the economy loses at least 60 thousand job positions by this fact.

### **2 GOAL AND METHODOLOGY**

The goal of this article is to analyse reasons for Czech companies' departure to tax havens. Main methods used in this article are the method of complete analysis of the current state of tax havens and the development of companies' departures to tax havens since 2007. This year was selected due to the start of the crisis in the Czech Republic. The main goal was to determine the effects acting on companies to think of the departure to destinations with lower tax burden.

#### **2.1 Negative Effect of Tax Havens**

Multinational companies especially use tax havens in the field of intellectual property. These companies can decide to a large extent where research and development will be implemented with the goal to ensure the flow of licence fees to a jurisdiction with lower tax. In compliance

with this strategy, Desai et al. (2006) gave the evidence that multinational companies in the U.S.A. which focused on research and development were more probable to found branches in tax havens.

The other view of these problems seems to be supported with recent experience in income from taxes of legal entities. Despite the high amount of direct foreign investments to tax havens, the revenues from income tax of legal entities in the U.S.A., Great Britain and other capital-exporting countries have not dropped, but in fact they have increased. This fact indicates that concerns expressed in harmful impacts of tax havens can be relatively exaggerated.

Desai et al (2006) created a model in which there is a complementarity between investments in the tax haven and investments in neighbouring countries with high taxation. On the one hand, an investment in a country with high taxation induces demand for operations in the tax haven for the purpose of reducing the income tax liability. On the other hand, the presence of the tax haven enables tax planning which reduces costs of investments in neighbouring countries with high taxation. This implies that it can be reasonable to believe that major world economies take advantage of the existence of tax havens. This fact is supported by the models of Keen, Dessai, Hong and Smart (Keen, 2001, Desai et al., 2006, Hong and Smart, 2007) which state under what conditions corporate activities of a tax haven can be beneficial for domestic countries of multinational companies. Tax planning of multinational companies (e.g. obtaining income in a tax haven through interest stripping) reduces their efficient tax rates and makes them more willing to invest in countries with high taxation.

## **2.2 Positive Effect of Tax Havens**

Tax havens can act positively in the field of tax competition. As shown by Weichenrieder (2005), statutory tax rates for legal entities have significantly decreased in Europe in recent decades. The presence of an international tax planning provides the countries with high taxation the possibility to maintain or even increase entrepreneurial tax and valid tax rates on capital if initial tax rates are not too high and at the same time to protect the outflow of direct foreign investments (Hong and Smart, 2010).

## **2.3 Transparency of Tax Havens**

The interest in tax havens reflects their disproportionately high role in the world economy, especially in relation to international capital flows. Tax havens are one of the central topics of current political debates in the field of taxes, including the scope of international tax competition (Slemrod and Wilson, 2009, Dharmapala, 2008) as well as activities of avoiding paying the tax by enterprises (Desai et al., 2006).

Tax havens have been recently paid a higher attention to as proven by initiatives of the Organisation for Economic Co-operation and Development (OECD, 1998, 2000, 2004). The reason is to support the efficient exchange of information between tax authorities of different countries. Within the initiative of OECD (2000) a list of countries and territories has been created which are considered to be tax havens. They include e.g. Belize, the British Virgin Islands, Gibraltar, Hong-Kong, Jersey, the Marshall Islands, the United Arab Emirates, St. Vincent and Grenadines, the U.S.A.

In the following years most of these havens agreed on the improvement of transparency of their tax systems and facilitated the exchange of information. Nonetheless, the scope of sharing the information in practice is unclear and the impact of this initiative is doubtful. Since 2013 OECD has not extended the list of countries considered the tax haven. However, Luxembourg, Cyprus, the British Virgin Islands and the Seychelles do not meet international



standards for tax transparency. It follows from the report published by the Global Forum on Transparency and Information Exchange for Tax Purposes which forms part of the Economic Co-operation and Development (OECD) and which focuses on fighting against tax havens.

Kudrle (2008) studied the total foreign portfolio investments (disclosed by the Bank for International Payments) at the Cayman Islands. His analysis of time series does not find any significant impact of this OECD initiative. Bucovetsky and Haufler (2008) who studied the efforts of Ireland to attract headquarter operations implemented in Europe, came to similar conclusions. They detected a very weak political response by the European Union, despite the proven willingness of member states to harmonise tax policies in other areas.

### **3 ONSHORE AND OFFSHORE COUNTRIES**

#### **3.1 Characteristics and Division of Tax Havens**

OECD considers a tax haven to be a jurisdiction which meets certain criteria:

- It has nominal or zero taxes,
- It shows a lack of transparency,
- It has laws or administrative procedures which prevent efficient exchange of information with the governments of countries whose residents obtain tax advantages in the jurisdiction.

OECD carefully monitors the countries which are considered to be tax havens and it issues their list divided to three “lists”. The black list has been empty since the half of 2009. The longest list is the grey one which contains countries (e.g. Malaysia, Belize, the Philippines etc.) which promised implementing the rules for the exchange of tax information but has not implemented them in their system of law. The third list is the white one which contains countries which have implemented the rules of OECD in their systems of law regarding the transparency and the exchange of information in tax issues and which adhere to them (e.g., among others, the Seychelles, the Czech Republic, the Netherlands and most the other states of the EU).

For a country to be transferred from the grey list to the white list, 12 agreements on the exchange of information in tax matters must be concluded.

#### **3.2 Onshore Countries Used in International Tax Planning**

Onshore destinations are often sought for because of their economic, social and political stability. The system of law is usually simpler, clearer and more easily enforceable for companies. Companies operating in these onshore destinations act seriously. The tax advantage usually rests in a lower tax burden in the selected type of tax. The table shows some selected countries in relation to the Czech Republic.

Table 1 – The tax burden in selected types of taxes. Source: Own elaboration.

	Cyprus	Lithuania	Luxembourg	Malta	The Netherlands	Great Britain
Double Taxation Avoidance Agreement with the Czech Republic	Yes	Yes	Yes	Yes	Yes	Yes
Taxation of capital income	No	No	No	No	Yes	Yes
Taxation of payment of dividends from the Czech Republic	No	No	No	No	No	Yes
VAT rate	8% 15%	21% 9% 5%	3%, 6% 12%, 15%		6% 19%	0% 5% 20%
Income tax rate	10%	15%	21,84%	35%	20-25.5%	30%

### 3.3 Offshore Countries Used in International Tax Planning

Offshore destinations are characterised by the fact that they have a benevolent relation to the entrepreneurial environment. Gains from entrepreneurial activities of a company are not usually taxed at all or only by the minimum in the form of an annual fee for “company operation”. These destinations usually offer absolute anonymity as to the publication of the real owner of income and bank transactions. The table shows some selected countries in relation to the Czech Republic.

Table 2 – The tax burden for selected types of tax. Source: Own development.

	Bahamas	The Virgin Isles	Hong-Kong	Lichtenstein	Panama	The Seychelles
Double Taxation Avoidance Agreement with the Czech Republic	No	No	Yes 2012	No	Yes 2013	No
Taxation of capital income	No	No	No	Yes	No	No
Taxation of income of legal entities	No	No	No	Yes	No	No
Filing the income tax return	No	No	Yes	Yes	No	No
Provision of data about the company	No	No	Yes	No	Yes	No

Companies in countries where the tax return is not filed pay the minimum annual flat rate fee to the state.

The most favourite tax havens in the Czech Republic were the Netherlands, Cyprus and Luxembourg in 2010.

### 3.4 Tax Planning

At the current era of globalised world there are few companies operating exclusively in a single region or a single country. The absolute majority of medium-sized and large economic

entities implement their economic activities in two and more countries, both within the EU, and outside it. Tax planning means using tax-advantageous provisions of laws in individual countries (Široký, 2013).

Tax planning can be performed by:

- Tax optimisation
- Transfer pricing – transfer prices, i.e. the method of profit distribution
- Treaty shopping – an agreement on purchasing
- Double Taxation Avoidance Agreements
- Tax residency, the global tax duty
- Tie-breaker rules within double taxation avoidance agreements
- Permanent plant
- Withholding and security tax – from 1 January 2013 more than double as high increase in the taxation of payments to tax havens in the Czech Republic but this measure does not apply to every tax haven
- CFC legislation – based on the basic principle of avoiding the leakage of tax income abroad, the rules are not implemented in the Czech Republic (Kozák, 2013).

Offshore and onshore enterprising within the international tax planning is not anything else than using the tax-advantageous provisions in the acts of individual countries. The basis for successful enterprising is the reaching of a competitive advantage. Therefore, entrepreneurs in the whole world strive to search for competitive advantages. It needs to be realised that taxation as such is a cost and entrepreneurs can achieve a competitive advantage in the field of international competition especially by means of reducing their costs. It is absolutely legitimate, and even desirable for competitiveness of enterprises, to use these advantages and to efficiently optimise their tax duty. By the correct selection and setting of the given structure, it is possible to significantly reduce the total tax burden down to zero (Mandel and Tomšík, 2011).

Every company has different requirements in tax planning. A location, free trade zones, anonymity and jurisdiction is important for an international trading with goods. Hong-Kong or Cyprus best meet such conditions. Investors that provide their funds for projects by means of loans also engage in developer projects. Interests form a tax-eligible cost and therefore investors seek a location where collections of revenue interest are not taxed. It is suitable to use companies registered in Cyprus and Malta for this type of transactions. Another element of tax planning is anonymity of ownership while preserving the control. International holding structures which meet both the elements of anonymity and ensure high image, tax-exempt sale of ownership interests within the group and tax-exempt flow of dividends serve for such purpose. These conditions are met by jurisdictions of Cyprus, Malta, the Netherlands, and Luxembourg etc. With regard to portfolio investments in publicly tradable securities, standard offshore companies at the Seychelles, Panama and the British Virgin Islands are used. When providing licences, it is important, when selecting a jurisdiction, to proceed according to individual double taxation avoidance agreements which can reduce the tax rate or even completely eliminate it. John Learned Hand, a US federal judge, answered the question whether tax planning is legal as follows: “The legal right of all tax payers to reduce the amount of taxes or avoid them, which means using the means within the scope of law, cannot be contested.”

## 4 ANALYSIS OF FACTORS INFLUENCING DECISION-MAKING OF COMPANIES

Two hypothesis were established prior the analysis:

*H<sub>0</sub> – On the basis of the analysis of all the factors affecting companies' departure to tax haven, we can define that companies' departure to tax havens is not influenced by the state tax policy.*

*H<sub>1</sub> – On the basis of the analysis of all the factors affecting companies' departure to tax haven, we can define that companies' departure to tax havens is influenced by the state tax policy.*

### 4.1 Development of Companies Registered in the Czech Republic

The willingness of entrepreneurs to found new companies grows together with economic recovery. In 2013, 22 845 new companies were founded in the Czech Republic, which is most in the recent three years. The total number of companies exceeded 391 thousand and it increased almost by seven per cent on year-to-year basis. It follows from the analysis of the Bisnode consulting company. In the first half of 2014, 12 557 companies were founded, which was more by 4.43% than in the same period of the previous year. If this trend persists, most companies since the pre-crisis year of 2007 will be established this year as follows from the analysis of the Bisnode consulting company. The total number of companies registered in the Czech Republic exceeds 400 thousand according to the Czech Statistical Office. However, the share of joint-stock companies in the entrepreneurial base has been decreasing. It is also connected with the prohibition of anonymous stock in the Czech Republic.

Table 3 – The number of companies registered in the Czech Republic. Source: Own elaboration.

	2013	2012	2011	2010	2009	2008	2007
Limited liability company	374 514	348 334	332 987	316 429	296 787	280 736	269 763
Joint-stock company	25 057	24 937	24 714	24 042	23 221	22 888	20 455
Total	399 571	373 371	357 701	340 471	320 008	303 624	290 218

According to the Czech Statistical Office as of 31 December 2013, the share of active and inactive joint-stock companies was 84.19% of active ones and 15.81% of inactive ones. The share of active and inactive limited liability companies was 75.11% of active ones and 24.89% of inactive ones.

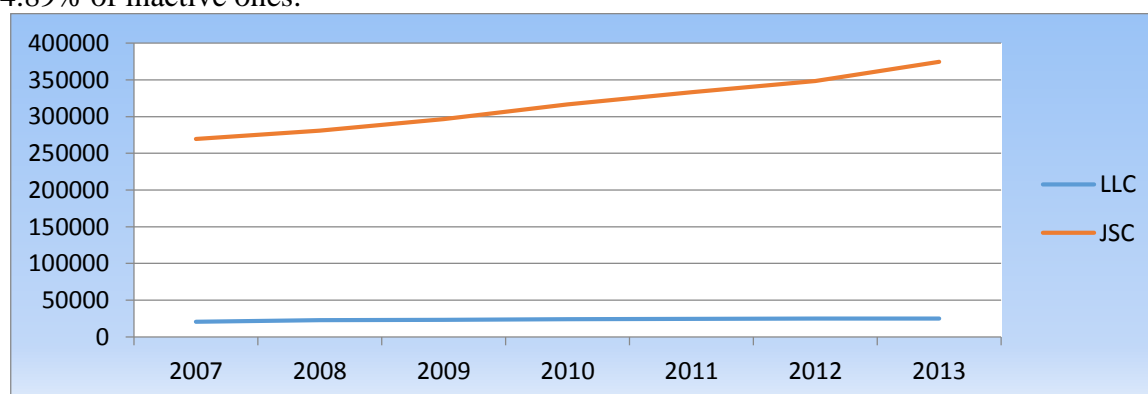


Figure 1 – The development of the number of companies registered in the Czech Republic. Source: Own development.

Table 4 – The number of newly established companies in the Czech Republic. Source: Own development.

	2013	2012	2011	2010	2009	2008	2007
Limited liability company	22 227	21 592	21 174	22 460	21 756	22 638	21 063
Joint-stock company	618	862	1 159	1 174	1 095	1 336	3 967
Total	22 845	22 454	22 333	23 634	22 851	23 974	25 030

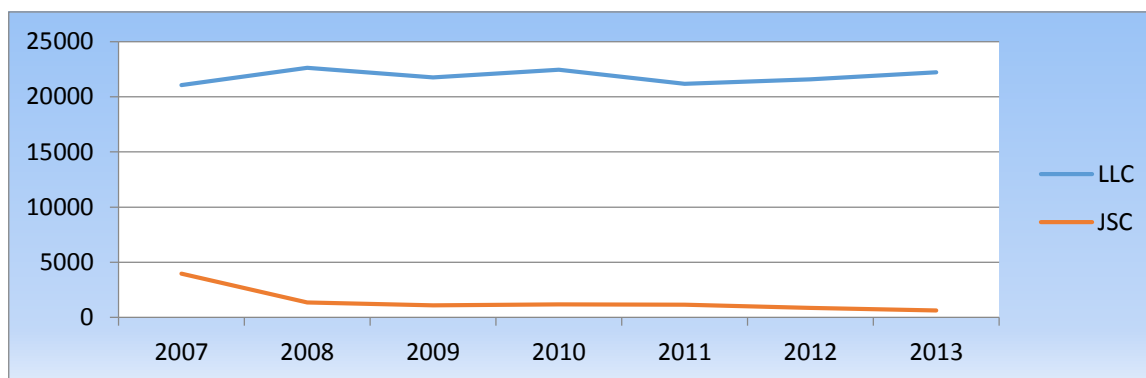


Figure 2 - The development of the number of companies established in the Czech Republic. Source: Own development.

#### 4.2 Departure of Czech Companies to Tax Havens

Entrepreneurs that lose profits due to high taxes use the only possibility how to efficiently express their disagreement with the policy of their country. It is failure to pay or avoidance of payment the taxes, which can be implemented absolutely legally in practice by transferring the registered office of the company to a country with better conditions for doing business, i.e. to a tax haven. In total, in 2010 there was a drop in the interest of Czech companies to transfer the registered office to tax havens, and the year-to-year increase thus only reached 2.5%, which was the lowest year-to-year increment of recent years when ČEKIA monitors these statistics. ČEKIA explains it as follows: “The reason for the decrease in the interest of entrepreneurs in tax havens is connected with the saturation of the market, the continuing difficult economic situation in the Czech Republic as well as with the slight optimism of entrepreneurs after the victory of the right wing in the Parliamentary election or by the pressure of advanced countries, including the Czech Republic, on tax havens and their efforts to conclude agreements on the exchange of information in tax matters.”

Another reason is the protection of anonymity. Since January 2014 bearer shares have been cancelled in the Czech Republic and this resulted in a higher outflow of companies to tax havens.

Table 5 – The number of Czech companies with an owner in a tax haven. Source: Own elaboration.

	2013	2012	2011	2010	2009	2008
Belize	127	118	94	83	77	55
The Virgin Islands	483	455	438	422	424	441
Cyprus	1965	1904	1705	1550	1411	1150
Lichtenstein	248	261	255	245	262	275
Luxembourg	1160	1173	1192	1254	1241	935
The Netherlands	4396	4443	4501	4519	4551	3474

Panama	204	199	190	170	162	108
The Seychelles	590	512	414	330	262	225
The U.S.A.	2867	2903	2750	2630	2545	2135

The total development of the number of Czech companies with an owner in a tax haven is as follows since 2008:

Table 6 – The total number of Czech companies with an owner in a tax haven. Source: Own development.

	2013	2012	2011	2010	2009	2008
Total	12719	12676	12196	11424	11143	8990

### 4.3 Departure of Slovak Companies to Tax Havens

The situation is similar in the other countries of the European Union. For comparison, we provide the table of the number of Slovak companies with an owner in a tax haven.

Table 7 – The number of Slovak companies with an owner in a tax haven. Source: Own development.

	2013	2012	2011	2010
Belize	117	96	75	51
The Virgin Islands	88	78	81	78
Cyprus	755	757	600	535
Lichtenstein	32	28	18	15
Luxembourg	354	392	344	318
The Netherlands	1124	1110	1052	1050
Panama	94	62	38	25
The Seychelles	220	180	65	18
The U.S.A.	859	760	671	601

The total development of the number of Slovak companies with an owner in a tax haven is as follows since 2010:

Table 8 – The total number of Slovak companies with an owner in a tax haven. Source: Own elaboration.

	2013	2012	2011	2010
Total	3853	3646	3093	2830

This series shows that the number of companies with an owner in a tax haven has been increasing even though there is an outflow of companies from some destinations to more advantageous destinations. In Q1 2014 as many as 185 companies has transferred their registered offices from Slovakia to tax havens, while in the previous year it was 208 companies. The departure of Slovak companies to tax havens is especially caused by increasing the taxes and the growth of administrative burden.

It is clear from the development in the Czech Republic and Slovakia that the number of companies with an owner in a tax haven has been increasing.

#### **4.4 Foreign Registered Capital of Czech Companies**

A study dealing with the ratio of foreign registered capital in Czech companies to the foreign capital with an owner from a tax haven follows from the MagnusWeb database. Foreign capital in Czech companies has remained almost at the same level in the range of CZK 920 – 960 billion since 2010, of which foreign registered capital controlled from tax havens has increased from CZK 350 billion to CZK 490 billion since 2010.

#### **4.5 Tax Haven Selection Factors**

Factors typical for tax havens

- Ring fencing – the manner of financing
- Low or zero effective tax rate
- Lack of tax system transparency
- Lack of efficient exchange of information
- Exemption of income from foreign sources

35 countries have been identified as a harmful tax haven and 47 countries have been identified as potentially harmful tax regime.

Five best tax havens with regard to Czech entrepreneurs include:

- The Netherlands, 4 396 Czech companies with a Dutch owner
- The U.S.A., 2 867 Czech companies with a US owner
- Cyprus, 1 965 Czech companies with a Cyprian owner
- Luxembourg, 1 160 Czech companies with a Luxembourgian owner
- The Seychelles, 590 Czech companies with a Seychelles owner

Advantages of founding of these companies include:

- Possibility to reach a zero profit
- Founding a company with no financial costs
- Prestige of a European company
- Higher entrepreneurial freedom
- Low fee replacing the income tax
- No taxation of legal entities

Time exigency of administrative processing as well as simple tax environment which discourages from investments are important for founding a company in a tax haven.

The data were taken from the research within the Doing Business project which compared companies of 185 economies.

Table 9 – Paying taxes – summary. Source: Doing Business Project.

	Number of tax payments per year	Time devoted to taxes	Tax on profit (%)	Wage tax and levies	Other taxes (%)	% of profit
Eastern Asia-Pacific	25	209	16.7	10.9	6.9	34.5
Eastern Europe and the Middle Asia	28	260	9.1	22.1	9.3	40.5
Latin America and Caribbean Region	30	367	21.5	14.4	11.3	47.2
Middle East and Africa	19	184	11.9	16.5	3.9	32.3
OECD countries with high income	12	176	15.2	23.8	3.7	42.7
South Asia	30	311	17.1	8.7	14.4	40.2
Sub-Saharan Africa	39	319	19.0	13.3	25.5	57.8

The table shows that OECD countries with high income have the lowest time exigency for administrative processing, while Latin America and the Caribbean region twice as high.

Table 10 – Tax payment in TOP 5 and the Czech Republic. Source: Doing Business Project.

	Value of paid taxes	Number of payments per year	Value of time per year	Tax on profit in %	Wage tax and other levies	Other taxes in %	% of profit
The Czech Republic	120	8	413	7.5	38.4	3.4	49.2
The Netherlands	29	9	127	20.6	18.1	1.3	40.1
The U.S.A.	69	11	175	27.6	10.0	9.0	46.7
Cyprus	31	28	147	9.0	11.8	2.1	23.0
Luxembourg	14	23	59	4.1	15.4	1.5	21.0
The Seychelles	20	27	76	23.3	1.7	0.7	25.7

The research dealt with numerous comparisons of values but it especially focused on the number of tax payments and time exigency of book-keeping and tax processing.

The comparison of TOP 5 tax havens with the

1. The value of collected taxes – the Czech Republic highly exceeds TOP 5
2. The total number of tax payments per year. The indicator shows the total number of paid taxes and contributions, the manner of payment and frequency of payments – the Czech Republic has a significantly lower number of tax payments per year. They include the income tax of legal entities, the value added tax, the road tax, the real estate tax, and the employment tax.
3. Time necessary for the preparation, filing and paying (or refusal to pay) the income tax, value added tax and social security (in hours per year). The table shows that time exigency exceeds TOP 5 as well as the highest values in South America and the Caribbean region.



4. The amount of tax on profit paid out by companies as a percentage of business profit – it is significantly lower in the Czech Republic compared to the Netherlands and the U.S.A.
5. The amount of income tax of employees – the burden of employees is high in the Czech Republic
6. Other taxes – there are different taxes in different state therefore we will not compare them
7. Total tax duty – it is comparable in the Czech Republic with the other TOP 5

Figure 3 – Total number of tax payments per year. Source: Own elaboration.

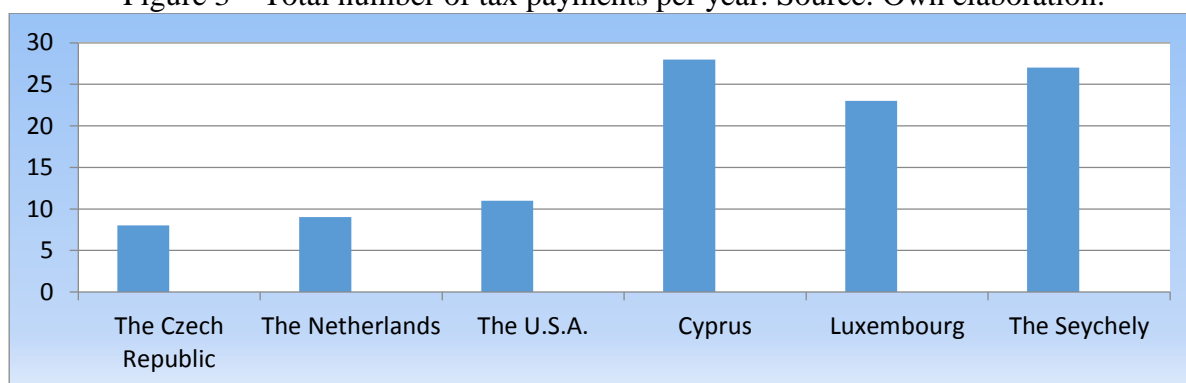
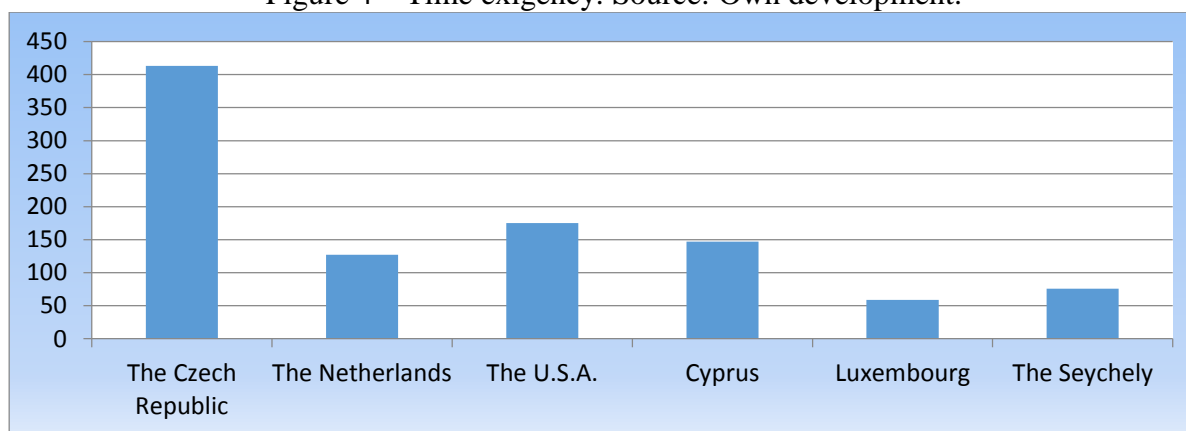


Figure 4 – Time exigency. Source: Own development.



#### **4.6 Selection of the Most Advantageous Tax Haven**

There are numerous companies dealing with various activities, trade, services, real estate transfer, trading securities, trading real estate.

International trade – as far as the international trade is concerned, the region of trading, the region of customs warehouses and free trade zones is important for a company. With regard to anonymity of owners and tax optimisation, Great Britain and Malta are suitable in Europe, and the U.S.A. and Hong-Kong in the world.

International services – the same conditions apply in the field of services as in trading the goods. When the setting is correct, the taxation rate is between 1 and 2%. Suitable locations in the EU are Great Britain and Malta, in the world the U.S.A. and Hong-Kong.

Real estate trading – the investor provides its funds for projects by means of loans and interests on such loans. The interest is usually taxed in the Czech Republic with regard to withholding taxes at the place of interest payment source and consequently at the place of revenue interest collection with regard to income tax. Such location in the EU is e.g. Malta.

## **5 SUMMARY OF RESULTS**

Approximately 15% of countries are considered to be tax havens. These countries have a tendency to be small and rich. A statistically significant factor influencing the probability for a tax haven establishment is the quality of state administration. This probability will increase from 26% to 61% in a state with the population below one million together with the growth of state administration quality (Dharmapala and Hines Jr., 2009). The evidence from US companies suggests that low tax rates offer much stronger stimuli for foreign investments if the state is well administered. Due to this reason, the tax policy should be added in the list of economic policies which can be affected by public administration bodies (Nunn and Trefler, 2006). Tax havens are the states with a high quality public administration, political stability, preserving the principles of the legal state, the government efficiency and democracy (Kauffmann et al., 2005).

According to analysis of Czech companies it is evident, that since 2007 the economy is raising and entrepreneur's willingness to start business is growing. The number of newly founded companies is rising. But since 2008 the number of companies with an owner in a tax haven is also rising.

In 2009 the number of companies with an owner in tax haven was 23,95% higher than in 2008. In 2010 the number of companies with an owner in tax haven was only 2,52% higher than in 2009. In 2011 the number of companies with an owner in tax haven was 6,76% higher than in 2010. In 2012 the number of companies with an owner in tax haven was 3,94% higher than in 2011. In 2013 the number of companies with an owner in tax haven was 0,34% higher than in 2012.

The progress is not steady, the departure to tax havens are following changes in governmental tax policy. Lehman Brothers Holding Inc. collapse in 2008 contributed to the high raise we observed in 2009. EU member states adopted tax measures (European Commission, 2010). Those were dominantly discretionary measures to support financial sector and demand revival. The number of companies departing to tax havens rose by 23,95 per cent.

In 2010 the tax burden is shifted from direct taxes to indirect taxes, there is backing of fiscal policy and there is also backing of the measures for lowering of the budget deficit. In 2011 most of the tax measures increase taxes, tax mixture changes, the work tax decreases, there is new taxation of financial sector, benefits, capital market, new ecology taxes are introduced and/or raised. The per cent of departures rises again up to 6,76%.

In accordance with the aforementioned analysis, the  $H_0$  hypothesis (the departure to tax havens is not influenced by states' tax policy) is disproved. Every tax policy change between 2008 and 2013 did influence the companies' departure to tax havens.

To support the conclusion the secondary state of Slovakia was also analysed. In 2011 the number of companies with an owner in tax haven was 9,30% higher than in 2010. In 2012 the number of companies with an owner in tax haven was 17,88% higher than in 2011. In 2013 the number of companies with an owner in tax haven was 5,68% higher than in 2012. This course suggests that the governmental changes of Slovak tax policy lead to the rising numbers of companies departing to tax havens. In 2011 Slovakia introduced new policy for preventing tax evasions.

The survey shows that more than three per cents of Czech companies have their registered office in a tax haven and their number has been increasing. Large as well as smaller companies depart. Numerous entrepreneurs state the reasons such as bureaucracy, instable tax laws, the breach of anonymity etc. Although only three per cents of companies of approximately 400 thousand of the ones registered in the Czech Republic are controlled from tax havens, about 30% of entrepreneurs would change their registered office to a tax haven. The government did not manage to prevent these departures and they still believe that three per cents of companies are few, but while the amount of foreign capital invested in domestic joint-stock companies and limited liability companies dropped on the year-to-year bases, the amount of the capital from destinations considered to be tax havens increased by CZK 69.4 billion on the year-to-year basis, i.e. by more than 17%. The most attractive tax havens of Czech companies include the Netherlands, Cyprus and Luxembourg.

Although the number of companies has been increasing in the Czech Republic, according to the Czech Statistical Office the share of inactive limited liability companies is almost a quarter and the number of inactive joint-stock companies reaches 15%. This statement needs to be considered for the analysis. There is no statistics for newly founded companies whether they transfer their seats to tax havens but according to the survey large enterprises reaching a profit transfer their registered office. The following companies left for tax havens in 2014:

- NET4GAS, s.r.o.
- ENERGOCHEMICA SE
- ARKADIA, a.s.
- Agro Tera,a.s.
- Bea Development, a.s.
- TCCM s.r.o.
- QUARRYHILL s.r.o.
- Global Facility, s.r.o.
- Česká realitní a.s.
- GRAND PRINC MEDIA, a.s.

It is possible to restrict tax avoidance through tax havens especially by improving the work of Tax Offices. Their extension is necessary for this purpose. The work of tax offices in the United States, Germany or France shows it is possible. The current government should create conditions for it. It is possible to act more strictly against tax avoidance through tax havens and off-shore centres. It requires a strong support of the domestic government and the cooperation of the states at the international level. The solution must necessarily include the unification of the tax base amount and the tax rate at least at the level of EU, and introducing a withholding tax on transactions with companies with the registered office in a tax haven.

Recommendations which should make companies conduct business in the Czech Republic include:

1. International exchange of information should be ensured among states
2. This exchange of information should operate without the prior request if the state believes the information in the other state can be useful
3. Setting of such tax conditions which would be advantageous

4. Avoidance of double taxation
5. Distributing the tax revenues between both the states

So far the economy is not affected by companies' departures to tax havens, but the rising numbers (3% of Czech companies have an owner in a tax haven and 17% of Czech companies' capital volume is located to tax havens) are alarming.

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## **PHILANTROPY AS PART OF THE REGIONAL CONTEXT FOR SOCIAL INCLUSION**

*Helena Kolibová, Magdalena Chmelařová*

### **Abstract**

The aim of this paper is to analyze corporate philanthropy and description of the situation in the field of philanthropy among target legal entities and individuals operating in the Moravian-Silesian Region. Regional labor market is marked by the passing restructuring and high unemployment.

In order to cover the issue, the analysis of secondary data was carried out (quantitative approach) and credible figures concerning cumulated tax returns submitted in 2014 on donations, total bulk of the donations and the number of entities that submitted the tax return for the year 2013.

The every business activity is put into the context of social culture within cultural patterns. Therefore, we wish to highlight the fact that an inclusive concept of corporate and individual donations bonds is able to contribute to a development of the civil society.

The article was based on the implementation of the project called “*Specialized maps and systems to support seniors and cooperation between participating players for the development of volunteering*” (project number TD020048), which is solved with financial support from TA CR.

*Keywords: Corporate philanthropy, forms of donations, donator motivation, areas of support, corporate social responsibility, stakeholders, tripleAbottom.*

JEL Classification: D14, M14, M15

### **1 SPECIFICS OF PHILANTHROPY**

Philanthropy is not just a one-off donation in order to “do good” and help. It is an activity that promotes the functioning of community life. It stimulates a harmonious environment and arises from a sense of togetherness towards the area of life, work, and living.

The basis of a broader perception of philanthropy in its context is a holistic concept of altruistic behaviour. Thus, the concept of philanthropy forms a unit exceeding more than the summary of its parts, including the ways of their implementation. It is formed by the solidarity of individuals, corporate companies and society-wide solidarity with its stimulating outreach. The philosophical basis for a holistic approach to donations must be based on respect and knowledge of the environment - people, nature, and social orientation. Hence, it reflects a donor’s relation to their neighbourhood in the hierarchy of values and freedom of choice. In this respect, philanthropy belongs to preventive and creative activities affecting society both as ex ante and ex post to solve social problems (Stiglitz, 1986).

The major point of consideration for altruistic behaviour in business environment and its ties to non-profit entities is the attitude to the issue of whether companies are exclusively economic and/or moral entities concurrently (Potůček, 2005). Adopting an attitude on the concept of funds reallocation and redistribution out of a key framework of government intervention signifies a related issue.

According to the author team, the view that society as a whole provides a framework and allows individual entities to achieve their goal, has the general support. In this respect it is possible to understand that every business activity is put into the context of social culture within cultural patterns (habits, customs, laws, and taboos), where their nature has a moral character (Šmajš, Binka, & Rolný, 2012). The moral maturity of business entities has, from this point of view, a direct impact on ties to the community and helps to create the essence of corporate philanthropy. This means that an organization as a bearer of its own contribution and access options to the economic and social reality actively contributes to improving the quality of life. It also strengthens social consensus with the emphasis on maintaining traditions and a regional context.

*The primary objective of the analysis is to answer the following questions:*

*What is the situation in the field of donations in the Moravian-Silesian region for both legal entities and individuals expressed as a percentage share between donations in the target groups and the amount of realized donations?*

*What was the overall average of financial donations provided in the Moravian-Silesian region?*

*What topics is philanthropy connected with?*

### **1.1 Theoretical bases for corporate philanthropy**

Nowadays, there are two basic approaches to corporate philanthropy in the Czech society. We can differentiate between the **reactive concept**, when the company has not any adapted corporate philanthropic strategy and evaluates every single request for donations, and the **proactive concept**, when the company uses a developed philanthropic strategy including the rules and chosen supported target groups or areas; or as an old and new corporate philanthropy (Smith, 2003).

In case of proactive or new philanthropy, effects develop the reason for the altruistic approach because repeated support:

- appears to be much more rewarding due to the fact that it includes a long-term perspective. This allows donated funds to be included into the plans of individual organizations beneficiaries and use the funds efficiently. It complements and diversifies financial resources and helps to create job opportunities in the area,
- gives a clear framework for a donor organizations' policy and thus prevents an excessive number of applicants whose project bears no relation to donor priorities of the company,
- strengthens a benefactor's image; can help to strengthen brand loyalty and presents the strategy of the company openly. Because of its transparency it is a tool for incentive company policy and the way how to work with the public, including embracing principles of the social organization's responsibility.

## **1.2 Donation forms**

In reality, there are two forms of donations (Postoje k problematice dárcovství, 2010).

### **a) Cash donations**

This is the easiest, fastest and also the most commonly used method of support. Alternatives:

- *Direct support* is the most common form. It is based on the fact that the company donates financial or material resources once or repeatedly to support a beneficial community project.
- *Collection among employees and matching fund.* The company or employees themselves organize a collection directly. The collection is often performed on the principle of “matching”, which is based on the fact that the company will increase (e.g. will double) the means collected among employees. This form combines employees’ engagement and corporate support. Especially large foreign statewide companies, operating in services, acquire resources on gifts through a collection among employees. Large international business companies, mostly with a Czech investor, prefer the matching fund as an alternative source of funds for their donor activities.
- *Corporate foundation / corporate endowment fund.* They work as independent legal entities. They differ from other foundations about the fact that their founders are companies which they get most funds for the implementation of long-term charitable programmes from.
- *Charity auctions and exhibitions.* They are organized by a company for employees, business partners, or customers. The resulting financial proceeds are used for charitable purposes.

The support of entities by a financial contribution (a gift) remains the most frequently used form of a support in companies (Peková, Pilný, & Jetmar, 2005). The crucial majority of companies are engaged in cash donation. The form of material donation is represented numerically less, but still strongly (over 50%).

Tax treatment options how to deduct gifts and reduce the tax base are different.

*Individuals* as the donors may, according to the income tax law, deduct the value of a gift from their tax base. But the total value of donations in a given year must be greater than 2% of their tax base, or is at least CZK 1,000. However, it is possible to deduct the maximum of 15% of the tax base (the maximum limit was 10% of the tax base till the end of the year 2013).

*Legal entity* as the donor is entitled to the deductibility if the value of a gift (or all gifts of one organization) is at least CZK 2,000. In the case of a donation, the donor may apply a deductible item and decrease the adjusted tax base. *(In contrast to the individual, legal entity reduces the tax base of the item deductible from the tax base (§ 34 of the ITA) as a tax loss deduction, support of research and development, or deduction for vocational training. The value of the gifts can be applied if they conform to the rules laid down by law. If the donor is subject to VAT and gives a gift, it is necessary to pay VAT based on the value of the gift. Financial donations are not subject to the value added tax. For a donor, the VAT is a further cost associated with the gift).* Even with the legal entities, there is an increase since 2014 and



at the same time the limit for deduction of donations to the maximum of 10% of the tax base is unified.

### **b) Non-monetary donations**

It is gradually becoming a common way how to support charitable activities.

- *Training, education and professional support.* Companies may contribute towards developing expertise and professionalism of non-profit organizations and their cost savings by providing these services free of charge or at a low cost.
- *Providing facilities for the operation of non-profit organizations.* Companies can provide premises, pay rent, lend equipment or distribution network, provide presentations and advertising options (on product packages, in correspondence, etc.).
- *Corporate volunteering.* Generally, it connects beneficial company activities with the support of employee volunteering. The company releases its employees to perform voluntary activities. It also establishes contacts and partnerships with non-profit organizations where the employees can work as volunteers in single events or long-term projects. Corporate volunteers can take part both in purely charitable unskilled works and professional ones. For example, they help to create a PR or marketing plan of a non-profit organization, website, or a computer network. The employees need not take a holiday but they are fully paid by the employer as time worked.
- *Participation on the boards and grant committees of non-profit organizations.* The company representatives bring perspective of professionals from the opposite side to a non-profit organization. At the same time they strengthen credibility of organizations and a public benefit of the activity.

*Connection between the philanthropy and other corporate activities.* It is a specific approach of “doing good” when philanthropic activities are linked with commercial ones (e.g. with the use of marketing tools). It does not only arise from purely altruistic motives, but it depends on the actual corporate attitude (Giving USA 2014 Report Highlights).

- *Cause related marketing (shared marketing).* A company donates a certain amount of one of its selected products for charitable purposes. For example, every crown of a particular product sold goes to the target groups (disabled children, animals’ shelter allowance, the reconstruction of cultural monuments etc.). The contribution of goods sold is frequently used by large statewide business firms with a Czech investor mainly. These activities bring about effects for non-profit organizations in the fact that, in addition to financial income, the public interest in the philanthropic topics is increasing.
- *New products using existing technology.* The company is involved in a formation of facilitating mechanism for supporting community activities, where a non-profit organization is exempt from fees (e.g. Collection account of the Czech savings bank *Česká spořitelna*, or project DMS - Donor SMS).

## **2 SITUATION IN DONATIONS OF INDIVIDUALS AND LEGAL ENTITIES IN THE MORAVIAN-SILESIAN REGION**

The core of philanthropic actions lies in the practical procedures. Their common motto is a development of the civil society not only at the moral level, but financial and material levels at the same time. The Ministry of Finance in the Czech Republic annually draws up aggregate data, concerning donations, derived from filled tax returns of individuals and legal entities. The registered donations are in the range of 4 billion Czech crowns within the last three years.

Various forms and activity tools suit individual participants. Naturally, the degree of their support is also differentiated depending on a different economic base. The Moravian-Silesian region is a difficult area not only in terms of the unemployment rate and its level, but also in the incidence of socially pathological patterns, etc. Therefore, the authors have focused on understanding the situation in the field of philanthropy in the Moravian-Silesian region with two target groups. They are both individuals and legal entities and the focus consists in expressing a percentage share between donations and the amount of realized donations.

The parts of statistical summaries do not contain support topics and target groups of support beneficiaries. It means that observations on what types of gifts or their nature are not realized at this level. It is possible to deduct all the gifts from the tax base that are rendered non-profit organizations and state organizational units, i.e. the police, political parties, health care, education, churches, etc.

The Moravian-Silesian region is a region with problems in heavy industry, unemployment is high, the condition affects the decline in purchasing power. In the region grown regional disparities in quality of life (southwest Frýdek-Místek and northwest areas Opava are in contrast with the eastern area Karviná, Havířov due to the unemployment rate and air quality). The region is the lack of consistency and low flow of information between public and private actors in the field of philanthropy, weak utilization of voluntary cooperation.

### **2.1 Methodology**

Mathematical-statistics methods were used within the research and they are useful for improving the solution of professional problems and tasks. The reason for their choice was the fact that they contribute to the promotion and improvement of a professional decision-making. In order to cover the issue, the analysis of secondary data was carried out (quantitative approach) and credible figures concerning cumulated tax returns submitted in 2014 on donations, total bulk of the donations and the number of entities that submitted the tax return for the year 2013. Furthermore, numerical characteristics of random variables (often called moments) were analyzed and they are divided into three groups. Nonetheless, we requested information, i.e. what was the donation in differentiation between districts with separate legal entities and individuals (*they were mass phenomena which are formed by individual cases. DAP - tax returns, DPFO (PIT) stands for personal income tax*), and we used location characteristics which give the expected value (mean) and distribution. Besides expected value, the median, mode and percentile belong to location characteristics.

When the data files were acquired, the conditions corresponded with unified legislation, which was historically valid, and procedures in key organizations. The results are presented in a structured form of graphical and tabular outputs including comments. Since the authors have worked both with directly observable and derived indicators, conclusions of the research convey the findings which will enable to meet the objectives of the paper together with other information (*directly observable indicators - DAP and PIT, derived indicators – e.g. average*

*gift, aggregate deduction, etc.*). The research subject is rather a corporate donorship, namely its division into individuals and legal entities.

### **Method for selecting a sample of respondents**

The entities of the Moravian-Silesian region as specified statistical units represented a basic information file and were registered at the Tax Office of the Moravian-Silesian region. The Office has provided information based on data in the tax period of 2013 under the Act 106/199 Coll. on Free Access to Information.

Sampling of a statistical unit was defined in terms of:

- Factual aspect – individuals and legal entities who are obliged to provide the information required by law,
- Spatial aspect - the Moravian-Silesian region,
- Temporal aspect - entities that submitted a tax return for the year 2013 in 2014, i.e. on long-term basis.

Namely they are:

Karviná district, regional office Karviná, Bohumín, Český Těšín, Havířov, Orlová.

Ostrava district, regional office Ostrava I, Ostrava II, Ostrava III.

Nový Jičín district, regional office Nový Jičín, Fulnek, Kopřivnice.

Frýdek-Místek district, regional office Frýdek-Místek, Frýdlant nad Ostravicí.

Bruntál district, regional office Bruntál and Krnov.

Opava district, regional office Opava and Hlučín.

The current data provided by the Tax Office have become the starting point for the sampling design.

### **Sample size determination**

Information of individuals and legal entities were included into the sample size selection (*In terms of income tax, donors can be divided into two basic groups. Individuals - ordinary citizen, an employee, or a person who has income from independent activities or rental income, eventually from other activities; Business entity - a legal entity.*). We compared data of the total 186,601 (DAP total) submitted tax returns of individuals, of which 13,444 documents were tax returns with a gift (DAP with a gift). As for legal entities, there were 29,982 (DAP total) submitted tax returns processed, of which 1,830 were tax returns with a gift (DAP with a gift). During the analysis, we statistically worked with a planar set of people with the tax liability under the Act No. 586/1992 Coll. on Income Tax as amended. The abundance of the sample of respondents and the method for their selection ensure representativeness of the results and high degree of validity (tab. 1, 2).

### Structure of the sample of respondents

Tab. 1 – Overview of individuals with tax returns (DAP). Source: Tax Office data, own calculations.

District	DAP total	DAP with a gift	Amount of donations
Bruntál	14,183	764	8,311,637.00
Frydek-Mistek	33,912	2,860	40,226,907.00
Karviná	34,176	2,619	34,776,915.00
Nový Jičín	23,133	1,696	20,476,447.55
Opava	29,306	1,906	21,474,469.00
Ostrava	51,891	3,596	46,337,234.00

Tab. 2 – Overview of legal entities with tax returns. Source: Tax Office data, own calculations.

District	DAP total	DAP with a gift	Amount of donations
Bruntál	1,607	115	5,990,669
Frydek-Mistek	4,950	344	21,395,311
Karviná	3,807	214	9,859,979
Nový Jičín	2,810	198	8,739,218
Opava	3,366	244	7,320,956
Ostrava	13,442	715	33,288,606

### The organization of data collection and validity of the survey

The analysis procedure respected the schedule of tax legislation. That means deadlines of tax returns (the end of June of the calendar year), finalization of tax returns processed in legally responsible organizations, and application of controls. Beside other things, the procedure monitored the elimination of errors caused by human failure. The data passed the entrance and logical controls of Tax Offices.

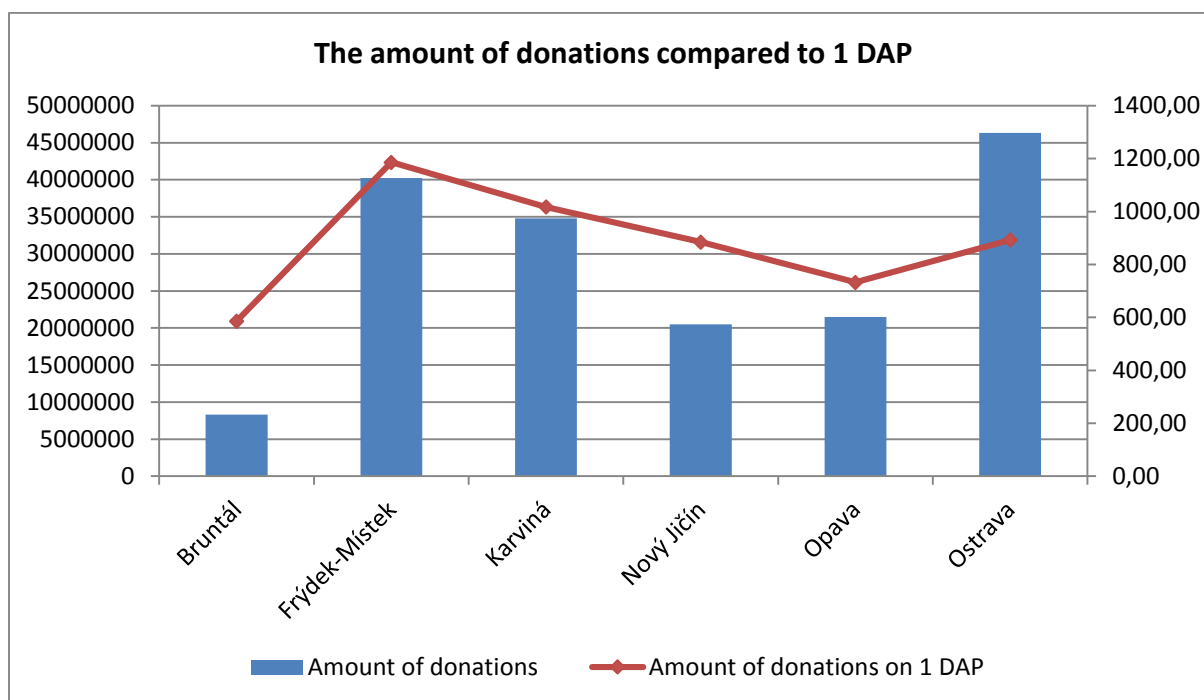


Fig. 1 – Overview of donating compared to tax returns by regions. Source: Tax Office data, own calculations.

The number of reported donations (figure 1) shows generosity of donors among individuals from the Ostrava district in particular. Although there was a lower than average number of donors, they donated higher amounts distributed to the account of a selected target group, or gave money to classical philanthropic activities, or to newer types of non-profit activities, such as the support for education, the fight against corruption, etc. The lowest level of such activities was performed in the Bruntál district apparently as a consequence of the crisis that hit the numerous poorer sections of the population. It was accompanied by unemployment, debts, or threats by execution processes more than elsewhere (Friedrich, 2006).

The Czechs give annually about CZK 150 per capita to humanitarian donorship (<http://www.nadacevia.cz/cz/radce-darce>). However, it is generally known that persons who submit tax returns are characterized by greater generosity. Usually, the reported amount is over CZK 11,000 a year, although there are significant differences not only between regions, but also between districts.

Particular locations in the Moravian-Silesian region also differ from each other. Data show that the gifts per one tax return were higher in the agglomerations of Frýdek-Místek and Karviná (FM 14,065.35 and KA 13,278.70).

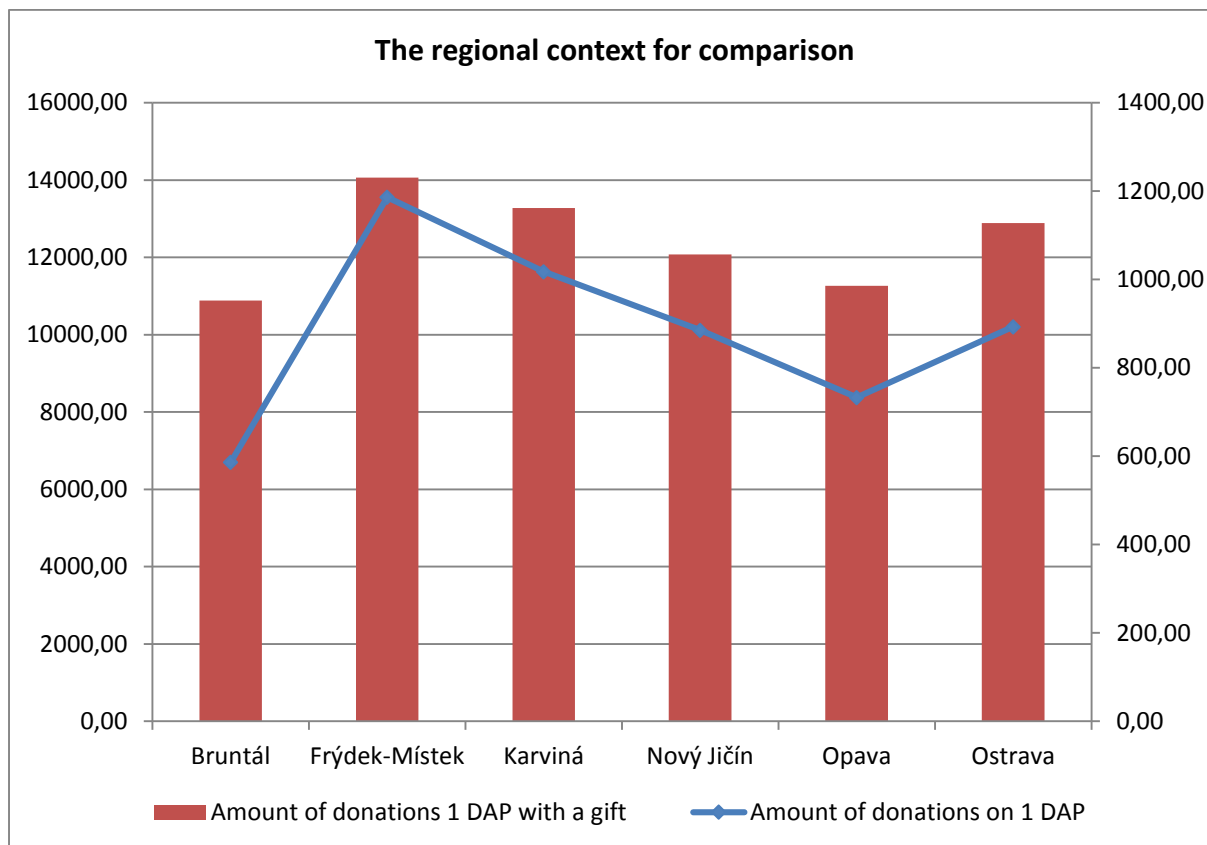


Fig. 2 – FO data overview in the regional context for comparison of the donation per 1 DAP with a gift against 1 DAP. Source: Tax Office data, own calculations.

The results demonstrate a certain reticence of individuals towards donation in the Bruntál district, which reflects the socio-economic situation.

## 2.2 Summary – the main findings

The data show that promoting corporate philanthropy occurs above-average in the Opava district with 7.25% and oddly enough in the Bruntál district with 7.16%. Nonetheless, the level of funds for charity is below the regional average and “financially lagging” behind other areas of the region (graph 2). The involvement of companies, i.e. the percentage of DAP with a gift, in the Bruntál district even exceeds the most outstanding support of financially supporting companies in the Frýdek-Místek district. This is even more pronounced in the Ostrava district with 5.32% and in the Karviná district with 5.62%.

It must be acknowledged that the actual amount of money donated in the region, whether for regional use or solving social and international projects, may be even higher. Donations realized directly in the streets are still present. They are, for example, groups of carol singers in the collection of Three Kings’ Day, World Cancer Day, etc.

The use of new technologies is becoming popular in the Moravian-Silesian region. They are, for example, on-line donations and donor SMS mainly; peer to peer donations based on the principle “from buddy to buddy”; or on-line long-term benefits. Funds for charity arise both from individuals and corporate donors within the Czech society. Currently, an interesting trend called new philanthropy is promoted in the society. On the one hand the loss of donations from companies is recorded but on the other hand they are establishing their own foundations for this purpose. Thus the number of donors from private individuals is

strengthened in practice. Nevertheless, it should be noted that the average donation from individuals differs from the one of legal entities. In the Czech Republic, it is roughly CZK 11,000 per year with individuals and about CZK 132,000 per year with legal entities (*according to data from the VIA Foundation*).

Individual companies professionally compare with each other the amount of charity funds. The differences are not as significant as the differences from a regional perspective. Basically, we can state that professionally they are at the same level, although they differ in themes, timing, or profile of their charity. Distinctions occur in interdisciplinary differences and, of course, between regions.

The average donation from a legal entity amounts to about CZK 132,000. The corporate donations in the agglomeration of Frýdek-Místek have the highest value (CZK 62,195.67), followed by the agglomerations of Karviná (CZK 46,074.67) and Ostrava (CZK 46,557.49).

The companies in the Moravian-Silesian region have undoubtedly an important position within the Czech Republic. These are mainly large organizations and leaders of heavy industry. It is apparent from their placement in the rankings of the association “Czech Top 100”. Since 1994, its main objective has been to compile and publish an annual list of one hundred most important companies in the Czech Republic by selected economic indicators. Two dozen companies from the Moravian-Silesian region are placed regularly in these annual reports (Janoušková, & Sobotovičová, 2013).

In connection with the economic crisis, an income inequality gap shows a “scissors” patterns also in the regional context. It means that due to this fact, opinions of entities and companies on social, group, and personal solidarity began to crystallize. Manifestations of altruistic behaviour began to differentiate mainly towards motivation of their beneficiaries. Not only a number of general studies (*for example, CVVM surveys, Nationwide research on corporate philanthropy was realized in June 2004 by Czech Donors Forum in cooperation with AGNES and supported by the PHARE program - Long-term sustainability of civil society, and VIA Foundation <http://www.nadacevia.cz/cz/radce-darce>*), but also our research shows that feelings of mutual trust and solidarity were reduced by worries about coping with own economic situation and maintaining personal financial security. At the same time the public asked the government to observe control functions and do not squander. In other words, social policy and the concept of a welfare state should be targeted and transparent.

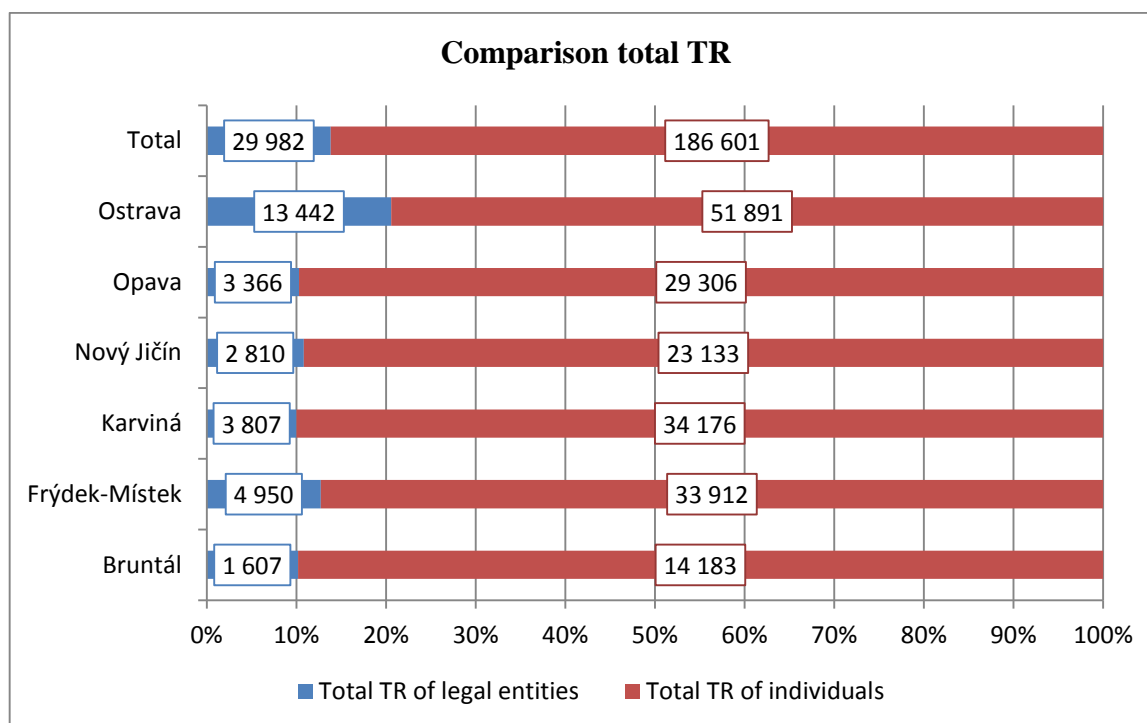


Fig. 3 – Tax records overview of legal entities and individuals. Source: Tax Office data, own calculations.

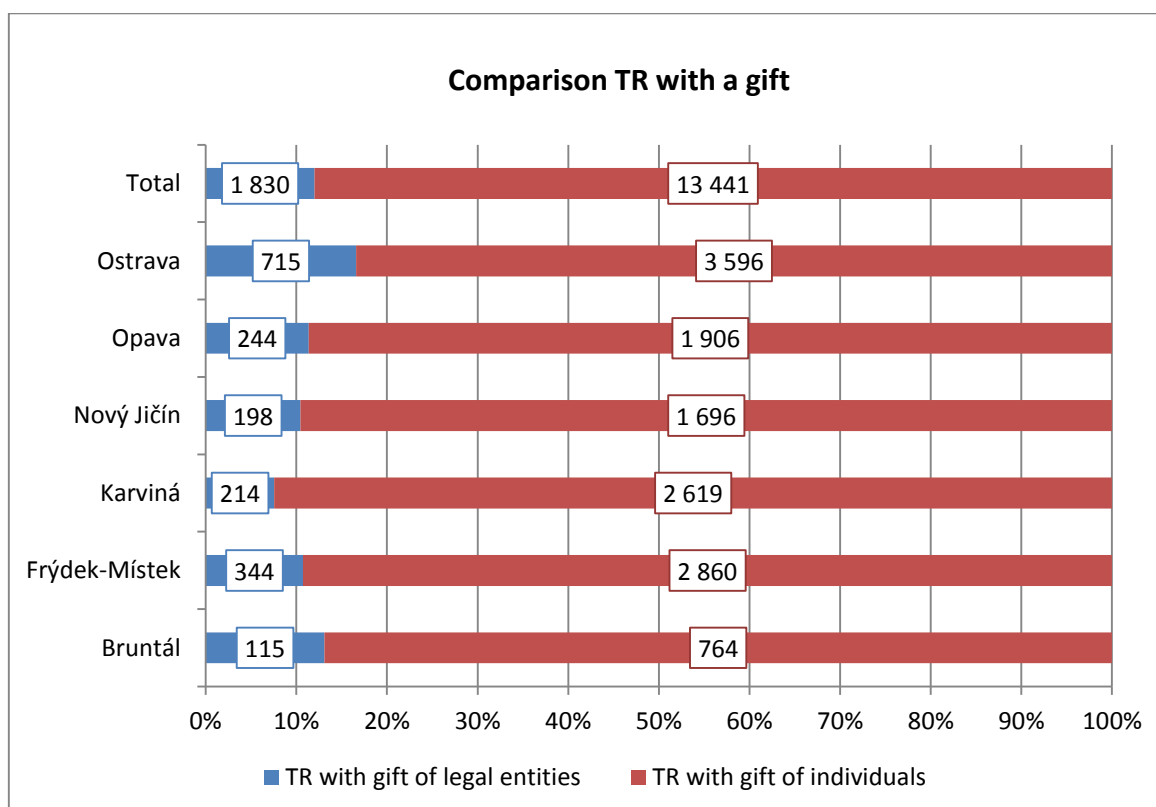


Fig. 4 – Tax records with a gift overview of legal entities and individuals. Source: Tax Office data, own calculations.



The biggest difference of applied tax deductions occurs in Ostrava, Karviná and Frýdek-Místek, where donors within the ranks of individuals ultimately prevail (in thousands) (graph 3, 4).

Private donations in the Moravian-Silesian region exceeded the limit of CZK 171,603,609 in 2013, while corporate donors gave to a “good thing” CZK 86,594,739. Nonetheless, in real terms the growth of individual donations was reduced by inflation, which amounted to 1.4 in 2013 (<https://www.czso.cz/csu/czso/domov>).

Basically, we can say that smaller sums of money from a multitude of donors bring in substantial revenues for much-needed activities and they are a real source of donating.

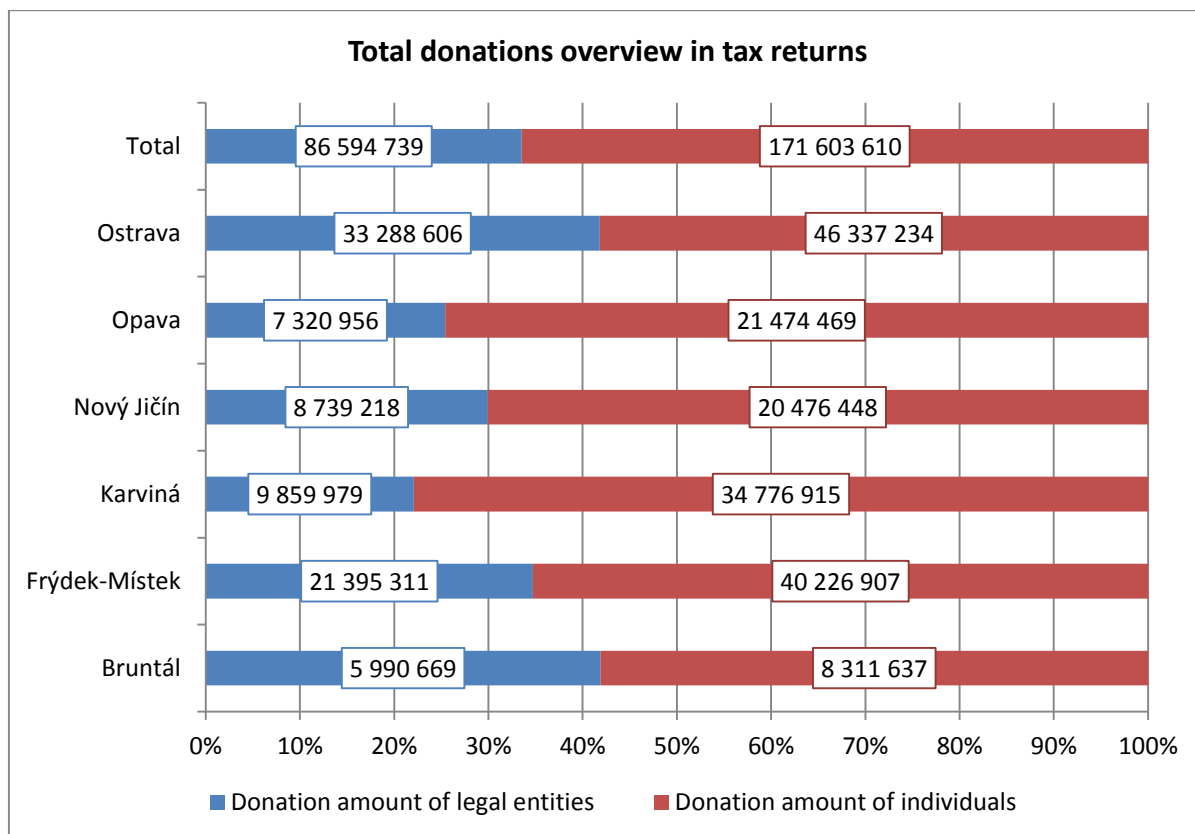


Fig. 5 – Total donations overview in tax returns, data for 2013 in the Moravian-Silesian region. Source: Tax Office data, own calculations.

### 2.3 The potential for corporate philanthropy in the Moravian-Silesian region

We can conclude that recent years have led to variations in a hierarchy and acceptance of post-materialistic values in a regional environment. In particular, difficult areas in the Moravian-Silesian region still exist (Kolibová, a kol. 2013). The loss of primary public pressure on environmental protection or companies’ compliance with the requirements of corporate social responsibility was somehow demonstrated. But philanthropy and an interest in the possibility of providing tax allowance for making a donation to charity suggest an increasing trend (graph 5) (*An increasing number of donors are showing an interest in the activities of the supported organization and they are insisting on a greater donation transparency.*).

*Identifying trends in corporate philanthropy*

- People with a good standard of living and thriving businesses have remained in their attitudes and support of philanthropic acts. However, it is true that people with declining living standards (i.e. also people close to the median wage which is getting closer to the poverty line) and companies with existential problems are in their attitudes rather radical.
- Companies, which were engaged in philanthropic activities during the last five years, do not plan to increase the amount of donations.
- Reflections on increasing the proportion of corporate philanthropy must take into consideration the fact that the potential for attracting new donors could relate to unconcerned companies, alternatively new legal entities. This might be possible due to the increasing economic companies' performance and the arrival of new investors in the region who utilize industrial zones, for example.
- In the following years, qualitative development of corporate philanthropy may be expected in the areas of cooperation between companies on common projects and in the area of increasing corporate professionalism. It means that large companies, like in other countries, will not make decisions on the selection of a target group or organization only at the level of the management in case of philanthropy. However, they will exploit employee committees to a larger extent and will respect the opinion of the employees.
- Qualitative development of corporate philanthropy refers to the use of various forms and tools of new technologies such as on-line donations, peer to peer donation etc.
- The transformation also refers to guaranteed long-term effects of philanthropy. Companies begin to prioritize their support for competencies, namely donations to a process of education, quality of life, etc.
- In connection with trends in corporate philanthropy and fundraising professionalism, the income of non-profit organizations is growing. These have a strong and sophisticated marketing based on a good reputation.
- Qualitative development of corporate philanthropy will present business decisions of a company. It will focus on public interest of a site as an associated economic benefit.

### **3 CONCLUSION - PHILANTHROPY AS PART OF SOCIAL INCLUSION**

From the given point of view, we can consider altruistic behaviour of individuals and legal entities to be a tool that can be used for the benefit of a broader inclusion strategy in the society (Marion, 2002). However, it should be emphasized that the inclusive concept of relationships between corporate and individual donations contributes to a development of the civil society. Yet, it cannot do without mutual respect and cooperation (CCS's 2014 Snapshot of Today's Philanthropic Landscape Executive Summary).

The degree of positive effects is manifested in regard to the fact whether the particular philanthropic activities represent a comprehensive transformation, or it is a support in the short-term interval (for one-off projects). Alternatively, they can represent systematic long-

term measures, which are capable of stimulating the target group and improving their position either on the labour market or within the quality of life (Janoušková & Sobotovičová, 2013).

The boom of the interest in philanthropy, both corporate and individual, and its use for NGO activities in particular is part of the political support. It is respected even by regional authorities because altruistic behaviour plays an important role and has significance within the Moravian-Silesian region. Donorship, both individual and corporate, has been on the rise after the political changes in 1989. This fact is supported with the CSO data and conducted surveys (<http://www.nadacesirius.cz/soubory/ke-stazeni/postoje-cechu-k-darcovstvi-pruzkum-median.pdf>).

The common denominator of awards and competitions for philanthropists (responsible businesses and donors) is:

- Public expression of thanks as beneficiaries' initiative to the nomination of donors. It is a feedback of solidarity donation which is usually in the form of a moral award and tries to reward and highlight the greatest benefactors or donations as such,
- Publicity and emphasis on the importance of charitable work through competitions and rankings. This is also an impulse for motivation among other individuals and legal entities (*For example, at the beginning of the process of public expression of thanks, there was the award "D" firstly awarded in 2001. Dozen of companies, from individuals to large companies, have been awarded the prize since then. One of the prize-winnings in the national category was Alena Bujáková in 2014, who represented the company Inforpres, and she was awarded for the support of children's home in Frýdek-Místek. Or in 2012, Primary School T.G.Masaryk in Opava was awarded for their support of people in need. Furthermore, the show "TOP Responsible Company" honours only companies that have evaluated their strategy in the field of responsible entrepreneurship and implemented innovative approaches. The ranking is part of the professional corporate platform called Business for Society. Similarly, the price Via Bona is awarded by the Via Foundation.*).

It is necessary to find a balance between needs, possibilities, and solidarity in the relationship between a donor and recipient (Inglehart, 1990) A correct rhythm of altruistic behaviour reinforces the feeling of importance, togetherness, and openness in the emotional level, which is given by a personal relationship to a target group or place. Consequently, it draws a donor into life both at a spiritual level, which is a tribute and expression of relationships sophistication, and physical level, which takes the form of instrumental and financial assistance or a gift, and tax legislation in the society.

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## **THE PROPOSAL OF USING ECO-CONTROLLING TOOLS AT THE MUNICIPAL LEVEL IN THE CZECH REPUBLIC**

*Karel Kolman, Eliška Pastuszková*

### **Abstract**

The principles of environmental management accounting have been known for twenty years; this method has been developed for use in the private sector. The process can be applied to public sector organizations whose leaders want to engage the question of environmental impacts in their management, decision-making and control efforts. The aim of this paper is to analyze the usability of environmental management accounting tools for the needs of municipalities in the Czech Republic, and based on the findings, to suggest possible practical applications. Mainly observed is the impact on improving the financial management of the municipality. The possibility of using environmental management accounting tools is based on a questionnaire survey, and then on the basis of the five modules, a functional model of environmental management accounting is created for a specific municipality. Additionally, practical improvements are introduced in the environmental performance of an organization, including appropriate communication with internal and external stakeholders.

*Keywords: Environmental management accounting, municipality, environmental management, EMAS*

JEL Classification: H83, Q56, R51

### **1 INTRODUCTION**

Today, a large number of organizations and individuals are involved somehow in environmental protection. Their efforts mainly concentrate on the area of ex post, which is the practice of disposing of already existing environmental burdens. It is preferable however to prevent these negative effects in the first place. For this reason, environmental management is discussed, which focuses on waste prevention, more efficient use of natural resources, emissions reductions, etc. In practice, there are a number of offshoots of management tools. Their creation, development and use are rooted in the German-speaking part of Europe. Authors brought certain simplification (or rather association) back in the 1990s under the term environmental management accounting (EMA) (Sturm & Müller, 2000). As the title suggests, it is an environmentally oriented application of controlling. This term thus represents the entire control process of decision-making, planning, implementation, monitoring and feedback. The concept, as already mentioned, is used mainly in Germany, Austria and Switzerland for the needs of manufacturing companies.

The authors of this paper explore the issue of usability of environmental management accounting tools, specifically for the needs of municipalities in the Czech Republic. The essence of this effort is the assumption that the vast majority of Czech municipalities neither applies nor even knows about these environmental management tools, or does not approach environmental management conceptually even in terms of its own management and decision-making.

## **2 THEORETICAL BASIS**

Today, businesses are primarily managed economically. Their existence is dominated by financial metrics. Effects resulting from production and product life cycles are ignored. The impact of production on the environment is played down in favor of economic (financial) results for the entire production process. Companies perceive the orientation of the environmental aspect as unnecessary, burdensome or a losing endeavor. Many find it unnecessary to develop activities outside those required by environmental legislation.

Efforts to eliminate the impact of production on the environment are not the only type of environmental behavior. It pays to implement environmental thinking already in the planning and management phase from the very beginning of the production process as a strategic management tool (Naan & Horst, 2011).

Managerial environmental management accounting is based on the fundamental processes of financial controlling. It assumes a strategic approach to environmental issues and proposes a systematic approach with various management steps starting with strategy formulation, decision support, management, implementation, and continuing on to communication and control. This concept is based on linking environmental strategy with strategic and financial objectives of the top management of the company. Emphasis is placed on increasing eco-efficiency, defined as the ratio between the impact on the environment (the environmental impact incurred) and value added. Applied in practice is e.g. the contribution ratio (potential) to global warming in relation to a unit of turnover, in proportion to the return on net assets. (Sturm & Müller, 2000)

Successful development of environmental management accounting depends on the organizational, technical and technological conditions and success factors. Environmental management accounting is a topic that transcends departments and hierarchical levels of society. These features make it suitable for all employees and require their involvement as an important success factor. (Neuhaus, 2008)

Environmental management accounting is used as a strategic tool for the effective protection of the environment. It was initially applied predominantly in the German speaking countries of Austria, Germany and Switzerland. Its use is oriented towards manufacturing companies. The concept then spread beyond European countries. One example might be a study conducted on Canadian companies (Henri & Journeault, 2010), which points to the fact that environmental management accounting indirectly affects the economic performance of an organization. Expansion has been going on recently not only in terms of territory but also its specialization. The concept is already used by small and medium-sized enterprises in the service sector and public administration. (Hyršlová & Brožková, 2003)

The content of the concept of environmental management accounting, presented by authors Sturm and Müller, is not particularly specified. Only the general theoretical level is described, consisting of five basic modules (Sturm & Müller, 2000):

1. Determining an environmental policy and aims
2. Information system and environmental accounting (data management)
3. System for decision-making support
4. Implementation
5. Communication

Because this concept is not precisely defined, it provides the opportunity to connect to other existing methods of environmental management and compile them into the five presented modules. One of the basic pillars of the concept is environmental accounting. This type of

management (sometimes rather cost) accounting is used to express the environmental costs and benefits arising from the activities forming an environmental impact. Even in terms of environmental accounting, specific instructions at the level of companies and organizations do not exist. This is due to the fact that the very concept of environmental accounting expects each organization to take an original approach to elaborating environmental costs and schedules. Most publications are based on the work of the authors Sturm and Müller (2000) or Schaltegger (2002), and in the Czech Republic, Hyršlová and Vaněček (2002).

The second pillar, which brings some standardization of the whole implementation process of "eco-thinking", is the program of environmental management and audit system – EMAS for short. This is a "set of rules" above the legal framework with which organizations comply voluntarily in order to improve their environmental performance. The essential attribute of EMAS is the existence of external benefits such as an increase in credibility or better position in the public procurement system (Michelsen & de Boer, 2009; Preuss, 2009). EMAS is currently designed for business and more. Studies were conducted on the implementation of environmental management using an EMAS scheme in Italian cities (Marazzi, Bandini, & Contin, 2010; Mazzi, Mason, Mason, & Scipioni, 2012) EMAS is sometimes compared to similar systems of ISO certification, namely ISO 14001 - Environmental Management Systems (Lozano & Vallés, 2007). The ISO system is the basic level, for which EMAS acts as a certain superstructure. The two approaches have both commonalities and differences. In the Czech Republic, there is also the concept of Green Procurement, which helps institutions financed from public funds to foster environmentally friendly operation. (Síť ekologických poraden, 2015)

### **3 AIM AND METHODOLOGY**

The aim of this paper is to analyze the usability of the environmental management accounting tool for the needs of Czech municipalities; its findings suggest practical utilization, where one may primarily observe the impact on improving the financial management of the municipality.

The research itself included exploring the possibility of using environmental management accounting tools supported by a questionnaire survey on a sample of municipalities. The survey focused on ascertaining the current information base and the needs of municipalities in the environmental field. The sample included all municipalities within the district of Zlín, so the total sample amounted to 89 potential respondents.

The outcomes of this quantitative survey were taken into account in the application part of drafting a proposal for practical use of the concept of environmental management accounting in Czech municipalities. On the basis of the five modules formulated in the works of Sturm and Müller (2000), a functional environmental management accounting model was created for a specific municipality in the Czech Republic. Possible practical steps are also presented for improving the environmental profile of the organization.

A general framework of environmental management accounting was created based on a critical literature review.

### **4 RESULTS**

The analysis involved a survey by questionnaire of selected municipalities, aimed at determining the current information base and the needs of municipalities in the environmental field. All municipalities in the district of Zlín were used for a quantitative survey, totaling in 89 potential respondents. Standardized questionnaires were sent electronically to the e-mail addresses of municipal representatives and collected through GOOGLE Disk. The survey was

conducted April 8-16, 2014, and the return exceeded 25 %. As revealed in the questionnaires and by the authors' investigations, municipalities do not have enough information and knowledge in the field of environmental management. Their attention focused primarily on waste management, recycling and care of public greenery, but without conceptual links to environmental management. Related to this is the fact that awareness among municipality representatives on the use of existing concepts (especially EMAS) is minimal. The survey showed, however, that in the context of the actual functioning of the municipal authority, municipalities strive to behave responsibly. These assumptions may act as a stepping stone for implementing the concept EMAS, ISO 14001 or another concept of "Green Procurement".

#### **4.1 The use of environmental management accounting in Czech municipalities**

For the purposes of practical use of environmental management accounting, it is necessary to rely on the already functioning environmental programs and approaches. The key pillar of the proposed solutions therefore involves systems such as EMAS, Green Procurement and environmental accounting. Based on these instruments, the original modules of environmental management accounting were expanded to include a practical dimension of usability in Czech municipalities.

Modules of environmental management accounting defined by Sturm and Müller (2000) can be defined as follows for the needs of Czech municipalities:

##### **MODULE 1 – Determining an environmental policy and objectives**

Determining an environmental policy and calculation of the environmental footprint of the municipality (municipal authority)

##### **MODULE 2 - Information system and data management**

Quantifying environmental costs and revenues, including an environmental accounting report

##### **MODULE 3 – Decision-making support system**

Description of a simplified EMAS system in combination with elements of Green Procurement, subsidy policy options

##### **MODULE 4 - Implementation**

Practical implementation of a Green Procurement model, evaluation of municipal investment projects in relation to the environment

##### **MODULE 5 - Communications**

Establishing rules and obligations for employees, information for external entities (simplified environmental statement)

These modules are presented in a practical example of a municipality. The municipality Spytihněv was selected as the model municipality. This municipality of the Zlín district has 1,720 inhabitants. Spytihněv has not yet implemented environmental management techniques; on the other hand, it declares its interest in protecting the environment at least through the consumption of materials and energy.



#### **4.2 MODULE 1 - Determining an environmental policy and objectives**

The environmental policy of the municipality in question comes from their statement in which they are declared basic objectives of environmental protection. The main objectives of the municipal environmental policy include:

- Comply with all applicable legislation, standards, rules and regulations on environmental protection and Green Procurement
- Conserve natural resources by reducing the consumption of energy and water, by waste sorting and recycling, and by reducing fuel consumption
- Raising environmental awareness of all employees, influencing their suppliers and customers. Ensure their continuing education and encourage them to protect the environment
- Adhere to the principles of Green Procurement, which represents selection of goods having the lowest possible impact on the environment. Particular keys include energy intensity of production, recyclability and degradability, transport distance and content of toxic substances. When acquiring new office equipment, ensure reduced energy consumption, low emissions and low radiation
- In the process of awarding new projects, ensure an environmental profile of applicants, reducing energy consumption, investment
- Commit tenants of residential and commercial space to ecological behavior, waste sorting, green shopping
- Regularly evaluate the meeting of targets, including ensuring public awareness. Place emphasis on prevention and education in the field of environmental education.

As a support tool for determining environmental targets, it is possible to calculate the municipality's environmental footprint and consider it in relation to the ecological capacity of the territory. This was the means by which data on the monitored municipality was calculated.

#### **4.3 MODULE 2 - Information system and environmental accounting (data management)**

Module 2 contains the setup of the information system and compilation of reports on environmental accounting for the given entity. The following table (Tab. 1) shows a model report of environmental costs and revenues of the monitored municipality of Sptyihněv in 2013.

In the case of costs, the following variables affect four basic areas:

- Waste management, wastewater and air emissions
- Caring for the environment and pollution prevention
- The material cost of non-product output
- Cost of product output.

Tab. 1 - Report on environmental costs and revenues of the municipality Spytihněv. Source: authors' own processing based on financial statements of the municipality

Categories of environmental costs and revenues	The Environmental Domain				
	Air emissions	Waste water	Waste	Other	Total
<b>1. Waste, waste water and air emissions</b>	<b>119 817,00 CZK</b>	<b>831 077,57 CZK</b>	<b>1 004 709,24 CZK</b>	<b>1 948 648,00 CZK</b>	<b>3 904 251,81 CZK</b>
1.1 Depreciation for waste, waste water and air emissions					- CZK
1.2 Equipment maintenance, operating materials and equipment-related services		316 734,00 CZK		1 948 648,00 CZK	2 265 382,00 CZK
1.3 Workers		38 450,00 CZK	50 700,00 CZK		89 150,00 CZK
1.4 External services		473 893,57 CZK			473 893,57 CZK
1.5 Fees, Taxes		2 000,00 CZK			2 000,00 CZK
1.6 Fines, penalties and damages		- CZK			- CZK
1.7 Liability for damage to the environment		- CZK			- CZK
1.8 Provisions for recovery and cleanup		- CZK			- CZK
1.9 Other costs	119 817,00 CZK		954 009,24 CZK		1 073 826,24 CZK
<b>2. Care for the environment and pollution prevention</b>		- CZK	- CZK	- CZK	- CZK
2.1 External services					- CZK
2.2 Workers					- CZK
2.3 Research and development					- CZK
2.4 Increased costs associated with cleaner technologies					- CZK
2.5 Other costs					- CZK
<b>3. The price for the material contained in the non-product output</b>		222 371,88 CZK	- CZK	- CZK	222 371,88 CZK
3.1 Raw materials		1 049,00 CZK			1 049,00 CZK
3.2 Packaging					- CZK
3.3 Excipients					- CZK
3.4 Operating Materials		638,00 CZK			638,00 CZK
3.5 Energy		219 749,88 CZK			219 749,88 CZK
3.6 Water		935,00 CZK			935,00 CZK
<b>4. The cost of processing non product output</b>					- CZK
<b>Environmental costs total</b>	<b>119 817,00 CZK</b>	<b>1 053 449,45 CZK</b>	<b>1 004 709,24 CZK</b>	<b>1 948 648,00 CZK</b>	<b>4 126 623,69 CZK</b>
<b>5. Environmental revenues</b>	<b>1 717 353,00 CZK</b>	<b>728 444,00 CZK</b>	<b>830 995,50 CZK</b>	<b>1 547 000,00 CZK</b>	<b>4 823 792,50 CZK</b>
5.1 Subsidies, grants	1 717 353,00 CZK		112 127,50 CZK	1 547 000,00 CZK	3 376 480,50 CZK
5.2 Other revenues		728 444,00 CZK	718 868,00 CZK		1 447 312,00 CZK
<b>Environmental revenues total</b>	<b>1 717 353,00 CZK</b>	<b>728 444,00 CZK</b>	<b>830 995,50 CZK</b>	<b>1 547 000,00 CZK</b>	<b>4 823 792,50 CZK</b>

The municipality in question only works with outputs from financial accounting records and waste management. For the purposes of management - environmental – accounting, this data is insufficient. The first step, which does not involve any financial burden, is therefore appropriate extension of the chart of accounts to include an analytical breakdown that helped to quickly and uniquely identify environmental financial flows.

#### 4.4 MODULE 3 - Decision-making support system

In the Czech Republic, there are several voluntary environmental tools that can be implemented by public entities in their management in order to improve their environmental performance and position. Therefore, the role of environmental management is to decide which one is suitable for the given organization.

The EMAS scheme seems to be the most advanced instrument (in the current version of EMAS III, see European Commission, 2015). To a certain extent, it is a substitute for its competitor ISO 14 001. Green Procurement evolved in 1996, (zeleneuradovani.cz, 2014), and can also be understood as a certain part (or auxiliary element) of implementing EMAS.

The EMAS concept is a European platform, hence its establishment applies not only Czech but also European legislation (specifically the European Parliament and Council Regulation (EC) No. 761/2001 on the voluntary participation of organisations in a Community eco-management and audit scheme (EMAS III). As is also apparent from the survey of this paper, the majority of small municipalities (also due to certain financial administrative demands) is not familiar with this concept and is not considering its implementation.

Although there are Czech municipalities that have successfully implemented the concept EMAS III (Chrudim and Jilemnice), we selected for our chosen municipality the concept of Green Procurement, which, due to the size of municipality, was less demanding in terms of implementation. On the other hand, it should be noted that as opposed to the acclaimed EMAS, it obviously holds lesser prestige.

The initial state of the municipality was evaluated in the preliminary audit of the concept of Green Procurement. A substantial part of the materials for audit is designed as a form in which it is possible to select from the options yes / no / I do not know. The result of eight major areas is the finding that the areas of water management and interior furnishings warrant the most attention. Here many replied “no” or “I do not know”. Contrarily, the municipality is strongest in the area of heating and heat savings.

#### **4.5 MODULE 4 - Implementation**

Introducing environmental management accounting involved practical implementation of the concept of Green Procurement in the observed municipality. The second part was to create an overview of investment projects of the selected municipality impacting the environment. Based on an initial audit, ten priority areas were selected where there is room for implementing environmental improvements and savings.



Fig. 1 - Priority areas identified in the selected municipality. Source: authors' own elaboration

For each domain, the current situation was assessed and possible solutions were suggested that might bring environmental savings. One example may be the domain of lighting, where savings are evident from the following table.

City Hall offices are equipped with suspended fluorescent lights. Common areas, corridors, toilets, are equipped with conventional bulbs. For simplicity, the assumption is that all the lights are on full-time (i.e. 42 hours per week).

Tab. 2 - Implementation - Lighting. Source: authors' own elaboration

	Type of action	Group	Type	ANNUAL SAVING /ADDITIONAL COSTS		
				Unit	price per unit	CZK
<b>3. LIGHTING</b>	Current situation	fluorescent tube	tube 58 W	8,00	463 CZK	3 706 CZK
		light bulbs	bulbs 60 W	4,00	479 CZK	1 917 CZK
			bulbs 40 W	6,00	319 CZK	1 917 CZK
<b>TOTAL</b>						<b>7 539 CZK</b>
<b>3. LIGHTING</b>	Proposal for improvement / savings	replacement of fluorescent lamps: Philips MASTER TL-D 18W / 830		8,00	42 CZK	⊗ 336 CZK
		<b>(-) savings 40 W</b>		-8,00	319 CZK	⊙ -2 556 CZK
		replacement of light bulbs: olight 4x T3, 540lm, E14, 2700K, 11 W		10,00	36 CZK	⊗ 360 CZK
		<b>(-) savings 49 W</b>		-4,00	391 CZK	⊙ -1 565 CZK
		<b>(-) savings 29 W</b>		-6,00	232 CZK	⊙ -1 390 CZK
		switching off during the day 18 W		-8,00	144 CZK	⊙ -1 150 CZK
		switching off during the day 11W		-10,00	88 CZK	⊙ -879 CZK
		<b>Total of switching off</b>		50%		⊙ -1 014 CZK
<b>TOTAL</b>						<b>⊙ -5 829 CZK</b>

If quantified savings of all specified domains were implemented, it would be possible to manage the office with savings of nearly CZK 30,000 per year. Since 2013, projects have been implemented whose total value exceeds CZK 6,025,000. Currently there are four more prepared projects totaling CZK 13,153,964. All these projects focus on effective environmental protection, waste management, and energy savings or reduced dust.

Purchased materials, refreshments and amenities of the municipality appear wasteful and hint to a lack of an overall concept. Another area that is not fully controlled efficiently is the operation of its municipal service vehicles. Based on these facts, a simple form was created based on a Microsoft Excel spreadsheet containing the following areas:

- **E-shopping** – here employees can enter their requirements for the purchase of materials, goods, equipment, furniture, etc.
- **E-idea** - in this list, users can upload their ideas for improvements and savings in operating the office and in the environment
- **E-ride** - this part is used for ordering service vehicles. The aim is to increase the utilization of individual travelled routes of vehicles
- **E-projects** - describes municipal projects with ties to the environment. Serves to raise awareness among individual employees
- **E-obligations** - Here are listed the responsibilities of individual employees for partial implementation of environmental management objectives.

This document is shared to a shared data repository so that all managers have access to it and are able to track the status of their orders. Selected employees may approve and revise individual requirements. The aim is to centralize a purchasing system so that the principles of green procurement could be respected, to collect insights of employees on possible savings, to raise awareness among all employees and to better organize the operation of service vehicles.

#### **4.6 MODULE 5 - Communications**

For each implementation of a management system, participation is necessary of all interested parties. Environmental management is no exception. It is important to provide information on two levels, i.e. inside the office and in its surroundings.

At the beginning of the process, it is necessary to convince management about the suitability of the tool and effects arising from implementation. The next step is to convince all employees to the extent that they are willing to voluntarily change their habits and adapt to the new environmental management system. Furthermore, it is necessary to put together the schedule of the entire implementation so that all employees know what phase they are now in and what phase awaits them.

The next step is to determine responsibility for the implementation of each task for employees (or unions, departments, etc.). For successful personnel management, responsibilities should be supplemented by motivation and reward for individual employees. Of course there must be regular training in EEA (Environmental education and awareness).

It is also necessary to communicate with external entities. The behavior of public authorities should reflect the motto *Verba docent, exempla trahunt*. (Words instruct, illustrations lead). For this reason, it is appropriate for the municipality to express its environmental efforts to external entities.

The surrounding of the municipality authority can be divided simply into five segments: citizens as the authority's "clients", suppliers, customers and tenants, other public administration institutions and the media.

Methods of communication with these interest groups vary. The first impulse may be a visit to the municipal authority, where citizens can read about the introduction of environmental management (bulletin boards, information panels, gifts, brochures, etc.). Another option is to use the municipal Website, municipal periodicals or an info channel.

An outcome of the concepts EMAS and of Green Procurement is an annual environmental assessment report, in which the municipality assesses fulfillment of environmental policy objectives for the given period. Its achievements are also outlined here, but so is the unfulfilled measure of environmental management accounting.

## **5 DISCUSSION**

As also confirmed by questionnaire survey, selected municipalities resolve the problem of effective environmental protection, but only by partial measures. They lack a comprehensive view of this issue, from the strategic level down to the operational level. Comprehensive tools include e.g. implementation of an environmental management system and an audit of the scheme EMAS III or ISO 14001. However, municipalities are not so keen on implementing such complex measures, or do not even know about these options. The difficulty in implementing these instruments is a basic disadvantage primarily for small municipalities. Embracing environmental management accounting with its variability may therefore be a suitable conceptual tool even for those municipalities not daring to introduce EMAS III and ISO 14001. They can "put together" their own concept into individual modules, which however will eliminate the basic problem with the existing municipalities in the Czech Republic, i.e. the lack of a concept in environmental management and decision-making, and their limitation to partial, unrelated steps. However, for environmental management accounting as well, the main factor remains the willingness of representatives (or citizens) of the municipality to implement a comprehensive concept of environmental management and decision-making.

## **6 CONCLUSION**

The aim of this paper is to analyze the usability of the tool of environmental management accounting for the needs of municipalities in the Czech Republic, and based on the findings, to suggest possible practical applications.

There are some environmental management tools applied in the Czech Republic, the most important of which are the concept EMAS and ISO 14 001. Both of these tools however are mainly used by business entities. Only four public administration entities have incorporated the EMAS concept in their management (two of which are the aforementioned cities). The reason for the marginal involvement of local authorities is a low level of awareness regarding the possibilities of implementation, which is evident from the survey taken among the municipalities of the district Zlín. Potential applicants may also be discouraged by the financial and administrative burden of the whole process, because from the environmental review phase to the final environmental validation and certification, they cannot avoid external entities. The Czech Environmental Information Agency and the Ministry of Environment can offer consultation and assistance. In recent years, it has been possible for implementation to apply for a grant from Czech-Swiss funds and a revolving fund of the ME. Green Procurement can be implemented as an alternative to the EMAS concept as a simpler tool for organizations. The indisputable advantage is simpler applications for small communities, and its disadvantage is lower credibility and less developed reputation.

For these reasons, to create a functional model for environmental management accounting, elements from both concepts were selected, i.e. EMAS and Green Procurement. According to the basic template layout of environmental management accounting, objectives were divided into five modules. The main part (MODULE 4) represents the implementation of environmental improvements and savings in data from a specific municipality. It is simply clear that the introduction of the environmental management accounting tool can reduce the cost of operations of the institution and energy consumption in general. Within the framework of implementation, ten priority areas were selected in which there is room for improvement. Furthermore, a document for information sharing, centralized purchasing organization and operation of company vehicles was created.

The outcome from the survey confirmed the assumption that municipalities in the Czech Republic do not use or do not know of environmental management tools.

### **Acknowledgement**

The authors are thankful to the Operational Programme Education for Competitiveness co-funded by the European Social Fund (ESF) and the national budget of the Czech Republic for the Grant No. CZ.1.07/2.3.00/20.0147 - "Human Resources Development in the Field of Measurement and Management of Companies, Clusters and Regions Performance", which provided financial support for this research. This article has been elaborated also as one of the outcomes of the research project IGA/FaME/2015/027 "The Identification of Impacts of Selected Methods and Techniques for Performance Management in the Frame of Financing Municipalities in the Czech Republic) for financial support to carry out this research"

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## **CUSTOMERS' SATISFACTION AS AN INFLUENCE OF CORPORATE SOCIAL RESPONSIBILITY IN COMMERCIAL BANKS: CASE FROM KENYA AND CZECH REPUBLIC**

*Felix Kombo, Jiří Paulík*

### **Abstract**

Customer satisfaction is a key measure of provision of quality services to clients. Many banks are now focused on ensuring maximum customer satisfaction to their clients as an edge over their competitors for gaining competitive advantage. The actions and initiatives of Corporate Social Responsibility (CSR) influence customer satisfaction though through different levels for each customer. As a result of CSR activities and initiatives, many businesses have been able to retain customers (through customer loyalty), command high profits and high market shares.

The purpose of this article is to investigate satisfaction of Kenyanbank customers. Descriptive analysis is used to analyze our data. The outcomes of our research are entirely based on research results and use of a questionnaire. Based on the results, overall level of satisfaction in Kenya is slightly above Czech Republic. The main reasons for satisfaction in both countries are different while the main reason for dissatisfaction is the same.

**Keywords:** *Customersatisfaction, commercial banks, corporate social responsibility, Czech Republic, Kenya*

**JEL Classification:** G 21, M 31

### **1 INTRODUCTION**

Commercial banks are among the important institutions in any economy in the world. This statement is also reiterated by Sharma and Kumar (2013) who state that commercial banks occupy a crucial role in the development efforts as well as act as catalysts for economic growth. Beck et al. (2010) mention financial development as one of the key development role for commercial banks. The recent financial crisis demonstrated the role of commercial banks and their irresponsible behavior that caused the downturn of global economy. According to Soana (2011), banks played a major role in the financial crisis. Commercial banks have attempted to reclaim their damaged reputation and trustworthiness among others by implementing socially responsible principles within the CSR concept into their strategies. Due to business specifications of commercial banks and their operations with customers' deposits, they have been exposed to permanent public spotlight. Customers are eager to know that transactions with their deposits are transparent and banks behave ethical and avoid frauds committed on customers.

There is the need for commercial banks to ensure that their clients enjoy their services and products by creating lasting customer experience. According to Belás and Homolka (2013), customer satisfaction in banks present an important area of building long-term relationships with clients. Satisfied customers are always willing to buy bank's products and also willing to pay higher prices for products and services (Belás, 2005). For this article, definition by Chakrabarty (2006) has been used in support of Belás and Homolka (2013). Customer satisfaction is how a product or service surpasses customer expectation (Chakrabarty, 2006).

A product or service can only surpass customer expectation if it is of quality. This also leads to customer loyalty. According to Belás, Burianová, Cipovová, & Červenka (2013), customer satisfaction and loyalty are partial activities of CSR.

Luo and Bhattacharya (2006) argue that a firm's CSR initiatives usually lead to better customer satisfaction. They mention that antecedents such as perceived value increase customer satisfaction. Therefore, customers usually derive higher level of satisfaction from products or services that come from companies that are socially responsible. This explains why people prefer to be associated with socially responsible banks (banks that are ethical, responsible and with fair prices). Lee et al. (2012) also argue that CSR is associated with trust which influences customer satisfaction and loyalty (retention). Social responsibility represents to some extent an abstract concept and therefore there is no uniform definition for CSR. Kotler and Lee (2005) state a definition of international organization Business for Social Responsibility which defines CSR as managing of business in such a way which surpasses ethical, legal, commercial and social expectations. Luo and Bhattacharya (2006) also define CSR as direct or indirect contributions to the society by performing socially responsible behaviors and/or engaging in actions that advance some social good or welfare. This is because businesses and communities are intertwined and therefore success depends on the good health of the society. Pérez and del Bosque (2012) also argue that the CSR concept appears to be one of the most effective tools a company can use to improve its public image. Banks are able to express their values and vision through CSR to their key stakeholders as well.

The above statement also implies that bank customers are the basic pillar of the existence of commercial banks because of their activities within the banking industry and therefore, their satisfaction from CSR actions is key for any commercial bank to exist. We investigate customers' satisfaction of banking services in Kenya and compare the results with those from Czech Republic. The results will be analyzed according to gender, age and level of education. Furthermore, the paper will provide the main reasons for customer satisfaction and dissatisfaction in commercial banks in Kenya compared to Czech Republic. The rest of the paper will be as follows. Section 2 discusses about CSR in commercial banks and elements that drive customer satisfaction. Section 3 outlines the development of scientific assumptions. Section 4 gives the results of the survey. Section 5 gives the results and finally section 6 will conclude this paper.

## **2 CSR AND CUSTOMER SATISFACTION IN COMMERCIAL BANKS**

### **2.1 CSR in commercial banks**

Socially responsible banking is becoming a well-established notion in the financial services industry (Scholtens, 2009). Many companies nowadays publish their CSR activities together with sustainable reports on their websites for their customers. CSR has many merits for these companies. These merits include increased profits, enhanced customer loyalty, enhanced brand attitude, trust and skirted negative publicity (Senthikumar et al., 2011). CSR is also used as a pre-emption strategy to save corporations from unforeseen risks and corporate scandals, possible environmental accidents, governmental rules and regulations and better relationship with employees based on volunteerism terms (Akanbi and Ofoegbu, 2012). Soana (2011) also states that CSR contributes to safeguarding corporate reputation by

lowering unpredictability in the event of harmful effects, such as the withdrawal of a product thus protecting profits and financial results.

These merits are achieved because of CSR integration of social, environmental, ethical, consumer concerns and human rights into business operations and core strategy in close collaboration with stakeholders (Ostalecka and Swacha-Lech, 2013). The authors further argue that implementing CSR into banks involves commitment to the economy, shareholders, customers, employees, society and environment. They explain the commitments as follows: economic commitment involves complying with both regulatory and supervisory legal norms. Commitment to shareholders involves achieving satisfactory rate of return, increasing effectiveness, risk management and improving of corporate governance to create shareholder value. Customers' commitment involves enhancing innovation, efficient customer service, creating good customer relationship and delivering of quality services and products.

For employees, it involves creating of opportunities basically for career development and also improving both work-life balance as well as corporate culture development. To the society, it includes undertaking projects within the society that are for instance related to education, innovation, and environmental consciousness. Environmental commitment is supporting and contributing to green economy development, for instance by coming up with environmentally friendly products and financing ecological projects. Implementation of these commitments contribute to sustainable development, creation of reputation and increasing profits.

Cheng et al. (2014) also argue that companies with better CSR performance and commitment achieve lower capital constraints. CSR leads to achieving of customer satisfaction, which makes it possible for customers to come back to businesses and give financial return to CSR (Luo and Bhattacharya, 2006). Consumers have taken the initiative to support such companies that engage in CSR (Green and Peloza, 2011). Loureiro et al. (2012) argue that the overall importance of CSR is consumer satisfaction. This is because CSR may not only contribute to better financial performance by directly reducing costs and increasing productivity but may also contribute indirectly by increasing customer satisfaction (Loureiro et al., 2012).

## **2.2 Elements that drive customer satisfaction in commercial banks**

Customer satisfaction is the primary criterion for the assessment of banks' relationships with the market (Munari et al., 2012). Banks with high level of customers' satisfaction are also able to be differentiated from their competitors thus making customer satisfaction an important aspect of retail banking (Walker et al., 2008). According to Halimi et al. (2011), as customers' satisfaction enhances, customers' loyalty also increases. This increase leads to high profits and market shares. Commercial banks have been forced to operate with emphasis on customer services due to strong competition and long-term achievement since it is linked to bank's ability to adapt in changes of customers' preferences and needs (Grigouridis et al., 2013). Chakrabarty (2006), mentions service quality as an accepted element of customer satisfaction as indicated by Parasuraman et al. (1994).

Banks are placing more focus on service quality in search of competitive advantage (Kumar et al., 2010). They further state that service quality is the primary competitive weapon used in differentiating bank products. Service providers are the primary source of service quality. Kumar et al. (2010) emphasize the need for banks to ensure service quality since it enables customer retention, customer loyalty and higher revenue. According to Berry et al. (2006), customers' assess services based on performances. These performances are based on the technical performance, tangibles associated with the service and the behavior and appearance of the service providers. All these performances play specific roles in creating the customer's

service experience, influencing both the rational and emotional perceptions of service quality (Berry et al., 2006).

Research by Wruuck (2013) for Deutsche Bank AG in Germany about pricing in retail banks, argues that bank prices play a significant role for customer satisfaction and profitability. The author further argues that customer satisfaction is achieved when price satisfaction actually matches customer's expectations. According to Matzler et al. (2006), customers switch banks because of price and therefore price is an important element of customer satisfaction. Situational and personal factors also drive customer satisfaction (Zeithaml and Bitner, 2000).

### **3 MATERIALS AND METHODS**

To compare satisfaction of bank customers in Kenya and Czech Republic, a questionnaire survey has been used as a method of data collection. Munari et al. (2013) argues that customer satisfaction surveys are the main source of information to set strategies aimed at meeting needs or understanding of customer perceptions, most importantly showing relationships and possible areas of improvement for customers. The questionnaires contained questions on gender, education, overall satisfaction, factors of satisfaction and factors of dissatisfaction. For Kenya, the survey was conducted in October 2014 to November 2014. Survey in Czech Republic was conducted in October 2012.

KPMG (2013) on their research on customer satisfaction on a sample of 25 000 banking customers across 14 countries in Africa, state that Kenya's bank customers are satisfied because of existence of branches of their respective banks. They also state that bank customers are dissatisfied because of high prices for services and products from banks. According to Belás, Burianová, Cipovová, & Červenka (2013), the most important factor of customer satisfaction in commercial banks in Czech Republic is the ability to use e-banking services while the most important factor of customer dissatisfaction is the high price policy of bank products and services. The above arguments have resulted to the following scientific assumptions for this research.

SA1: The overall levels of customers' satisfaction in banks in Kenya and Czech Republic are different.

SA2: The most important factor of satisfaction for bank customers in Kenya is the availability of branches, while the most important factor of satisfaction for bank customers in Czech Republic is the possibility to use e-banking. These levels of satisfaction are supported by more than 50% of the respondents.

SA3: The most important factor of dissatisfaction for bank customers in Kenya and Czech Republic are the same. These levels of dissatisfaction are supported by more than 50% of the respondents.

Descriptive statistics and also Pearson's chi-square test have been used to our analyze data. Our significance level is 5% (0.05).

### **4 RESULTS**

A total of 323 respondents completed the survey from the Czech Republic. Out of 323 respondents, 37% were women and 63% were men. A total of 403 respondents completed the survey from Kenya, of which 43% were men and 57% were women. Results indicate younger

age structure of Kenyan respondents, 81% were between 18 and 30 years old while 32% in the Czech Republic. This younger age structure has widely been used in this research because majority of the adult population above 30 years old use M-Pesa services (mobile banking for mostly unbanked) compared to the younger generation (18 to 29 years) who prefer using banks. According to KPMG (2014), M-Pesa functionality has more than 14 million customers (70% of Kenya's adult population). The age structure could have been considered as potential source of variances within results of the survey. However, our research was not focused on showing variances within the age structure rather focus on reasons for satisfaction or dissatisfaction within the age groups. Tables 1 and 2 below give the results of the overall level of customer satisfaction and reasons for satisfaction in Kenya and the Czech Republic respectively. The results are analyzed according to gender, age and level of education.

Tab.1 - Overall level of customer satisfaction in Kenya and Czech Republic. Sources: Belás et al (2014), Belás, Burianová, Cipovová, & Červenka (2013), own source

Are you satisfied with banking products and services provided?	In total	Gender		Age			Education level	
		Men	Women	Under 30 years	30 - 50 years	Over 50 years	University	Primary and secondary
Yes in %	63,80 (62,23)	58,70 (55,37)	67,50 (66,34)	64,40 (64,71)	63,90 (59,51)	20,00 (65,52)	63,70 (66,12)	64,10 (59,90)
No in %	32,80 (26,32)	39,00 (31,40)	28,10 (23,27)	31,90 (24,51)	33,30 (28,83)	80,00 (22,41)	32,70 (27,27)	35,90 (25,74)
Don't know in %	3,50 (11,46)	2,30 (13,22)	4,30 (10,40)	3,70 (10,78)	2,80 (11,66)	0,00 (12,07)	3,60 (6,61)	0,00 (14,36)
Critical values of $\chi^2$		5,990		9,488			5,990	
Calculated values of $\chi^2$		5,860 (3,894)		5,325 (1,315)			4,988 (4,499)	

**Note:** Data in brackets, ( ) refer to results for Czech Republic; secondary education has been used to also refer to respondents of primary education due to minimum number of responses.

As per the survey, 62% of Czech bank customers are satisfied with their respective banks, 26% are dissatisfied and 11% of them have no clue whether they are satisfied or not. Results have showed that 64% of Kenyan respondents are satisfied by their banks, 33% are dissatisfied and 4% did not know. Based on the above results of Czech and Kenyan bank customers, we conclude that the overall levels of satisfaction are different. Through this, our assumption No. 1 has been confirmed.

Tab. 2 - Reasons behind satisfaction of bank customers in Kenya and Czech Republic. Sources: Belás et al (2014), Belás, Burianová, Cipovová, & Červenka (2013), own source

What does satisfy you the most in your bank? (you can list up to three reasons)	In total	Gender $\chi^2=3,84000^*$		Age $\chi^2=5,99000^*$			Education level $\chi^2=3,84000^*$	
		Men	Women	Under 30 years	30 - 50 years	Over 50 years	University	Primary and secondary

Quick services at branches	%	27,79 (13,93)	27,33 (15,70)	28,14 (12,87)	26,38 (11,76)	34,11 (12,27)	0,00 (22,41)	25,70 (14,05)	44,44 (13,86)
	$\chi^2$		0,032 (0,506)		4,741 (4,255)			6,998 (0,002)	
Quality of products and services	%	23,57 (17,65)	22,09 (20,66)	24,68 (15,84)	23,31 (12,75)	25,00 (19,63)	20,00 (20,69)	23,74 (21,49)	22,22 (15,35)
	$\chi^2$		0,366 (1,210)		0,127 (4,255)			0,052 (1,964)	
Availability of branches	%	57,82 (49,54)	58,72 (44,63)	57,14 (52,48)	59,20 (44,12)	51,39 (51,53)	60,00 (53,45)	58,38 (38,02)	53,33 (56,44)
	$\chi^2$		0,101 (1,864)		1,488 (1,813)			0,419 (10,270)	
E-banking functionality	%	45,41 (74,61)	48,84 (67,77)	42,86 (78,71)	43,87 (89,22)	55,56 (74,23)	0,00 (50,00)	46,64 (83,47)	35,56 (69,30)
	$\chi^2$		1,424 (4,785)		7,465 (30,044)			1,980 (8,015)	
Friendly services at branches	%	35,48 (17,03)	37,79 (9,92)	33,77 (21,29)	34,97 (16,67)	34,72 (12,88)	80,00 (27,59)	33,80 (16,53)	48,89 (17,32)
	$\chi^2$		0,698 (6,924)		4,405 (6,586)			3,973 (0,034)	
Developed network of ATMs	%	43,67 (40,25)	43,60 (42,15)	43,72 (39,11)	42,33 (50,98)	47,22 (35,38)	80,00 (34,48)	44,97 (42,15)	33,33 (39,11)
	$\chi^2$		0,0001 (0,291)		3,302 (7,162)			2,199 (0,291)	

**Note:** Data in brackets, ( ) refer to results for Czech Republic; \* critical values of  $\chi^2$ .

According to the results, Czech bank customers are most satisfied with e-banking services (75%). This functionality is most important to women (79%) than men (68%). Another significant difference is that, e-banking is favored by people under 30 years old (89%) more than the other age groups i.e. 30-50 years (74%) and over 50 years (50%). It is also important to people with university education. Availability of the branches is the most important factor of satisfaction to people with primary and secondary education (56%) as well as people over 50 years old (53%) than people with university of education (38%) and the other age groups.

The most important reason for customer satisfaction in the Kenyan banking industry is the availability of branches. This is most important for the age groups of over 50 years old and under 30 years old. The test results also indicated that availability of the branch as the most important factor in all of our social groups. Statistically significant differences were found. Respondents with primary and secondary education preferred quick service at branches (44%) more than those with university education (26%).

For both the Czech Republic and Kenya results, significant differences are visible. The important reasons for customer satisfaction are different. This has confirmed our assumption No. 2.

While e-banking is the most important reason for satisfaction in Czech Republic, it is preferred more by people with university education and women. For availability of the branch as the most important reason for satisfaction in Kenya, it is preferred more by people with university education and men.

Tab. 3 - Reasons for dissatisfaction of bank customers in Kenya and Czech Republic. Sources: Belás et al (2014), Belás, Burianová, Cipovová, & Červenka (2013), own source

<b>What does dissatisfy you the most in your bank?</b>	<b>In total</b>	<b>Gender</b> $\chi^2=3,84000^*$	<b>Age</b> $\chi^2=5,99000^*$	<b>Education level</b> $\chi^2=3,84000^*$
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(you can list up to three reasons)			Men	Women	Under 30 yrs.	30 - 50 years	Over 50 years	University	Primary and secondary
Slow services at branches	%	52,61 (22,60)	52,91 (21,49)	52,38 (23,27)	53,37 (22,55)	51,39 (21,47)	20,00 (25,86)	53,91 (22,31)	42,22 (22,72)
	$\chi^2$		0,011 (0,137)		2,252 (0,471)			2,190 (0,009)	
High prices of products and services	%	55,09 (65,33)	59,88 (67,77)	51,52 (63,86)	55,52 (61,76)	51,39 (66,87)	80,00 (67,24)	55,59 (61,98)	51,11 (67,33)
	$\chi^2$		2,791 (0,510)		1,677 (0,837)			0,324 (0,954)	
Impersonal approach	%	17,37 (13,62)	18,02 (21,49)	16,88 (8,91)	18,40 (23,53)	13,89 (10,43)	0,00 (5,17)	18,72 (14,88)	6,67 (12,8)
	$\chi^2$		0,089 (10,172)		1,902 (13,440)			4,043 (0,386)	
Poor quality of e-banking	%	34,00 (1,86)	31,98 (3,31)	35,50 (0,99)	32,82 (2,94)	37,50 (0,00)	60,00 (5,17)	32,12 (2,48)	48,89 (1,49)
	$\chi^2$		0,545 (2,226)		2,101 (7,238)			5,008 (0,410)	
Poor accessibility of branches	%	15,14 (9,60)	13,37 (8,26)	16,45 (10,40)	14,42 (12,75)	19,44 (8,59)	0,00 (6,90)	13,97 (8,26)	24,44 (10,40)
	$\chi^2$		0,727 (0,396)		2,063 (1,843)			3,417 (0,396)	
Low acceptance of my needs	%	42,43 (13,31)	45,93 (13,22)	39,83 (13,37)	44,17 (15,69)	36,11 (11,04)	20,00 (15,52)	44,13 (13,22)	28,89 (13,37)
	$\chi^2$		1,504 (0,001)		2,612 (1,470)			3,803 (0,001)	

**Note:** Data in brackets, ( ) refer to results for Czech Republic;\* critical values of  $\chi^2$ .

High prices of products and services (65%) is the most important reason for dissatisfaction to Czechs. This factor is unanimously agreed upon in all of the social groups. Impersonal approach was chosen by men (21%) than women (9%). The second most important reason for dissatisfaction is slow services at branches followed by impersonal approach, poor acceptance of needs, poor accessibility of branches and poor quality of e-banking respectively.

The main reason for dissatisfaction of Kenyan bank customers is high prices of products and services (55%). This reason of dissatisfaction is the same as in the Czech Republic. This has confirmed our assumption No. 3. Moreover, Kenyan respondents perceive other factors of dissatisfaction such as slow services at branches (53%) and low acceptance of needs (42%) visibly more than Czech bank customers. The most visible difference is showed by poor quality of e-banking (34%) as the fourth reason for dissatisfaction in Kenya but the least reason of dissatisfaction in the Czech Republic (2%). For Kenya, e-banking is statistically important within the social terms of education level.

## 5 DISCUSSION

Our research has some similarities and differences with some of the previous works done about customer satisfaction in Kenya and Czech Republic. For instance, the overall level of satisfaction in Kenya is above 70% (KPMG, 2013). In comparison to our research, the overall level of satisfaction is 64% in Kenya. According to Belás et al (2014), the overall level of satisfaction in Czech Republic is 62%. For better information, the overall level of satisfaction

in Slovak Republic was 61% in 2012 (Belás, Holec, and Homolka, 2013). Based on our research results, the overall levels of satisfaction are slightly different between Kenya and Czech Republic.

It is further stated by KPMG (2013) that availability of branches (99%) is the most important reason for satisfaction in Africa. For our research, availability of branches (58%) is also the most important reason for satisfaction in Kenya. They further mention that developed network of ATMs (77%) as the second most important reason for satisfaction from a sample of 1 190 Kenyan respondents. Our research has developed network of ATMs (44%) as the third most important reason for satisfaction. According to a global survey carried out by Ernst & Young (2014) on customer satisfaction and behavior, e-banking (46%) is the most important reason for satisfaction for Czech bank customers and this is the same (75%) for our research. Global survey has showed that satisfaction with branch (27%) as a bank's channel is lower than e-banking and ATMs in the Czech Republic. Based on our research, the most important reasons for satisfaction are different.

High prices of products and services (70%) is the main reason for dissatisfaction in Africa's banking sector (KPMG, 2013). Based on our research, high prices of products and services (55%) is also the main reason for dissatisfaction in Kenya and in the Czech Republic (65%). Furthermore, low prices of products and services accompanied with service quality is considered as an important factor in creating customer loyalty for bank customers in Africa (KPMG, 2013). They further state that customers prefer to choose bank that are easily accessible and with cheaper fees and rates to indicate their satisfaction or dissatisfaction with commercial banks.

Authors Martinez and del Bosque (2013) argue that CSR has an immense effect on customer satisfaction. Furthermore, Belás, Cipovová, and Demjan (2014) mention that a satisfied customer is of great importance for the current and future performance of commercial banks.

These findings are important for commercial banks that are focused in using CSR to improve customer satisfaction. This is because customer satisfaction as a result of CSR activities leads to customer loyalty, profitability and increased market share in the banking industry as mentioned in our research. The results are also important for commercial banks and researchers who want to compare levels of satisfaction and dissatisfaction between Kenya (Africa in general) and Czech Republic (other EU countries).

## **6 CONCLUSION**

The purpose of this research was to look at customer satisfaction as an influence of CSR activities in commercial banks. The countries for research were Kenya and Czech Republic from samples of 403 and 323 people respectively. CSR leads to customer satisfaction through retaining customers thereby increasing profits and high market shares for companies. Elements such as service quality, pricing, situational and personal factors drive customer satisfaction. According to the literature used, for banks to implement CSR activities, they must be committed to the economy, shareholders, customers, employees, society and the environment (Ostalecka and Swacha-Lech, 2013).

Based on the findings, the overall levels of satisfaction in Kenya is 64% and 62% in Czech Republic. This has confirmed our assumption No. 1 that the overall levels of customers' satisfaction between the two countries are different. Women are satisfied more than men between the two countries.



The most important reason for satisfaction in Kenya is the availability of branches (58%) while in Czech Republic is e-banking functionality (75%). According to our research, the results have confirmed our assumption No. 2. Both the reasons are preferred by people with university education. However, women prefer e-banking more than men in Czech Republic and men prefer the availability of branches more in Kenya. High prices of products and services was chosen as the most important reason for dissatisfaction for Kenyan and Czech bank customers. They both were selected by 55% and 65% of the respondents respectively. These results confirmed our assumption No. 3.

Future research should focus on the possible ways commercial banks in Kenya can improve customer satisfaction through the use of e-banking. This recommendation has been arrived at because of the popularity of e-banking in the 21<sup>st</sup> century and the response from our survey. It also gives an opportunity for commercial banks to tap into the younger adults (18 to 29) and to make use of many internet subscribers in Kenya. According to KPMG (2014), there are 14 million internet users in Kenya. As a managerial recommendation, commercial banks should come up with policies or measures to tackle reasons for dissatisfaction, most importantly high prices of products and services.

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## **ASPECTS OF CREATING SHARED VALUE IN BATA UP TO 1945 – APPLICATION MODEL FOR TODAY**

*Gabriela Končítková*

### **Abstract**

The concept of CSV (Creating Shared Value) is currently perceived as a modern trend, as an output or higher level of CSR (Corporate Social Responsibility). The simplest definition, which highlights the difference between CSR and CSV, states that the goal of CSR is to do good whereas the goal of CSV is to do good business. But conceptions may vary. The main objective of this paper is to prove that the issue of CSV is not a modern trend, as it is often called and perceived. This business concept was used and enhanced by Tomas Bata (1876-1932) when building his shoe empire. The business philosophy of Tomas Bata covered all the factors by which we nowadays evaluate whether a company is progressing in line with CSV or not. Bata established businesses closely connected with the local communities, not only in Zlin but throughout the world. Individual company branches were fully dependent on communities, which created a significant percentage of the company's staff. Bata did not merely consist of a large number of branches worldwide, but it also affected the social development in all areas of social life in the places where it had operations. It was a clear application of the CSV policy.

Aim of the research is to prove that the Bata Company developed its business activities according to values of the same CSV strategy as used today.

This article presents the partial results of research that focuses on answering the following question: Why nowadays days are not only Czech, but also international companies, seeking inspiration from the Bata Management System?

*Keywords: Tomas Bata, Creating Shared Value, Corporate Social Responsibility, Human resource, Management.*

JEL Classification: A130, B31, M14, M12,

## **1 CREATING SHARED VALUE AND CORPORATE SOCIAL**

Each theory and approach can seek shared value in varying fields and areas. Some authors talk about shared values from a global perspective, impact the whole of society, other authors argue for the need to create value for the company's immediate community. Importance of shared values can be seen in production activities, employee care, development of public facilities and responsible investing. Porter and Kramer (2014) define the concept of CSV as attitudes and practices that enhance the competitiveness of companies, simultaneously with the economic and social conditions in all areas in which it operates. CSV focuses on identification and expansion of the links between social and economic development. The authors agree that the CSV has the power to unleash the next wave of global growth. Porter and Kramer (Junge, 2011) emphasize that current interdependence that exists between corporations and their surroundings means that both sides should pursue the principle of creating shared value for mutual benefit. In other words, they point out that successful corporation requires a healthy social environment whilst a healthy social environment requires a successful corporation.

The authors state that better educated children will become more skilled workers and that a low unemployment rate in cities will result in a higher consumption level amongst the population. Therefore, companies should integrate the principle of shared value into their business approaches and strategies, and use it to their competitive advantage. An increase in shared value can also be seen also in sport. This theme is described by Woong, Hyun-Woo and Yukyoum (2015) who highlighted the importance of human perception of such areas as history and identification. The overall concept of CSV is based on the nature of identification. To create CSV, the first important step is to identify the creator and the object.

If we focus on finance, for example, Belas (2013) points out in his study the need for banks to behave responsibly towards their clients, but also towards the community in which they operate. These conclusions are based on extensive research into customer satisfaction with banking services. This research clearly shows that nowadays a client expects and requires the bank to produce "extra activity" that would support community development (Belas 2013).

Bata up to 1945 is a rare example of a company that became a leader thanks to gradual increase of shared value within individual areas. Ghasemi, Nazemi and Hajirahimian (2014) state that CSV can be described as a development stage of CSR. The authors also defined the basic requirements that a company needs to fulfil in order to be able to transform from CSR to CSV.

To understand CSV we need to understand the tools used to measure or assess examples of it. This area requires substantial innovation (Pfitzer, Bockstette and Stamp, 2013). The authors propose the creation of an optimal structure for CSV innovative models. These models are undoubtedly closely related to the economic consequences of CSV. Critics of CSR and CSV models point out that many companies are unable to pay workers an average wage, but they would like to develop CSR and CSV strategy. Wage ratios motivated Tomas Bata to create a CSV strategy that would guarantee above-average wages for employees. Bilan (2013 and 2014) draws attention to the issue of wages in relation to shared responsibility. One can say that the study was conducted with Tomas Bata's words in mind: "The level of development of a nation is recognized by the wages of the population" (Bata, 1932). Therefore it is not possible to plan a CSV strategy regardless of economic conditions inside the company. CSV strategy should primarily focus on employees and subsequently on the community and society. CSV and CSR strategies should not be just a fashionable trend, but an approach to make the business activity improve community life around the company and in the wider context also on a global scale. De Jonge (2014) points out the direct impact of CSR and CSV strategies on public. He applied his study at WestJet Airlines and demonstrated direct influence of CSR and CSV strategies.

This approach becomes very important when companies decide to expand their market scope towards emerging economies and markets with generally low income. In these cases, there must be a link between the company and socially strongest companies. According to the theory of Porter and Kramer, the concept of shared values should reduce the risk within their value chain to the receiving companies.

Company should also apply a philanthropic strategy which would have a positive impact on competitive advantage. Finally, it is necessary to create an approach where social sector is perceived as a common value. Modern multinational companies transform their own CSR approach in order to create the CSE, or socially responsible business.

## **2 THE LEGACY OF CREATING SHARED VALUE IN THE CZECH REPUBLIC IN THE EARLY 20TH CENTURY**

Bata was established in 1894 and on the way to achieving sustainable growth experienced 30 years of conducting business and overcoming obstacles. For Bata steady growth is only noticeable from 1924 onwards. From a small family enterprise, which started business in shoemaking - a challenging and competitive sector, it grew into a company which in 1928 turned out to be the largest exporter of footwear in the world.

Bata used CSV strategy not only in Zlín, but also in other cities where its branches were founded. In addition to its core business activities, the company cared also about other areas of social life - infrastructure, housing, public facilities, education system, health and social care.

How did Tomas Bata manage to create a perfect information system within his company? Thanks to his unique system every week he was found out the exact operational results of every branch in the world, all without use of IT. Furthermore, how is it possible that people worked for Bata with enthusiasm and were rewarded with salaries three times higher than the national average? Entrepreneurs nowadays these questions and many others, and search for the answers in the Bata Management System. The Bata Management System is a term for the business practices, strategy and overall philosophy of Bata, developed between 1894-1945 by Tomas Bata and his associates and followers.

Currently, it is still possible to observe the direct effects of the business philosophy of Tomas Bata on particular people. Through oral history it is still possible to record the personal stories of people who worked at Bata and completed their education and training there. These people stand as a proof of the active and successful operation of the company's philosophy and strategy. The Original Bata Management System can only be defined up until 1945 when the company was nationalized. More than 70 years have passed since the last displays of pure "Bataism", but witnesses who lived through this time remember it very vividly. Managers and entrepreneurs nowadays often wonder how Bata managed to change the way of thinking of the local people (employees, customers, residents etc.). Many companies are dealing with the same problem - human resources. High-quality and loyal employees have become scarce. Many companies are addressing the same question: If you cannot find quality employees on the labour market, can you train them? Tomas Bata was able to gain his employees' trust, loyalty and in particular managed to merge corporate culture, vision and philosophy. This concept corresponds to Bata's theory of an industrial man as described later in this text.

Due to the breadth of the concept of the Bata Management System, it was important to choose just one area for this research project - an area in which displays of CSV could be mapped and applied to the current business environment.

In light of the aforementioned problems of modern business environment, the research focused on the personnel policy of Bata up to 1945 and the CSV tools used for its realization. Individual areas were defined within the research, in which Bata applied CSV principles in the field of human resources and employees' care. There were good working conditions, a good education system, social system, health care system, housing facilities and cultural and sports activities for employees. The individual areas of Bata's CSV policy towards employees are described in detail below.

### **3 RESEARCH METHODOLOGY**

Aim of the research is to prove that the Bata Company developed its business activities according to values of the same CSV strategy as used today. Therefore CSV strategy cannot be perceived as a modern tool. The second objective of the research is to prove that the Bata Company applied CSV first to employees. After achieving the first two objectives, the third goal is to create an application model that would help companies build a business by the same strategy as Tomas Bata did. The main objective of this paper is to present parts of the development strategy of the Bata Company up to 1945 which can be perceived according to current indicators as CSV manifestation. Partial aim of the research is to determine whether the current companies are interested to apply CSV strategy elements of the Bata Company into their businesses.

The first part of the research is dedicated to the research of archival documents and interviews with witnesses who lived through this exceptional system. This part of the research is based mainly on the use of qualitative research methods.

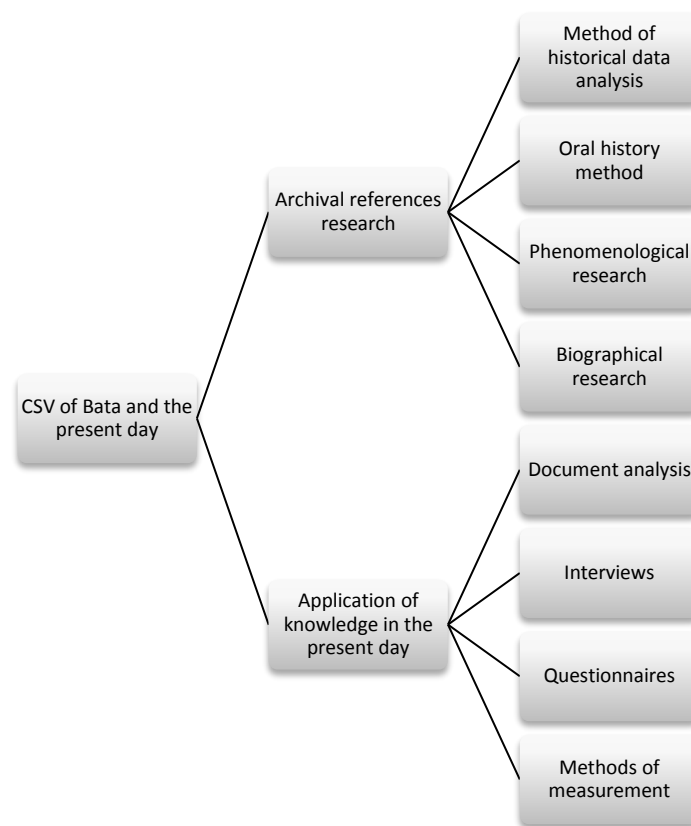


Fig. 1 – Scheme of research methodology. Source: author.

#### **3.1 Methodology of archival references**

The research methodology of the historical questions on Creating Shared Value in the Bata control system is associated mainly with a comprehensive analysis of historical documents that are stored in archives. Currently it is possible to study the daily activities of Bata through historical documents that are stored in national archives with a special section for Bata company archives. The methodology for processing the papers is divided according to



research methods that are related to the processing of archival documents and personal testimonies of witnesses. These methods are:

Historical data content analysis method - through this method it is possible to examine archival documents that are stored in the Moravian-provincial Archives in Brno, with a satellite office in Zlín. The archives store documents on the operation of Bata up to 1945 - circulars, daily reports, regulations, guidelines, reports, newspapers, etc.

Phenomenological research method - includes all documents and archival documents related to the social approach which was and is considered to be a phenomenon. This research method can only be connected to the facts that show characteristics of the phenomenon. Within the framework of the phenomenological research documents such as newspaper articles, contemporary media reports, historical studies and other information can be processed.

Oral history method - thanks to this method it is possible to gain valuable insight into the functioning of Bata up to 1945 based on the personal experiences of witnesses who were directly involved in the Bata Management System.

Biographical research method - this method focuses on the research of biographical materials. This type of material includes personal photographs of witnesses, personal notes and things of witnesses who were direct participants of the Bata Management System up to 1945. These materials can be found in private collections of the witnesses.

The research methods cannot be separated from each other as many of them are interlinked. The topic of research of two different methods can be the same; each of these methods, however, looks at the topic from a different angle.

The close connection can be seen especially between the oral method of research and biographical research. Both methods are based on the personal relationship of the witness to the time period. However, one focusses on interviews with witnesses, whereas their personal belongings related to the research issue are only additional and illustrate the situation - as is the case of the oral history. The biographical research method is the exact opposite: the main subject of the research is the personal belongings of the witnesses and their experience only illustrates the research.

The biographical research method is also closely linked to the research method of historical data analysis. Both of these methods examine and analyses historical documents related to the topic of research. The phenomenological research method appears across all research methods and deals with the problem from the phenomenon perspective, i.e. it examines if the topic of research can be considered as phenomenon or not.

Research of historical data is different from conventional research which is linked to the economic sciences. In contrast to other studies, historical research can be initiated only by setting goals and not by asking research questions. With historical research it is common that a researcher merely needs to determine the reality of a phenomenon without having to examine the problem by asking specific questions. Before beginning the research, the researcher often does not know what direction the research question should aim.

#### **4 BATA AS AN EXAMPLE FOR CSV BUSINESS STRATEGY**

As already mentioned, Bata did not enter the market with a unique product that would guarantee a leading position on the market. The company started business in an industry that was known for being a challenging competitive environment. Bata operated in two main areas. The first area was producing footwear which was happened from the very beginning.

The second area was the production of tires which dated from 1931. The company managed to create a stand-alone corporation for these two main production activities, which gradually became independent of suppliers and drew on its own activities, covering the needs of the company. In addition to these activities, Bata managed to develop hospital care, a school system, infrastructure, housing, social welfare, cultural and sports facilities, as well as transportation and other activities that will be presented in detail below.

Prior to its expansive growth Bata had to overcome the fundamental problems faced by most companies during their operations. To stabilize the company on the market, it was necessary to:

1. Secure stable suppliers.
2. Secure smooth and efficient production.
3. Secure sales.

Tomas Bata used to say that "he did not build a factory but a man who built a factory." The fundamental prerequisite for the rise of Bata was an educated employee who would be able to live in a modern metropolis. Under the influence of Bata, the town of Zlín developed into a modern city called "a garden city". Before Bata launched its business in Zlín, it was only a small village of three thousand inhabitants. During the thirty years of Bata in Zlín the population increased by more than twelve times. The municipality itself was not able to fully reflect the rapid pace of the company growth.

Tomas Bata wanted to provide to his co-workers (in Bata they did not use the term employee, but rather co-worker for the simple reason that they all had a common goal and they had to work together to achieve this goal) with services and facilities through Bata's activities. This was necessary because neither the town of Zlín nor other businesses were able to keep up with the growth of Bata. Thus Bata, through its operations and activities, also started to support the growth of surrounding businesses, the town and public institutions.

As mentioned previously, there were two key motifs of Bata which had led to the increase of shared values and could not be separated. Bata was a leader in production trends and aimed to be the best on the market. But this goal could not be achieved without a well-trained staff. The company would not be able to provide facilities for the training and education needed for its employees if they relied solely on the existing town facilities and public institutions. The company had to be very active in this area.

The education of the so-called "industrial man" (this term will be defined later), however, had a significant impact on education in Zlín and its surroundings. It also led to a societal change and increase in social values.

This relationship is illustrated by the following picture:

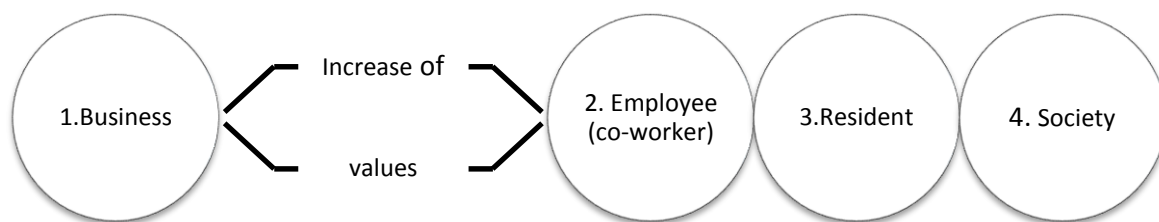


Fig. 2 - Model CSV. Source: authors.

1. The Business - Bata identified the needs of educated and skilled employees. For this purpose a new term was created - "industrial man." The "Industrial man" was a person, who:
  - worked in the factory,
  - had an above-standard income,
  - developed and enhanced his work activities,
  - was active in life-long learning,
  - lived in his own Bata house,
  - had a good family and social background,
  - had a healthy lifestyle,
  - had good quality health care,
  - engaged in cultural and social activities,
  - achieved a balance between work, personal development, family and social life.
2. Every employee (co-worker) of Bata Company was to become an "industrial man". Moving from point 1 to point 2 was possible only through action, thanks to which social values also increased. It was possible to achieve this objective only through the Bata's own initiative.
3. However, CSV activities of Bata were not aimed only at employees of the company, but they were also available for the residents of Zlin and its surroundings. Through these activities Bata fundamentally influenced the standard of living in Zlin.
4. The resulting increase in living standards led to changes to the population of Zlin. The company's activities began to impact all residents and social life began to evolve. Several of the company's activities could avoid involvement of residents even if they wished for that.

In the current economic climate this situation is called "the inability to exclude the subject of consumption". For example, the company carried out construction of roads, sidewalks, street lighting, planting of greenery in the town centre etc. Details of these activities will be provided in the following diagram.

It is clear that, due to the activities of Bata, social values evolved and thus life in Zlin was influenced greatly. Bata has not applied this model only in Zlin, but also in other cities around the world where its affiliates were based. Therefore it is not possible to say that this was just an isolated phenomenon which has been linked to the city of Zlin and the former Czechoslovakia.

#### **4.1 CSV of Bata in various fields of interest**

In this part of the article I would like to introduce all levels of CSV strategy in Bata. To some extent this strategy resembles Maslow's hierarchy of needs. However, the pyramid displayed below corresponds to the timeframe of the development of activities in Bata. Tomas Bata himself made several trips to America where he became fascinated and inspired by flow production, and also by the life of the industrial man. He understood this philosophy very quickly and put it into practice in Zlin. He realized that he could build a great company only

with great people who would share his vision and would not be distracted by worrying about their housing, food, health care or education for themselves and their children.

Tomas Bata needed his colleagues to concentrate on the development of the company without any distraction which is why the company provided for and fulfilled all the other needs of its employees. First the company covered the food, housing and job security needs (this evolved and developed in line with the times). Consequently, it was necessary to provide social facilities for employees and their families so that the employee was aware that the company cared about their personal life. At the same time professional health care began to develop. In the field of health care the company achieved significant results based on prevention and education. Social life played another very important role in the company. Tomas Bata believed that one should work eight hours a day, eight hours should be spent on personal development, family and culture, and eight hours for sleep.

Cultural, social and sporting life in Zlín was very diverse. Education and personal development played an essential part in shaping the "industrial man". Only a man with desire to learn and grow was fit for Bata. All these activities meant that co-workers of Bata fully shared the corporate philosophy and vision as corporate activities interfered with their lives at every stage and in every area of life. These stimuli led to the creation of the so-called "industrial man" as shown below:

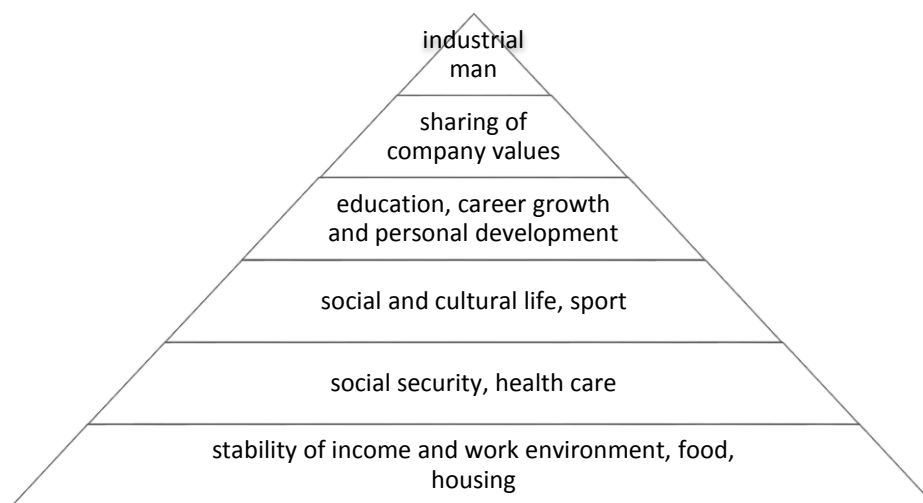


Fig. 3 – Pyramid of the industrial man's needs. Source: authors.

All areas in which the company operated influenced public life in the town and the overall development of the town.

In the public sector, this meant primarily financial support for the public administration and creating initiatives during the process of decentralization of the administrative authorities to Zlín. An initiative to supply housing for employees was introduced as part of Bata's urban development. Thanks to this initiative entire neighbourhoods were created for the employees. The rent for these houses was very low, but the house rules were very strict. The company also built a power station, sewage disposal, roads, sidewalks, sewage system, street lighting, etc.

As part of public facilities, Bata guaranteed the development of services and availability of goods in Zlín. The company started its own shops, trying to deliver good quality food so that their employees could eat healthily. The company also set up catering facilities - canteens and cafeterias, where it was possible to find high quality food for better prices. The company took

a phenomenal approach to creating its own educational system, which was able to fully replace the state education system.

The company established several nursery schools and specialized primary schools which were based on a Waldorf model, and a full range of secondary schools, from famous Bata schools to industrial schools in various fields. Special attention was also paid to lifelong learning - school for newly recruited employees, Sales school, Flying school or Export school. Tomášov, the institution for future senior level managers was another special educational institution. In the field of education Bata also placed great emphasis on the teaching of foreign languages.

Significant results were achieved in the field of social and health care. Bata needed healthy staff, and so it began to develop a whole range of activities aimed mainly at preventative health, safety regulations in the company, access to health care, mandatory health checks and more. These activities resulted in the establishment of Bata's own hospital and plans to build a so-called "House of Health", but this project was interrupted by the Second World War. This activity, the primary aim of which was to improve the health of employees, had an impact on the overall improvement of the health of the residents of Zlin and its surroundings.

Cultural and sporting life was also very important. The company founded many sports and cultural institutions. These institutions included a cinema, hotel, swimming pool, sports facilities and more and were also widely used by citizens who were not employed by Bata.

The close connection between the areas is shown in the figure below.

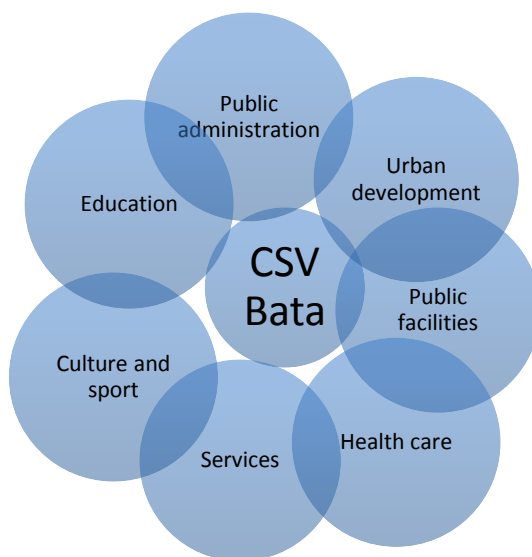


Fig. 4: Connection between the areas of Bata's CSV. Source: author.

## **5 COMPANIES NOWADAYS AND THE CSV HERITAGE OF BATA**

The current attitude of companies towards the utilization of Bata's CSV heritage has been analysed in companies which began following the Bata model on their own initiative. The research is carried out based on a combination of quantitative and qualitative methods, which are described in Methodology chapter. The research was carried out in seven companies. These firms are from industries and of different sizes. A common characteristic of these firms

is that the owner or top manager seeks inspiration from Bata Management System. These managers and owners were interviewed in order to find out the motives which have led them to seek the inspiration from the Bata Management System. Although their answers varied, it was possible to find certain common points. For example: “In the Bata Management System we have started to see a concentration of current theories about motivating people and their leadership, the integration of processes into company culture and many others. It is necessary to point out that the information was in a comprehensive and understandable form.” At the same time, the analysed parties agreed that the Bata Management System was based on the needs of Czech people and has aspects that are tailored to the mentality of the Czechs.

Choosing a company suitable for inclusion in the research depended on the company’s interest in increasing the involvement of employees in corporate culture. A common feature of the companies was the need to improve their personal activities and self-defined situations that the company has been facing, especially the problems in processes that depend on human activity.

There were a number of possible answers on a sliding scale to the question of why a firm would want to become a company which increases social value through its activities. The highest percentage of compliance is seen in this answer: “The need to create a better environment for future generations” and “The need to deal with personnel issues”.

However, when analysing these activities, it transpired that they are more focused on increasing social value amongst disinterested people rather than their own employees or stakeholders. At the same time, each of the interested companies displayed a need to increase the efficiency of internal human processes. So the question remains: why not increase social value for one’s own employees first, then for the community and then for the whole of society, as Bata did up to 1945.

This situation is illustrated by the following figure:

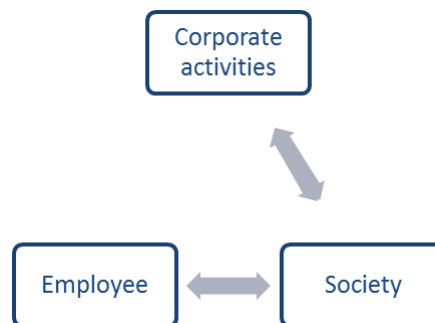


Fig. 5: Model of malfunction of CSV activities of firms. Source: author.

Setting a specifically definable goal is the main condition for the establishment of a strategy for the successful application of principles which will lead to the development of CSV based on the Bata Management System. Companies themselves should define what their goal is. Managers in many cases could not decide whether their goal is increasing the real value or mere profit maximization, although neither is mutually exclusive.

The application model for introducing the CSV inspired by Bata’s philosophy is based on man. Man is seen from all perspectives of human life and development, and should reflect the needs, wishes and dreams. Knowledge of these gifts lets you create a high quality motivational strategy for the company that leads to an understanding of proper CSV activities.

After analysing and processing personnel actions, each employer must know the motives of his employees in the various areas of their lives:

- Everyday activities at work
- Long-term activity at work
- Personal motives and interests
- Family motives
- Social motives

Based on the knowledge of these themes, a matrix of motives and needs of a company has been created. In places where the individual matrix points meet each other, there is space for a company to influence its employees. In these areas, the company should begin to develop activities that will exceed the obligations and rights of the employer and the employee will develop increasing interest for shared values in the area. It is necessary to transfer this model beyond the corporate culture. Beyond the confines of corporate culture, it is necessary to interest the community in which the company operates in its operations. Only then it is possible to find new ways to increase shared values.

The matrix of motivations and needs is the part of the application model which produces the results of the research.

## **6 DISCUSSION**

There are two main conclusions to be drawn from the above discussion. The first conclusion is a finding that the behaviour of the Bata Company up to 1945 exhibits elements of CSV strategy. On the basis of this finding, the CSV strategy cannot be perceived as something modern. CSV strategy may still be considered a more specific and higher conception of CSR strategy. We might as well continue to talk about the fact that CSV strategy can be applied by current companies and therefore it is a current trend. However, it is not modern or new trend, since the strategy was used to develop the Bata Company between 1894 -1945, not only in the Czech Republic but also abroad.

Potter and Kramer refer in their studies to the fact that CSV is a trend which present times call for, because business environment cannot be sustainable without a change in the concept. It is not necessary to refute this statement, but we also cannot claim that the current business environment is in the same situation as the Bata Company was. Upon further research some day we may be able to say that the Bata's CSV model is the best for sustainable business growth, not only in domestic environment but also abroad.

Personal interviews and surveys in companies, that follow the legacy of Tomas Bata, demonstrate that domestic companies understand better the CSV model in the context of the Bata Company than in the context of modern foreign companies. Based on data obtained in these companies it will be possible to use quantitative research methodology and principles of CSV application inspired by the Bata Company up to 1945.

## **7 CONCLUSION**

The presented article informs research on creating application model for developing CSV strategy in modern-day companies that are inspired by the Bata Management System legacy. These companies serve as an example for others looking for solutions on how to streamline

work in the field of human resources whilst creating shared value for the local community and stakeholders.

Aim of the research is to prove that the Bata Company developed its business activities according to values of the same CSV strategy as used today. These activities are converted into a model. Subsequently, this model will be adapted to the needs of the current business environment and legal framework. Based on the comparison of these models, an “ideal model” is established. Following that a distance test is developed. The distance test is the name for the method by which each firm can assess how far it is from the “ideal model” and work out what steps it must take in which areas and at what level in order to get closer to the ideal state. Consequently, methodological documentation on the individual steps and method for implementing Bata’s CSV in the current business environment has been developed.

To verify the functionality of the model and its impact not only on internal employees, but also especially on community life, it will be necessary to monitor the progress of the implementation and its impact over the coming years. This is not a short-term process and results could not be measured and evaluated immediately. The model in Bata developed over almost 30 years. Only after that was it possible observe its direct consequences on society on a global scale.

The basic principal for the application of a CSV model is to focus on employees as people who perceive the everyday needs of human society. Even today, in some companies one can find certain models that perceive humans only as an executor of tasks without any behavioural aspect to his personality.

In the application model, the object of development is an employee who should, through CSV, develop the community and encourage the development of shared values through the company and environment.

### **Acknowledgement**

*This paper was carried out with financial support from IGA TBU No. IGA/FaME/2015/031.*

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## **RECENT TRENDS, CHARACTERISTICS AND PROSPECTS OF PAYMENT CARDS IN THE SLOVAK REPUBLIC FROM THE PERSPECTIVE OF CLIENTS**

*Korauš Anton, Kiseľáková Dana, Demjan Valér, Cibák Ľuboš*

### **Abstract**

Payment cards continue to replace cash and checks in advanced economies. Along with the growth of payment card transactions has come greater scrutiny by public authorities of certain payment network rules along with the level of certain fees. This article reviews recent trends, characteristics and prospects of payments cards in the Slovak Republic from the perspective of clients.

The aim of this article was to examine recent trends, characteristics and prospects of payments cards in the Slovak Republic from the perspective of clients. In accordance with this objective, satisfaction as well as factors of this satisfaction and dissatisfaction, behaviour and decision-making of clients in Slovakia have been analyzed in relation to a gender, age structure, and level of education of customers.

The results of this research confirmed the overall level and factors of satisfaction, behaviour, and decision-making of banking clients. However, there are also significant differences in the opinions, ideas and decision making process and factors of satisfaction and dissatisfaction of bank clients in Slovakia within individual social groups. New payment technologies enhance consumer satisfaction and generate substantial efficiencies.

*KEYWORDS: payment cards, credit cards, debit cards, commercial banks, satisfaction of bank clients, reason for satisfaction of clients, behaviour of banking clients, decision-making of banking clients*

JEL Classification: G21, M14, M12, M31, Z13

## **1 INTRODUCTION**

Belás et al. (2013a) argues that the commercial bank as other business subjects achieves its basic goals through purchasing banking products and services to its clients. Customers in business relationships require a high level of acceptance of their needs from staff and accurately provided services (Lages & Piercy, 2012).

Payment cards continue to replace cash and checks in advanced economies. Along with the growth of payment card transactions has come greater scrutiny by public authorities of certain payment network rules along with the level of certain fees. This article reviews recent trends, characteristics and prospects of payment cards in the Slovak Republic from the perspective of clients.

At the end of 2013, Slovakia had issued 4.79 million payment cards, representing an increase by 4.4%. Highest annual increase (+ 78%) was observed in the case of contactless cards, which is now currently 2.15 million units (45% of all cards). Any thirteenth payment card in 2013 was carried out contactless.

## **2 THEORETICAL BACKGROUND**

The proliferation of payment cards has dramatically changed the ways we shop and merchants sell goods and services. Today, payment cards are indispensable in most advanced economies. Amromin and Chakravorti (2009) find that greater usage of debit cards has resulted in lower demand for small-denomination bank notes and coins that are used to make change in 13 advanced economies. Recent payment surveys also indicate that consumers are using payment cards instead of checks. Juřík (2012) states that aside from making money transaction more comfortable, the cards have been also used to increase loyalty of customers. This is why they are sometimes referred to as loyalty payment cards or personal payment cards.

Wider acceptance and usage of payment cards suggest that a growing number of consumers and merchants prefer payment cards to cash and checks. In addition, payment cards may allow access to credit that can be used to attract consumers without funds. Debit, credit, and prepaid cards are three forms of payment cards. Debit cards allow consumers to access funds at their banks (defined broadly as depository institutions) to pay merchants; these are sometimes referred to as “pay now ” cards because funds are generally debited from the cardholder’s account within a day or two of a purchase. Credit cards allow consumers to access lines of credit at their banks when making payments and can be thought of as “paylater ” cards because consumers pay the balance at a future date. Prepaid cards can be referred to as “pay before” cards because they allow users to pay merchants with funds transferred in advance to a prepaid account. Greater usage of cards has increased the value of payment network operators.

Our analysis also draws upon a model by Bolt and Chakravorti (2008a). They study the ability of banks and merchants to influence the consumer’s payment instrument choice when they have access to three payment forms-cash, debit card, and credit card. Their analysis combines elements of “two-sided” models that stress price structure with those that consider consumers’ liquidity constraints and security concerns. In addition, they consider how banks set prices when they participate in multiple payment networks (“payment substitution”). Much of the payment literature focuses on the intensive margin-how fees influence usage-instead of the extensive margin-how fees affect adoption-or does not distinguish the two. Notable exceptions are Bedre and Calvano (2009), Bolt and Chakravorti (2008a), and Chakravorti and Roson (2006).

Examine the level of satisfaction, decision making and behaviour of bank customers to the banking business is very important not only from a practical as well as theoretical aspects.

Belás (2014) points out that several authors examine the issue of satisfaction of banks’ clients in the context of bank management. Munari et al. (2013) indicate that customer satisfaction is becoming a stable goal of banking marketing policies, an important element for strengthening corporate reputation. Chavan, Ahmad (2013) state that the bank business increasingly depends on the quality of the customer service provided and overall satisfaction of each single customer. Relationship marketing has become the most critical aspect of corporate banking success. According to Grigoroudis et al. (2013, p.21) “the long-term success of banking organizations is related to their ability to adapt to changing customer preferences and needs. For this reason customer orientation and a continuous improvement in philosophy is adopted in order to design and provide products and services that meet customer requirements. This justifies the importance of internal and external service quality assessment and incorporation of quality measures in the performance evaluation of business organizations. Belás at al. (2014) argues that furthermore, the ability of banking institutions to respond to changing market conditions may provide a significant competitive advantage against competition”.

Clients generally demand quality from their banks as well as want them to understand their needs in order to be able to respond appropriately. Lages and Piercy (2012) suggest that clients in business relationships require a high level of acceptance of their own needs from staff and accurate services.

### **3 MATERIALS AND METHODS**

Given the purpose and objective of the research as well as the intended target group described in the research assignment, it has been decided to conduct an Usage & Attitude survey focusing on clients of Slovak banks. For this research in the year 2014 were used the methodology CAWI (Computer Aided Web Interviewing) on National On-line panel which contains more than 30.000 members in the Slovak Republic. This allowed us to cover required sample while respecting representative distribution of basic socio-demo easily.

#### Basic inputs for research

*SAMPLE SIZE: N=700 interviews in Slovakia*

*TARGET GROUP: Respondents aged 18 – 69 y.o.,*

*LENGHT OF THE QUESTIONNAIRE: 20 minutes*

*FIELDWORK: 2.6. – 26.6. 2014*

representatively distributed into gender, age groups, education level, region and city/village size.

Chakravorti at al. (2014) argues, that the Internet has come of age. Twenty-one years since the marketplace first took notice, the World Wide Web today is at the heart of the global economy, channelling interactions for nearly 40% of the world's population. Computer-assisted web interviewing is a Internet surveying technique in which the interviewer follows a script provided in a website. The questionnaires are made in a program for creating web interviews. The program allows for the questionnaire to contain pictures, audio and video clips, links to different web pages, etc. The website is able to customize the flow of the questionnaire based on the answers provided, as well as information already known about the participant. It's considered to be a cheaper way of surveying since you don't need to use people to hold surveys unlike Computer-assisted telephone interviewing.

Chakravorti and To (2007) consider a scenario with monopolist merchants and a monopolist bank that serves both consumers and merchants where the merchants absorb all credit and payment costs.

Chang and Krosnick (2010) argue that surveys showed that data collected via the Internet manifested higher concurrent and predictive validity and less random and systematic measurement error than data collected via telephone interviewing. With the increasing use of the Internet, online questionnaires have become a popular way of collecting information. The design of an online questionnaire often has an effect on the quality of data gathered. There are many factors in designing an online questionnaire; guidelines, available question formats, administration, quality and ethic issues should be reviewed. Online questionnaires should be seen as a sub-set of a wider-range of online research methods.

Krosnick (1999) about technological innovations in questionnaire administration expresses its view that these innovations have clear advantages for improving the quality and efficiency of questionnaire administration. Krosnick and Presser argue (2010) that researchers who compose questionnaires should find useful guidance in the specific recommendations for the wording and organization of survey questionnaires.

During research proceedings, two hypotheses and three scientific assumption have been established where methods of expert estimate during quantitative criteria establishment have been used.

*SA1: The overall satisfaction level of clients with payment cards is higher than 70 % in our research.*

*SA2: The most significant factor in client's decision on using the credit cards are the fees, while the impact measure of this factor will be over 50 %.*

*SA3: The most significant factor in client's decision on using debit cards are the fees and card issuer, while the impact measure of this factor will be over 50 %.*

*H1: The customers' satisfaction is not significantly determined by their gender, and achieved education structure.*

*H2: The customers' satisfaction is significantly determined by their age.*

## 4 RESULTS

Scientific assumptions have been verified through descriptive statistics indicators. The percentage calculations and weighted averages have been used.

In the survey, 646 respondents have been approached where 43.96 % of them were males and 56.04 % were females. The age structure of respondents is as follows: 40.86 % of them are aged under 30 years, 59.14% are over 30 years. The education structure of respondents is as follows: 1.12 % of them have achieved primary education, 63.75 % are secondary education graduates and 35.13 % are university graduates.

Established scientific assumptions in each table were examined through Pearson statistics. P-value less than 5% leads to rejection of the null hypothesis.

Tab. 1 - Overall customer satisfaction with banking payments cards and services

Are you satisfied with banking payments cards and services provided?	In total	Gender		p-value	Age		p-value	Education level		p-value
		Women	Men		Under 30 years, old	Over 30 years old		Primary and secondary	University	
Yes	523	293	230	0.98404	214	309	0.96012	340	183	0.87288
No	78	44	34	0.9442	32	46	0.97606	50	28	0.88076
Do not know	45	25	20	0.9442	18	27	0.90448	29	16	0.95216

Source: created by authors.

The level of clients' satisfaction with payment cards is a significant factor in successful commercial eligibility of all banks. Not only are the debit cards a product but also a medium for advertisement and client's satisfaction. Therefore the investigation of overall customer satisfaction with payment cards and services is very important. The assessment of one scientific assumption and two hypotheses in this field is important and meaningful.

SA1: The overall level of customer satisfaction with payment cards will be over 70 %. SA1 has been proved. In our research, we have found out that the overall level of customer satisfaction with payment cards was over 80.95 %.

H1: The determination of satisfaction of clients with payment cards by gender and achieved level of education is not statistically significant. H1 has been proved. We have found out that there are no statistically significant differences between respondents of different gender and levels of education.

H2: The determination of satisfaction of customers with payment cards by age is statistically significant. H2 has not been proven. We found out that the customers' satisfaction with payment cards is not significantly determined by their age.

**Tab. 2 - Type of banking payment cards used**

From the presented options, please choose the ones which you personally use or would like to use in the future.		In total	Gender		Age		Education level	
			Women	Men	Under 30 yrs. old	Over 30 years old	Primary and secondary	University
Credit card		192	107	85	82	110	125	67
	p-value		0.92034		0.53526		0.93624	
Debit card		384	217	167	156	228	211	173
	p-value		0.77182		0.88076		0.000	
Consumer loan card		41	22	19	12	29	20	21
	p-value		0.74896		0.11876		0.02574	
Prepaid card		29	16	13	14	15	16	13
	p-value		0.92034		0.40654		0.26272	

*Source: created by authors.*

Based on our investigation of the aspect as to which payment cards are currently used by customers and which payment cards they want to use in the future, we have found out that the most significant share is yielded by debit cards (59.44 %) and credit cards (29.72 %). Despite the fact that our results from prepaid cards (Tab 1) show a 4.48 % share, their number is gradually increasing.

**Tab. 3 - Number of banking payment cards used**

How many payment cards do you have altogether? This includes credit cards, debit card and consumer loan cards. From the presented options, please choose the ones which you personally use or would like to use in the future.		In total	Gender		Age		Education level	
			Women	Men	Under 30 years. old	Over 30 years old	Primary and secondary	University
1 card		382	235	147	149	233	276	106
	p-value		0.00072		0.24604		0.000	
2 cards		191	96	95	89	102	114	77
	p-value		0.05486		0.05486		0.07508	
3 cards		36	19	17	12	24	16	20
	p-value		0.6818		0.34212		0.0083	
4 cards		24	8	16	10	14	11	13
	p-value		0.0226		0.93624		0.0466	
5 and more cards		13	4	9	4	9	2	11
	p-value		0.06432		0.45326		0.00016	

Source: created by authors.

As to the number of payment cards, most customers (59.13 %) hold just one card, especially women (61.51 %) and persons aged over 30 years (60.99 %). These facts give an assumption of further acquisition activities of banks in the field of payment cards.

**Tab. 4 - Factors influencing the customer selection of a credit card**

What influences you most when selecting a CREDIT card? List three criteria.		In total	Gender		Age		Education level	
			Women	Men	Under 30 years. old	Over 30 years old	Primary and secondary	University
Fees		457	237	220	165	292	272	185
	p-value		0.00086		0.00012		0.000	
The issuing bank		381	211	170	163	218	244	137
	p-value		0.68916		0.23404		0.60306	
Low interest rates and fees		347	157	190	142	205	235	112
	p-value		0.000		0.97606		0.101	

Ancillary services		272	169	103	119	153	169	103
	p-value		0.00782		0.20408		0.21498	
The card brand (MasterCard, VISA)		254	163	91	116	138	185	69
	p-value		0.0008		0.0455		0.00062	
Recommendation		165	117	46	63	102	112	53
	p-value		0.000		0.41794		0.34722	
Employer		62	32	30	24	38	40	22
	p-value		0.4593		0.71884		0.95216	

Source: created by authors.

The most significant factor in payment cards lies in their price, i.e. in the fee charged for using the payment cards. As to age, as many as 63.89 % of clients aged over 30 years are influenced by the charges.

SA2: The most significant factor in client's decision on using credit cards are the fees, while the impact measure of this factor will be over 50 % In our research, the measure of the impact of fees charged by banks will be over 65 %.

Tab. 5 - Factors influencing the customer selection of a debit card

What influences you most when selecting a DEBIT card? List three criteria.	In total	Gender		Age		Education level		
		Women	Men	Under 30 yrs. old	Over 30 years old	Primary and secondary	University	
Fees		429	241	188	175	254	276	153
	p-value		0.92034		0.96012		0.69654	
The issuing bank		440	246	194	177	263	286	154
	p-value		0.92034		0.63122		0.9124	
Low interest rates and fees		335	188	147	138	197	218	117
	p-value		0.9681		0.85716		0.90448	
Ancillary services		260	146	114	107	153	169	91
	p-value		0.96012		0.90448		0.95216	
The card brand (MasterCard, VISA)		249	139	110	103	146	162	87
	p-value		0.92828		0.84148		0.93624	
Recommendation		165	92	73	67	98	107	58
	p-value		0.93624		0.93624		1.000	
Employer		60	34	26	25	35	39	21
	p-value		0.92034		0.89656		0.98404	

Source: created by authors.



The choice of debit card is mostly influenced by charges while as many as 59.20 % of respondents aged over 30 years and 61.33 % of respondents with elementary and secondary levels of education select their debit card based on the fees charged by the banks.

SA3: The most significant factor in client's decision on using debit cards are the charges and card issuer, while the impact measure of this factor will be over 50 %. Our research will show that the measure of the impact of charges and bank that issued the payment card will be over 60 %.

## **5 DISCUSSION**

Satisfied customer is of major importance for current and future financial performance of commercial banks. Korauš (2011) states that a satisfied customer stays loyal to his bank while costs incurred by keeping an existent customer satisfied are five times lower than those incurred in the process of gaining a brand new customer. A loyal customer is willing to pay a higher price whereas for luring a satisfied customer away from the competitor means to reduce the price of bank's product by 30 %. A satisfied client represents a free form of advertising. He is more inclined to purchase more products from the bank. A satisfied customer gives positive feedback to banks' employees, which in turn becomes a source of their satisfaction and pride in their work and business.

The level of customers' satisfaction in banking business differs considerably from country to country. The most important reasons for switching to another bank includes an increase in fees, poor service and operational personnel errors (Titko & Lace, 2010), lack of interest in solving clients' problems and high price policy (Belás et al., 2013b).

Our current research has confirmed these trends. The overall level of customers' satisfaction is comparable to the situation on European banking market. Clients feel low level of interest in solving their financial issues and high price policies of the bank. Banks also do not use the proper form of their sales opportunities, because only 33 % of respondents in our research have confirmed that employees of the branch often offer interesting products (53 % of respondents said that employees in the branch rarely offer products and 14 % of clients said that a banks has never offered an interesting products at all). This trend may also have implications on the cross-selling index. According to our findings, the average value of this index is 2.23. This number gives an indication of great sales opportunities for commercial banks in Slovakia, because a normal consumer needs objectively more banking products such as: current account for payment needs, credit card for regular purchases, savings account for the need to cover future risks and mortgages for provide housing or some investment products.

Tesfom and Birch (2011) suggest that young and older bank customers differ significantly in their perception of switching barriers: relational benefits, switching costs, availability and attractiveness of alternatives, service recovery and duration of time they intend to keep their relationship with their banks. According to the authors, older costumers are more satisfied with services than young clients who also prefer modern distribution channels and possibility of several alternatives. This research has been conducted in USA.

Our research has not confirmed the fact that the overall customers' satisfaction with provided services depends on age, gender, or education level of banks' clients. Our research has shown some differences between perceptions of selected social groups. For example when comparing young clients with old ones, the former surprisingly considered the poor availability of the branch as an important reason for their dissatisfaction and are less sensitive to the price of products and services. Compared to men, women are more sensitive to the

price and mode of operation in the branch. University graduates were more critical of banks and stated that the possibility to e-banking usage is the most important reason for their satisfaction.

These results indicate that attitudes of retail consumers differ from country to country. They determine the current situation on banking market and may have different objective preferences on traditional, historical, cultural, moral and political grounds. In this context, it is appropriate to conduct such studies on regional markets.

## 6 CONCLUSIONS

The results of our research have confirmed the validity of the first scientific assumption. Values of testing criteria have shown that the overall level of customer satisfaction with bank payment cards is over 70 %.

The first hypothesis has been confirmed. The overall customer satisfaction with bank payment cards is not statistically significant as to gender and achieved education level. We found that there were no statistically significant differences between genders and respondents with different levels of education.

The second hypothesis has been not confirmed. We found that the customer satisfaction with bank payment cards is not statistically significant as to age.

The research has confirmed the validity of the second scientific assumption, namely that in our research the measure of the impact of fees is over 65 %. Mostly affected clients by this factor are those aged over 30 years.

The third scientific assumption has been confirmed. The measure of the impact of fees in our research is over 60 %. This factor affects women significantly more than men; younger clients are less affected than older ones are. These findings can be interpreted as a fact that money saving belongs to major priorities of clients. The research has also shown that the sensitivity over bank payment cards is higher in women. This can be related to their feature of being more economical than men as a result of their high sense of responsibility toward family finances.

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## **APPLIED MACHINE LEARNING PREDICTIVE MODELLING IN REGIONAL SPATIAL DATA ANALYSIS PROBLEM**

*Martin Kovářik, Radek Benda*

### **Abstract**

Urban and Regional Studies deal with large tables of spatial data obtained from censuses and surveys. It is necessary to simplify the huge amount of detailed information in order to extract the main trends. The main aim of this article is to present and compare machine learning models in spatial data analysis problem. As an example of spatial data modelling we draw upon public-domain data about California housing values. We use a variety of regression modelling techniques, showing how additional information about location (longitude and latitude) can contribute to the analysis. The data comprise observations of housing values, economic covariates, and longitude and latitude. We follow Pace and Barry (1997) in defining response and explanatory variables for a linear regression model.

*Keywords: Machine Learning, Spatial Data Analysis, Linear Regression, Regression Trees, Random Forests, Support Vector Machines, Cubist Model, k-fold Cross-Validation*

JEL Classification: C61, D12, M21

## **1 INTRODUCTION**

Machine learning is a scientific discipline that explores the construction and study of algorithms that can learn from data. Such algorithms operate by building a model based on inputs and using that to make predictions or decisions, rather than following only explicitly programmed instructions.

Machine learning can be considered a subfield of computer science and statistics. It has strong ties to artificial intelligence and optimization, which deliver methods, theory and application domains to the field. Machine learning is employed in a range of computing tasks where designing and programming explicit, rule-based algorithms is infeasible. Example applications include spam filtering, optical character recognition (OCR), search engines and computer vision. Machine learning is sometimes conflated with data mining, although that focuses more on exploratory data analysis. Machine learning and pattern recognition „can be viewed as two facets of the same field“.

In 1959, Arthur Samuel defined machine learning as a "Field of study that gives computers the ability to learn without being explicitly programmed" (Simon, 2013).

Tom M. Mitchell provided a widely quoted, more formal definition: "A computer program is said to learn from experience  $E$  with respect to some class of tasks  $T$  and performance measure  $P$ , if its performance at tasks in  $T$ , as measured by  $P$ , improves with experience  $E$ " (Mitchell, 1997).

This definition is notable for its defining machine learning in fundamentally operational rather than cognitive terms, thus following Alan Turing's proposal in Turing's paper "Computing Machinery and Intelligence" that the question "Can machines think?" be replaced with the question "Can machines do what we (as thinking entities) can do?"

Statistical learning refers to a vast set of tools for understanding data. These tools can be classified as supervised or unsupervised. Broadly speaking, supervised statistical learning

involves building a statistical model for predicting, or estimating, an output based on one or more inputs. Problems of this nature occur in fields as diverse as business, medicine, astrophysics, and public policy. With unsupervised statistical learning, there are inputs but no supervising output; nevertheless we can learn relationships and structure from such data.

This contribution introduces application of machine learning models into spatial data analyses problem. Spatial analysis is a set of techniques for analyzing spatial data. The results of spatial analysis are dependent on the locations of the objects being analyzed. Software that implements spatial analysis techniques requires access to both the locations of objects and their attributes. Spatial statistics extends traditional statistics to support the analysis of geographic data. It provides techniques to describe the distribution of data in the geographic space (descriptive spatial statistics), analyse the spatial patterns of the data (spatial pattern analysis), identify and measure spatial relationships (spatial regression), and create a surface from sampled data (spatial interpolation, usually categorized as geostatistics).

## **2 LITERATURE REVIEW**

Though the term statistical learning is fairly new, many of the concepts that underlie the field were developed long ago. At the beginning of the nineteenth century, Legendre and Gauss published papers on the method of least squares, which implemented the earliest form of what is now known as linear regression. The approach was first successfully applied to problems in astronomy. Linear regression is used for predicting quantitative values, such as an individual's salary. In order to predict qualitative values, such as whether a patient survives or dies, or whether the stock market increases or decreases, Fisher proposed linear discriminant analysis in 1936. In the 1940s, various authors put forth an alternative approach, logistic regression. In the early 1970s, Nelder and Wedderburn (1972) coined the term generalized linear models for an entire class of statistical learning methods that include both linear and logistic regression as special cases. By the end of the 1970s, many more techniques for learning from data were available. However, they were almost exclusively linear methods, because fitting non-linear relationships was computationally infeasible at the time. By the 1980s, computing technology had finally improved sufficiently that non-linear methods were no longer computationally prohibitive. In mid 1980s Breiman, Friedman, Olshen and Stone (1984) introduced classification and regression trees, and were among the first to demonstrate the power of a detailed practical implementation of a method, including cross-validation for model selection. Hastie and Tibshirani (1986) coined the term generalized additive models in 1986 for a class of non-linear extensions to generalized linear models, and also provided a practical software implementation. Since that time, inspired by the advent of machine learning and other disciplines, statistical learning has emerged as a new subfield in statistics, focused on supervised and unsupervised modeling and prediction. In recent years, progress in statistical learning has been marked by the increasing availability of powerful and relatively user-friendly software, such as the popular and freely available R system. This has the potential to continue the transformation of the field from a set of techniques used and developed by statisticians and computer scientists to an essential toolkit for a much broader community.

Machine learning tasks are typically classified into three broad categories, depending on the nature of the learning "signal" or "feedback" available to a learning system. These are: (Russell and Norvig, 2003)

- Supervised learning. The computer is presented with example inputs and their desired outputs, given by a "teacher", and the goal is to learn a general rule that maps inputs to outputs.

- Unsupervised learning, no labels are given to the learning algorithm, leaving it on its own to find structure in its input. Unsupervised learning can be a goal in itself (discovering hidden patterns in data) or a means towards an end.
- In reinforcement learning, a computer program interacts with a dynamic environment in which it must perform a certain goal (such as driving a vehicle), without a teacher explicitly telling it whether it has come close to its goal or not. Another example is learning to play a game by playing against an opponent. (Bishop, 2006), (Wernick et al., 2010)

Between supervised and unsupervised learning is semi-supervised learning, where the teacher gives an incomplete training signal: a training set with some (often many) of the target outputs missing. Transduction is a special case of this principle where the entire set of problem instances is known at learning time, except that part of the targets are missing.

Among other categories of machine learning problems, learning to learn learns its own inductive bias based on previous experience. Developmental learning, elaborated for robot learning, generates its own sequences (also called curriculum) of learning situations to cumulatively acquire repertoires of novel skills through autonomous self-exploration and social interaction with human teachers, and using guidance mechanisms such as active learning, maturation, motor synergies, and imitation.

Spatial analysis confronts many fundamental issues in the definition of its objects of study, in the construction of the analytic operations to be used, in the use of computers for analysis, in the limitations and particularities of the analyses which are known, and in the presentation of analytic results. Many of these issues are active subjects of modern research.

Common errors often arise in spatial analysis, some due to the mathematics of space, some due to the particular ways data are presented spatially, some due to the tools which are available. Census data, because it protects individual privacy by aggregating data into local units, raises a number of statistical issues. The fractal nature of coastline makes precise measurements of its length difficult if not impossible. A computer software fitting straight lines to the curve of a coastline, can easily calculate the lengths of the lines which it defines. However these straight lines may have no inherent meaning in the real world, as was shown for the coastline of Britain.

These problems represent a challenge in spatial analysis because of the power of maps as media of presentation. When results are presented as maps, the presentation combines spatial data which are generally accurate with analytic results which may be inaccurate, leading to an impression that analytic results are more accurate than the data would indicate (Monmonier, 1996).

Spatial dependency is the co-variation of properties within geographic space: characteristics at proximal locations appear to be correlated, either positively or negatively. Spatial dependency leads to the spatial autocorrelation problem in statistics since, like temporal autocorrelation, this violates standard statistical techniques that assume independence among observations. For example, regression analyses that do not compensate for spatial dependency can have unstable parameter estimates and yield unreliable significance tests. Spatial regression models (see below) capture these relationships and do not suffer from these weaknesses (Kovarik, 2013), (Kovarik, Sarga and Klimek, 2015). It is also appropriate to view spatial dependency as a source of information rather than something to be corrected. (De Knegt et al., 2010)

Locational effects also manifest as spatial heterogeneity, or the apparent variation in a process with respect to location in geographic space. Unless a space is uniform and boundless, every location will have some degree of uniqueness relative to the other locations. This affects the

spatial dependency relations and therefore the spatial process. Spatial heterogeneity means that overall parameters estimated for the entire system may not adequately describe the process at any given location.

Alfons (2013a) provides cross-validation tools, which are useful in conducting benchmark studies as illustrated in this contribution. Benchmark studies, also known as statistical simulations, may be conducted within special packages designed for this type of research (Alfons 2013b; Alfons, Templ, and Filzmoser 2013).

Cressie (1993) and Lloyd (2010) provide an overview of methods in spatial data analysis. Spatially weighted regression can be especially useful in this domain of application (Fotheringham, Brunsdon, and Charlton 2002). Bivand, Pebesma, and Gómez-Rubio (2008), Bivand (2013), and Bivand and Yu (2013) review relevant software for spatial data modelling and geographically weighted regression.

Cressie and Wikle (2011) introduce the emerging area of spatio-temporal modelling. Spatio-temporal models are used in weather forecasting and in the study of global climate trends. They are used for research in spatial epidemiology, criminology, transportation, and logistics. We expect that spatio-temporal models will be utilized much more extensively in marketing analytics and predictive analytics in general as mobile data about consumers become more widely available. Cressie and Wikle (2011) describe spatio-temporal modelling as the next modelling frontier. Spatio-temporal models are, by definition, hierarchical model, typically Bayesian hierarchical models. Software for spatio-temporal modelling is available for the R programming environment (Pebesma 2013).

### **3 USED METHODS**

Quantitative and simulation methods was used for the issue solution. When solving these research problems methods are adequate to issues and objectives – a combination of quantitative and simulation methods of research. Machine learning models with 10-fold cross-validation used in processing the results are based on the experience of the authors. Below is shown some of used models in simulation study in very short description.

#### **3.1 Linear Regression**

The objective of ordinary least squares linear regression is to find the plane that minimizes the sum-of-squared errors (SSE) between the observed and predicted response:

$$SSE = \sum_{i=1}^n (y_i - \hat{y}_i)^2, \quad (1)$$

where  $y_i$  is the outcome and  $\hat{y}_i$  is the model prediction of that sample's outcome. Mathematically, the optimal plane can be shown to be

$$(X^T X)^{-1} X^T y, \quad (2)$$

where  $\mathbf{X}$  is the matrix of predictors and  $y$  is the response vector. Previous equation (1) is also known as  $\hat{\beta}$  ("beta-hat") in statistical texts and is a vector that contains the parameter estimates or coefficients for each predictor. This quantity (1) is easy to compute, and the coefficients are directly interpretable. Making some minimal assumptions about the distribution of the residuals, it is straightforward to show that the parameter estimates that minimize SSE are the ones that have the least bias of all possible parameter estimates



(Graybill, 1976). Hence, these estimates minimize the bias component of the bias-variance trade-off.

### **3.2 Regression Trees**

Tree-based models consist of one or more nested if-then statements for the predictors that partition the data. Basic regression trees partition the data into smaller groups that are more homogenous with respect to the response. To achieve outcome homogeneity, regression trees determine:

- The predictor to split on and value of the split
- The depth or complexity of the tree
- The prediction equation in the terminal nodes

In this section, we focus on techniques where the model in the terminal nodes are simple constants. There are many techniques for constructing regression trees. One of the oldest and most utilized is the classification and regression tree (CART) methodology of Breiman et al. (1984). For regression, the model begins with the entire data set,  $S$ , and searches every distinct value of every predictor to find the predictor and split value that partitions the data into two groups ( $S_1$  and  $S_2$ ) such that the overall sums of squares error are minimized:

$$SSE = \sum_{i \in S_1} (y_i - \bar{y}_1)^2 + \sum_{i \in S_2} (y_i - \bar{y}_2)^2, \quad (3)$$

where  $\bar{y}_1$  and  $\bar{y}_2$  are the averages of the training set outcomes within groups  $S_1$  and  $S_2$ , respectively. Then within each of groups  $S_1$  and  $S_2$ , this method searches for the predictor and split value that best reduces SSE. Because of the recursive splitting nature of regression trees, this method is also known as recursive partitioning.

### **3.3 Random Forests**

As illustrated with the solubility data, bagging trees (or any high variance, low bias technique) improves predictive performance over a single tree by reducing variance of the prediction. Generating bootstrap samples introduces a random component into the tree building process, which induces a distribution of trees, and therefore also a distribution of predicted values for each sample. The trees in bagging, however, are not completely independent of each other since all of the original predictors are considered at every split of every tree. One can imagine that if we start with a sufficiently large number of original samples and a relationship between predictors and response that can be adequately modelled by a tree, then trees from different bootstrap samples may have similar structures to each other (especially at the top of the trees) due to the underlying relationship. This characteristic is known as tree correlation and prevents bagging from optimally reducing variance of the predicted values. Despite taking bootstrap samples, each tree starts splitting on the number of carbon atoms at a scaled value of approximately 3.5. The second level splits vary a bit more but are restricted to both of the surface area predictors and molecular weight. While each tree is ultimately unique-no two trees are exactly the same — they all begin with a similar structure and are consequently related to each other. Therefore, the variance reduction provided by bagging could be improved. For a mathematical explanation of the tree correlation phenomenon, see Hastie et al. (2008). Reducing correlation among trees, known as de-correlating trees, is then the next logical step to improving the performance of bagging. From a statistical perspective, reducing correlation among predictors can be done by adding randomness to the tree construction process. After Breiman unveiled bagging, several authors tweaked the algorithm by adding

randomness into the learning process. Because trees were a popular learner for bagging, Dietterich (2000) developed the idea of random split selection, where trees are built using a random subset of the top  $k$  predictors at each split in the tree. Another approach was to build entire trees based on random subsets of descriptors (Ho, 1998; Amit and Geman, 1997). Breiman (2000) also tried adding noise to the response in order to perturb tree structure. After carefully evaluating these generalizations to the original bagging algorithm, Breiman (2001) constructed a unified algorithm called random forests. A general random forests algorithm for a tree-based model can be implemented as shown in figure 1.

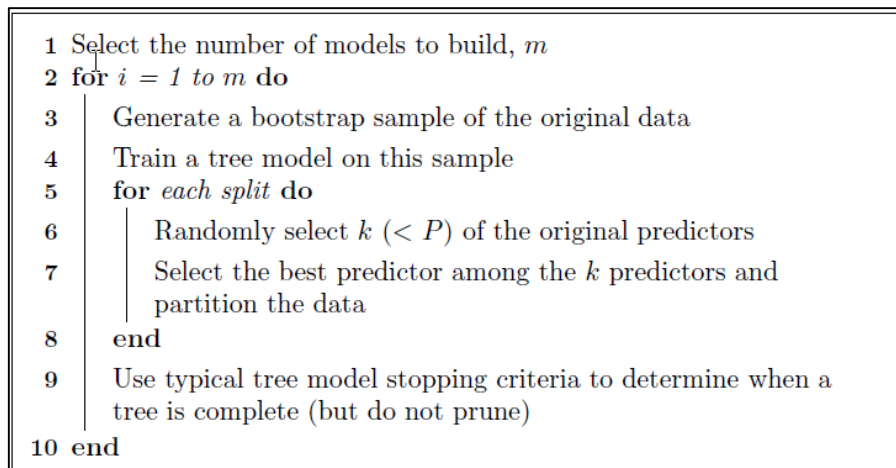


Fig. 1 – Basic Random Forests algorithm. Source: Kuhn and Johnson, 2013.

### 3.4 Support Vector Machines

Support vector machines are a class of statistical models first developed in the mid-1960s by Vladimir Vapnik. In later years, the model has evolved considerably into one of the most flexible and effective machine learning tools available, and Vapnik (2010) provides a comprehensive treatment. Here we touch on similar concepts from SVM for regression and layout the case for classification. Consider the enviable problem shown in the left panel of figure 2 where two variables are used to predict two classes of samples that are completely separable. As shown on the left, there are a multitude (in fact an infinite) number of linear boundaries that perfectly classify these data. Given this, how would we choose an appropriate class boundary? Many performance measures, such as accuracy, are insufficient since all the curves would be deemed equivalent. What would a more appropriate metric be for judging the efficacy of a model? Vapnik defined an alternate metric called the *margin*. Loosely speaking, the margin is the distance between the classification boundary and the closest training set point.

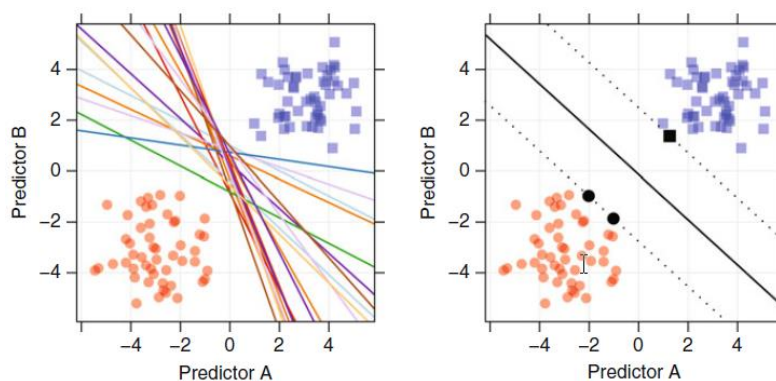


Fig. 2 – *Left*: A data set with completely separable classes. An infinite number of linear class boundaries would produce zero errors. *Right*: The class boundary associated with the linear maximum margin classifier. The solid black points indicate the support vectors. Source: Kuhn and Johnson, 2013.

For example, the right-hand panel of figure 2 shows one possible classification boundary as a solid line. The dashed lines on both sides of the boundary are at the maximum distance from the line to the closest training set data (equidistant from the boundary line). In this example the three data points are equally closest to the classification boundary and are highlighted with solid black symbols. The margin defined by these data points can be quantified and used to evaluate possible models. In SVM terminology, the slope and intercept of the boundary that maximize the buffer between the boundary and the data is known as the maximum margin classifier.

### 3.5 Cubist Model

Cubist is a rule-based model that is an amalgamation of several methodologies published some time ago (Quinlan 1987, 1992, 1993) but has evolved over this period. Previously, Cubist was only available in a commercial capacity, but in 2011 the source code was released under an open-source license. At this time, the full details of the current version of the model became public. Our description of the model stems from the open-source version of the model. The implementation of Cubist uses Manhattan (a.k.a. city block) distances to determine the nearest neighbors. Also, neighbors are only included if they are “close enough” to the prediction sample. To filter the neighbors, the average pairwise distance of data points in the training set is used as a threshold. If the distance from the potential neighbor to the prediction samples is greater than this average distance, the neighbor is excluded (Kuhn and Johnson, 2013).

### 3.6 *k*-Fold Cross-Validation

The samples are randomly partitioned into *k* sets of roughly equal size. A model is fit using the all samples except the first subset (called the first *fold*). The held-out samples are predicted by this model and used to estimate performance measures. The first subset is returned to the training set and procedure repeats with the second subset held out, and so on. The *k* resampled estimates of performance are summarized (usually with the mean and standard error) and used to understand the relationship between the tuning parameter(s) and model utility. The cross-validation process with *k* = 3 is depicted in figure 3 (Kuhn and Johnson, 2013).

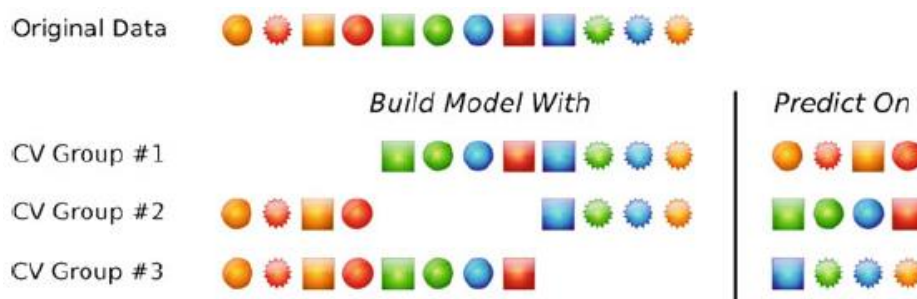


Fig. 3 – A schematic of threefold cross-validation. Twelve training set samples are represented as symbols and are allocated to three groups. These groups are left out in turn as models are fit. Performance estimates, such as the error rate or  $R^2$  are calculated from each set of held-out samples. The average of the three performance estimates would be the cross-

validation estimate of model performance. In practice, the number of samples in the held-out subsets can vary but are roughly equal size. Source: Kuhn and Johnson, 2013.

#### **4 SOLUTION**

As an example of spatial data modelling we draw upon public-domain data about California housing values. We use a variety of regression modelling techniques, showing how additional information about location (longitude and latitude) can contribute to the analysis. The data comprise observations of housing values, economic covariates, and longitude and latitude. We follow Pace and Barry (1997) in defining response and explanatory variables for a linear regression model. Original models and computed variables are shown below. For our purposes we used data set (Pace and Barry, 1997) which is available from the Carnegie-Mellon StatLib repository (see the reference no 36). It consists of aggregated data from each of 20,460 neighborhoods (1990 census block groups) in California.

We select a subset of 1,206 block groups, focusing on the region around San Diego, further dividing the data into 803 training observations, and 403 test observations.

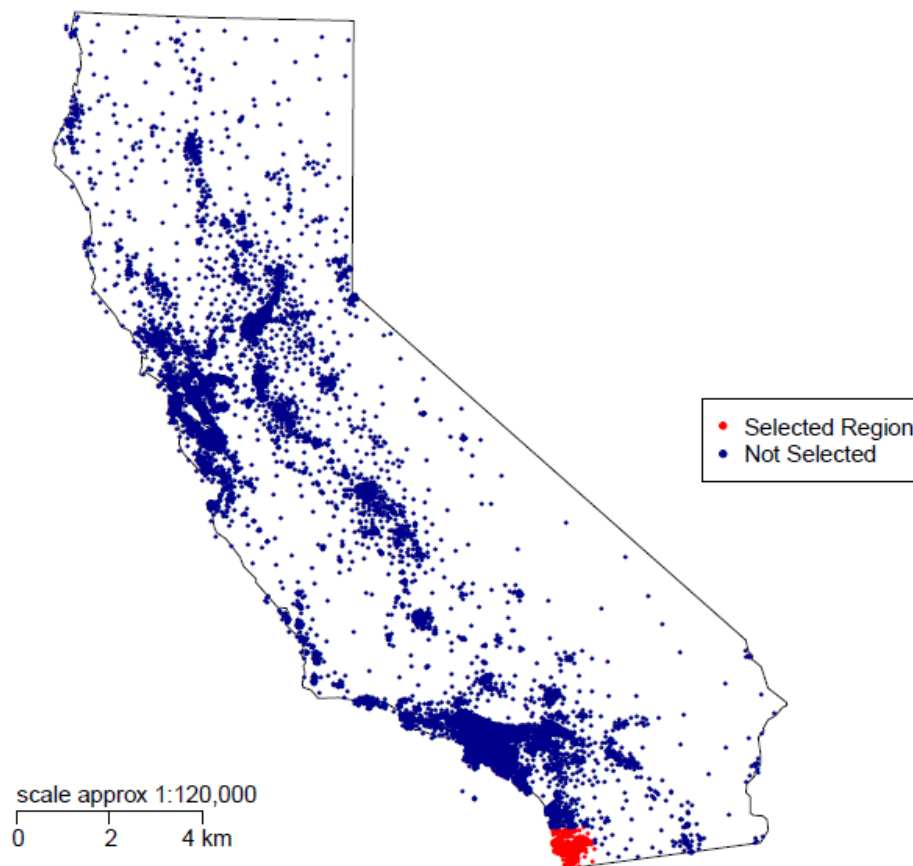


Fig. 4 – Spatial map of selected region. Source: Own work in R.

Relationships between pairs of variables in this problem are shown in the correlation heat map in figure 5, which orders explanatory variables by their correlation with the response variable used in the Pace and Barry (1997) model, the log median housing value of homes in the block groups (in hundreds of thousands of dollars). From the correlation heat map we can see the importance of income in explaining housing values. Note the apparent censoring for the log median value and age of houses. Original database and computed variables are shown below. Pace and Barry (1997) model for baseline for comparisons:

$$\begin{aligned} \log(\text{value}) = & \text{income} + \text{income}^2 + \text{income}^3 + \\ & + \log(\text{age}) + \log(\text{pc\_rooms}) + \log(\text{pc\_bedrooms}) + , \\ & + \log(\text{pop\_hh}) + \log(\text{hh}) \end{aligned} \quad (4)$$

where value is median house value (\$100,000), income is median income (\$10,000), age is housing median age (years), rooms are total rooms, bedrooms are total bedrooms, pop is population, hh is households, latitude is latitude, longitude is longitude, log(pc\_rooms) is log per capita rooms: log(total rooms / population), log(pc\_bedrooms) is log per capita bedrooms: log(bedrooms / population), log(pop\_hh) is log population per household and log(hh) is log households. For comparison lets look at a simple model with the original variables:

$$\log(\text{value}) = \text{income} + \text{age} + \text{rooms} + \text{bedrooms} + \text{pop} + \text{hh}. \quad (5)$$

And for comparison lets look at a full model with the transformation of original variables:

$$\begin{aligned} \log(\text{value}) = & \text{income} + \text{age} + \text{rooms} + \\ & + \text{bedrooms} + \text{pop} + \text{hh} + \log(\text{pc\_rooms}) + . \\ & + \log(\text{pc\_bedrooms}) + \log(\text{pop\_hh}) \end{aligned} \quad (6)$$

A review of the correlation heat map in figure 5 also reveals strong correlations among predictors. Correlations among predictors is called *multicollinearity* and is a special concern of modellers working in regression contexts (Belsley, Kuh, and Welsch, 1980). Additional issues are raised by a review of the scatter plot matrix in figure 6.

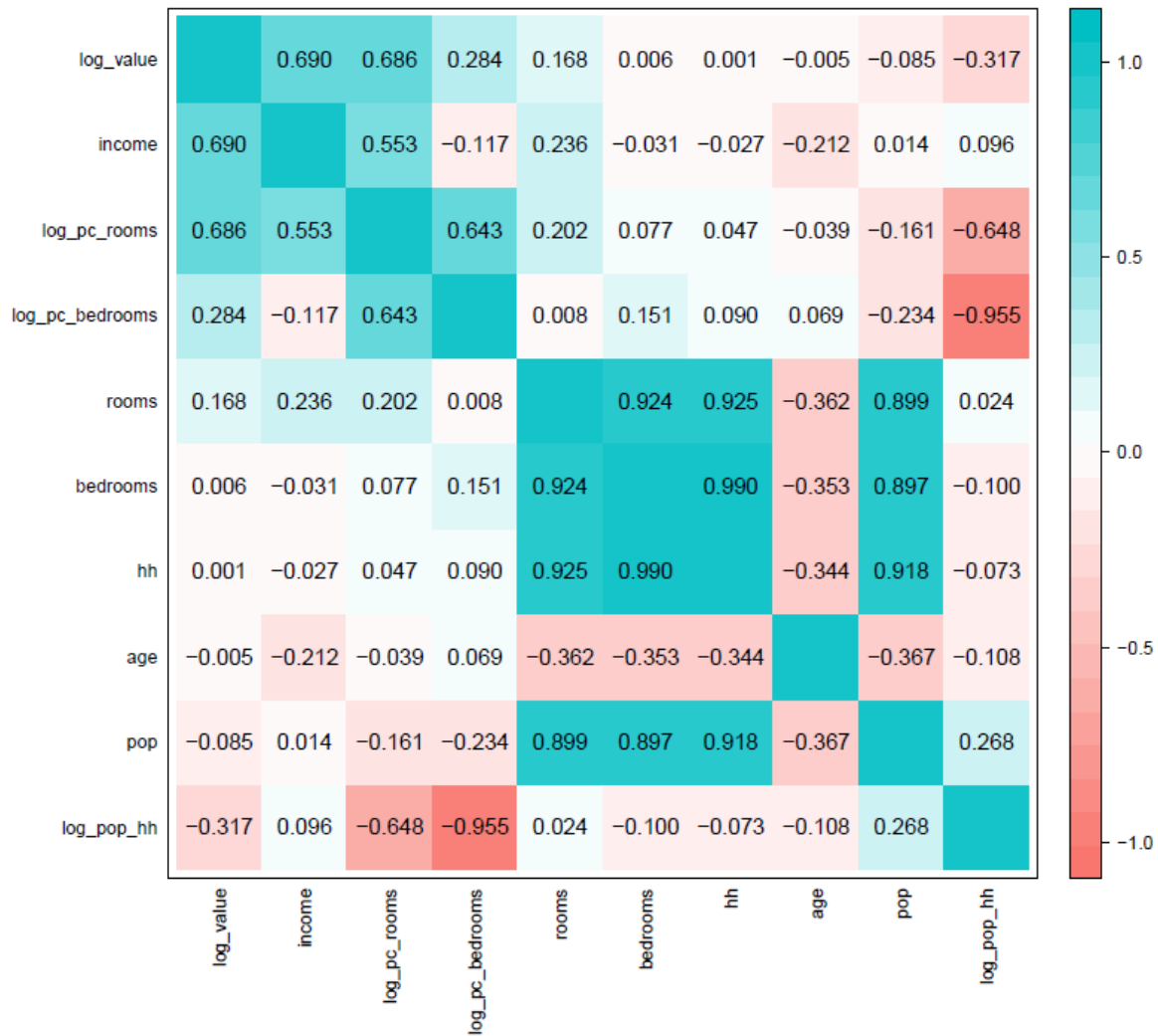


Fig. 5 – California Housing Data: Correlation Heat Map for the Training Data.  
Source: Own work in R.

The standard linear regression for the training data using the Pace and Barry (1997) model is not shown here, but this model, which will serve as a baseline for comparing other regression models in this problem, explains 45.4 percent of response variance in the test set and RMSE is 0.339. The response in this problem is the natural logarithm of median home value in the block group. We note that multicollinearity is introduced into this problem by Pace and Barry’s (1997) use of income, squared income, and cubed income in the linear predictors. We note as well that, in tests of hypotheses about regression coefficients, the model assumes independent observations. This is a questionable assumption given that observations are expected to be spatially autocorrelated.

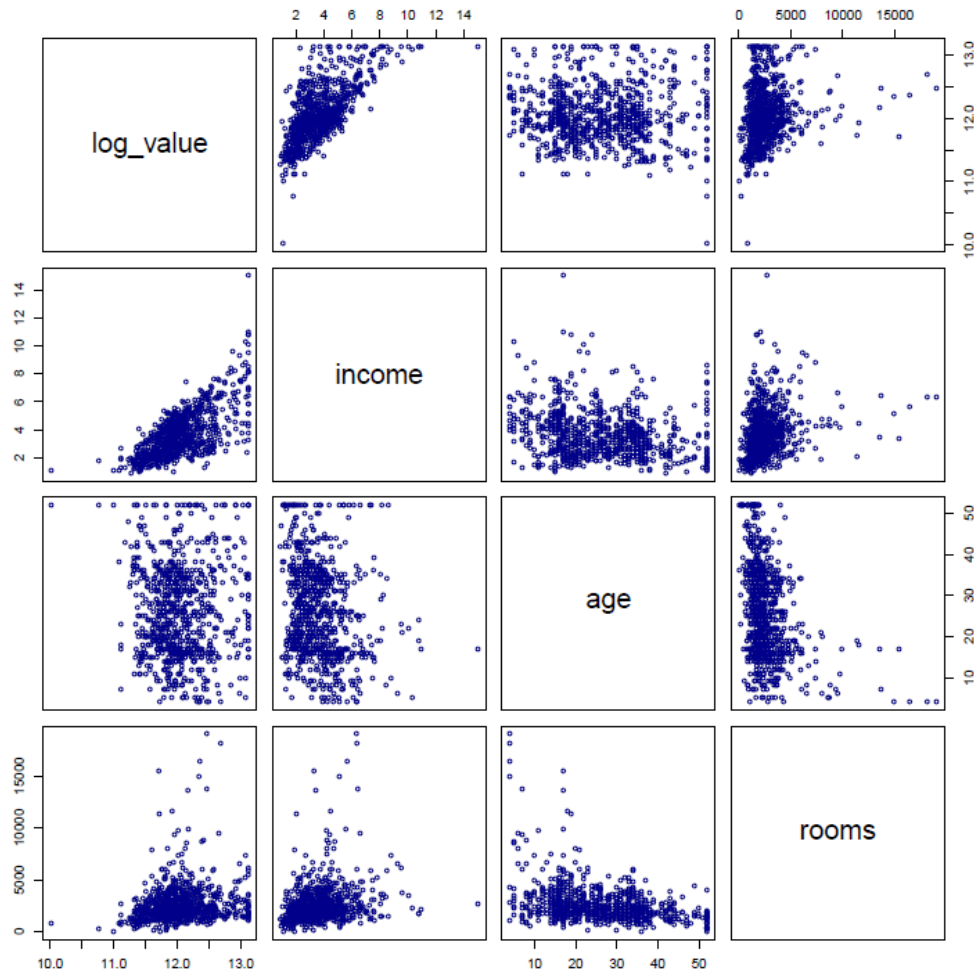


Fig. 6 – California Housing Data: Scatter Plot Matrix of Selected Variables.  
Source: Own work in R.

These data provide an opportunity to examine various regression models. We begin with tree-structured regression using the original set of variables, ignoring the added variables from Pace and Barry (1997). This model fits the test data well, explaining 45.4 percent of response variance, which is a poor job in predicting. If we include the full set of variables as input to tree-structured regression, we do better, with the model explaining 58.8 percent of response variance in the test set, and RMSE is much lower.

A random forest fit to these data, using the original explanatory variables only, performs very well on the test set, explaining 65.9 percent of response variance and RMSE is 0.259. Predictive models with spatial data may be improved by adding a spatial component. All other things being equal, we expect that observations close together in space will be more similar to one another than observations separated by greater distances. In other words, there will be spatial autocorrelation. We expect that this will be true for housing values as well as for variables being used to explain housing values. Spatial data models use information about observations location in space (longitude and latitude). Geographically weighted regression is especially useful for working with problems like the Californian housing study. When we fit a geographically weighted regression model to the data for the California housing study, we are able to explain 62.6 percent of response variability in the test set and RMSE is 0.27 and 71.6 percent in the training set. To improve further on the accuracy of predictive models for this problem, we use the two best performing models in the test set (random forests and geographically weighted regression) to create a hybrid model. In particular, we compute the

average of the predictions from the random forests and geographically weighted regressions. The resulting SVM and GBR model for all predictors outperforms all other models tested on the test set, explaining 69.78 percent of response variance and 65.76, respectively. These two models are the most suitable for further prediction because of their stability in difference between training and test R-squared and RMSE criteria. A summary of the findings is shown in table 1.

The value of a model lies in the quality of its predictions. Regression and spatial data models are important in predicting housing values. They are also important in location-based demand estimation, sales forecasting, and site selection research. Traditional theory-based, data-adaptive, and hybrid methods may be employed, as we have seen in working with the California housing study.

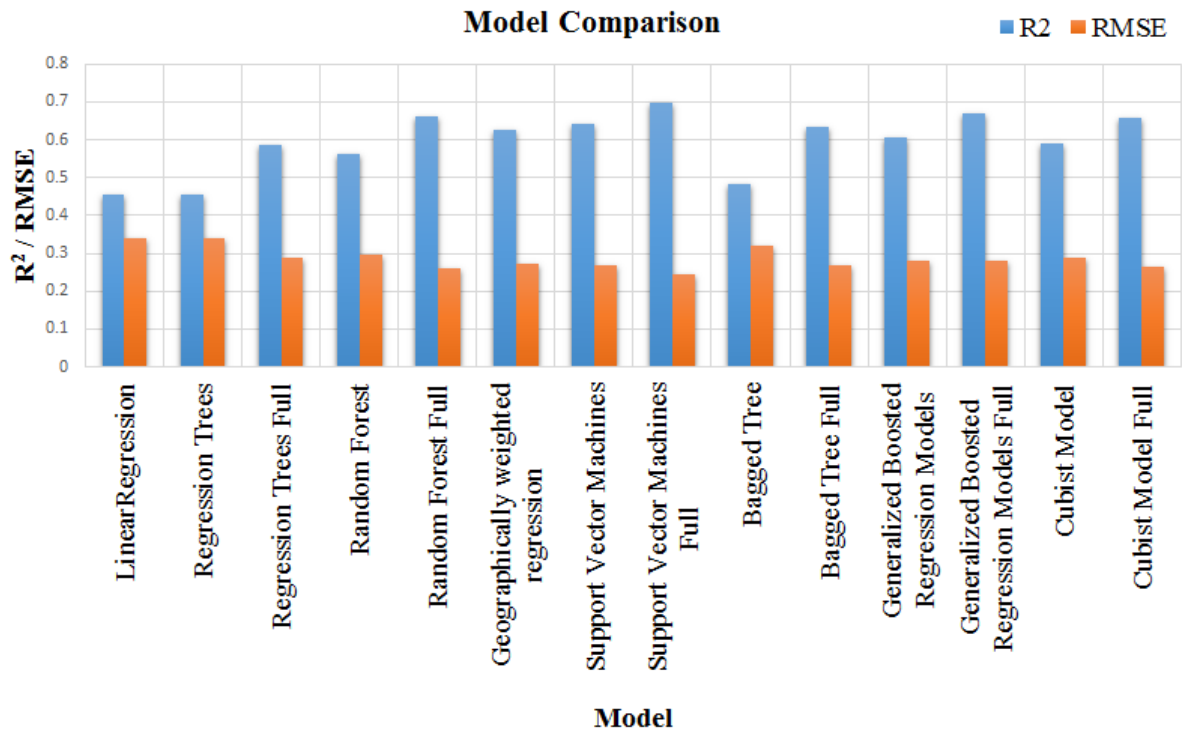


Fig. 7 – Model Comparison by 10-fold Cross-Validation for Test Data.  
Source: Own work in R.

Working with block groups in the California housing study, we implicitly take location into account because response and explanatory variables are linked to the observational unit—the block group location. We can do more with spatially-referenced data such as these. Because we have information about longitude and latitude, we can use distances between observational units to build nearest-neighbour predictors, and we can use distance-referenced explanatory variables in predictive models.

Tab. 1 – The Results of Models Comparison: Own work in R.

Model	Training Data Set		Test Data Set	
	R <sup>2</sup>	RMSE	R <sup>2</sup>	RMSE
LinearRegression	0.548	0.299	0.454	0.339
Regression Trees	0.548	0.299	0.454	0.339
Regression Trees Full	0.616	0.273	0.588	0.288



Random Forest	0.642	0.263	0.564	0.295
Random Forest Full	0.678	0.249	0.660	0.260
Geographically weighted regression	0.716	0.234	0.627	0.274
Support Vector Machines	0.669	0.253	0.640	0.270
Support Vector Machines Full	0.681	0.247	0.698	0.245
Bagged Tree	0.574	0.287	0.484	0.320
Bagged Tree Full	0.644	0.262	0.635	0.269
Generalized Boosted Regression Models	0.652	0.259	0.605	0.281
Generalized Boosted Regression Models Full	0.687	0.246	0.668	0.281
Cubist Model	0.635	0.267	0.588	0.289
Cubist Model Full	0.676	0.251	0.658	0.263

We use the proportion of response variance accounted for as a criterion for evaluating regression performance in the California housing study. This criterion is also known as the coefficient of determination or R-squared. It varies from zero to one with higher numbers indicating higher goodness of fit and better models. We compute its value in the test set by squaring the correlation of observed and predicted response values. Proportion of response variance is an easy concept for managers to understand, and this index of goodness of fit takes values from zero to one in all studies.

## 5 CONCLUSION

The main aim of this article was to present and compare machine learning models in spatial data analysis problem. As an example of spatial data modelling we drew upon public-domain data about California housing values. We used a variety of regression modelling techniques, showing how additional information about location (longitude and latitude) can contribute to the analysis. The data comprise observations of housing values, economic covariates, and longitude and latitude. We followed Pace and Barry (1997) in defining response and explanatory variables for a linear regression model. For the prediction of California housing values we chose SVM and GBR model with highest R-squared in training and test set and quite stable RMSE in both data sets.

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## **EFFECTIVE CORPORATE TAXATION AND STATUTORY TAX RATE**

*Ivana Košťuríková*

### **Abstract**

Corporate taxes have a significant impact on the company's decisions about their business activities in the country. Due to the corporate taxation a lot of companies moved from countries with high rates to low-cost tax destinations. A gradual decline in the income tax of corporations has occurred in Europe over the past decades. This fact affected behaviour of advanced economies, which were forced to increase or at least maintain competitiveness of their country in the fight for foreign investors with the adjacent Central European or East European countries. In this respect, the efforts to maintain significant domestic companies on its territory and prevent from their leave to more favourable destinations in terms of tax and to the countries with cheap labour force, which include also the East European countries, has become the strategy of the West European countries. On the contrary, the East European countries attempted to attract these foreign companies to conduct business in these countries. An effective corporate tax rate could prove to be a convenient comparative value for comparison of corporate taxation. This rate does not include only the amount of the statutory tax rate on corporate income but also other aspects of tax systems determining the total amount of effectively paid taxes.

*Keywords: corporation, effective taxation, statutory tax rate, effective average tax rate, implicit tax rate, European Union*

JEL Classification: C10, G30, H25, H32, H71, K34, M40, O10

### **1 INTRODUCTION**

The enlargement of the European Union and the globalisation process also substantially affect taxation systems and fiscal policy in the individual countries (Reodano, 2007). In the sphere of direct taxes the important external factor is the tax competition between single countries and that is also in the frame of the expanded European Union (Baldwin&Krugman, 2004). It depends on historical development of each country, and also on economic, political, and, last but not least, philosophical opinions, how the structure and content of the tax system will be influenced. It is important for the state to pursue a favourable tax policy to ensure support to all taxpayers and thus to ensure competitiveness of the state and development of the society.

As far as decisions of corporate management are concerned, the taxation system is one of the decisive factors. The taxation environment in which a company operates affects the amount and distribution of the disposable profit, a selection of optimal financial and asset structure, investments etc., which is directly related to the financial position of the company, its individual activities and affects also production factors and for foreign investors the amount of burden is one of the significant factors affecting the selection of the place of business.

According to the comparison of legal entities income tax, decreasing tax burden for firms has been showed unambiguously in the last decade. However, apart from that, economic behaviour of companies, in connection with positioning their capital abroad, reacts on comparability of tax conditions in single countries. According to Šíroký (2008), appropriate adjustment of corporate tax rate may stimulate businesses for more economic activity.

### 1.1 Aim and methodology

The aim of this paper is to evaluate the effective taxation of corporations which can be expressed using either the effective average tax rate (EATR) or implicit corporate tax rate (ICTR) and using simple regression analysis to examine the dependence of the effective corporate taxation on the statutory tax rate on corporate income. Equation of selective regression function that has the form:

$$\hat{y} = b_0 + b_1x \quad (1)$$

where:  $b_0, b_1$  - selective (empirical) regression parameters,

$x$  - statutory tax rate on corporate income (independent variable),

$\hat{y}$  - effective or implicit tax rate on corporate income (dependent variable),

presents an approximation of the entered values where the coefficients are determined by the method of least squares, so that the sum of squared deviations of the original values from obtained model would be minimum. The  $R^2$  index expresses the degree of reliability of the calculated estimate of the development.

## 2 TAX REVENUES

Tax systems are dependent on a number of factors, which affect in mutual circumstances fulfilment of the basic principles and functions of taxes (Smith, 2007). There has not been a lot of changes in requirements for a good tax system and individual taxes since the Adam Smith's time (Kubátová, 2010). The good tax system cannot simultaneously fulfil all requirements as they are in conflict with each other (Vančurová&Láchová, 2010). The structure as well as amount of taxes is primarily subject to economic factors, such as the economic growth, inflation rate, the extent of engagement of the economy in the international trade, sector and geographic structure as well as the workforce structure. The sector structure in connection with the extent of concentration of the economy, i.e. the proportion of corporations.

The government's choices of the corporate tax rate and public investment are interdependent (Gomes&Pouget, 2008). It is important to note that the proportion of corporate tax incomes in the total incomes from taxes grew until 2008 in spite of a fall in the statutory tax rates of legal persons, which was caused by tax competition. This fact was a result of extension of tax bases, progress of corporate business and other factors. However, this trend has changed as a result of the economic crisis. The development of the proportion of the tax from companies' profit in the total tax income is presented in the following table and figure (in Croatia case, all data are not available).

Tab. 1 – The proportion of the tax on corporations' profit in the total tax incomes in the individual EU countries in the years 2000 - 2012. Source: Taxation trends in European Union, 2014.

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Difference 2000-2012
AT	5.0	7.2	5.5	5.3	5.6	5.5	5.6	6.2	6.2	4.4	4.8	5.5	5.5	0.4
BE	7.1	6.9	6.7	6.4	6.9	7.2	8.0	8.0	7.6	5.6	6.0	6.6	6.8	-0.3
BG	8.6	12.5	10.5	8.9	7.8	5.9	6.8	13.1	9.8	8.8	7.4	6.9	6.8	-1.8
CY	20.9	20.4	19.6	13.5	11.3	13.3	15.3	16.9	18.4	18.4	17.4	19.5	17.8	-3.0
<b>CZ</b>	<b>9.8</b>	<b>11.4</b>	<b>12.0</b>	<b>12.5</b>	<b>12.2</b>	<b>12.2</b>	<b>13.0</b>	<b>13.0</b>	<b>12.2</b>	<b>10.5</b>	<b>10.0</b>	<b>9.8</b>	<b>9.5</b>	<b>-0.3</b>
DE	6.6	5.8	6.0	6.1	6.5	7.7	8.8	7.8	6.9	4.9	5.9	5.8	6.3	-0.3

DK	7.1	4.3	4.2	4.6	5.7	6.5	7.6	7.6	6.9	5.0	5.8	6.7	6.9	-0.2
EE	2.9	2.3	3.6	5.1	5.4	4.7	4.9	5.2	5.1	5.2	4.0	3.8	4.5	1.6
EL	12.0	10.1	10.0	9.1	9.6	10.3	8.6	7.9	7.8	8.1	7.7	6.5	3.3	-8.6
ES	9.2	8.5	9.3	9.3	10.1	10.9	11.4	12.8	8.6	7.5	5.9	5.7	6.6	-2.6
FI	12.5	9.4	9.3	7.7	8.1	7.6	7.7	9.0	8.1	4.7	6.0	6.3	5.0	-7.5
FR	6.3	7.0	5.9	5.0	5.4	5.3	6.6	6.7	6.3	3.0	4.5	5.2	5.0	-1.3
HR	n.a.	n.a.	4.9	5.2	5.0	6.3	7.7	8.3	7.9	7.1	5.4	6.6	5.6	n.a.
HU	5.6	6.0	6.1	5.8	5.6	5.6	6.3	6.9	6.5	5.4	3.1	3.1	3.3	-2.3
IE	11.9	12.1	13.1	13.1	12.1	11.4	12.3	11.2	9.8	8.7	9.0	8.3	8.5	-3.4
IT	5.9	7.8	6.6	5.7	5.9	5.8	7.1	7.6	7.2	5.7	5.6	5.3	5.1	-0.8
LT	2.2	1.8	2.0	4.8	6.4	7.1	9.2	8.5	8.9	6.0	3.5	3.0	4.8	2.6
LU	17.8	18.4	20.4	19.2	15.3	15.4	13.8	14.8	14.3	14.7	15.4	13.5	13.4	-4.4
LV	5.3	6.6	7.1	5.3	6.1	6.9	7.5	8.9	10.9	5.9	3.5	5.1	5.7	0.5
MT	12.9	11.5	11.8	13.8	11.5	11.7	12.9	18.3	18.4	18.3	18.4	17.7	18.7	5.8
NL	10.9	11.0	9.4	8.1	8.8	9.7	9.4	9.1	8.8	5.6	6.0	5.8	5.4	-5.4
PL	7.5	5.8	6.3	5.6	7.1	7.6	7.1	7.9	7.9	7.2	6.3	6.4	6.6	-0.9
PT	12.0	10.6	10.5	8.8	9.4	8.5	9.1	10.9	11.1	9.2	9.0	9.7	8.7	-3.3
RO	9.8	8.8	9.3	10.1	11.6	9.8	10.0	10.5	10.7	9.9	8.6	8.3	7.6	-2.1
SE	7.3	5.3	4.3	4.6	6.0	7.3	7.5	8.1	6.3	6.4	7.4	7.3	6.5	-0.8
SI	3.1	3.4	4.1	4.6	5.0	7.2	7.7	8.6	6.7	4.9	5.0	4.5	3.4	0.2
SK	7.7	7.8	7.6	8.4	8.2	8.7	9.9	10.2	10.7	8.8	9.0	8.6	8.5	0.9
UK	9.7	9.5	8.1	7.9	8.1	9.3	10.8	9.4	9.6	8.0	8.7	8.6	8.1	-1.6

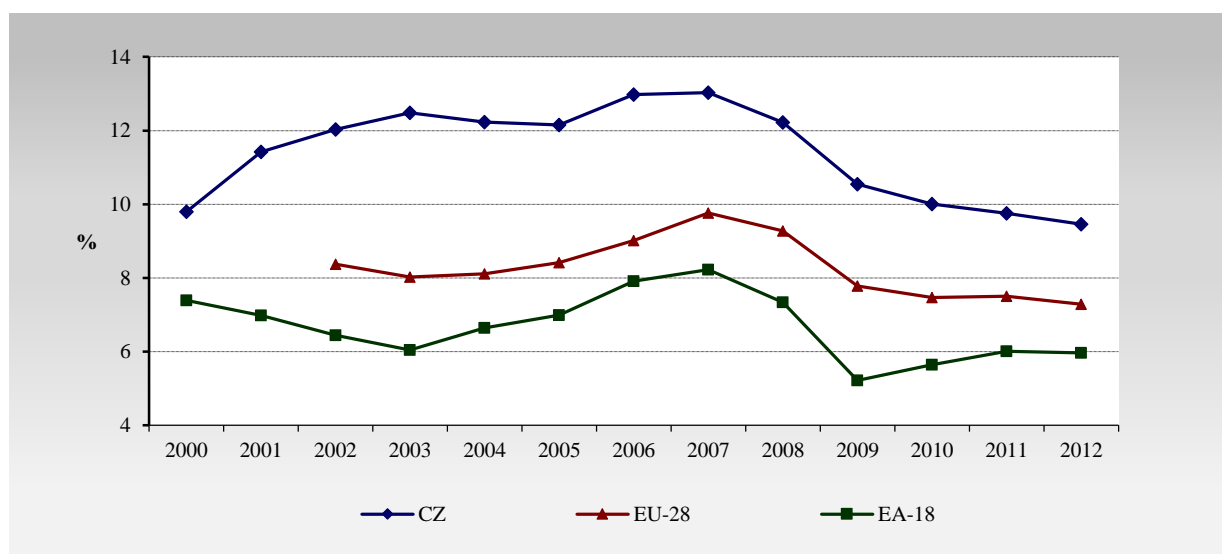


Fig. 1 – The proportion of the tax on corporations' profit in the total tax incomes in the years 2000 - 2012. Source: author by Taxation trends in European Union, 2014.

As we can see in the figure above, the share of corporate tax revenues in total tax revenues in the Czech Republic is significantly higher than the average value in the European Union. On the other hand, this tax revenue is still declining in our country unlike EU-28, where the value is around 7.5 %, and unlike EA-18, where a slight increase is even evident.

According to the statistics, the general dramatic fall in the statutory rates was not accompanied by a fall in tax payments proportionally with GDP, as it is apparent in the following table and figure.

Tab. 2 – The proportion of the tax on corporations' profits in GDP in the individual EU countries in the years 2000 - 2012. Source: Taxation trends in European Union, 2014.

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Difference 2000-2012
AT	2.2	3.2	2.4	2.3	2.4	2.3	2.3	2.6	2.6	1.9	2.0	2.3	2.4	0.2
BE	3.2	3.1	3.0	2.9	3.1	3.2	3.6	3.5	3.3	2.4	2.6	2.9	3.1	-0.1
BG	2.7	3.8	3.0	2.8	2.5	1.8	2.1	4.4	3.2	2.6	2.0	1.9	1.9	-0.8
CY	6.2	6.3	6.0	4.4	3.7	4.7	5.5	6.8	7.1	6.5	6.2	6.9	6.3	0.0
<b>CZ</b>	<b>3.3</b>	<b>3.9</b>	<b>4.2</b>	<b>4.4</b>	<b>4.4</b>	<b>4.3</b>	<b>4.6</b>	<b>4.7</b>	<b>4.2</b>	<b>3.5</b>	<b>3.4</b>	<b>3.4</b>	<b>3.3</b>	<b>0.0</b>
DE	2.9	1.7	1.6	1.8	2.2	2.5	2.9	2.9	2.7	2.0	2.2	2.6	2.7	-0.2
DK	3.3	2.8	2.9	2.9	3.2	3.9	4.4	3.8	3.3	2.3	2.8	2.8	3.0	-0.2
EE	0.9	0.7	1.1	1.6	1.7	1.4	1.5	1.6	1.6	1.8	1.3	1.2	1.4	0.6
EL	4.1	3.4	3.4	2.9	3.0	3.3	2.7	2.6	2.5	2.5	2.5	2.1	1.1	-3.0
ES	3.1	2.9	3.2	3.2	3.5	3.9	4.2	4.8	2.8	2.3	1.9	1.8	2.2	-1.0
FI	5.9	4.2	4.2	3.4	3.5	3.3	3.4	3.9	3.5	2.0	2.6	2.7	2.2	-3.7
FR	2.8	3.1	2.6	2.1	2.4	2.3	2.9	2.9	2.7	1.3	1.9	2.3	2.3	-0.5
HR	n.a.	n.a.	1.8	2.0	1.9	2.3	2.9	3.1	2.9	2.6	2.0	2.3	2.0	n.a.
HU	2.2	2.3	2.3	2.2	2.1	2.1	2.3	2.8	2.6	2.2	1.2	1.2	1.3	-0.9
IE	3.8	3.6	3.7	3.8	3.7	3.5	3.9	3.5	2.9	2.4	2.5	2.3	2.4	-1.3
IT	2.4	3.2	2.7	2.3	2.4	2.3	2.9	3.3	3.1	2.4	2.4	2.3	2.3	-0.2
LT	0.7	0.5	0.6	1.4	1.9	2.1	2.8	2.6	2.7	1.8	1.0	0.8	1.3	0.6
LU	7.0	7.3	8.0	7.3	5.7	5.8	5.0	5.3	5.4	5.8	5.9	5.1	5.3	-1.7
LV	1.6	1.9	2.0	1.5	1.8	2.0	2.3	2.7	3.2	1.6	1.0	1.4	1.6	0.0
MT	3.5	3.3	3.5	4.2	3.6	3.9	4.3	6.2	6.1	6.1	5.9	5.8	6.3	2.8
NL	4.3	4.2	3.6	3.0	3.3	3.6	3.7	3.5	3.4	2.1	2.3	2.2	2.1	-2.2
PL	2.4	1.9	2.0	1.8	2.2	2.5	2.4	2.8	2.7	2.3	2.0	2.1	2.1	-0.3
PT	3.7	3.3	3.3	2.8	2.9	2.7	2.9	3.6	3.7	2.9	2.8	3.2	2.8	-0.9
RO	3.0	2.5	2.6	2.8	3.2	2.7	2.8	3.1	3.0	2.7	2.3	2.4	2.2	-0.8
SE	3.8	2.6	2.0	2.2	2.9	3.6	3.6	3.8	2.9	3.0	3.4	3.2	2.9	-0.9
SI	1.2	1.3	1.6	1.7	1.9	2.8	3.0	3.2	2.5	1.8	1.9	1.7	1.3	0.1
SK	2.6	2.6	2.5	2.8	2.6	2.7	2.9	3.0	3.1	2.5	2.5	2.5	2.4	-0.2
UK	3.5	3.4	2.8	2.7	2.8	3.3	3.9	3.4	3.6	2.8	3.0	3.1	2.9	-0.6

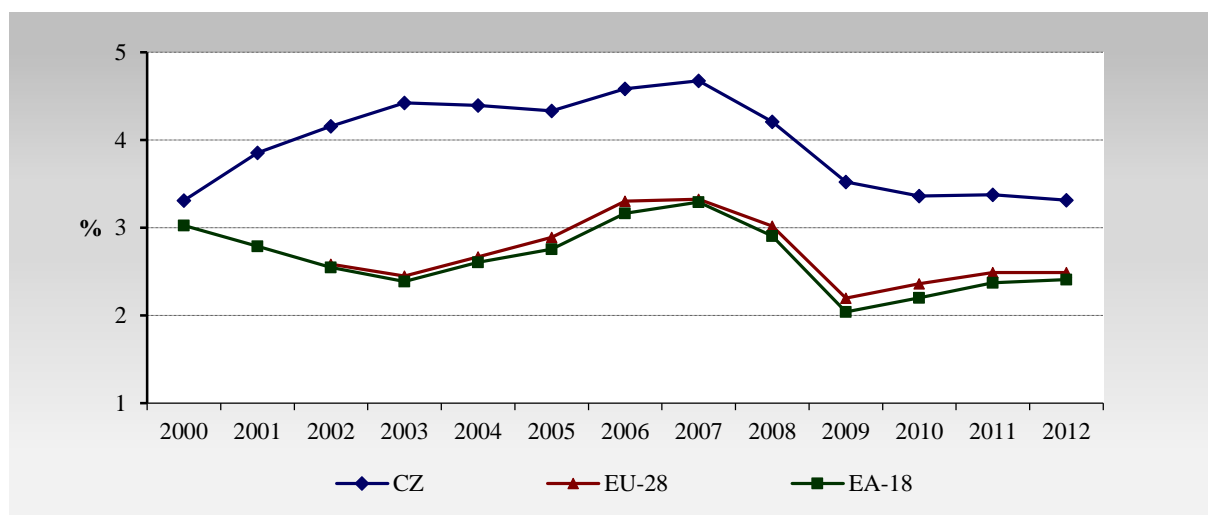


Fig. 2 – The proportion of the tax on corporations' profits in the years 2000 - 2012. Source: author by Taxation trends in European Union, 2014.

### 3 STATUTORY TAXATION

In the Czech Republic, the income tax has showed a gradual fall, including the income tax of legal persons (corporations). This trend has been reflected across the European Union in the long term, but not in all countries. Therefore, differences between corporate tax rates have arisen when the lowest rates are in Bulgaria and Cyprus, both at the level of 10 %. On the other hand, the group of countries with the highest basic rates over 30 % includes Malta, France a Belgium.

The following figure shows the basic rate of corporate income tax in the individual countries of the European Union in 2013. It may be deduced from it that the Czech Republic is, with the rate of 19 %, below the EU average rate which is just under 22 %. The corporate tax rates at the same level of 19 % are both in Poland and Hungary. The same rate was in neighbouring Slovakia but it has proceeded the opposite direction than most of the EU countries and has increased this rate by 4 percentage points to 23 % in 2013 (Kozelský&Jedlička, 2013).

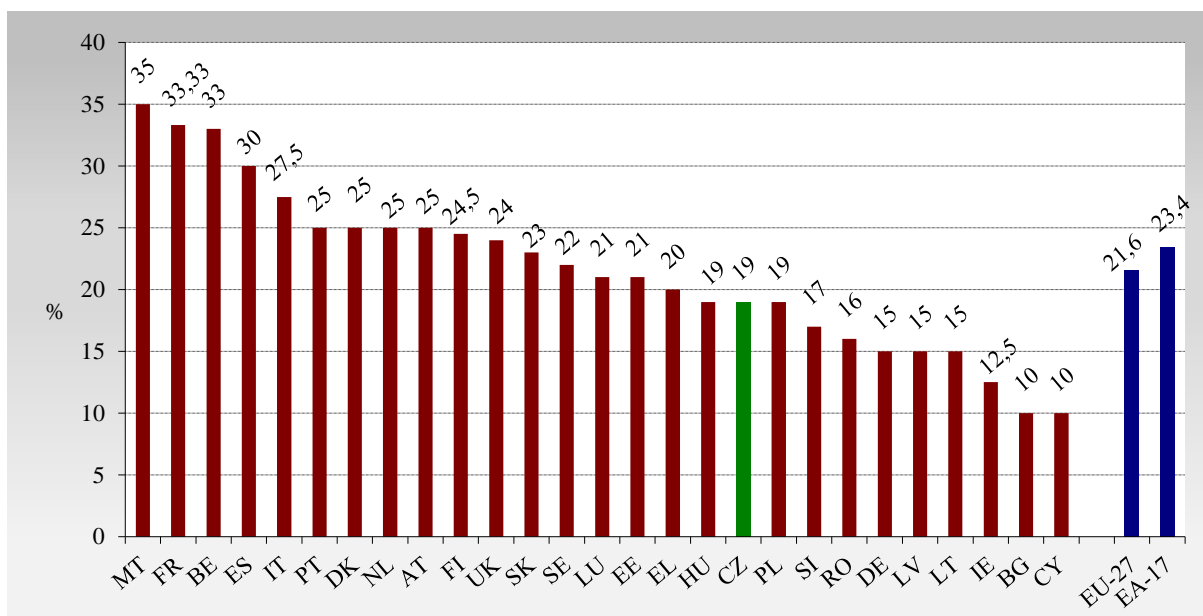


Fig. 3 – The basic tax rate on corporate income in the EU countries in 2013. Source: author by Kozelský&Jedlička, 2013.

Some states added the various surcharges or local rate to the basic tax rate. The Belgian basic corporate tax (33 %) is increased by 3% surcharge. In Luxembourg there is not only 7% surcharge but also the local rate in the amount of an additional 6.75 %. The additional local rates are used more in Hungary, Italy, France, Spain and Germany. The statutory income tax rates, which include not only basic tax rates, but also temporary or permanent additional taxes and reliefs, are shown in figure 4.



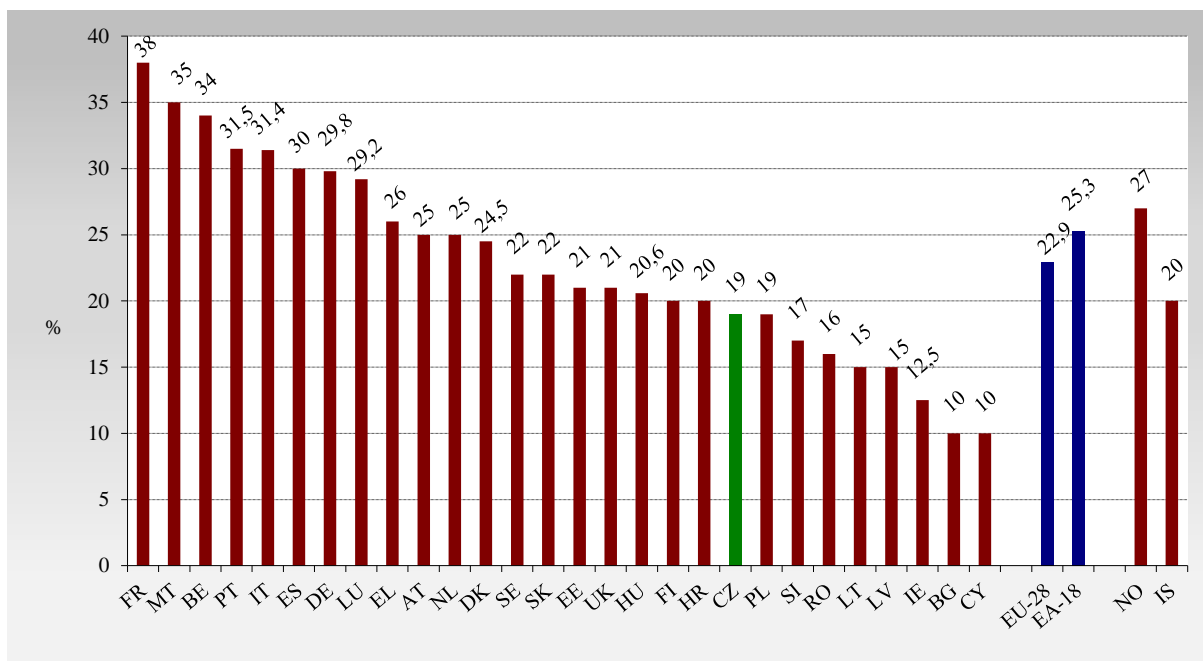


Fig. 4 – The top statutory tax rate on corporate income in 2014. Source: author by Taxation trends in European Union, 2014.

#### **4 EFFECTIVE TAXATION**

Different rules for setting corporate tax base and its amount, which are caused by individual tax legislations in the particular countries, also mean a substantial limitation for an objective comparison of tax burden for companies by statutory income tax rates in those countries. Consequently, statutory tax rate cannot serve as an impartial indicator for the purposes of mutual comparison of this burden in different states, and therefore economists had to come up with a new measure for effective taxation of corporations. This issue has extensively dealt with by Barrios, Nicodème and Fuentes (2014).

As Blechová (2014) claims, there exist three methods of determination of effective tax rates. These methods are coined as methods of backward macroeconomic view, backward microeconomic view and forward microeconomic view. The differences between macroeconomic and microeconomic approaches are determined by the applied data. The macroeconomic approach calculates effective tax rates of aggregated macroeconomic data contained in the national accounting of the individual states. On the contrary, microeconomic approaches calculate these rates from the financial statements of the individual companies containing either empirical data or data concerning the theoretical perspective. The differences between the approaches with backward and forward perspective are determined by the type of applied information. For estimation of tax burden of companies, approaches with backward view use ex-post data concerning the real life of companies, while the approaches with forward perspective use statutory characteristics of a tax system for determination of tax aspects concerning future business decisions of companies. Nicodème (2002) claims, using the micro backward-looking approach to compute effective tax rates there could be some concerns regarding domestic tax discrimination since some sectors and sizes enjoy significantly more favorable tax burdens.

#### 4.1 Effective average tax rate

The impact of taxation on the choice is measured by the proportion of total income taken in tax in each location. Devereux and Griffith (2003) proposed a measure of an effective average tax rate (EATR) to identify the effect of taxation on such discrete location choices.

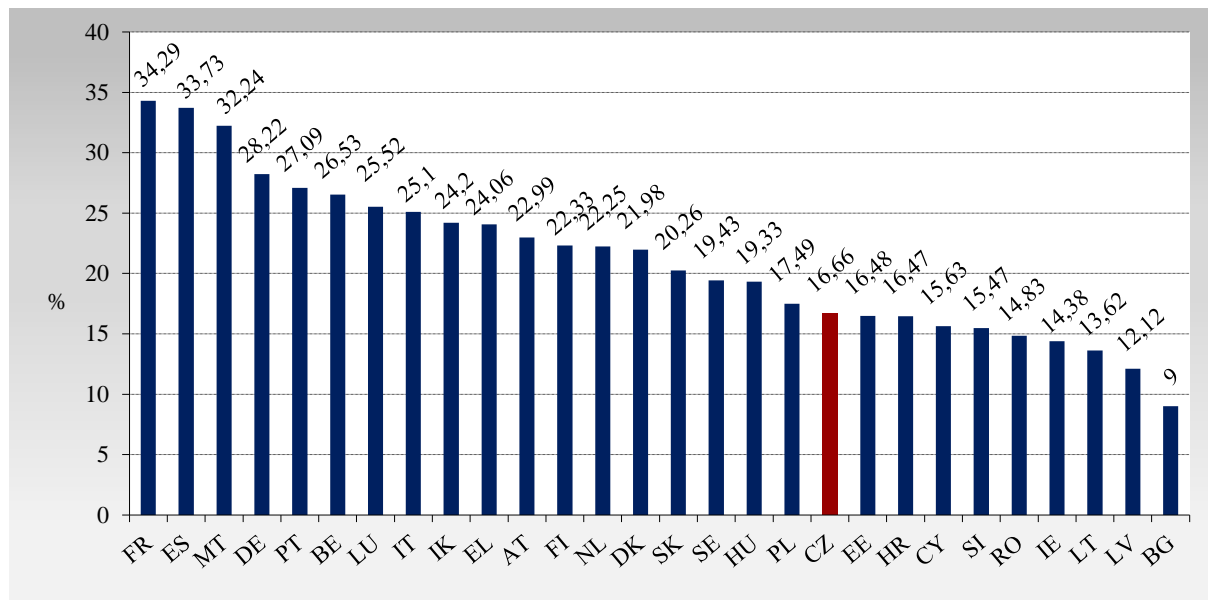


Fig. 5 – The effective average tax rate in 2013. Source: author by Taxation trends in European Union, 2014.

Figure 5 shows the effective average tax rates in the individual EU Member States in 2013. In this year the lowest EATR was in Bulgaria (9 %). The biggest decrease of this rate occurred in this country, namely by 19.1 percentage points from 28.1 % in 2000. The significant decrease of the rate is also apparent in the Czech Republic from 23.6 % in 2000 to 16.6 % in 2013.

The forward-looking effective tax rates offer a convenient theoretical framework for summarising at a broad level the interaction of tax rules relating to capital investment. It should be noted that the indicator should be interpreted with caution, taking into account the assumptions related to the hypothetical investment as well as to the modelling detail of the tax systems.

#### 4.2 Implicit tax rate

Implicit corporate tax rate also appears to be an appropriate measure of comparison of effective corporate taxation. This tax rate takes into account not just the amount of the statutory tax rates from corporations' rates but also other aspects of taxation systems determining the total amount of effectively paid taxes. The implicit corporate tax rate is calculated as a ratio of the aggregated income taxes or from profits paid by corporations to the value of tax base, which is the corresponding potentially taxable base including these aggregated values: net operating profit/loss of non-financial and financial corporations, the difference between the received and paid interest, rent of lands, income from property insurance and dividends distributed by companies operating in the particular state and credited to non-financial and financial corporations, households, independent entrepreneurs and non-profit institutions, state authorities and the rest of the world (Blechová, 2010).

The following figure presents the implicit tax rate of corporations in some EU Member States in 2012. For other countries data are not available.

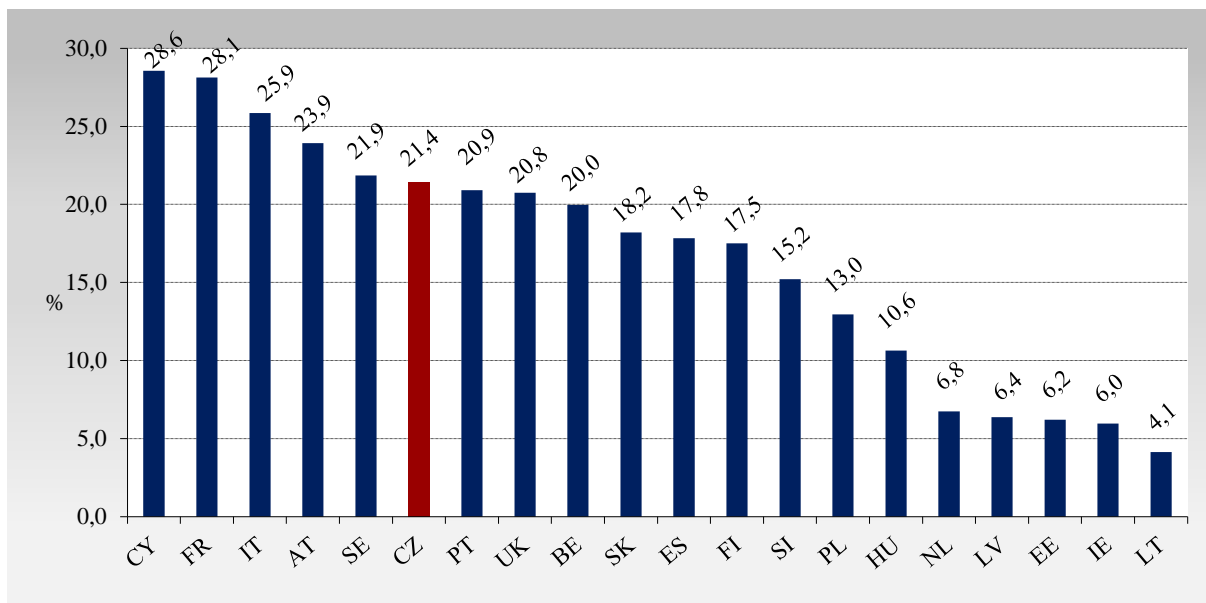


Fig. 6 – The implicit tax rate in 2012. Source: author by Taxation trends in European Union, 2014.

The implicit tax rate on corporate income did not change significantly in the Czech Republic in the years 2000 - 2012 and fluctuated around 21.5 % in 2012. In 2000 it was the lowest ICTR (24.5 %) of all Visegrad group countries when the highest implicit taxation was reached by corporations in Slovakia (40.2 %). In the neighbouring countries there was a gradual reduction of the implicit rate to below the level of implicit taxation in the Czech Republic (in Hungary from the rate of 34 % in 2000 to the rate of 10.6 % in 2012).

## 5 RESULTS

As already mentioned, the effective average tax rate and the implicit tax rate are appropriate criteria to compare the effective taxation of corporate income. The dependence of both rates on statutory corporate tax rate was examined by simple linear regression.

The figure 7 shows that the 99 % of EATR changes are explained by changing of statutory tax rate. The regression line was estimated using the least squares method, from which it can be deduced that an increase in the statutory corporate tax rate by 1 % results an increase in the effective average tax rate on average by 0.76 %.

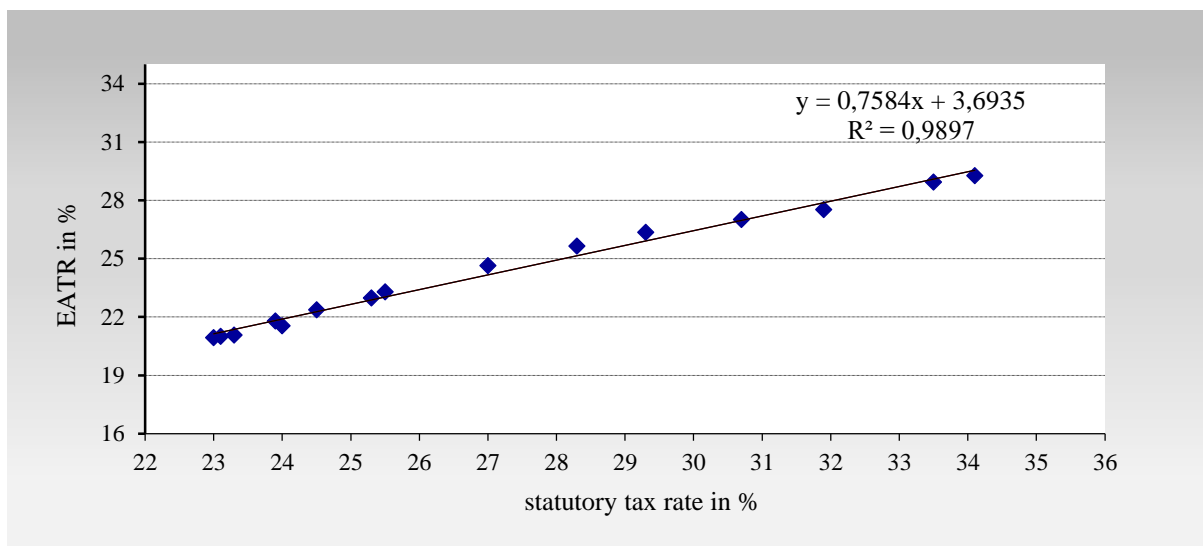


Fig. 7 – Effective average tax rate depending on statutory tax rate. Source: author’s analysis.

To verify whether the regress model is indeed suitable for the data, first there were tested the individual parameters using the t-test. The statistical significance of the whole model was then verified using the F-test. Based on the results in tab. 3 and 4, it is clear, that statistically the both parameters (intercept and slope) are not significant. The regression model is suitable and can be used for the data.

Tab. 3 – Test of significance of regression parameters. Source: author’s analysis.

Parameter	Estimate	Standard Error	T Value	Prob. Level
Intercept ( $b_0$ )	3.693512924	0.589148592	6.269238307	2.88209E-05
Slope ( $b_1$ )	0.75843445	0.021487049	35.29728382	2.68701E-14

Tab. 4 – Test of the suitability of the regression model. Source: author’s analysis.

ANOVA	Df	Sum of Squares	Mean Square	F - Ratio Prob.	Level
Model	1	121.8644048	121.8644048	1245.898245	2.68701E-14
Error	13	1.271562319	0.097812486		
Total	14	123.1359671			

As shown in figure 8, the 81 % of ICTR changes are explained by changing of the statutory tax rate. The remaining approximately 19 % of changes are caused by other factors (mainly tax base construction and tax deduction).

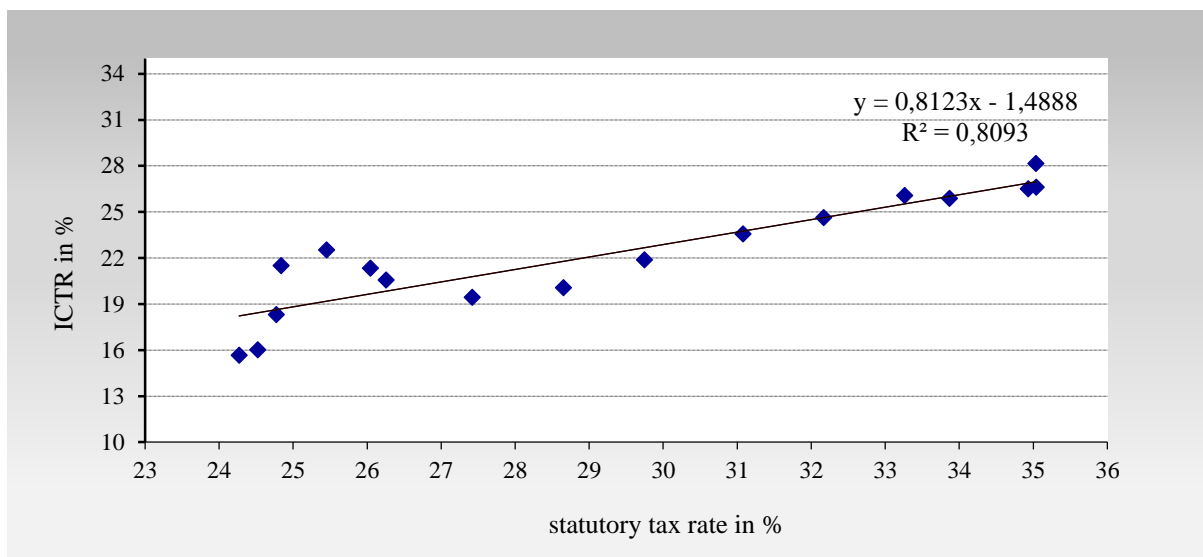


Fig. 8 – Implicit tax rate depending on statutory tax rate. Source: author’s analysis.

Based on the result of regression coefficients test (tab. 5) it is clear that parameter  $b_0$  (intercept) is not statistically significant, on the other hand, the parameter  $b_1$  (slope) is. Test of suitability of the regression model (tab. 6) confirmed that the model is suitable and can be used for the data.

Tab. 5 – Test of significance of regression parameters. Source: author’s analysis.

Parameter	Estimate	Standard Error	T Value	Prob. Level
Intercept ( $b_0$ )	-1.488806243	3.006049607	-0.495270018	0.627586045
Slope ( $b_1$ )	0.812266543	0.101796682	7.979302775	8.88995E-07

Tab. 6 – Test of the suitability of the regression model. Source: author’s analysis.

ANOVA	Df	Sum of Squares	Mean Square	F - Ratio Prob.	Level
Model	1	180.0042189	180.0042189	63.66927278	8.88995E-07
Error	15	42.40763505	2.82717567		
Total	16	222.4118539			

## 6 CONCLUSION

The tax system is expected to remain unchanged over the life of the investment. The impact of taxation depends on a number of features of the tax system, including the statutory tax rate, capital allowances, the treatment of foreign source income, wealth taxes paid by the company, as well as possibly the treatment at the corporate and personal level of dividends paid by the company, and wealth and capital gains taxes at the personal level.

Rates and development of corporate taxes in individual countries are carefully observed because their amounts are really important in corporate decision-making about the allocation of investment. The simplest alternative is the comparison of statutory corporate rates of income taxes. For its simplicity and easy availability of data, this comparison has been becoming the most commonly applied. Different rules for setting corporate tax base and its

amount, which are caused by individual tax legislations in the particular countries, are a substantial limitation for an objective comparison of tax burden for companies by statutory income tax rates in those countries. Consequently, for the purposes of the reciprocal international comparison, statutory tax rates are not quite an appropriate and objective indicator.

The instrument which removes the imperfect information capability of the basic or statutory tax rates is the implicit tax rate. It takes into account the tax base and the method (if any) by which the systems of corporate and personal income taxes are integrated. For comparison, companies can also use the effective average tax rate which is calculated by special methods.

### **Acknowledgement**

This paper was supported by the Ministry of Education, Youth and Sports Czech Republic within the Institutional Support for Long-term Development of a Research Organization in 2015.

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## **PERSONALITY TYPES OF ENTREPRENEURS AND SELECTED ATTRIBUTES OF CREDIT RISK IN THE SME SEGMENT. A CASE STUDY FROM CZECH REPUBLIC AND SLOVAKIA**

*Ludmila Kozubíková, Přemysl Bartoš*

### **Abstract**

The aim of this article was to examine the relationship between personality characteristics and approach to the perception and management of credit risks. Based on the preferred personality qualities and knowledge the entrepreneurs have been included into two categories, namely they are artist-entrepreneurs and businessmen-laborers, also the differences in their entrepreneurial attitudes have been examined. Our results showed that there are differences in the attitudes of these two categories of entrepreneurs in approaching credit risk, where it was found out that the defined categories of business have different approaches to knowledge of credit conditions of commercial banks. According to the findings of our research, there are significant differences between defined types of businessmen while evaluating changes to the current approach of commercial banks in lending to SMEs in comparison to the pre-crisis period. The results of our study have showed a high degree of confidence of individual groups of entrepreneurs when evaluating their ability to manage financial risks in the company.

*Keywords: entrepreneurship, types of entrepreneurs, segment SME, credit risk*

JEL Classification: L26, O16, G21

## **1 INTRODUCTION**

Small and medium-sized enterprises play an important role in the economic system of any developed country.

The business environment of small and medium-sized companies varies considerably. In this context, Bilan (2013) states that ecological, economical, social and environmental problems, as well as challenges connected with developing of the consumers, make the companies concerned with existing level and quality of relationship between them and the society, their employees and their consumers.

In this context, it is clear that the issue of entrepreneurship in the small and medium-sized companies is very topical area of scientific research. Currently, great importance is given to research of personal and knowledge characteristics of people for business because many of the results that are mentioned below show the fact that to be an entrepreneur does not fit all the people and the business needs a specific properties. These properties may affect the approach to the assessment and management of business risks that significantly influence the success in business.

In our article there are examined the selected attributes of the credit risk of SMEs in relation to the defined personality types of entrepreneurs.

## **2 THEORETICAL BACKGROUND**

The business environment is determined by personality characteristics and motives of individual entrepreneurs. Business situations are often unique in their unpredictability,



complexity and changing requirements during the business process. Entrepreneurs must be capable to have the features of several personalities at once and as one person to demonstrate the ability to act as investors, inventors, accountants, dispute investigators, leaders, technologists, marketing specialists and top sellers. For this reason, the more knowledge and skills the entrepreneur is capable to demonstrate the better. (Frese, Gielnik, 2014)

According to Deáková, Drážovská, Grznárik and Kondášová (2010) the most important personal qualities for an entrepreneur are: courage, self-reliance, responsibility, determination, perseverance, proactive approach, creativity and scholarship in a particular area, where this businessman intends to do business.

Kvietok (2013) states, that decision to take on the business risk is symptomatic of a certain type of people. A significant part of the motivation to take risks in business follows from the success motivation. To achieve the set goals, successful people are willing to take on reasonable risks associated with feedback about the level of achieved results. Entrepreneurs are sort of being managed with an inner feeling, which means that they feel that their personal fate is the result of their own efforts. They are independent, autonomous, and rely on themselves, what are the characteristics of entrepreneurial personalities.

According to Beugelsdijk and Noorderhaven (2005), entrepreneurs differ from the general population and from paid employees in a lot of characteristics. They are more individually oriented; they have a greater individual responsibility and effort. In this context Omerzel and Kušce (2013) indicate that the inclination to take risks, self-efficacy and the need for independence are the most important factors affecting personal performance of the businessman.

According to Soininen, Martikainen, Puumalainen and Kyläheiko (2012) consider innovativeness, risk-taking and proactivity as essential characteristics of entrepreneurial orientation. According to Eggers, Kraus, Hughes, Laraway and Snyckerski (2013) to drive company to growth, the firm will need to deploy a strategy centred on entrepreneurial orientation or else risk stagnation. In this regard Lasagni (2012) indicates that her results show that innovation performance is higher in SMEs that are proactive in strengthening their relationships with innovative suppliers, users, and customers.

Moro and Fink (2012) state that the banks play an essential role in financing SMEs because these have more difficulties accessing equity on capital markets.

Important issue of SMEs is represented by financial gap because many of these companies have very limited access to external financial resources. (European Commission, 2011) This disadvantageous standings is partially compensated by national and regional policies (Grebeníček et al., 2013) and also by the policies of the European Union including cohesion policy, although the success of targeting the entrepreneurs in both countries varies (Hájek et al., 2014). In this context, Dierkes, Erner, Langer and Norden (2013) state that companies in small and medium sector are smaller, more informationally opaque, riskier, and more dependent on trade credit and bank loans. According to Canales and Nanda (2012) small businesses, and particularly young small businesses, have little internal cash flow to finance their operations and are also associated with significant asymmetric information.

In relationship to the features of the personality of the businessmen Mishra and Lalumiere (2011) in the results of their study show that personality characteristics such as impulsivity, search for sensation, low self-control may represent mechanisms through which the preferences of risk are manifested in the behavior. Risk-taking, respectively willingness to abandon already known and right ways and get down to the business with uncertain income should be important for achieving the objectives of the international level. The tendency to

seek high-risk situation is also associated with a tendency to be optimistic and perceive opportunities rather than threats in any situation (Dai, Maksimov, Gilbert, Fernhaber, 2014). A reasonable optimism is desired from the perspective of the development of the company. An excessive optimism may have harmful effects because entrepreneurs are making strategic errors or plunge into a large number of tasks at once (Frese, Gielnik, 2014).

Banks stated in their documents that there is a rule in the rating process: the smaller company, the more important soft information.

Moro and Fink (2012), Belás, Cipovová, Novák, and Polách (2012), Cipovová and Belás (2012) state that the econometric findings show that lending relationships cannot be reduced to facts and figures because, by leveraging strong relationships, trust can also support and increase the amount of other soft and hard information that the loan manager can access and, thus, help the loan manager to take decisions. In this context Belás and Polách (2011) state that models for credit risk measuring are representing tendency to exactly define complex economic processes using mathematical or statistical models. Such models in despite to sophisticated approach cannot and fail to express truly a complexity of economical system, determined by other important undefinable values, such as attitude, expectation, each economic entity preferences.

The document of European Commission (2006) states that in the research of McKinsey & Company, 75 % of the total number of medium and large-sized banks consider indebtedness of enterprises as the most important quantitative factor of internal rating. 50 % of banks give equal attention to the following indicators: liquidity and profitability. From wide range of possible qualitative factors, approximately 50 % of medium and large-sized banks give high or very high attention to the quality management of SME and to following factors such as: market situation of SME and its legal form. According to this document, qualitative factors have a bigger impact on the rating in the case of larger companies or larger loans. In the case of start-ups companies, weights of these factors on the overall rating represent approximately 60 %. In the case of companies with sufficiently long business history (minimum 2 years), weight of qualitative factors is significantly lower and represents average of 20 -30 %.

Agostino, Gagliardi and Trivieri (2011) discovered that bank concentration seems to positively (and significantly) affect SMEs default risk when credit relationships are very concentrated; that is when firms borrow heavily from their main bank and have few credit relationships with other intermediaries. A possible interpretation being that, as debt from the main bank increases and firms do not resort to multiple banking connection (in the attempt to induce competition among lenders), entrepreneurs might remain locked into lending relationships and so, become exposed to the potential negative effects of concentrated markets. The results suggest that a detrimental effect of bank market structure on firm default probability would emerge when lending relationships are highly concentrated, and it would be stronger the longer the duration of bank-firm relations.

Gambini and Zazzaro (2013, p. 1004) state that small firms maintaining a stable credit relationship with a main bank grow less than bank-independent small firms. This is especially true for small expanding firms, while for downsizing ones maintaining stable relationships with a main bank does not restrain their decline in employment and asset size. With regard to medium-large firms, results indicate almost the opposite. Long-lasting bank ties have a modest impact on growth performance of medium-large firms.

### 3 RESEARCH AIM, METHODOLOGY AND DATA

The aim of this article was to examine the relationship between personality characteristics and approach to the perception and management of credit risks. In this context there were examined the changes in the performance of SMEs, which occurred during the crisis, the knowledge of the credit request from the business, changes in the attitude of commercial banks to the SME segment, which occurred during the crisis and the perceived ability of the entrepreneurs to manage financial risks in their own company. These attributes have a significant impact on the intensity of the credit risk in the SME segment.

The research was conducted in selected regions of the Czech Republic and Slovakia through questionnaire investigation. A total of 449 owners of small and medium-sized companies have joined our research, of those 180 from Zlin region (Czech Republic), 164 from Žilina region (Slovakia) and 105 from the Trenčín region (Slovakia). Despite the fact that these regions belong to two different countries, they share many common characteristics, because they are neighbors with each other, have similar conditions for their development and intensively trade together. Therefore, it is assumed that this sample is homogeneous. The selection of respondents was conducted by a random selection and sample size is considered as representative enough. We have used the firm database Albertino and specialized software in this process.

Based on the preferred personal qualities and skills that were indicated in the questionnaire the entrepreneurs were classified into two categories, namely they are the artist-entrepreneur and entrepreneur-laborers, and there were also examined the differences in their entrepreneurial attitudes. Within the category of entrepreneur-artist there was included the owner of the company, which said in our questionnaire that the most important characteristics of an entrepreneur include at least two of the following (not to be afraid of risk, creativity, imagination, intuition and optimism). The total number of such respondents was 98. To the category of entrepreneur-laborers there was included an entrepreneur who has indicated the desired properties for making the business at least two of these options (perseverance, expertise, quality education, intelligence, responsibility, determination and patience). 351 of the entrepreneurs fell in this category.

The following hypotheses have been defined:

*H1: There are significant differences exist in the opinions of defined types of entrepreneurs to assess the performance of their companies.*

*H2: There are statistically significant differences exist in opinions of defined types of entrepreneurs in knowledge of lending criteria.*

*H3: There are statistically significant differences between the defined types of businessmen in assessing changes to the current approach of commercial banks in lending to SMEs in comparison to the pre-crisis period.*

*H4: There are statistically significant differences exist in opinions of defined types of entrepreneurs to manage financial risk in their companies.*

The associations in contingency tables were analyzed by Pearson statistics for count data. In the cases, where asymptotic requirements for the test were violated; series of 5000 Monte Carlo replications from original data has been conducted. P-value is being compared with standard 5% confidence level. P-value lowers than confidence level leads to rejection of the null hypothesis. The null claims there is no association between variables. Calculations have been performed in statistical packages XL Statistics and R. Also tools of descriptive statistics have been used such as: percentages and averages.

## 4 RESULTS AND DISCUSSION

In Table 1 there are presented the results of evaluation of decline of companies' performance by defined categories of entrepreneurs.

Tab. 1 – Evaluation of changes in the performance of firms by entrepreneurs-artists and entrepreneurs-laborers. Source: own research

<i>How has your performance changed in comparison to the pre-crisis period?</i>	Entrepreneurs-artists in %	Entrepreneurs-laborers in %	p-value
1. Decreased significantly (more than 20 %)	21.59	27.35	0.27134
2. Slightly decreased (to 20 %)	37.50	35.33	0.70394
3. Is stabilized	17.05	22.51	0.26272
4. Increased slightly (to 20 %)	15.91	9.97	0.11410
5. Significantly increased (more than 20 %)	4.55	2.56	0.32708

The values of the test criteria have confirmed that the changes performance evaluation of enterprises according to defined parameters is very similar and statistically significant differences in the responses have not been found. The Hypothesis 1 was rejected.

Both groups rate market risk as the most important risk, which was demonstrated by a decline in performance of companies during the crisis, because up to 59% of entrepreneurs-artists and 63% of entrepreneurs-laborers in our research have stated that the performances have dropped.

Our results are compatible with the findings of other studies. According to Fetisovová et al. (2012) the financial and economic crisis has had serious implications on the performance of small and medium-sized companies in the European Union. In 2009, the gross production of SMEs within the EU27 decreased by 5.5%. Insufficient effective demand was the most urgent issue for 29% of these SMEs. The authors report that the demand in the domestic markets of the EU27 will remain weak. In this context Clowes and Bilan (2014) state that the Czech Republic, the country endowed with greater shares of capital in production (compared with Poland, Hungary and Romania) was not immune to the recession, as confirmed by the results of our research. In this context Knápková, Homolka, and Pavelková (2014) emphasize the importance of advanced techniques of the financial management in the Czech companies in the current economic environment.

A particularly important problem of SMEs is a financial gap since many of these companies have limited access to external financial sources. Even before the economic downturn, some small businesses were having trouble accessing the funds necessary for growth and innovation. As a consequence of the financial crisis, banks in many countries are even less willing to lend to businesses, which further escalates the problems faced by companies. (European Commission, 2011). According to Fetisovová et al. (2012) the approach to financial resources for SMEs represents a serious problem for SMEs. However, in the short term, it is less urgent than the lack of demand on domestic markets.

In our research, there was also compared the risk assessment from the regional perspective. It was found out, that entrepreneurs in Zlin region and entrepreneurs in Zilina and Trencin regions assess the risks very similarly. The only exception were the differences in the safety risk assessment, where entrepreneurs in Zilina region statistically significantly more perceived

the effect of this risk in comparison with the businessmen from Zlin region. (Belás et al., 2014)

It could therefore be assumed that the current assessment of business risks, which was found out through our own research in the segment of SMEs in the analyzed region is relevant: the most significant risk to the SME segment is a market risk, followed by financial risk. This assessment is not dependent on regions and neither from the defined categories of entrepreneurs.

In Table 2 there are given results of knowledge of commercial banks' lending criteria.

Tab. 2 – Knowledge of lending criteria of banks by the entrepreneurs-artists and entrepreneurs-laborers. Source: own research

<i>Do you know the criteria which banks assess in their lending process?</i>	entrepreneurs-artists in %	entrepreneurs-laborers in %	p-value
1. Yes	55.68	38.00	0.00262
2. No	10.23	15.14	0.23800
3. I have some idea	34.09	46.86	0.03078

The Hypothesis 2 was confirmed. It was identified that there exist statistically significant differences in opinions of defined types of entrepreneurs in the knowledge of lending criteria. The entrepreneurs-artists statistically significantly more stated that clearly aware of commercial banks' lending criteria in comparison with the entrepreneurs-laborers (p-value=0.00262), while at the same time statistically less was received an answer: I have some idea (p-value=0.03078).

It could be agreed with Behr and Güttler (2007), who see the solution on companies' part that understood banks' approach within the evaluation of creditworthiness and also they were able to evaluate their expected probability of default (PD) using rating model. This fact could help firms to understand their position from the bank's position. Also this fact would lead to provide necessary document about themselves for better assessment of their creditworthiness and also it would lead to the possibility of further negotiations between the bank and the company about credit conditions. According to author, knowledge of own PD also allows to increase transparency in credit process. As well as it allows potential use for searching of external funding sources. If SMEs have knowledge about their creditworthiness, they may affect management decisions in favor of new sources of external funding due to the expanding range of financing options.

Tab. 3 – Evaluation of the changes of approach of commercial banks to finance SMEs during the crisis. Source: own source

<i>How has the banks' approach as for the lending changed compared to 2008?</i>	entrepreneurs-artists in %	entrepreneurs-laborers in %	p-value
1. Their approach has significantly deteriorated	18.18	12.54	0.16758
2. Their approach has slightly deteriorated	29.55	19.09	0.03156
3. Their approach has slightly improved	11.36	11.40	0.99202
4. Their approach has significantly improved	2.27	1.14	0.41222
5. Their approach has not changed	10.23	13.11	0.46540
6. I do not know	28.41	42.74	0.01428

The Hypothesis 3 was partially confirmed, as it was found out that there were statistically significant differences between the defined types of businessmen while evaluating changes to the current approach of commercial banks to lending to SMEs in comparison to the pre-crisis period in response No.2. This was the largest group of the respondents, if there are excluded those respondents who did not know how to answer this question.

According to our results, a positive evaluation of the current approach of commercial banks for funding SMEs was reported by 37.50% of the entrepreneurs-artists and by 33.05% of the entrepreneurs-laborers. Entrepreneurs in the Czech Republic assess the approach of commercial banks to financing of their needs more positive than the entrepreneurs in Slovakia. (Belás, Bilan, Demjan, Sipko, 2015)

In Table 4 there are stated the opinions of defined groups of entrepreneurs on whether they can properly manage risks.

Tab. 4 – Evaluation of ability to manage financial risks in their own company by the entrepreneurs-artists and entrepreneurs-laborers. Source: own research

<i>Do you think that you can properly manage financial risks in the company?</i>	entrepreneurs-artists in %	entrepreneurs-laborers in %	p-value
1. Yes	33.72	30.86	0.61006
2. To some extend	59.30	61.14	0.75656
3. No	3.49	0.86	0.06010
4. Cannot tell	3.49	7.14	0.21498

The Hypothesis 4 was rejected. There haven't been found any statistically significant differences in the opinions of defined types of businessmen to manage financial risks in their companies.

Within the regional comparison, there was found out that the entrepreneurs in Zlin region evaluate their ability to manage financial risks in the company more optimistically than entrepreneurs in the Zilina region (p-value (No. 1)<0.01/p-value (No.2)=0.0210). (Belás et al., 2014)

In this context Krištofík (2010) states that the financial crisis has significantly changed the view on risk management in the SME segment in the European countries, including Slovakia. Based on many studies dealing with corporate management in Slovakia and published during the crisis, the most common failures, which can substantially affect the potential ability of a company to survive during the crisis, were for example mismanagement of cash flows or insufficient management of financial risks, i.e., the lack of an early warning from the financial manager. The results of our research, however, showed a high degree of confidence of individual groups of entrepreneurs.

## 5 CONCLUSION

The aim of this article was to examine the relationship between personality characteristics and approach to the perception and management of credit risks.

The most important finding in the context of our research is that the knowledge of lending criteria, which represents an important element in the management of SME credit risk, is likely to depend on personal characteristics of entrepreneurs.

According to our research there are significant differences between defined types of businesses in assessing of changes to the current approach of commercial banks regarding the lending to SMEs in comparison to the pre-crisis period.

The results of our study have showed a high degree of confidence of individual groups of entrepreneurs when evaluating their ability to manage financial risks in the company.

Our study has some limitations because it was performed on a limited sample of respondents and has a regional character. At the same time, this research suggests that there is likely a correlation exists between personality characteristics of businessmen of small and medium enterprises in approaching credit risk management, which will be the subject of our further research.

*This paper was created at Tomas Bata University in Zlín and was supported by Project No. IGA/FaME/2015/025: The potential possibilities of financial performance's growth of commercial bank in the context of SME's credit risk and customers' satisfaction.*

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## **DEVELOPMENT OF AN EFFECTIVE TAX RATE AND OTHER SELECTED INDICATORS OF PERSONAL INCOME TAX IN YEARS 1993 – 2014**

*Michal Krajňák*

### **Abstract**

The paper deals with an analysis of the development of an effective income tax rate in the Czech Republic in years 1993 – 2014. The paper shows that the decisive factor for the evaluation of the tax burden is not only an income tax rate specified by law but also the existence of items reducing the tax base or the tax. In cases where the taxpayers apply only the basic tax advantage for themselves, there occurs the growing trend of effective tax rate in the mentioned years. The trend of development is reverse in the second analyzed situation where, in addition to the basic benefit for the taxpayer, there is applied also fiscal advantage for two dependent children in cohabitation.

*Keywords: income tax, the effective tax rate, tax credit, tax allowances*

JEL Classification: C30, H24.

### **1 INTRODUCTION**

The personal income tax is a part of the tax system in the Czech Republic since its introduction. Since that date, the incomes of individuals are taxed by personal income tax using a gliding progressive tax rate. The tax reform which took place in 2008 replaced the gliding progressive tax rate by an unified rate. Due to the tax allowances and credits this tax remains, in most cases, progressive. For many taxpayers, the change led to a lower tax burden by direct taxes compared to indirect taxes. The choice between direct and indirect taxation is one of the oldest issues of taxation policy (Atkinson, 1997). Income tax is one of the major revenue of the state budget of the Czech Republic (Široký, Kovářová, Randová, 2012).

The aim of this article is to analyze the development of effective income tax rate (*ERT*) in years 1993 – 2014. Comparison of effective tax rates over time enable taxpayers to better evaluate current rates compared to earlier ones (Woolsey, Foster, 2009). Beside the *ERT* analysis, the paper deals with the effective tax rate after taking into account the mandatory contributions paid by employees ( $ERT_{T+1}$ ) and the implicit tax rate on labor ( $ITR_L$ ). Another part of the paper evaluates the trend of development of *ERT* with the aid of a regression analysis. The source of data for calculation of an income tax is the average wage in the Czech Republic, its 0,5 and 1,5 fold. The paper also uses the methods of description, analysis, comparison.

### **2 PERSONAL INCOME TAX**

Income taxes in the Czech Republic are regulated by Act no. 586/1992 Coll. on the Income Taxes, as amended. Selected provisions of the act undergo changes on every year basis. Among the most significant changes, there are those in tax rates or tax reliefs. The tax relief brings benefit to taxpayers in the form of lower or paid-later tax compared with a status if such provision in the tax act was not mentioned (Kubátová, Jareš, 2005).

## 2.1 Development in tax rates

Široký et al. (2008) states that there is a reduction of the tax burden by direct taxes at the expense of indirect taxes. The tax rate itself might not reflect the actual amount of the tax burden, for the tax base is usually reduced by tax reliefs. In many cases, the tax credit can be deducted from the calculated tax. The development of income tax rates during the years 1993 – 2014 is shown in Tab. 1. The analysis of a share of the tax in the tax mix of selected European countries was performed by Vitek (2011), tax reforms were dealt with by e.g. Appel (2006).

Tab. 1 - Development of personal income tax rates in the Czech Republic. Source: own processing according to the Income Tax Act

Years	1993	1994	1995	1996 - 2002	2001- 2005	2006- 2007	2008- 2014
Tax rate in %	15 – 47	15 – 44	15 – 43	15 – 40	15 – 32	12 – 32	15

Gliding progressive tax rate was preserved until 2007. During this period, the range, number and size of range of individual bands varied. Comparison to the baseline in year 1993 and the state before the tax reform in 2008 is stated in Tab. 2 and Tab. 3.

Tab. 2 - The personal income tax rates in 1993. Source: own processing according to § 16 of the Income Tax Act

From the tax base		Tax	From the tax base exceeding (CZK)
From CZK	Up to CZK		
0	60 000	15 %	
60 000	120 000	9 000 CZK + 20 %	60 000
120 000	180 000	21 000 CZK + 25 %	120 000
180 000	540 000	36 000 CZK + 32 %	180 000
540 000	1 080 000	151 200 CZK + 40 %	540 000
1 080 000	and more	367 200 CZK + 47 %	1 080 000

Tab. 3 - The personal income tax rates in 2007. Source: own processing according to § 16 of the Income Tax Act

From the tax base		Tax	From the tax base exceeding (CZK)
From CZK	Up to CZK		
0	121 200	12 %	
121 200	218 400	14 544 CZK + 19 %	121 200
218 400	331 200	33 012 CZK + 25 %	218 400
331 200	and more	61 212 CZK + 32 %	331 200

Since 2008, for the first time in history of the Czech Republic, the income is taxed not by gliding progressive tax rate, but as stated by Šíroký (2008), by a unified tax rate. A reason for the change is stated to be greater tax fairness. The rate is set at 15 %. The assessment base is not a gross wage after deduction of compulsory social security contributions and health insurance paid by the employee, but the super-gross wage, where, on the contrary, the gross wage is increased by social security contributions and health insurance paid by the employer. There was a decrease in a tax rate in most cases, but an increase in tax base. There was an introduction of 7%-solidarity tax in 2013 that is paid by taxpayers with income of more than 48 multiple of average wage in the national economy (Schellkens, 2014). The advantages and disadvantages of tax progressiveness is examined by e.g. Szyber (2003). Bahl, Wallence (2004) recommend a gliding progressive tax rate as the basis of taxation.

Many EU countries still use gliding progressive tax rates. To learn more about progressiveness indicators, see e.g. Nyamongo, Schoeman (2007). Even outside Europe, this fact is not sporadic, e.g. China or Canada (Shi, Xiaozhong, 2012). Whereas the tax rate is set in ad valorem, i.e. as a percentage, there will be an increase in the tax liability together with the growth of the tax base. This shall imply that one of the tasks of the income tax is to reduce income differences among tax payers (Chen, 2012). Whether it is optimal to have one band or more tax bands is very difficult to establish (Zee, 2005).

## 2.2 Development of values of deductions

Up to 2006, it was possible to deduct allowances for a taxpayer from the tax base. The amount, as stated in Tab. 4, had gradually increased. A similar trend could be seen in case of allowances for dependants living with the taxpayer in cohabitation.

Tab. 4 - The development of tax allowances [in CZK], Source: own processing according to § 15 of the Income Tax Act

Year	1993	1994	1995	1996	1997	1998	1999-2000	2001-2003	2004	2005
Taxpayer	20 400	21 600	24 000	26 400	28 800	32 040	34 920	38 040	38 040	38 040
Child	9 000	10 800	12 000	13 200	14 400	18 000	21 600	23 520	25 560	-

Tax allowances for a child was replaced in 2005 by a tax credit that may even have the character of a tax bonus, if the value of this amount is higher than calculated tax liability. Another replacement of tax allowances by tax credits occurred in 2006. The amounts of selected credits are shown in Tab 5.

Tab. 5 - The development of tax allowances [in CZK], Source: own processing according to § 35 of the Income Tax Act

Year	2005	2006 – 2007	2008 – 2009	2010	2011	2012 – 2014
Taxpayer	-	7 200	24 840	24 840	23 640	24 840
Child	6 000	6 000	10 680	11 604	11 604	13 404

The significant change of amounts occurred at the beginning of 2008. The reason for the increase was the change in technical calculation of tax liability. Compulsory social security contribution and health insurance is included in the tax base that is, in addition, increased by compulsory social security contributions and health insurance paid by the employer. The amount for dependents living in cohabitation in the period of years 2008 - 2012 increased, the credit for a taxpayer since 2008 still remains at the same level, except for a temporary reduction in 2011. Since 2015 there is an increase in the amount per child for people nourishing more children in cohabitation. The amount for the second and third dependent domestic child is increased by 200 CZK, respectively 300 CZK per month. Tax credits, as well as tax allowances have an impact on the amount of *ERT*.

### 3 METHODOLOGY

To assess the development of the tax burden, the time series will be analyzed. Time series consist of *ERT*, *ERT<sub>T+I</sub>* and *IRT<sub>L</sub>* calculated for the period of years 1993 – 2014 for the average wages (or 0.5 and 1.5fold of the average wage) in the Czech Republic. *ERT*, *ERT<sub>T+I</sub>* and *IRT<sub>L</sub>* are calculated using relation (1), (2) and (3). The *ERT* is characterized by the average tax rate that is defined as the percentage ratio of tax obligation to gross pay (Friedrich, Maková, Široký, 2012). *IRT<sub>L</sub>* measures the ratio of total taxation on labor in the total volume of employees' income (Pavel Vítek, 2005).

$$ERT = \frac{T}{W_g}, \quad (1)$$

where *T* is a tax liability and *W<sub>g</sub>* is gross wage.

$$ERT_{T+I} = \frac{T+I}{W_g}, \quad (2)$$

where *I* is social security contribution and health insurance payed by an employee.

$$IRT_L = \frac{T+I_E+I_R}{W_{sb}}, \quad (3)$$

where *I<sub>E</sub>* is social security contribution and health insurance paid by the employee, *I<sub>R</sub>* is social security contribution and health insurance paid by the employer and *W<sub>sb</sub>* is a super-gross wage.

A time series is a set of measurements, ordered over time, on a particular quantity of interest. (Newbold, 2013) For analysis of time series, there is a calculation of absolute increment in *AC* (4), relative increment *RC* (5) and the growth factor *CG* (6).

$$AC = y_1 - y_{t-1}, \quad (4)$$

$$RC = \frac{y_t - y_{t-1}}{y_{t-1}}, \quad (5)$$

$$CG = \frac{y_t}{y_{t-1}}. \quad (6)$$

where *y<sub>t</sub>* is the amount of the tax burden in year *t* and *y<sub>t-1</sub>* is the tax burden in the year *t-1*.

The tools of regression and correlation analysis are used to describe the dependencies between two statistical variables. Correlation and regression techniques may be applied to time-series

or cross-section data (Barrow, 1988). A simple regression lies in finding the dependency of one variable (a dependent variable  $y$ ) on a single variable (an independent variable)  $x$ . The task of regression (settlement) of argument  $y$  is to find such a regression function that would express the dependence of  $y$  on  $x$  in the best way. The best position for the regression line is found by maximizing the explained part and minimizing the error part.

$$y = \beta_0 + \beta_1 x, \tag{7}$$

where  $\beta_0$  and  $\beta_1$  are the parameters of a regression line.

For the estimates of parameters  $\beta_0$  and  $\beta_1$  obtained by the least-squares method, there is valid (8) and (9). To learn more about the method of least squares, see e.g. Morris (2012).

$$\beta_0 = \frac{\sum y_i}{n} - \beta_1 \frac{\sum x_i}{n}, \tag{8}$$

$$\beta_1 = \frac{n \sum x_i y_i - \sum x_i \sum y_i}{n \sum x_i^2 - (\sum x_i)^2}. \tag{9}$$

Coefficient of determination  $R^2$  evaluates an adherence of the measured values to a relevant regression function,

$$R^2 = \frac{s_{\hat{y}}^2}{s_y^2}, \tag{10}$$

where  $s_{\hat{y}}^2$  is an empirical variance of balanced values and  $s_y^2$  an empirical variance of the measured values (Neumann, 2000).

## 4 ANALYSIS

Analysis of the development of the tax burden is evaluated using *ERT* indicator. In addition to that, the values  $ERT_{T+I}$  and  $IRT_L$  are calculated for the average wage in the Czech Republic, its 0,5 and 1,5 folds for the period 1993-2014. The development of annual average wage in the Czech Republic in this period is shown in Tab. 6. A objective way to measure the tax circumstances of the taxpayers is using an average wages (Šíroký, Maková, 2009).

Tab. 6 - The average annual gross wage [in CZK] in the Czech Republic 1993-2014, Source: [www.czso.cz](http://www.czso.cz)

Year	1993	1994	1995	1996	1997	1998	1999	2000
Gross	70 848	84 048	99 684	117 900	129 624	141 612	153 564	158 628
Year	2001	2002	2003	2004	2005	2006	2007	2008
Gross	172 536	186 288	197 160	209 592	220 128	234 552	251 484	271 104
Year	2009	2010	2011	2012	2013	2014		
Gross	280 128	286 368	293 460	300 804	300 936	301 896		

#### 4.1 ERT and other indicators in case of application of the basic tax relief for a taxpayer

In this case, selected indicators are calculated under the condition when the taxpayer applies a tax relief only for himself. Results are shown in Tab. 7.

Tab. 7 ERT [in %] and Tax [in CZK] for taxpayer applying tax relief for himself. Source: own calculations

Year	T for 0,5 HM	T for 1,0 HM	T for 1,5 HM	ERT for 0,5 HM	ERT for 1,0 HM	ERT for 1,5 HM
1993	3 825	6 120	11 300	<b>7.20</b>	<b>8.64</b>	<b>10.63</b>
1994	4 950	7 695	14 540	7.85	9.16	11.53
1995	6 120	9 360	18 140	8.19	9.39	12.13
1996	7 635	11 505	21 460	8.63	9.76	12.13
1997	8 430	12 720	24 060	8.67	9.81	12.37
1998	9 120	13 788	26 188	8.59	9.74	12.33
1999	9 870	14 910	28 220	8.57	9.71	12.25
2000	10 365	15 660	29 540	8.71	9.87	12.41
2001	11 265	17 120	32 220	8.71	9.92	12.45
2002	12 630	19 520	35 820	9.04	10.48	12.82
2003	13 695	21 420	38 795	9.26	10.86	13.12
2004	14 925	23 600	42 870	9.49	11.26	13.64
2005	15 960	25 440	46 320	<b>9.67</b>	11.56	14.03
2006	13 557	23 304	48 162	7.71	9.94	13.69
2007	15 666	26 212	53 712	8.31	10.42	14.24
2008	16 320	30 045	57 495	8.03	11.08	14.14
2009	17 385	31 455	59 610	8.27	11.23	14.19
2010	18 330	32 715	61 500	8.53	11.42	14.32
2011	20 595	35 340	64 830	9.36	<b>12.04</b>	<b>14.73</b>
2012	20 505	35 610	65 850	9.09	11.84	14.59
2013	20 520	35 640	65 880	9.09	11.84	14.59
2014	20 670	35 835	66 180	9.13	11.87	14.61

T = tax, HM = gross wage

*ERT* value is the highest in situation where the taxpayer's income is equal to the average wage in 2011. This was caused by a reduction in basic tax credit for a taxpayer by 1 200 CZK. In case of examining the development trend there holds the growth trend up till year 2005, in 2006 *ERT* decreased by 1.5 percentage points, afterwards it gradually increased up to 2011 when it reached the highest value. During the course of last three years, there can be seen almost constant value. The similar development concerns *ERT* for taxpayers with incomes of

0.5 or 1.5-fold of the average wage. Indicators  $ERT_{T+1}$  and  $IRT_L$  were calculated using relation (2) and (3). Their values are stated in annex in Tab A. Development is similar to  $ERT$ . Both the values of these indicators are higher, because they involve rates of compulsory social security contribution and health insurance.

Absolute increments ( $AC$ ), relative increment ( $RC$ ) and growth factors ( $CG$ ) for  $ERT$  were determined using (4), (5) and (6) (for more details for individual years see the annex Tab. B). In case of a taxpayer with an income amounting 0.5-fold of the average wage, the tax liability for the reference period increased each year by 0.09 %, in case of the average wage by 0.16 % and in case of a 1.5-fold of average wage there was an increase by 0.18 %.  $CG$  values less than one for a taxpayer with an income equal to the average wage were found in years 1998, 1999, 2006, and 2012. In those years,  $ERT$  value was, compared to last year, reduced. In years 1998 and 1999, there was an increase in the tax allowance for the taxpayer, in 2006 there was a decrease in income tax rate in the first band from 15 % to 12 %.

In other years, on the contrary,  $ERT$  was increasing, and therefore the average growth rate comes out in the positive value. Low-income taxpayers experienced a reduction of  $ERT$  still in 2001. The taxpayers with higher incomes additionally in 2008. The reason in this case was the replacement of gliding progressive tax rate by a 15% income tax. The gradual increase in ranges of bands might at first sight lead to the fact that the tax burden is reduced. Since the average wage increases, in all situations (0.5; 1.0 and 1.5-folds of the average wage) there was an increase of  $ERT$  (compared to the original year 1993 and year 2014).

The best way of presenting time series data is a time series plot (Buglear, 2012). The development of  $ERT$  for a taxpayer applying a basic tax relief is presented in Fig. 1. Estimation of parameters of the line is obtained by the least-squares method. In all three cases, the coefficient  $\beta_0$  is greater than zero, which means that on average the tax increased each year. The form of equation (7) was gained by using the relation (8) and (9). The coefficient of determination  $R^2$  for a taxpayer with 1.5-fold the average wage has a value of 0.93, which means that 93 % of the variability is explained by the regression model shown in Fig. 1. Relatively high level of reliability is performed by a function for the taxpayers with average income. Low level of reliability is displayed by a function for a taxpayer whose income reaches 0.5-fold of the average wage ( $R^2 = 0.19$ ).



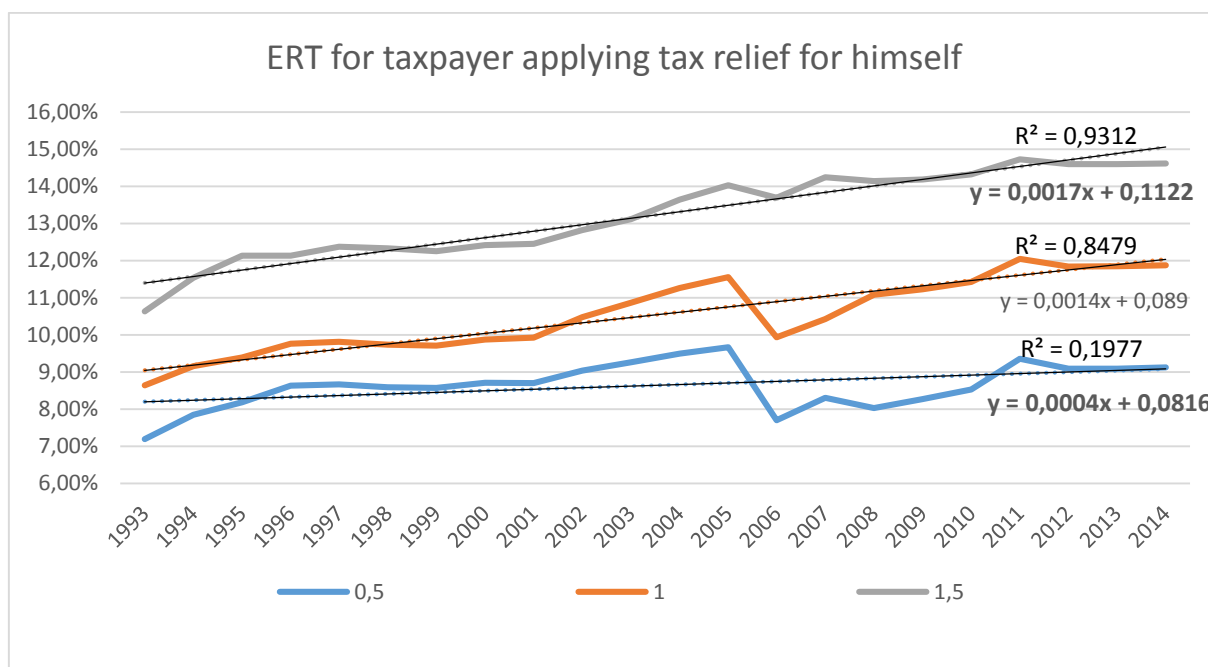


Fig.1: ERT in years 1993-2014. Source: own calculations

#### 4.2 ERT and other indicators in case of application of the basic tax relief for a taxpayer and tax benefit for 2 dependent children

A similar analysis is carried out in the case where the taxpayer applies, in addition to the tax relief for taxpayer, also for a tax benefit for 2 dependent children in cohabitation.

Tab. 8 ERT [in %] and Tax [in CZK] for taxpayer applying tax relief for himself and 2 children. Source: own calculations

Year	T for 0,5 HM	T for 1,0 HM	T for 1,5 HM	ERT for 0,5 HM	ERT for 1,0 HM	ERT for 1,5 HM
1993	1 125	3 420	8 025	2.12	4.83	<b>7.55</b>
1994	1 710	4 455	10 220	2.71	5.30	8.11
1995	2 520	5 760	13 340	3.37	5.78	8.92
1996	3 675	7 545	16 180	4.16	6.40	9.15
1997	4 110	8 370	18 300	<b>4.23</b>	6.46	9.41
1998	3 720	8 370	18 988	3.50	5.91	8.94
1999	3 390	8 430	19 580	2.94	5.49	8.50
2000	3 885	9 090	21 980	3.27	5.73	9.24
2001	4 215	9 870	22 800	3.26	5.72	8.80
2002	5 565	11 685	26 420	3.98	6.27	9.45
2003	6 645	13 110	29 260	4.49	6.65	9.89
2004	7 245	14 130	31 720	4.61	<b>6.74</b>	10.09

2005	768	8 871	34 320	0.47	4.03	10.39
2006	1 557	11 304	36 162	0.89	4.82	10.28
2007	3 666	14 212	41 712	1.94	5.65	<b>11.06</b>
2008	-5 040	8 685	36 135	-2.48	3.20	8.89
2009	-3 975	10 095	38 250	-1.89	3.60	9.10
2010	-4 878	9 507	38 292	-2.27	3.32	8.91
2011	-2 613	12 132	41 622	-1.19	4.13	9.46
2012	-6 303	8 802	39 042	<b>-2.79</b>	<b>2.93</b>	8.65
2013	-6 288	8 832	39 072	<b>-2.79</b>	<b>2.93</b>	8.66
2014	-6 138	9 027	39 372	-2.71	2.99	8.69

T = tax, HM = gross wage

Taxpayers with average and lower-than-average income record reduction of *ERT* compared to years 1993 and 2014. Most of notable reduction of *ERT* occurred at the turn of 2004/ 2005 and 2007/2008. In case of taxpayers with above-average incomes, *ERT* reaches the higher value by 0.6 percentage point in comparison to years 1993 and 2014.

*ERT* was increasing up to year 1997 for all the analyzed income groups of taxpayers. Increased range and a reduction of the number of tax bands led to a reduction of *ERT* in years 1998 and 1999. During 2000 - 2004, *ERT* was increasing, with one exception. Range of bands and level of rates remained unchanged between years 2001 to 2005. The situation in 2005 is noteworthy, at that time the reduction of *ERT* was noted by taxpayers with average and lower-than-average income, while *ERT* for taxpayers with higher incomes increased.

In 2006 and 2007 we can observe a gradual increase of *ERT* shown in Fig. 2. The reason of this is a growing level of average wages and a replacement of tax allowances for the taxpayer by a tax credit. The highest benefit from replacement of tax allowances by tax credits had taxpayers with low incomes. *ERT* reduction occurred in 2008 – the tax rate and the technique of its calculation changed. Until the end of the analyzed period there were no major changes in the amount of *ERT*, except for year 2011 when there was a reduction of tax credit for the taxpayer by 1 200 CZK.

By applying the tax allowance or tax credit for dependents, *ERT* has, in comparison with past results, lower values. The negative values of *ERT* in the years 2008 – 2014 for low-income taxpayers are noteworthy. The value of tax credits is higher than the tax liability before credits and there occurs an entitlement to a tax bonus.

Due to the income tax progressiveness, there arises the highest value of *ERT* in case of taxpayers with above-average income. Even if the minimum amount of income tax rate was at the level of 15 % during the most of the reference period, the *ERT* does not acquire that level of amount in any of the observed years. These above mentioned conclusions of *ERT* analysis is valid for the Czech Republic, because personal income taxes are strongly differentiated in European Union member states (Wołowiec, Sobon, 2011). The development of  $ERT_{T+I}$  and  $IRT_L$  values is stated in annex in Tab. C. A similar trend is in force, the amount of values is also affected by the level of rates of compulsory social security contributions and health insurance.

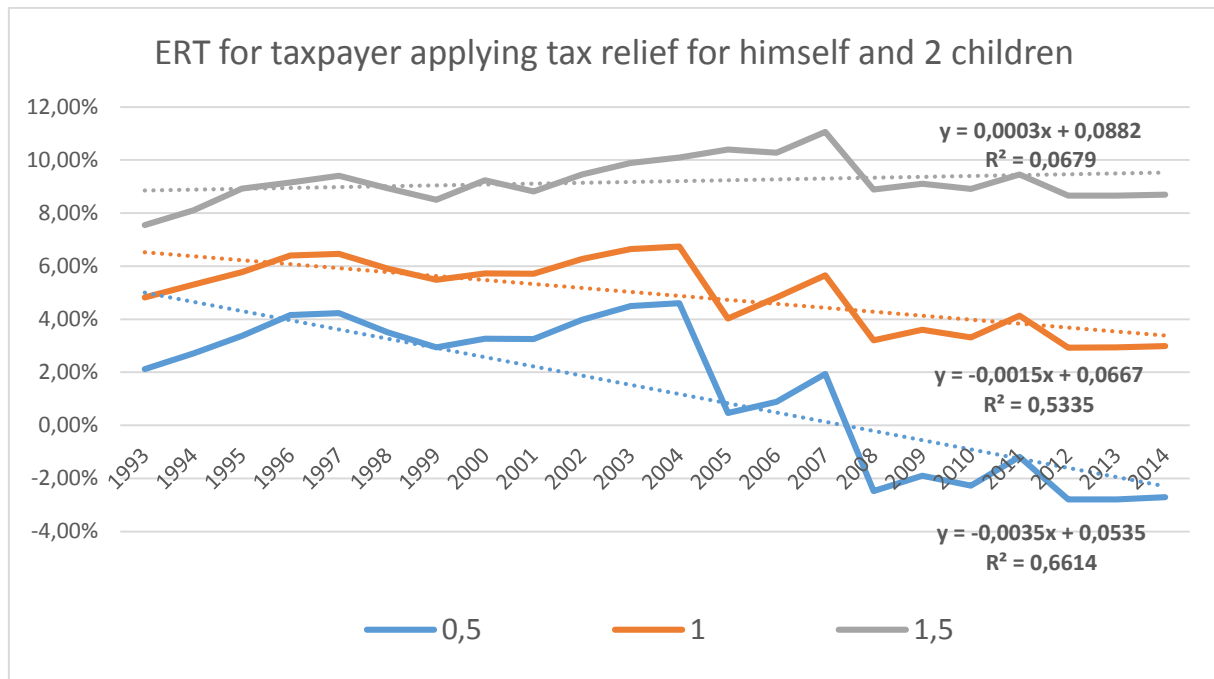


Fig. 2: ERT in years 1993-2014. Source: own calculations

The form of equations of regression line, as well as the coefficient of determination, is shown in Fig. 2. Since the regression line is descending,  $\beta_1 x$  is negative for a taxpayer with the average income and income amounting to 0.5-fold of the average wage. The disadvantage in this case is less explicitness of equations, for  $R^2$  is only 0.0679 in case of a taxpayer with income amounting to 1.5-fold of the average wage.

In an appendix to this paper in Tab. C, there is calculation of absolute increments, relative increments and growth factors of *ERT*. The most of negative values occur in the case of taxpayers with lower-than-average income, on average, their *ERT* decreased by 0.23% each year. The average absolute increment for a taxpayer with average incomes shows also the negative values  $-0.087\%$ .

## 5 CONCLUSION

In terms of development of income tax it is possible to summarize several crucial moments. Apart from the year 1993, when the law was created, these are undoubtedly years 2005 and 2006.

In 2005 the tax bonus was introduced. This step was beneficial namely for low-income groups. A year later, some of tax allowances were replaced by tax credits. Unlike the item for dependent child, these have not got a character of a tax bonus. While tax allowances are more favorable for taxpayers with average and above-average incomes, tax credits on the other hand are more favorable for low-income taxpayers.

The year 2008 is considered to be another important moment. In most cases, there were reductions in the tax rate, but on the other hand, tax base was increased, because in case of income from employment, it is not gross salary after deduction of premiums, but super-gross wage. Changes concerned also the amount of tax credits that went upwards, they were often even several times higher. Reduced tax rates and increased tax credits in most cases resulted in a reduction of the tax burden. In many developing countries, the effects of even the most

progressive income tax on distributional outcomes are likely to be small compared to the effects of more important taxes on consumption, such as the value-added tax and excise taxes (Bird, Zold, 2005). Although at first glance the income tax rate might seem to be the same for all, due to the existence of tax allowances and tax credits its real amount is different. Therefore, it is recommended to assess the effective tax rate in the assessment of the tax burden. In most cases, the personal income tax is the progressive tax (Schneider, Jelínek, 2005).

On the effective tax rate also have an impact changes in social policy, inflation or phase of the economic cycle. The question of taxation is not only economical, but often also a political dimension of topic. It is usual that during the recession tax burden is reducing, while increasing the period of expansion. Political decisions and preferences focusing with policy aimed at selected groups of people in a large extent influence the legislation governing personal income tax.

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## Appendix

Tab. A –  $ERT_{T+I}$  a  $IRT_L$  in %. Source: own calculations

Year	Tax relief for a taxpayer						Tax relief for a taxpayer and 2 children					
	$ERT_{T+I}$			$IRT_L$			$ERT_{T+I}$			$IRT_L$		
	0.5 PM	1.0 PM	1.5 PM	0.5 PM	1.0 PM	1.5 PM	0.5 PM	1.0 PM	1.5 PM	0.5 PM	1.0 PM	1.5 PM
1993	20.7	22.1	24.1	41.7	42.7	44.2	15.6	18.3	21.1	38.0	39.9	41.9
1994	21.1	22.4	24.8	41.7	42.6	44.4	16.0	18.6	21.4	37.9	39.8	41.9
1995	21.4	22.6	25.4	41.9	42.8	44.8	16.6	19.0	22.2	38.4	40.1	42.5
1996	21.1	22.3	24.6	41.6	42.4	44.2	16.7	18.9	21.6	38.3	39.9	42.0
1997	21.2	22.3	24.9	41.6	42.5	44.4	16.7	19.0	21.9	38.3	40.0	42.2
1998	21.1	22.2	24.8	41.5	42.4	44.3	16.0	18.4	21.4	37.8	39.6	41.8
1999	21.1	22.2	24.8	41.5	42.4	44.3	15.4	18.0	21.0	37.4	39.3	41.5
2000	21.2	22.4	24.9	41.6	42.5	44.4	15.8	18.2	21.7	37.6	39.4	42.0
2001	21.2	22.4	24.9	41.6	42.5	44.4	15.8	18.2	21.3	37.6	39.4	41.7
2002	21.5	23.0	25.3	41.9	42.9	44.7	16.5	18.8	22.0	38.1	39.8	42.2
2003	21.8	23.4	25.6	42.0	43.2	44.9	17.0	19.1	22.4	38.5	40.1	42.5
2004	22.0	23.8	26.1	42.2	43.5	45.3	17.1	19.2	22.6	38.6	40.2	42.7
2005	22.2	24.1	26.5	42.3	43.7	45.6	13.0	16.5	22.9	35.5	38.2	42.9
2006	20.2	22.4	26.2	40.9	42.5	45.3	13.4	17.3	22.8	35.8	38.8	42.8
2007	20.8	22.9	26.7	41.3	42.9	45.7	14.4	18.2	23.6	36.6	39.4	43.4
2008	20.5	23.6	26.6	41.1	43.4	45.7	10.0	15.7	21.4	33.3	37.6	41.8
2009	19.3	22.2	25.2	39.8	42.0	44.2	9.1	14.6	20.1	32.2	36.3	40.4
2010	19.5	22.4	25.3	40.0	42.1	44.3	8.7	14.3	19.9	31.9	36.1	40.2
2011	20.4	23.0	25.7	40.6	42.6	44.6	9.8	15.1	20.5	32.7	36.7	40.6
2012	20.1	22.8	25.6	40.4	42.4	44.5	8.2	13.9	19.7	31.5	35.8	40.0
2013	20.1	22.8	25.6	40.4	42.4	44.5	8.2	13.9	19.7	31.5	35.8	40.0
2014	20.1	22.9	25.6	40.4	42.4	44.5	8.3	14.0	19.7	31.6	35.8	40.1

PM = average wage

Tab. B - Absolute increment, relative increment and growth factor of ERT (only for taxpayer).  
Source: own calculations

Year	Absolute increment in %			Relative increment in %			Growth factor		
	0.5 PM	1.0 PM	1.5 PM	0.5 PM	1.0 PM	1.5 PM	0.5 PM	1.0 PM	1.5 PM
1993	-	-	-	-	-	-	-	-	-
1994	0.65	0.52	0.90	0.091	0.060	0.085	1.091	1.060	1.085
1995	0.33	0.23	0.60	0.042	0.026	0.052	1.042	1.026	1.052
1996	0.45	0.37	0.00	0.055	0.039	0.000	1.055	1.039	1.000
1997	0.04	0.05	0.24	0.004	0.006	0.020	1.004	1.006	1.020
1998	-0.08	-0.08	-0.05	-0.010	-0.008	-0.004	0.990	0.992	0.996
1999	-0.02	-0.03	-0.08	-0.002	-0.003	-0.006	0.998	0.997	0.994
2000	0.14	0.16	0.16	0.017	0.017	0.013	1.017	1.017	1.013
2001	-0.01	0.05	0.03	-0.001	0.005	0.003	0.999	1.005	1.003
2002	0.33	0.56	0.37	0.038	0.056	0.030	1.038	1.056	1.030
2003	0.22	0.39	0.30	0.025	0.037	0.023	1.025	1.037	1.023

2004	0.23	0.40	0.52	0.025	0.036	0.039	1.025	1.036	1.039
2005	0.17	0.30	0.39	0.018	0.026	0.029	1.018	1.026	1.029
2006	-1.96	-1.62	-0.34	-0.203	-0.140	-0.024	0.797	0.860	0.976
2007	0.60	0.49	0.55	0.078	0.049	0.040	1.078	1.049	1.040
2008	-0.28	0.66	-0.10	-0.034	0.063	-0.007	0.966	1.063	0.993
2009	0.25	0.15	0.05	0.031	0.013	0.003	1.031	1.013	1.003
2010	0.26	0.20	0.13	0.031	0.017	0.009	1.031	1.017	1.009
2011	0.82	0.62	0.41	0.096	0.054	0.029	1.096	1.054	1.029
2012	-0.27	-0.20	-0.13	-0.029	-0.017	-0.009	0.971	0.983	0.991
2013	0.00	0.00	0.00	0.000	0.000	0.000	1.000	1.000	1.000
2014	0.04	0.03	0.02	0.004	0.002	0.001	1.004	1.002	1.001

Tab. C - Absolute increment, relative increment and growth factor of ERT (taxpayer and 2 children). Source: own calculations

Year	Absolute increment in %			Relative increment in %			Growth factor		
	0.5 PM	1.0 PM	1.5 PM	0.5 PM	1.0 PM	1.5 PM	0.5 PM	1.0 PM	1.5 PM
1993	-	-	-	-	-	-	-	-	-
1994	0.60	0.47	0.56	0.281	0.098	0.074	1.281	1.098	1.074
1995	0.66	0.48	0.81	0.243	0.090	0.100	1.243	1.090	1.100
1996	0.79	0.62	0.23	0.233	0.108	0.026	1.233	1.108	1.026
1997	0.07	0.06	0.26	0.017	0.009	0.029	1.017	1.009	1.029
1998	-0.73	-0.55	-0.47	-0.172	-0.085	-0.050	0.828	0.915	0.950
1999	-0.56	-0.42	-0.44	-0.160	-0.071	-0.049	0.840	0.929	0.951
2000	0.32	0.24	0.74	0.109	0.044	0.087	1.109	1.044	1.087
2001	-0.01	-0.01	-0.43	-0.003	-0.002	-0.046	0.997	0.998	0.954
2002	0.73	0.55	0.65	0.223	0.096	0.073	1.223	1.096	1.073
2003	0.51	0.38	0.44	0.128	0.060	0.046	1.128	1.060	1.046
2004	0.12	0.09	0.20	0.026	0.014	0.020	1.026	1.014	1.020
2005	-4.14	-2.71	0.30	-0.899	-0.402	0.030	0.101	0.598	1.030
2006	0.42	0.79	-0.12	0.903	0.196	-0.011	1.903	1.196	0.989
2007	1.06	0.83	0.78	1.196	0.173	0.076	2.196	1.173	1.076
2008	-4.42	-2.45	-2.17	-2.275	-0.433	-0.196	-1.275	0.567	0.804
2009	0.59	0.40	0.22	-0.237	0.125	0.024	0.763	1.125	1.024
2010	-0.38	-0.28	-0.19	0.200	-0.079	-0.021	1.200	0.921	0.979
2011	1.08	0.81	0.54	-0.477	0.245	0.061	0.523	1.245	1.061
2012	-1.61	-1.21	-0.80	1.353	-0.292	-0.085	2.353	0.708	0.915
2013	0.01	0.01	0.00	-0.003	0.003	0.000	0.997	1.003	1.000
2014	0.08	0.06	0.04	-0.027	0.019	0.004	0.973	1.019	1.004



## **PROFESSIONAL COMPETENCY REQUIREMENTS ON CONTROLLERS IN THE CZECH REPUBLIC: AN EMPIRICAL STUDY**

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### **Abstract**

The article describes the outcomes of the project whose purpose is – on the basis of the “Draft for a Common Statement” – to state generally accepted requirements for the professional competence of managerial accountants and controllers. The paper concludes that, despite the fact that Draft is only the first step, it brings substantial contributions: it has led to a better understanding of the differences which accompany this profession’s development in different parts of globe. It enables better identification of common features, but also differences in profiles and professional orientations of professional accountants, auditors and professional accountants in business, and of managerial accountants or controllers whose quality professional development is the principle aim of this project.

The important part of the project is the empirical research focused on changing the requirements of managers and controllers, and mapping the current situation in the Czech Republic in this area. The research compares the opinions of two groups of respondents – experts, who are responsible for the professional competence development of controllers on the one hand, and managers and controllers operating in a business environment on the other hand. The paper provides results relating to following areas: the general content of controllers’ activities, controllers’ authority and responsibility, requirements for controllers’ education, professional skills and practical experience, ethical aspects of management accounting as well as the quality assurance of the controllers’ work.

*Key words: professional competence, controller, management accountant, developmental tendencies*

JEL classification: M21

### **1 PREFACE**

Business environment, company management and company managers’ professional competence development create closely interdependent “inter-connected bowls”. The substance of business process plays prime role; its recognition influences the quality of company management and it is an inspiration source for the development of education, skills, experience and ethical pre-conditions of managers. But, this process has also its important feedback; education of managers impacts the quality of company management which can cultivate business environment.

It is apparent that the substance of business environment has changed substantially in the last few years and these changes also have impact on how companies are managed, including the instruments and methods used. It is not easy to generalise the most important general tendencies profiling this development, in our opinion they are the following:

- Approaching company management as a system which connects organization, planning, control, decision making, motivation and information functions;
- Developing it on a multi-dimensional view of the business process leads to an ever stronger integration of all the relevant aspects of its management: not only of strategic but also tactical and operational perspectives, product, responsibility,

activity based, customer and territorially oriented sections also and its financial and non-financial sides; and

- The interdependence of each of the above sections then influenced by the emphasis placed on the need for an interdisciplinary view of the managed entity.

Also changes in business environment and global crisis manifest itself in the growing pressure to competence of experts who are responsible for it.

All these changes have the impact also on the work of controllers and managerial accountants. This pressure is apparent in many regards. Primarily, it is demonstrated by new requirements of companies and other entities in which the ability and necessity of qualitative changes in the work of these experts have been stressed.

## **2 AIM OF THE PAPER**

In this regard, the aim of this paper is to describe a project whose general orientation is to

- Specify requirements for education, skills and experience but also for professional approaches, values and attitudes of these experts; and – consequently
- Create a framework for the definition of quality standards for the work of these experts.

The project was initiated in the middle of 2011 by the International Group of Controlling (IGC). However, shortly after the first version of the Draft for a common statement development, whose aim was to define the project framework, it was stopped as an international project and it was recommended to national bodies to realise it on national bases.

The “Czech version” of the project has been running since the beginning of 2012 at the Faculty of Finance and Accounting of the University of Economics, Prague. It has used the outcomes of the IGC team and it has extended them in two principle lines, on the basis of:

- The development of revised project’s framework which comes from literature sources and from the requirements of professional bodies; and
- Empirically oriented research, whose aim is to map the principle requirements of the professional competence of controllers/managerial accountants.

The paper describes by an evaluating way revised “Draft for a Common Statement” and empirical research focused on changing the requirements of managers and controllers and mapping the current situation in the Czech Republic in this area.

## **3 LITERATURE REVIEW**

Most research (Kaplan, Cooper, 1998, Burns and Yazdifar, 2001, Merchant, 2003) confirms the significant role of quality financial management in the changing environment which is influenced by the following tendencies: the inter-disciplinary nature of company management, emphasizing its strategic perspective, its multidimensionality, and the integration of all substantial aspects of purposive business management including inter-relationships (but also divergence) between the user and processing areas of quality information systems (Simons, 2004, Parker, 2002, Merchant, 2003).

This situation has a significant impact not only on the substance of the company management control system, including its information support (Carruth, 2004), but also on the professional education, skills, experience and ethical values and attitudes of financial managers. Some authors devote special attention to controllers or managerial accountants.

For example Kaplan (1998) states that ICT development especially has enabled these experts to be liberated from routine data processing, which gives them the opportunity to

- Spend less time on standardized statements of development and – subsequently – to devote more attention to analyses and interpretation of submitted information;
- Communicate more intensively companies' aims and means of their fulfilment with those people from departments who participate in the realization of the aims; and
- Shift part of its work form the area of comparison of actual and desired company results to the area of decision-making about the future course of the business process.

Also, according to Grandlund and Lukka (1998), controllers should not act as internal information support providers only, but more as business partners who are co-equal members of decision-making teams.

Zralý (2007) reacts to the changing role of managers, controllers and managerial accountants and the interactions among them by suggesting the approach be titled the “controlling convergent concept”.

All the above-stated changes in the content of controllers'/managerial accountants' work have also manifested themselves in new requirements of their professional competence and capabilities. Before, they were required to have adequate knowledge, skills and experience of the management accounting instruments and methods, and their implementation and use in the framework of company information systems. Recently, they are expected to be able to use this knowledge, and these skills and experience more as means to successive aims – to integrate on an interdisciplinary basis management accounting information with the other non-financial and qualitative data, to have the capability to justify, interpret and present ascertained results, to give adequate information support for decision-making and to be able to strengthen companies' synergistic effects through the communication and integration of the relations they develop and cultivate (see for example Burns and Yazdifar, 2001, Yasin, 2005, Hoper, 1980, Horváth, 2006, and Zralý, 2007).

Moreover, according to many research outcomes, the level of soft skills (the ability to argue, interpret and present discovered results and to connect financial information with intangible and “invisible” sections of business activities) and the necessity to perceive professional approaches, values and attitudes are important; those aspects are undervalued in all respected materials devoted to the professional competence development of financial managers (Yasin, Bayes, Czuchry, 2005, Pierce and O'Deam, 2003, Grandlund and Lukka, 1998, Jablonsky, Keating and Heian, 2004).

All these changes find expression in the reactions of universities and economically oriented professional bodies which feel the necessity to implement these requirements into university curricula and into certification systems of professional competence development.

#### **4 RESEARCH METHODOLOGY**

Comparison is the principle method which permeates the project solution. It manifests itself in the following sections:

- In comparison of already existing standards which define requirements for professional competence of controllers and management accountants, and literature sources which are interested in impact of business environment changes on education, skills, experience and ethical values of these experts; this comparison is used especially in the 5th chapter of this paper;
- In comparison of these developing requirements with actual business practise; and

- In comparison of how this practise is perceived by experts who are responsible for the controllers' and management accountants' professional competence development and by those who actually operate in company practise; these both dimensions of comparison are used in the 6th chapter of this paper.
- Besides this principle method, the project solution is also based on
- Descriptive methods which are used especially in definition of requirements for the professional competence development;
- Mathematical and statistical methods used in the expression of trends and relations which are the subject of investigation of the empirical part of project; due to required length of paper the tables and graphs which enables to formulate and support conclusions stated in the 7th chapter are not presented in the paper; nevertheless, they are available for interested parties and they will be commented during the paper presentation;
- Generalization which is used in the formulation of the project conclusions.
- All above stated methods are integrated in system approach. Also it is used in the following three sections:
- In the content of solved topic where it has been the intension of researches to investigate all substantial issues of the controllers' and management accountants' professional competence in their mutual relations;
- In expression of relations between investigated sections and the project conclusions; and
- In the integration of general and empirical part of the project.

The aim of the empirical phase of research which follows the definition of conceptual general outcomes is to map how the above stated tendencies manifest themselves in the recent requirements of professional competence of controllers and management accountants; moreover, the question has been analyzed from two view angles:

- From the view-point of experts who are responsible for their professional competence development in the pre-qualification stage;
- From the view-point of managers and controllers/managerial accountants operating in a business environment.

The research should give a comprehensive answer to the question to what extent the changing requirements of the professional competence of these experts are perceived in practice and reflected by institutions which are responsible for their universal education.

With regard to this aim the questionnaire was developed in two versions:

- a version concisely titled "**A controller/management accountant should be...**", designated for the first group of experts; and
- a version concisely titled "**A controller/management accountant is...**", designated for the second group.

The respondents of the second group are randomly selected companies operating in the Czech Republic (number of employees over 100, turnover over €50m and sales also over €50m). Companies from various industries are included in the sample.

Regarding the content and structure of both versions they are identical to a significant extent. Their basis was derived from the above stated analysis of the "Draft for a Common Statement". However, other materials have been also used as inspiration sources, especially:

- IFAC International Standards for Professional Accountants (IFAC, 2003);
- Revised Model Accounting Curriculum (UNCTAD, 2011);

- Syllabuses of the specializations “Accounting and Company Financial Management” (Major) and “Controllership” (Minor) taught at the Faculty of Finance and Accounting of the University of Economics, Prague;
- Education and certification programmes of professional competence development of both the Chamber of Auditors and Union of Accountants professional bodies operating in the Czech Republic; and
- Education and certification programme of the British Associations of Chartered Certified Accountants (ACCA) and Chartered Accountants of England and Wales (ICAEW).

A relatively broadly focused questionnaire, based mostly on questions, required answers on a scale from 1 (strong disagreement) to 5 (strong agreement), but – to a lesser extent – also required Yes or No answers and open answers. It investigated the experts’ opinions in the following problem areas:

- The position of controllers/management accountants in the organizational charts;
- The structure of departments of controllership/management accounting;
- The relationship of these departments to accounting, tax and other departments;
- The general content of the controllers’/management accountants’ activities;
- Areas and extent of the controllers’ authority and responsibility;
- The specific content of the controllers’/management accountants’ activities;
- Requirements for education;
- Requirements for professional skills and practical experience;
- Controllers’/management accountants’ role in ethical aspects of business.
- The selection of potential candidates for a controller / management accountant positions;
- Quality assurance of the controllers’/management accountants’ work.
- The intention of the research team was to work with the questionnaire in two stages:
- The aim of the first stage was to verify the questionnaire’s understandability and completeness in individual interviews with 20 – 30 representatives of both groups of respondents; and
- On the basis of this phase, analyze both questionnaires to formulate a structure which would be appropriate for their electronic distribution and assessment.

## **5 PROJECT GENERAL OUTCOMES**

The principle aim of the project was more complicated than it might appear *prima facie* – due to specifics of the profession of controller or managerial accountant and also due to territorial differences of their role in company management.

The requirements for competence of broadly defined profession of professional accountants are harmonised relatively unambiguously on the basis of the IFAC International Education Standards (2003) and in the area of education. They are even specified by the UNCTAD Model Accounting Curriculum (2011); however, they are the instruments of harmonisation which are oriented primarily to auditors as professional accountants. With regard to their specific role in the framework of the accounting profession it is apparent that the requirements for their professional competence development will be different from experts whose principle focus is to optimise companies’ activities “from the inside”.

Moreover, unlike auditors whose activities in the public interest have been the subject of legislative treatment, analogous legal harmonisation of the requirements for managerial competencies has been perceived to be not only useless but even harmful with regard to the creation of barriers for the free movement of experts.

Additionally, the historical development differences in the areas of managerial control and applied managerial approaches manifests itself by the fact that these experts have different titles in different parts of the globe, but they are also endowed with different levels of authority and responsibility and they operate in different levels of a company hierarchy.

Consequently, the work on the project could not commence with an immediate discussion about quality standards; the project team decided to develop an initial general paper defining the conceptual foundation of the project, its aim, content, structure and consensual terminology. The “Draft for a Common Statement” which represented the first stage of the project solution became the subject of discussion by national IGC members.

### **5.1 Common statement intention**

The intention of the common statement was to generate internationally valid definitions of controlling and the controller's work.

These definitions serve several purposes:

- They can help internationally operating companies to assign tasks, competencies and responsibilities to controllers and management accountants according to their function and role in central or decentralized units of a company;
- They can sharpen the "image" of the controller and the understanding of his partnering function with managers;
- They help to devise and validate the curriculum of educative organizations and make their programs meet the needs of the companies which hire controllers and
- They point out to prospective controllers if the institution they want to choose for their education will cover contemporary topics and teach the relevant topics in depth.

### **5.2 Preamble**

Controlling is defined in the statement as the work a manager (of every hierarchical level) performs to keep his business under control. This job includes awareness of financial performance and the controller's and management accountants' job is to enable managers to execute their controlling functions.

The profession is usually called "Controller" in Continental Europe whereas in English speaking countries it is called more frequently "Management Accountant".

- In the Institute of Management Accountants (IMA) and CIMA publications the term "Management Accountant" is used;
- The IGC uses the term "Controller";
- The IFAC sees management accountants as one group of "Professional Accountants in Business".

Especially for the reason to find consensus, the statement suggests simplification in the sense that controller and management accountant are synonyms.

*Although we supported this simplification for many reasons, we suggested an adjustment of primary orientation of controlling. The first sentence actually stresses the importance of **financial performance** which is understood very narrowly – see, for example, IAS Framework (2007) – especially in connection with factors influencing profit only; we suggested using “performance” only. This term*

- *Better reflects that not only the financial, but also the non-financial section of performance is important for the companies' success; and*
- *It is in the compliance with CIMA's terminology (Management Accounting. Official Terminology, 2000).*

### **5.3 Mission**

The statement defines controlling as an intrinsic part of management. In an organization, all people with the power to make decisions (managers) are also responsible for keeping their part of the organization under financial control. Financial control is understood especially as business control. This includes financial stability and transparency, sound and informed decision-making, forward focus on financial success, and a holistic view of the business and of the resulting financial issues (Horváth, 2006).

Consequently controllers are defined as the supporting partners for managers in business questions. They are involved when managers do not have enough time or knowledge to fulfil their controlling task.

Controllers prepare and use instruments, methods and key figures in a manner that enables managers to take decisions and to recognize their own responsibilities for results, processes and communication. The focus is on the financial success of the organization and on the performance of its parts. Also, controllers assist all other employees when they control their results, processes and communication with the help of support-systems and appropriate tools.

In our opinion, also stated mission contents the narrow orientation of the controllers' activities on financial section of undertaking only. This is the reason why we suggested the adjustments which would extend the controlling understanding like a part of management oriented to not only financial but also non-financial part of business and its control.

Also, the third paragraph of the mission does not reflect – in our opinion – the substance of a controller added value for the company's success; we suggested changing the second question in sense: "As the system of management control has become too complex recently, controllers should support managers especially with the execution of information, but also communication, advisory and service functions of this system".

### **5.4 Dimensions**

According to the Statement, it is necessary to differentiate five principle dimensions in the controllers' job: profession, function, processes, roles and job title. However, their detailed description and evaluation go beyond the scope of this paper.

### **5.5 Personal requirements for a controller/management accountant**

In relation to the abovementioned framework, the Statement also defines personal requirements which a controller should have. The Statement stresses especially the following:

- Controllers should be the economic conscience of their entities and represent its values.
- Controllers should think and act future-oriented. To do so, they develop methods for the identification and evaluation of opportunities and risks.
- Controllers should design and maintain the controlling systems and provide for a uniform data base. They work with standardized systems and instruments on recurring questions, with customized systems and instruments on specific questions.
- Controllers should be able to support and moderate the development of all performance-related and value-oriented plans of the entity. They build systems to measure the entity capability and performance. These orient themselves both towards the conditions of the business activity as well as to the requirements of the relevant interest groups in a comprehensible way. Controllers also use benchmarks for verification. Managers determine content and level of objectives in the entity units they are responsible for.

- Controllers should prepare internal reports according to the needs of managers to run the organization with equitable valuations. If the rules for external reporting contradict the internal use and purposes, controllers prepare the data to reconcile the internal and the external valuations and explain the differences in a comprehensible way.
- Controllers should be responsible to the board for the examination of the plausibility of plans and investment proposals that were prepared by others.
- Controllers should define and/or coordinate the period, content, procedure and methods of the complete planning process. They compile the required comparisons between targets and actual results as well as the variances. They interpret the results, determine the causes and effects, and provide recommendations for corrective action. They devise the management information system and develop it further.
- Controllers should present and interpret the data by an unbiased way to managers. They take care that the reports correspond with the possibilities of the respective managers to influence the results. They instruct and further train the management of all levels in the use and interpretation of the data.
- Controllers should work with reliable key figures and reference values (actual-/ plan-/ forecast-/ values). When aggregating data they consider the respective decisions.
- The controller should not pass on confidential information and not make use of it for illegal purposes or in order to damage the organization.
- Controllers should be loyal to their organization. They are open-minded towards the needs of their customers, the managers. They actively seek out interaction with their managers and suggest improvements and corrective actions also when not asked to do so.

In our opinion, this part reflects in a very comprehensive and understandable way controllers'/management accountants' personal pre-conditions. This is the reason we suggested adding only one paragraph, corresponding with the above stated ethical section of controllers' activities: he/she should support and communicate the necessity of adhering to professional values, ethics and attitudes in the activities of an entity.

## **6 EMPIRICAL RESEARCH RESULTS**

The research is in the stage in which:

- 27 interviews with experts of the first group were conducted and evaluated; 21 of them participated in the first stage (they also judged the understandability and completeness of the questionnaire) and responded to questions of "A controller/management accountant should be ..." questionnaire; and
- 74 interviews with experts of the second group were conducted and evaluated; 5 of them participated in the first stage and responded to questions of "A controller/management accountant is ..." questionnaire.

The evaluation of the questionnaires brought the following results.

### **6.1 Controllers' position in the companies' organizational charts**

The present research did not produce an unambiguous response regarding questions of controllers' position in companies' organizational charts, desired structure of the departments assuring controllers' functions, or their relations to accounting, tax and other departments engaged in various aspects of companies' financial management.



In our opinion, it is not only the difficult generalization of progressive tendencies but also the different Anglophone and Germanic approaches to these questions which are applied in the Czech business environment which can be the main reasons for this ambiguity.

Nevertheless, most respondents of both groups supported a solution in which controllers or management accountants act under the supervision of the chief financial officer and stressed that these experts should not have straight-line authority and responsibility, so that they can act more like “the company’s economic conscience”.

## **6.2 General content of the controllers’ activities**

Regarding the general content of these experts’ activities, both groups of respondents were almost unanimous regarding the desired content of the controllers’/management accountants’ work. The correctness of data which are processed subsequently into the output information used in the managerial control and the successive quality, availability and transparency of the information rendered to company management belong into the responsibility of these experts.

In compliance with the above stated role of the company’s economic conscience, both groups of respondents also agreed that a controller/management accountant should not bear primary responsibility for the company’s financial results; nevertheless, we can notice slightly higher level of average and mode of responses provided by the second group of respondents, i.e. managers and controllers. In our opinion, it is possible to interpret in a sense that while the first group strictly reject this responsibility for financial results, in practice controllers earn a part of their bonuses based on the results. Nevertheless, this tendency comes more from the necessity to communicate interest for the company’s results across all company employees, regardless of whether they directly influence them or not.

## **6.3 Areas of the controllers’ authority and responsibility**

In relation to above stated general content of the controllers’ activities, the questionnaire has also investigated desired and actual areas of the controllers’ authority and responsibility.

The results show the respondents’ agreement with the opinion that a controller should be equipped with an adequate level of authority and responsibility in the areas in which he/she serves as:

- Coordinator of activities connected with the company’s aims and means of their fulfilment formulation;
- Expert preparing scenarios of future solutions for management;
- Methodist who is responsible for company directives on pricing, costing, budgeting and management accounting development and who also pays attention to their adherence;
- Expert facilitating and supporting communication between departments in all areas of company management which require coordination;
- Communicator who is responsible for transferring reached results to the relevant management levels and someone who should comment on, explain and interpret these results to managers; and finally
- Expert who should participate substantially in the regulations of a company financial management development including the system of remuneration and motivation.

What is remarkable is that the results in the areas of coordination of activities connected with the company aims and means of their fulfilment formulation are significantly different. According to the first group, the role of these experts is crucially important in this area; however, according to the opinion of experts from companies, controllers do not support this area very intensively. In their view, controllers are more focused on the technical and process

activities of controllership and information support of management, and they are not involved so much in general questions of strategy formulation and implementation.

Also, a relatively low agreement exists between both groups of experts regarding whether a controller should act as an originator of an information system or its parts. Conversely, both groups found a consensus that a controller should not have the authority to influence source allocation (e.g. he/she should not decide about the sold products volume and structure, accept make-or-buy decisions or about the development of customer or distribution channels).

Approximately 25 % of respondents mark the financial results value of 4 or 5. The sub-results for this group in relation to areas of controller activities are interesting. The average value of this group for the area of the scenarios preparation is 2.72; for the decisions on resource allocation it is only 2.61. That means a discrepancy between responsibility for financial result and power to influence them.

#### **6.4 Specific content of the controllers' activities**

Regarding the specific content of the controllers' activities, the research has acknowledged the quite crucial role of controllers in ensuring the aims of target information i.e. in planning and budgeting on the strategic, tactical and operational levels, including processing and presentation of forecasts, estimates and expectations. The respondents' answers also stressed the importance of "traditional controllers' task" – adequate information support in business factors (fixed assets, inventories etc.) acquisition and management of business phases (research and development, purchasing, production, logistics, sale etc.).

Surprisingly, substantially lower agreement exists regarding controllers' participation in the management accounting system and connected internal reporting system development. The respondents also did not find strong agreement in response to the question "To what extent should controllers bear responsibility for the quality of company project management, risk identification and management and organization structures development?"

We can also notice a fundamentally different answer to the question whether a controller should assure quality information support in the areas of business factors acquisition and business phases management between experts from academia and practice. Nevertheless, after analysing the data, the difference in this opinion may be caused by the sample of respondents; the companies included in the pilot part of the research have a relatively simple business cycle and these factors didn't apply to them.

#### **6.5 Requirements for education**

The research also focused on the educational requirement of controllers. Regarding the structure of these requirements, the questionnaire came from the structure of knowledge defined by the IFAC International Education Standards as well as the UNCTAD Revised Model Accounting Curriculum; as it has been already mentioned that also the aims, content and structure of initial (pre-qualification) programmes of Chamber of Auditors, Union of Accountants and ACCA, as well as the abovementioned syllabuses of the specializations of Accounting and Company Financial Management and Controllership taught at the University of Economics, Prague were taken into the consideration.

Both groups of respondents highlight the requirement of financial accounting and reporting, management accounting and corporate finance knowledge. What is surprising is that the second group even prefers knowledge of financial accounting over management accounting one. According both groups of respondents, taxation, internal control systems, business administration and information and communication technology are other areas of controllers' knowledge relevant to their work. On the other hand, knowledge of law, auditing, marketing

and international aspects of business have low importance for the controllers' activities, according to both groups of respondents.

The research also examined the correlation between the importance of the controllers' activities and the requirements for their education. The correlation coefficient is 0.49. The research does not confirm a very strong dependence on the importance of controllers' activities and requirements for education. The respondents that gave a high value to the importance of controllers' activities do not support this opinion for education.

### **6.6 Requirements for ICT competencies**

Currently, controlling and management accounting practice is very influenced by ICT; this tendency has been stressed in many of the abovementioned sources. This has been the reason why we devoted one special part of our questionnaire to this issue.

Generally, the responses of both groups acknowledged the fact that the development of ICT has changed the substance of controllers' work and –conversely – controllers are required to participate actively in the development of the ICT system.

Regarding more specific areas of investigation, the questionnaire tried to ascertain the role of controllers in the area of ICT, especially whether they act as users of ICT only or whether they also participate actively in ICT development. According to both groups, controllers are considered mainly ICT users rather than originators and verifiers of processing and user quality. Not very surprisingly for us, both groups also agreed with the statement that controllers should not serve as managers of ICT projects.

### **6.7 Requirements for professional skills and practical experience**

The research also focused on the relation between technical skills and soft skills (professional skills and practical experience). Their structure is derived from the overview that is mentioned especially in IFAC International Education Standard 3 – Professional skills, but also from the other sources, mentioned in the section devoted to educational requirements.

Both groups of respondents consider the stated soft skills to be important for controllers' activities; nevertheless, technical skills have slightly higher values. What is interesting is that the respondents of the first group consider soft skills to be more relevant in comparison with managers'/controllers' responses. In our opinion, the principle reason for this is the fact that, recently, the soft skills of controllers do not reach required level yet in the Czech Republic. Moreover, managers operating in business are still not convinced about their importance.

### **6.8 Controllers' role in ethical aspects of business**

According to the results of the research, both groups of respondents generally agree with the hypothesis that it is important for a company to define, enhance, support and communicate effectively ethical principles and rules of how they are carried out.

On the other hand, the research confirms quite a poor level of application of ethical principles and rules in business. This fact is quite apparent from the comparison of responses of both groups to the answer, whether controller participates in the development of ethical company standards, codes and guidelines: according to the first group of experts, it is very important to incorporate these standards into company standards, codes and guidelines. However, this importance is not followed by the recent situation declared by second group of respondents.

What is quite unsatisfactory, is the role of controllers in the process of ethical aspects of undertaking enforcement. While first group of respondents (and also standards and guidelines devoted to ethical aspects of professional accountants' activities) evaluate this section of controllers' work as quite important, according to the second group of respondents, recent situation in companies shows great possibilities for improvement in the future.

## **6.9 Human resource management**

The section devoted to human resource management is concentrated in two problem areas:

- The selection of potential candidates for a controller position; and
- The attention which is devoted to controllers' continuing professional development.

The questions relating to the selection of potential candidates for a controller position provide especially interesting outcomes.

First: education and practical experience are considered to be more important than personal values and communications skills for both groups of respondents; but, the difference is small and confirms the high importance of communication and presentation skills.

Second: relatively high importance is also given to language knowledge; to some extent, the mode given by the group of managers of controllers is 5. The reason is probably due to the fact that a many companies in the sample belong to multinational corporations, and effective communication with higher levels and other network members has a great importance.

Analysis of the area devoted to controllers' continuing professional development confirms that both groups of respondents consider professional development quite crucial for the quality of controllers' work. Management enables the continuing professional development of its controllers to some extent, especially when the company controllers are actively searching for such opportunities. However, according to the second group of respondents, company management does not pay adequate attention to whether controllers enhance their professional competence – especially if controllers are passive in this regard.

Both groups are unanimous that most controlling departments consist of a stable team of experts, one which does not change very much, and that is quite important for the quality of the team's work. Respondents also found an agreement that remuneration of controllers seems to be slightly higher than the average companies' level.

## **6.10 Quality assurance of the controllers' activities**

Data gained from the part of questionnaire devoted to quality assurance confirm the necessity of regular evaluation of controllers' work. On the other hand, answers to the open question "How is the controllers' work evaluated?" were very general, for example by vague explanation "the evaluation is realised on a mother company level". In this regard, it seems to us that development of quality standards for this group of experts could enhance the general awareness of how to assure the future quality of the profession.

## **7 CONCLUSIONS**

Although the outcomes of the project investigated the situation in the Czech Republic, in our opinion it already brings inspirations both in the area of general usage of the "Draft for a Common Statement" ideas, as well as the outcomes of the empirical research.

Regarding generalization of the "Draft" ideas, it is apparent that it is the first, but nevertheless an important step on the road whose general aim is not only to define, but also to enforce into practice and assure (more non-formal than supported by legislation) recognition of quality standards for managerial accountants' and controllers' work. Its content has already contributed to a better understanding of the differences which accompany the development of this profession in different part of the globe. It also enables better identification of common features and differences in profiles and professional orientations of auditors and professional accountants in business and of managerial accountants or controllers.

Consequently, the Draft content creates a solid outcome for the development of the first set of “Standards of good practice”, and discussion materials which can inspire by examples of “best practice”, all of which should contain:

- Definition of aims, content and structure of pre-qualification education including requirement for assessment of acquired level of knowledge;
- Determination of requirements for professional skills of these experts including how they are acquired;
- Definition of ways to gain practical experience including the manners and methods of verification whether the experiences have been really accomplished;
- Development of a discussion paper which would define the aims, content, structure and ways to verifying the continuing professional development of these experts; and
- Development of a code of ethics as a principle instrument to enforce professional approaches, values and attitudes in the work of managerial accountants and controllers.

Concrete suggestions regarding the individual abovementioned problem areas should be derived from the results of empirical research. Already investigations made in the Czech environment have brought some important stimuli for the controllers’ professional development management:

- Controllers are required to be responsible primarily for the availability and transparency of the information rendered to company management; on the other hand they should not be responsible primarily for company’s the financial results;
- In the area of requirements for education, both groups of respondents strongly highlight the knowledge of financial accounting and reporting, management accounting and corporate finance; in the ICT area, the controller is considered to be mainly a user rather than an originator and verifier of processing and user quality;
- In the area of requirements for professional skills and practical experience, both groups of respondents consider soft skills to be important; nevertheless, they perceive technical skills even more relevant for the controllers’ professional competence; the recent situation in the Czech Republic in worse in the area of soft skills of controllers as company managers are not convinced about their importance;
- Both groups of respondents also confirm how important for a company it is to define, enhance, support and communicate effectively ethical principles and rules of undertaking; on the other hand, the research also confirms a very poor level of their application in practice; this is the reason why this aspect should be incorporated into the quality standards as a very important one;
- Both groups of respondents consider professional development to be quite crucial for the quality of the controllers’ work; in this regard, management enables its controllers to continue their professional development, but it does not always verify whether controllers enhance their professional competence;
- The statistical results of quality assurance of the controllers’ work confirm the necessity of evaluating controllers’ work. On the other hand, answers to open questions such as “How is the controllers’ work evaluated?” were very general.

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The article has been developed as one of the outcomes of the IGA project No. F1/4/2012 "The impact of business environment changes on the professional competence of company controllers and in the frame of institutional support of science No. VŠE IP100040.

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## **PROJECT OPTION VALUATION: A CASE STUDY**

*Eva Kramná*

### **Abstract**

The objective of the company is to create wealth by initiating and managing investments that generate future cash flows that are worth than the costs of the investment. Effective capital budgeting can improve both the timing and the quality of asset acquisitions. It influences financial performance and health of the company. The purpose of this paper is to provide a detailed economic analysis of the investment project valuation by using traditional Net Present Value and flexible real options method. The purpose of this study is to analyze and verify the application of the real options methodology for investment decision making.

*Keywords: real options, net present value, flexibility, investment decision-making*

JEL Classification: M21

### **1 INTRODUCTION**

Investment decision making is essential and integral part of the financial management. Investment is usually connected with large capital expenditure from which the company expects high return on investment. Strategic investments are long term, influenced by a lot of internal and external factors and mostly accepted for constantly changing conditions. When company evaluates an internally generated investment project, one of the first step in the process, is the valuation of the opportunity. Using right tool to valuation will make better investment choices. A lot of approaches for projects valuation can be found nowadays. Without a doubt the best known and the most popular approach used for valuing investment opportunities is the Net Present Value (NPV) method which relies on discounted cash flow techniques as pointed by Brealey and Myers (2014). However, growing number of academics and practitioners have demonstrated that DCF valuation techniques do not capture some of the facts of today's business world. Inadequancies incorporated in traditional methods described Schwarz and Trigeorgis (2004), Copeland and Tufano (2004). Critics have argued that traditional techniques can, at times, lead to incorrect capital budgeting decisions. Mun (2006) presents that use of traditional discounted cash flow model are flawed because the model assumes a static, one-time decision-making process while the real options approach takes into consideration the flexibility and uncertainty in valuation. Myers (1984) suggests to view the investment project from the real options perspective rather than traditional financial theory. Koller, Goedhard and Wessels (2010), Guthrie (2009), Mun (2006), Damodaran (2011) propose modifying opportunities for growth of company on the basis of real options.

This paper considers the flexible investment project valuation. The purpose of the paper is to analyze and verify the application of the real options methodology for investment decision making. In the paper the investment project valuation by net present value and real options is demonstrated. The framework of real options is introduced theoretically and in terms of case study it is demonstrated how it can be implemented valuation of investment opportunities, especially those that bear high risk and uncertain future cash flow.

The remainder of this paper is organized as follows. Section 2 compares two main approaches to value investment projects with focusing on real options calculations as well as input parameters. Section 3 briefly describes objective and methodology of the paper. Section 4

presents the results of the analysis. The main ideas based on the results are discussed in section 5. Finally, section 6 concludes.

## **2 FLEXIBLE PROJECT VALUATION**

This section discusses the link between traditional net present value (NPV) calculations and real options approach from the theoretical and practical point of view.

### **2.1 Traditional and flexible models**

As a basis for understanding of real options application, it is essential to clarify differences and similarities between traditional decision analysis (NPV) and real options analysis (ROA). Net present value of the project is the difference between the present value of the future cash flows of an investment and capital expenditure of investment. The formula for calculating NPV can be written as:

$$NPV = C_0 + \frac{C_1}{1+r}, \quad (1)$$

where  $C_0$  is capital expenditure (cash outflow),  $C_1$  is expected future cash flow of an investment,  $r$  represents costs of capital.

By definition of NPV rule, all projects with a net present value greater than zero is able to accept. (Brealey & Myers, 2014) Although NPV is well known and used method, researches find out that it ignores the irreversibility of investment project as well as the value of flexibility to revise decisions after a project begins (Trigeorgis, 1998).

The relatively new approach that can help to overcome these limitations and provide more accurate valuation than the static discounted cash flow approaches by quantifying a project's embedded options called real options. (Schwartz, 2013) The concept of real options has the potential to capture the value of flexibility to revise management decisions made in the future with the advantage of better information (Rogers, 2009). As pointed by Schwartz (2013), the flexibility can be a considerable component of value for many investment projects and the framework of option pricing provides a powerful tool for analyzing such flexibility. According to Smith and Trigeorgis (2004) and Trigeorgis (2005) the strategic NPV can be expressed as follows:

$$\text{Strategic NPV} = NPV + \text{option premium}, \quad (2)$$

where NPV is the net present value of the investment project and option premium represents value of flexibility operation intervention.

### **2.2 Real options models**

For real option pricing can be used many tools but most of them are suitable only in specific situations. The most important and commonly used concepts in modern financial theory are Binomial and Black-Scholes model, as mentioned by Brealey and Myers (2014). Each of them has its own advantages and disadvantages. Key assumption that distinguishes both methods is underlying asset price development. Black-Scholes model is based on assumption that the underlying asset price follows stochastic process. On the other side, the fundamental of binomial model is discontinuity of time. The binomial model takes the risk-neutral approach to valuation. It assumes that underlying asset value can only either increase or decrease during time until option expires worthless. (Mun, 2006)

The model defines two approaches through which it is possible to determine the option value, replication and hedging strategy. Replication strategy is based on the fact that the portfolio



consists of underlying (risk) asset,  $S$ , and risk-free asset,  $B$  so that the portfolio replicated the underlying asset price development. (Zmeškal, 2013)

Portfolio value,  $C_t$ , at the beginning at the time  $t$ ,

$$a \cdot S_t + B_t = C_t, \quad (3)$$

portfolio value,  $C_t$  in the end at the time  $t+dt$  by increase of assets,

$$a \cdot S_{t+dt}^d + B_t \cdot (1+r)^{dt} = C_{t+dt}^d, \quad (4)$$

portfolio value,  $C_t$ , in the end at the time  $t+dt$  by decrease of assets,

$$a \cdot S_{t+dt}^u + B_t \cdot (1+r)^{dt} = C_{t+dt}^u, \quad (5)$$

where,  $S$ , is the value of underlying assets,  $a$ , the quantum of underlying assets,  $B$ , is the value of risk-free asset,  $C$ , is the value of the derivative,  $r$  is risk-free rate,  $u$  ( $d$ ) increase (decrease) underlying assets value index.

By solving all above mentioned equations the unique general relationship for option pricing is gained. The equation for the option pricing by assuming risk neutral probability of growth,  $p$ , according to the Zmeškal (2013) could be simplified as follows:

$$C_t = (1+r)^{-dt} \cdot [C_{t+dt}^u \cdot (p) + C_{t+dt}^d \cdot (1-p)]. \quad (6)$$

In american options pricing is necessary to take into account the possibility to exercise the option till maturity and to modify the equation as follows:

$$C_t = \max[VH; (1+r)^{-dt} \cdot (C_{t+dt}^u \cdot p + C_{t+dt}^d \cdot (1-p))]. \quad (7)$$

One of the important calculations is estimation of input parameters  $p$ ,  $u$ ,  $d$ . Assuming continuous price development of risk-neutral environment, i.e. mean value of the asset has to be equal to the price of the asset at the risk-free payoff,  $\Delta t = T/n$ , then:

$$S \cdot e^{r\Delta t} = p \cdot S \cdot u + (1-p) \cdot S \cdot d, \quad (8)$$

and variance of the proportional price change of asset is equal to  $\sigma^2 \cdot \Delta t$ , i.e.

$$p \cdot u^2 + (1-p) \cdot d^2 - [p \cdot u + (1-p) \cdot d]^2 = \sigma^2 \cdot \Delta t. \quad (9)$$

The last condition is:  $u \cdot d = 1$ .

By solving above equation the up and down probabilities can be expressed as

$$\begin{aligned} u &= e^{\sigma\sqrt{\Delta t}}, \\ d &= e^{-\sigma\sqrt{\Delta t}}, \\ p &= ((1+r)^{\frac{T}{n}} - d) \cdot (u - d)^{-1}. \end{aligned} \quad (10)$$

### 2.3 Input parameters of real options models

Real options depend on six basic variables. They are:

- The value of underlying asset – the value of underlying asset is able to determinate as the expected present value of cash flows from investment. An increase in the present value of the project will increase the NPV a therefore the real option will also increase. (Copeland & Antikarov, 2003)

- The exercise price – it corresponds to capital expenditure of the investment. Typically, it represents prospective costs of investment, namely for real call option it is capital expenditure at the start of the project, for sell options it is capital expenditure of savings or residual value at the end of the project. A higher investment cost will reduce NPV and therefore the real option will also decrease. (Copeland & Antikarov, 2003).
- The time to expiration of the option – it is the time during which management may decide to act, or not act. A longer time to expiration will allow us to learn more about uncertainty and therefore the real option will increase. (Koller, Goedhard & Wessels, 2010)
- Volatility of the value of the underlying asset – it is a measure for uncertainty as to the change in value over time. Volatility is usually given as variance or standard deviation of future cash flows from real assets. An increase in uncertainty of the environment will increase the real options value. (Copeland & Antikarov, 2003) It exists a lot of methods for volatility determination. From my point of view, methods based on historical values should be applied if the underlying asset is traded in the market and there are plenty of correct data from the past and it is able to assume that the future will evolve like the past. Because real options are rarely traded the alternative is to use the volatility of such asset that significantly correlated with the underlying asset and is traded on the market. Another appropriate possibility is to use historical volatility typical for the selected sector.
- The risk-free rate of interest over the life of the option – it equal to risk-free interest rate used for financial options. An increase in the risk-free rate will increase the time value of money advantage in deferring the investment costs and therefore it will increase real option. (Koller, Goedhard & Wessels, 2010) In my opinion, the approximation of the risk-free interest rate should be based on the current market data because the fundamental for estimating the market investment value are market data and their expected development. This should correspond to a risk-free interest rate.

#### **2.4 Sensitivity analysis**

Sensitivity analysis tests how the project's value responds to changes in key inputs as mentioned by Koller, Goedhard and Wessels (2010). From the investor's perspective sensitivity analysis can focus on which inputs to investigate further and monitor more closely. It can also draw attention to any incorrectness in determined inputs for option pricing. Very simple tool is considered Tornado diagrams. It provides decision makers a quick overview of the risks involved. Tornado diagrams help visualize these factors whose uncertainty drives the largest impact on the project value. (Koller, Goedhard & Wessels, 2010)

### **3 OBJECTIVE AND METHODOLOGY**

The article concentrates on the project's valuation under risk and flexibility. The main aim is to determine the effectiveness of the company's investment by using traditional method Net Present Value (NPV) and flexible method real options. The purpose of this study is to analyze and verify the application of the real options methodology for investment decision making.

The research has examined the research questions concerned applicability and process of real options methodology:

1. Does real options theory represent a suitable tool for evaluation of investment?
2. What are the input factors and parameters for real options valuation and how is possible to determine input parameters relevantly?

The real options framework is tested on selected company. The input data for investment valuation are obtained from the balance-sheets, income statements and internal materials of the company XY. The company XY is analyzed from the 2010 to 2013. Firstly, the value of the project by NPV in three scenarios is determined. The strategic and SWOT analysis helped to identify real option. Hereafter, the real options methodology for investment valuation is used and strategic NPV value is calculated.

## **4 RESULTS AND DISCUSSION**

In the following section the application of real option methodology for assessment of investment effectiveness is presented.

The case study concerns evaluation of investment project of the company XY specialized in production, processing and installation of concrete armature. The company's aim is to bring high-quality products to its customers. Therefore, management considers the purchase of new technological equipment for the production of so called 3D-stirrups. The use of this technology will bring material reduction and improving of technical characteristics. It is necessary to maintain technological competitive advantage and market position. The implementation of new technology will bring the possibility of increasing production capacity to realize shorter delivery times of individual contracts.

Management expects from the innovative solution the following positive effects:

- increase number of customers and market expansion,
- maintenance utility product's characteristics and reducing costs simultaneously,
- increase product quality,
- production efficiency and maintenance of market position,
- possibility to expand to other countries.

### **4.1 Valuation of investment project by traditional method**

Capital expenditures include purchase of 3D bending and cutting automated line including accessories. The planned values of revenues and costs are based on estimated contract development and business calculations. The prediction of project cash flow is quite difficult to estimate because it is influenced by many factors. It is therefore necessary to approach with caution to estimation of future revenues, especially with relation to the current situation in building-construction market. Therefore, it is taken into account the possible pessimistic scenario assumes slower growth in revenue of 10% compared with neutral scenario. The company is also aware of several times higher revenues. The optimistic scenario assumes 10% higher growth in revenue compared with neutral scenario. The neutral, pessimistic, optimistic scenarios are summarized in the Tab.1.

Tab. 1 – Cash flow of the investment. Source: Kramná, 2014

<b>Cash flow scenario (in thousand CZK)/Year</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>
Neutral	-1229	154	542	696	928	1141	1438	1582	1642	1783
Pessimistic	-1581	-364	-100	62	317	631	1115	1260	1323	1462
Optimistic	-778	600	853	1009	1249	1467	1762	1905	1960	2103

The sum of the cash flows is discounted by weighted average cost of capital and the final net present values for neutral, pessimistic and optimistic scenario are presented in the following Tab. 2.

Tab. 2 – Net Present Value of the individual projects scenarios. Source: Kramná, 2014

<b>Scenario</b>	<b>Criterion of the project effectiveness</b>	<b>Value (in thousand CZK)</b>	<b>Assesment of economic effectiveness</b>
Neutral	NPV > 0	2 151	Efective
Pessimistic		-2 400	Non-effective
Optimistic		5 604	Efective

The results show that in case of neutral and optimistic scenarios, the project will be economically efficient for the company and its implementation will contribute to the growth of the business value. However, in the case of fulfillment of the projected cash flows in the pessimistic variant the project is not effective to implement.

The traditional NPV method assumes a fixed implementation projects strategy with definite financial plan. With regard to the changing business environment, it is necessary to take measures in business activities. The change of the strategy during the project implementation can influence the actual project value. This flexibility value can be included in the project value by application of real option.

#### **4.2 Valuation of the investment project by real options**

Flexibility is the right of the management to expand to the markets in which they operate in case of growth number of contracts. In case of unfavorable estimated number of contracts the technological equipment can be sold.

The nature of the project and results of the SWOT analysis confirm that the project is flexible and is related with some degree of risk in forecasting cash flow. From this point of view, it is appropriate to apply real options methodology for investment valuation.

##### **Growth options – new markets**

Project opportunities arise from the possibility of obtaining new markets due to increasing of product technological norm. Expanding activities in new markets will bring additional revenues to company. It is call option where underlying asset is the net present value of future

cash flows from the expansion into the new market. The production increase is estimated to 20%. Exercise price is the capital expenditure associated with entry into the new market. The incursion into new market is connected with an increase of direct costs (20%) and additional costs for promotion of new armature type, finding of new customers, distribution costs of products and provision of tax consultant service. It represents american call option because the company has the possibility to enter into new markets at any time during the working life of technological equipment. Time to expiration of the option is 10 years. The parameters required to use Binomial model are shown in the Tab. 3.

Tab. 3 – Basic input parameters. Source: Kramná, 2014

Parameter		Characteristics	Value
Underlying asset	$S_t$	Net present value of future cash flow	6 069
Excercise price	X	Capital expenditure of project	8766
Volatility of the underlying asset	$\sigma$	Volatility of project	0,38
Maturity	T	Time of the project extending	10
Coefficinet of up movements	u	Up movements	1,8523
Coefficinet of down movements	d	Down movements	0,5399

Based upon these inputs, the Binomial model provided following value (Fig. 1) for underlying asset during the time of 10 years.

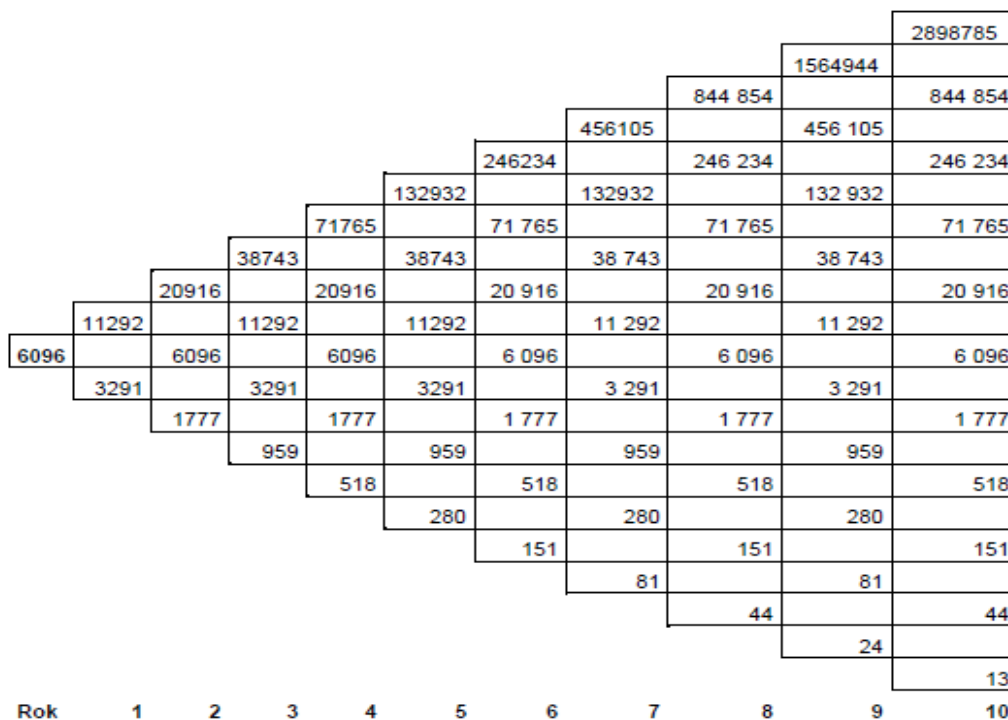


Fig. 1 – Underlying asset value. Source: Kramná, 2014

The value of underlying asset is able to increase by coefficient of up movement  $u$  with probability  $p$  and decrease by coefficient of down movement  $d$  with probability  $1-p$ .

The following Fig. 2 illustrates the intrinsic value of real call option at any point in time.

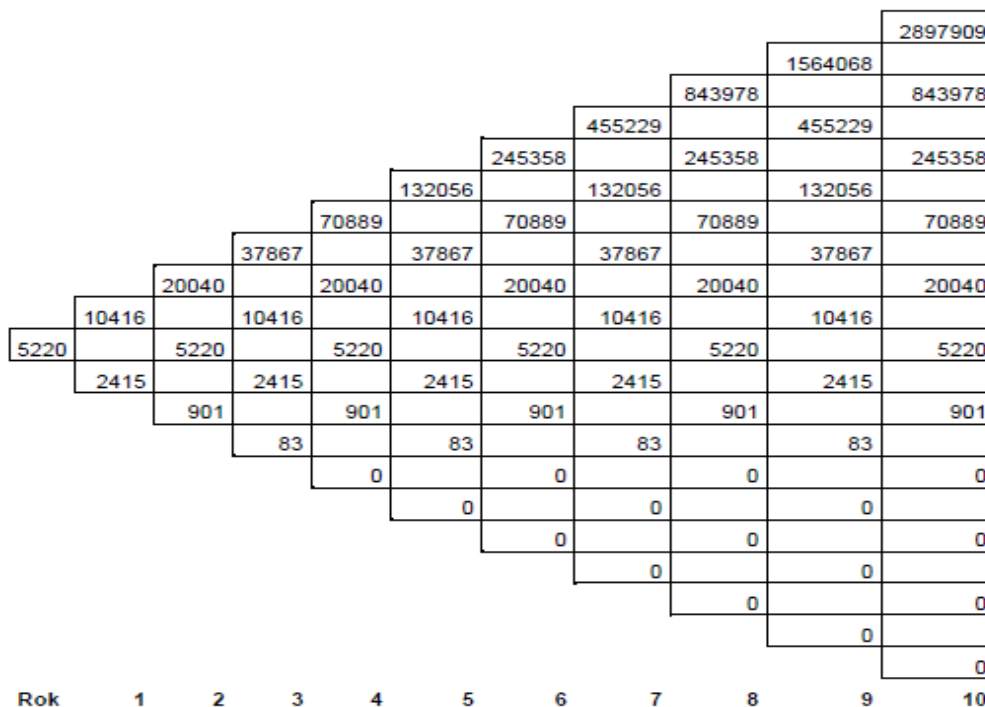


Fig. 2 – Intrinsic value of real call option. Source: Kramná, 2014

Real call option is preferable to apply only if it has intrinsic value, i.e. the difference between the current price of the underlying asset and the strike price is positive.

Valuation of real options assumed risk-neutral approach. As the basis for the approximation of the risk-free rate is used current yield to maturity of 3, 5 and 10 year bonds. The summary of risk free interest rate and risk-neutral probabilities of up and down movement is presented in the Tab. 4.

Tab. 4 – Risk-neutral probabilities and riskless interest rate. Source: Kramná, 2014

<b>Parameter</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>	<b>2023</b>
Risk-free interest rate (%)	2,10	1,82	2,67	1,27	1,98	2,78	2,67	3,69	3,63	3,97
$p$	0,37	0,36	0,37	0,36	0,37	0,37	0,37	0,38	0,38	0,38
$1-p$	0,63	0,63	0,63	0,64	0,63	0,63	0,63	0,62	0,62	0,62

Afterwards, the option value by replication strategy is determined. It is based on the assumption that the option price at maturity equals pay-off function. To establish the option price at each node is possible by reverse process from its realization to the initial value.

										2897909
								1564102		
							844041		843978	
						455321		455262		
					245447		245421		245358	
				132164		132110		132090		
			71018		70974		70889		70889	
		38021		37985		37936		37901		
	20252		20193		20144		20103		20040	
10708		10635		10574		10508		10449		
5612	5541		5463		5379		5283		5220	
	2848		2773		2693		2584		2448	
		1385		1313		1222		1092		901
			626		562		471		330	
				251		197		120		0
					81		44		0	
						16		0		0
							0		0	
								0		0
									0	
										0
Rok	1	2	3	4	5	6	7	8	9	10

Fig. 3 – Option to growth. Source: Kramná, 2014

The value of growth option is 5 612 thousand CZK. The option value quantified the possibility to expand into new market. Exercising the option right to expand production to foreign markets will increase the value of investment.

Strategic present value of the investment, i.e. the sum of the net present value of the investment plus the value of the real call option, is 3 212 thousand CZK.

$$\text{Strategic NVP value} = -2400 + 5612 = 3212$$

The results confirm that incorporating the right to expand into new market make the investment favorable.

### Sensitivity analysis

Sensitivity analysis provides information about the sensitivity of each factor on the selected parameter. The value of the investment is affected by many factors, i.e. production capacity, selling product's price, price of basic raw materials, the level of fixed costs and also external economic conditions such as interest rates, exchange rates, etc. Selected risk factors are assessed on the following Fig. 4 in descending order according to their influence on the option value.

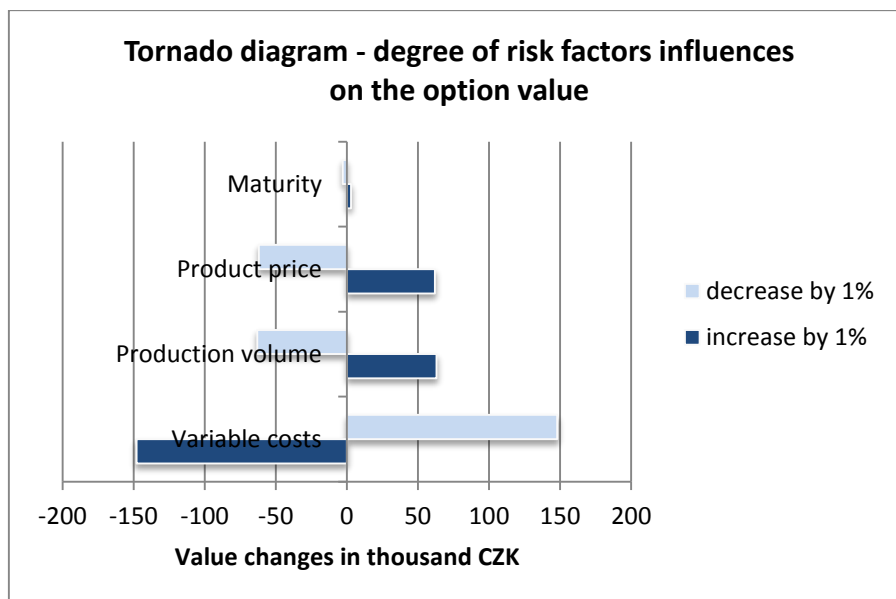


Fig. 4 – Tornado diagram. Source: Kramná, 2014

The results of the sensitivity analysis show that key risk factors are variable costs of the project. Decrease of variable costs by 1% growth option value of 148 thousand CZK (increase of 2,6%). The option value increases with the growth of production and price. Relatively small changes in option value evocates the maturity of option.

Nevertheless, this research is connected with some potential limitations. The problem related to the application of the real options methodology in practice could occurs when the underlying asset price is not known from the market. In this case the underlying asset value is calculated as the present value of future cash flow from the underlying investments. On this account the underlying assets is linked with other real options input parameters.

The results showed that in the case of pessimistic scenario the project seems to have no added value for company. However, when evaluating investment it is appropriate to take into consideration all factors and possibilities that the project create during its life. These issues could considerably affect the final project value. Real options approach has the potential to capture the flexibility value of the project. Application of the real options can improve the rationality of investment decision-making. The advantage of the real options model is especially train of thought that not says only whether to accept or reject an investment but when and under what conditions to realize it. The application of real options techniques provides long-term competitive advantage though better decision-making. On the basis of these results, I agree with Miller and Kelber (2015) that real options results should guide decision-makers to choose the best course of action, not necessarily to provide an “exact” option price.

In terms of these results, real options seem to be a useful tool for determining value of investment projects with higher volatility and flexibility.

## 5 CONCLUSION

Traditional capital budgeting methods are often insufficient to justify investment in nowadays turbulent and changing environment. Further, when the investment is evaluated, questions often arise concerning the optimal timing of the investment decision. Real options application



represents suitable tool to evaluate these issues. In this paper real options approach has been used in investment project valuation. The main aim of this paper was to analyze and verify the application of the real options methodology for investment decision making. The results confirmed that ability of company to change the course of investment has its own value. In the case study was the option to growth calculated. The possibility to expand into new market when the conditions were favorable became valuable. The results showed that real option added value to the investment project. It is able to confirm that a project with negative net present value can have a positive influence on the business value.

One of the problems with the real options applications in practice is the correct determining of the input parameters. For this reason the case study showed how to determine input parameters for real options model.

### **Acknowledgments**

*The authors are thankful to the Operational Programme Education for Competitiveness co-funded by the European Social Fund (ESF) and national budget of the Czech Republic for the grant No. CZ.1.07/2.3.00/20.0147 - "Human Resources Development in the field of Measurement and Management of Companies, Clusters and Regions Performance", which provided financial support for this research.*

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## **VALUE ADDED TAX RATES APPLIED TO LABOUR-INTENSIVE SERVICES AND IMPACT OF THEIR CHANGES ON THE VAT REVENUE**

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### **Abstract**

VAT rates changes, especially an application of reduced rates to labour-intensive services (restaurant and catering services, hairdressing services, minor repairing of shoes and leather goods and minor repairing of bicycles) in the European Union and the Czech Republic is a long term discussed topic. The aim of the paper is quantification of an assumed impact of potential transfer of selected services from the standard to the reduced VAT rate on the VAT revenue in conditions of Moravian-Silesian Region of the Czech Republic. The data for the analysis were obtained by the questionnaire research that was carried out among suppliers of these services, the General Financial Directorate and the Czech Statistical Office. While processing the paper there were used mainly the methods of comparison analysis and descriptive statistical methods. On the one hand, it was found by the analysis that this possible legislative change would lead to the drop of the VAT revenue up to 85 million CZK per a year, depending on the category of the services. On the other hand, it would bring positive aspects, especially an increasing of investment in business development by suppliers of those services. Last but not least, it could prevent price increasing during the planned introduction of the cash transactions fiscalization in the restaurants.

*Keywords: European Union Tax Policy, Labour-intensive Services, Value Added Tax, Value Added Tax Rates, Value Added Tax Revenues*

JEL Classification: D22, H21, H22, H32

### **1 INTRODUCTION**

Value Added Tax forms the most important part of national budgets revenues of the Member States of the European Union. Therefore, the problem of VAT rates application has been a long discussed topic in the Czech Republic and throughout the European Union. Generally, the current trend in the European Union is rather an increasing of VAT rates, which has a negative impact on the household consumption (Široký & Střilková, 2015).

Anyway, Bye, Strom, and Avitsland (2012) found by the research made in Norway that general and uniform VAT system covering all goods and services without exemptions is welfare superior to current and former non general and nonuniform Norwegian system. Similar results were obtained by Buettner and Erbe (2014) when they quantified the estimates of the effects of repealing the VAT exemption of financial services in Germany.

Nevertheless, the Czech Republic has introduced the second reduced VAT rate in the 10% level since the beginning of 2015, which is applied to selected types of goods (e.g. baby food, medicines and printed books).

In addition, the Czech Republic has been considering for a longer time in accordance with the Council Directive 2009/47/EC of 5 May 2009 amending Directive 2006/112/EC as regards reduced rates of value added tax, the application of a reduced VAT rate (now the first reduced rate on the 15% level) for the selected labour-intensive services for which there is still applied

the standard rate. Specifically, the restaurant and catering services, hairdressing services, minor repairing of shoes and leather goods and minor repairing of bicycles. (Chamber of Deputies of the Parliament of the Czech Republic, 2014). For the last time, the possible legislative amendment was discussed under Amendment No. 1341 of September 16, 2014 of Parliamentary press 251 of the amendment to the VAT Act which was published after its approval in the Collection of Laws of the Czech Republic in the Chapter 108 with No. 262/2014 Coll. However, this amendment was rejected again. For more about legislative process since 2009 see Randová and Krajňák (2009b).

The Government of the Czech Republic is going to gradually introduce a new tool in the fight against tax evasion, cash transactions fiscalization, since January 2016 (for more information about implementation of this system in Croatia see Tot & Detelj, 2014). The problem of tax evasion is dealt in detail also by Manea & Manea (2011). The cash transactions fiscalization will be related to the restaurants and hotels in the first stage. Ministry of Finance, in this context, has been considering transferring of restaurant services (excluding supply of alcoholic beverages) from the standard to the first reduced VAT rate to prevent excessive price increases (Kreč, 2015).

Unlike the Czech Republic, a majority of the Member States applied the reduced rate at least to some of the above mentioned services. Studies carried out in terms of these countries evaluated that this legislative change did not always lead to the anticipated positive effect, especially in terms of pricing policy of these services suppliers and state budgets. More positive indicators were generally reported in the area of business investment or increasing of profit but less into increasing of employment in the selected sectors. Another approach to the empirical analysis of impact of taxes other than income taxes on the corporate investment bring Buettner, Wamser (2009). Jensen and Schjelderup (2011) have also focused in their research to indirect taxation and tax incidence under nonlinear pricing.

These included e.g. the application of a reduced rate to restaurant services in France, where the beneficial effect was also reflected in an increase in employment (for more information see, e.g. Ministry for the Economy, Industry and Employment France, 2010 or Ministère de L'Artisanat du Commerce et du Tourisme, 2012). Furthermore, Finland, where the price reduction was reflected mainly in large companies, suppliers of hairdressing services and restaurants that were a part of an association of suppliers of restaurant services MaRa (see Kosonen, 2013 or Kosonen and Harju, 2013). In case of Belgium, there was an increase in number of jobs and business investment (for more information see Goos, Konings and Breemersch, 2013). In Germany, the VAT rate applied to restaurant services was reduced in 2010, which led to an increase of investment in the sector and a slight increase of job vacancies (Lomas, 2010). The reduction of VAT rates in the sector of hotel and restaurant services was also considered in Italy. The results of the study showed an increase in consumption of accommodation services, a slight decrease in prices and increase of new jobs. Despite the positive aspects, however, there would be a decline in VAT revenues (Manente and Zanente, 2010).

The paper is focused on quantification of impact of possible transfer of above mentioned selected labour-intensive services from the standard to reduced VAT rate on VAT revenue in the conditions of Moravian-Silesian Region of the Czech Republic.

## **2 THEORETICAL BACKGROUND**

VAT is a general consumption tax which the taxpayer, the final consumer pays included in the price of purchased goods and services (James, Nobes, 2010). Fundamental characteristic and unquestionable advantage of VAT is its neutrality, it does not reflect the income situation

of the consumer (Široký, 2008). The VAT payer pays tax on the output of the taxable supply, while claiming deduction of the received taxable supplies in order to realize this taxable supply (Platteeuw & Pestana, 2011). Every supplier of goods or services pays the tax only on the value that he added by his or her activity.

The general provisions regulating the issue of VAT rates applied in the Member States of the European Union are contained in Articles 93 to 130 of the Council Directive 2006/112/EC of 28 November 2006 on the common system of the value added tax (hereinafter referred to as VAT Directive) and its relevant Annexes. From the provisions referred that the supplies of goods and services are usually subject to the standard VAT rate of at least 15% (Annacondia & Corput, 2013). Furthermore, the Member States are allowed to apply one or two reduced rates of at least 5%, but only for a limited range of goods and services. As also reported in their publications, e.g. Široký (2013) and Hemmelgarn (2013), most Member States use specific exceptions to these rules. This is usually application of reduced or zero VAT rates on goods and services satisfying the basic needs (Kubátová, 2010).

Application of reduced VAT rates on labour-intensive services has been an actual topic for a longer time. The labour-intensive services have limited ability to innovate (they cannot benefit from technological progress as much as other sectors) and therefore have a relatively high costs per unit of labour. This sector is under high competitive pressure and employs a lot of young people and people with low qualifications (European Commission, 2011).

In this context, within the originally three-year experiment there was adopted Council Directive 1999/85/EC concerning VAT on labour-intensive services (category minor repairs of bicycles, shoes and leather goods, renovations and repairs of private dwellings, cleaning in private households, domestic care services and hairdressing), which allowed since 1 January 2000 to apply a reduced VAT rate to certain specified labour-intensive services, but only for an experimental period so that it could be possible to test the impact, in terms of job creation and in combating the "black" economy. Originally a three-year experimental period was extended several times until the end of 2010.

The European Commission had to prepare a report for evaluation of this experiment to the European Parliament. The required evaluation report was prepared in May 2007 by a company Copenhagen Economics as a study on reduced VAT rates applied in the Member States of the European Union "Study on Reduced VAT applied to Goods and services in the Member States of the European Union" (hereinafter CE study). A group of independent economic experts examined the impact of reduced VAT rates and exemptions on locally supplied services, particularly in relation to job creation, economic growth and the proper functioning of the internal market. Key results showed, as stated in Copenhagen Economics (2007), that the economic impact of the transfer of services from standard to reduced VAT rate envisaged an increasing of productivity, gross domestic product, employment, wages and lower prices of services. Higher wages and lower prices should bring an increase in consumption in the EU, which would lead to an increase in demand for these goods and services. This study also assumes that SMEs will be able to enter the market thanks to the released barriers, through which the large companies have the opportunity to keep prices unreasonably high, the opportunity to enter the market. Other assumptions include the shift from a so-called gray economy and "do it yourself activities" into the legal taxable sphere. Based on the results of this report and other consultations, the European Commission concluded that the application of reduced VAT rate for labour-intensive services which are intended for the local market, poses no real threat to the functioning of the internal market.

For these reasons, Council Directive 2009/47/ EC of 5 May 2009 amending Directive 2006/112/EC as regards reduced rates of value added tax (hereinafter "Directive 2009/47/

EC") which entered into force on 1 June 2009. Directive 2009/47/ EC allows the Member States of the European Union to include the selected services within a reduced tax rate without a time limit. In addition to the previously mentioned services, there are also a restaurant and catering services and delivery of books on any medium.

Even if the Directive 2009/47/ EC was adopted during the Czech presidency of the Council of the European Union, paradoxically it has not been yet fully implemented to the Czech legislation.

The proof of the persistent relevance of the VAT rates topic in the European Union also reveal are two public discussions that the European Commission launched to this given subject.

First, in 2010 was launched a consultation entitled "Green Paper on the future of VAT. Simpler, more robust and efficient VAT system." (European Commission, 2010) followed by debate in 2012 entitled "Review of existing legislation on reduced VAT rates". The purpose of these public consultations was according to the European Commission (2012) to collect relevant opinions, evidences and recommendations of the general public, especially among professionals in order to help the European Commission to develop reflection in this field. The results of those discussions, similarly to the results of the CE study from 2007 led to the recommendations for the Member States to apply the reduced VAT rates for selected commodities and services, including the labor-intensive ones which are intended for the local market, for more information see Copenhagen Economics (2007).

### **3 OBJECTIVES AND METHODOLOGY**

The goal of this paper is to quantify the foreseeable impact of a potential transfer of selected labour-intensive services from the standard to reduced VAT rate on VAT revenues in the conditions of the Moravian Silesian-Region of the Czech Republic.

The data for the primary empirical research were obtained by the questionnaire research carried out among suppliers of these services in the Moravian-Silesian Region of the Czech Republic. Moravian-Silesian Region has been chosen for the research due to the seat of the authors' university and easier availability of respondents. The individual categories of the respondents included suppliers of the labour-intensive services, to which is not according to the Directive 209/47/EC a reduced VAT rate is not applied. Especially restaurant and catering services, hairdressing services, minor repairing of bicycles, shoes and leather goods. Last but not at least, mainly for the more advanced analysis was made using the data from the Czech Statistical Office and the General Financial Directorate of the Czech Republic (GFD).

On the one hand the questionnaire contains the actual data for the taxable period 4<sup>th</sup> calendar quarter of the 2010 or in case of month taxable period - December 2010. On the other hand it contains the data that are presupposed by the VAT payer in case of the transfer of these services from the standard to the reduced VAT rate (Randová & Krajňák, 2013). Respondents who were not registered to VAT reported the data that would be demonstrated in a situation if they were VAT payers.

For the analysis that is contained in this paper, was prepared using the data included in the questionnaire related to VAT liability. Specifically: sales excluding VAT, costs excluding VAT, output tax according to VAT rates, input tax according to VAT rates and tax liability. Presupposed data of the respondents took into involved aspects of changes in labour productivity, number of employees, labour costs, trade margin, and investment in business development or potential increase of demand of their services.

For more information about impact of potential VAT rates changes on the behavior of suppliers of these services, see Randová, Krajňák (2012b), for more about the pricing policy of restaurants see e.g. Randová, Krajňák (2012a), about their investment decision Randová, Krajňák (2012c) or for more information about results in the categories of hairdressing services, minor repairing of shoes, leather shoes and bicycles see Randová, Krajňák (2013) and Randová, Krajňák, and Friedrich (2013).

### **3.1 Determination of the sample of the respondents**

Before starting the very research it was necessary to determine the sample size (number of respondents) in such a way to get results to at least average reliability and accuracy (Sudman, 1976). The process of determination of the sample size was in detail expressed in Randová, Krajňák (2013).

Tab. 1 - Population and sample size according to the subgroups. Source: authors' calculations according to data from the Czech Statistical Office

Population	Sample size (number of respondents)
Restaurant Services	161
Hairdressing Services	84
Minor repairing of shoes and leather goods	36
Minor repairing of bicycles	36
Total	317

The size of the population reaches up to 317 respondents, the size of particular subgroups of the population is determined according to the proportion of suppliers of restaurant services, hairdressing services, minor repairing of shoes and leader goods and minor repairing of bicycles. The data about number of suppliers of these services were obtained from the Czech Statistical Office (Randová & Krajňák, 2013).

### **3.2 Procedure of recalculating of VAT liability change of the respondents**

The data provided by the General Financial Directorate contained information about the VAT liability of suppliers of the analyzed services in total for each calendar year, but they were not classified according to each tax period. As it has been already mentioned, the respondents provided data for the last tax period of the year 2010 (a month or a quarter, depending on the VAT payer type).

For the comparability of data and for achieving the aim of this paper, the recalculation was made of the data obtained by the questionnaire research on the data per a year. The real and estimated VAT liability of each respondent for the referred tax period was at first multiplied by the number of VAT returns that the respondent submits per a year (four in case of quarterly VAT payer and twelve in case of monthly VAT payer). Subsequently, the average real and estimated VAT liability by individual categories of the respondents was calculated. The identified average real and estimated VAT liability was multiplied by the number of respondents in each category. In that way, it was found the recalculated sum of real and estimated VAT liability of the respondents was determined for the year that the questionnaire research was made (2010).

The change of average recalculated VAT liability (coefficient) in the year that the questionnaire research was made (2010) was calculated as ratio of recalculated estimated and recalculated real yearly VAT liability of all respondents according to equation (1)

$$\Delta VAT(LR)_0 = \frac{\Sigma VAT(LR)_0^e}{\Sigma VAT(LR)_0^r}, \quad (1)$$

where  $\Delta VAT(LR)_0$  is recalculated average yearly VAT liability change of the respondents in the year that the questionnaire research was made (coefficient),  $\Sigma VAT(LR)_0^e$  is recalculated sum of estimated VAT liability of all respondents in the year that the questionnaire research was made,  $\Sigma VAT(LR)_0^r$  is a sum of recalculated real VAT liability of all respondents in the year that the questionnaire research was made.

### **3.3 Procedure of recalculating of VAT liability change (potential VAT revenue of the Moravian-Silesian Region)**

Then, the data about real reported yearly VAT liability (a potential VAT revenue) for the all Moravian-Silesian Region of the Czech Republic obtained from the General Financial Directorate were multiplied by the coefficient (a recalculated average VAT liability change) in each year. The same coefficient was used because of the fact that owing to the persistence of the global economic crisis, there is not expected a sharp change in the behavior of the respondents, suppliers of the services or their customers. Since the VAT rates were different in each analyzed period, to reflect this fact the recalculated VAT liability of the each analyzed year  $VAT(L)_x$  was determined according to equation (2)

$$VAT(L_x^e) = \Delta VAT(LR)_0 \cdot VAT(LR)_x \cdot \left( \frac{VAT(R_x^s) - VAT(R_x^r)}{VAT(R_0^s) - VAT(R_0^r)} \right), \quad (2)$$

where  $VAT(L_x^e)$  is the recalculated estimated VAT liability of the analyzed year,  $\Delta VAT(LR)_0$  is the recalculated average yearly VAT liability change of the respondents in the year that the questionnaire research was made (coefficient),  $VAT(LR)_0$  is real VAT liability of the analyzed year,  $VAT(R_x^s)$  is VAT standard rate of the analyzed year,  $VAT(R_x^r)$  is reduced VAT rate of the analyzed year,  $VAT(R_0^s)$  is standard VAT rate of the year of questionnaire research was made,  $VAT(R_0^r)$  is reduced VAT rate of the year that the questionnaire research was made.

Procedures for data processing and analysis by mathematical and statistical methods are recommended e.g. by Anderson, Sweeney, and Williams (2011), Ashenfelter, Levine, and Zimmerman (2003), Jacques (2013) or Newbold, Carlson, and Thorne (2013). For another statistical approach to taxes evaluating see also e.g. Friedrich, Maková, and Široký (2012).

## **4 RESULTS**

This part of the paper contains deeper analysis of changes of VAT liability of all of selected categories of labour-intensive services suppliers. Especially the impact of potential transfer of these services from the standard to the reduced VAT rate on the VAT liability of the suppliers and a potential impact on VAT revenue in conditions of Moravian-Silesian Region of the Czech Republic.

### **4.1 Calculation of an average change of VAT liability (potential VAT revenue of Moravian-Silesian Region)**

By recalculating the data obtained by the questionnaire research, it was found that suppliers of services in the sample of Moravian-Silesian Region declared following changes in the average VAT liability, as shown in Tab. 2.



Tab. 2 – An average change of VAT liability per a year and respondent in Moravian-Silesian Region in the year of questionnaire research in 2010. Source: Questionnaire research.

Suppliers of labour-intensive services	Average real VAT liability (CZK)	Average estimated VAT liability (CZK)	Average change of VAT liability (%)
Restaurant services	543.678,47	218.341,39	60
Hairdressing services	87.870,18	5.021,09	94
Repairing of shoes and leather goods	46.152,67	- 13.084,33	128
Repairing of bicycles	85.401,89	- 7.597,67	109

As it is clear from results in Tab. 2, it was found by questionnaire research that suppliers of restaurant services would estimate an average VAT liability decrease by 60 % in comparison with the originally declared liability, suppliers of hairdressing services by 94 %. Suppliers of category repairing of shoes and leather goods would expect creation of an excess VAT deduction, therefore, they would assume an average VAT liability decrease by 128 % and suppliers of repairing of bicycles by 109 %.

The procedure of recalculating of VAT liability change of the respondents is contained in the Chapter 3.2. The results of the calculation of the coefficient according to equation (1) are shown in Tab. 3.

Tab. 3 – The change of average recalculated VAT liability of the respondents (coefficient). Source: authors' calculations according to the questionnaire research.

Suppliers of labour-intensive services	$\Sigma VAT(LR)_0^r$ (CZK)	$\Sigma VAT(LR)_0^e$ (CZK)	$\Delta VAT(LR)_0$ (coefficient)
Restaurant services	87.532.234	35.152.964	0,401600217
Hairdressing services	7.381.095	421.771	0,057142089
Repairing of shoes and leather goods	1.661.496	- 471.036	- 0,283501134
Repairing of bicycles	3.074.468	- 273.516	- 0,088963684

Through a process referred to in Chapter 3.3 of the paper, using equation (2) the recalculation was done of really declared VAT liability (potential VAT revenue of the Moravian-Silesian Region) to VAT liability that would have been declared in the case of the mentioned legislative change in individual years in the selected categories of analyzed services in the conditions of Moravian-Silesian region. The quantification was made for the period of years 2005 to 2013.

First the results of the category restaurant services will be shown.

#### 4.2 Results of the restaurant services category

As we can see in Fig. 1, the transfer of restaurant services from the standard to the reduced VAT rate would have meant an important decrease of VAT liability (a drop of the potential VAT revenue).

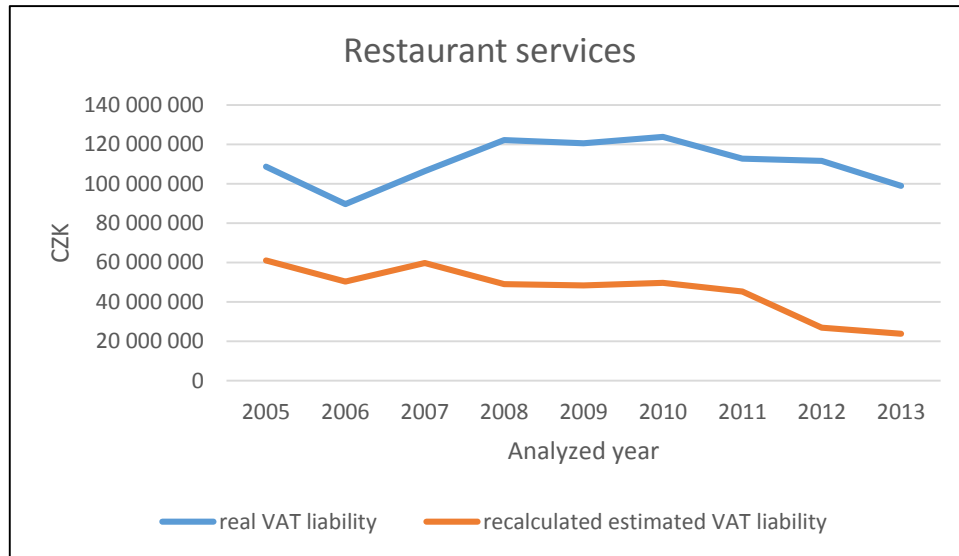


Fig. 1 – Real and recalculated estimated VAT liability of restaurant services. Source: authors' calculation according to the questionnaire research and GFD.

Fig. 2 shows the recalculation of VAT liability decrease of the suppliers of restaurant services in Moravian-Silesian Region. The decrease is reflected in the range of 40 to 85 million CZK annually. The biggest change would arise in case of the mentioned legislative change in 2012.

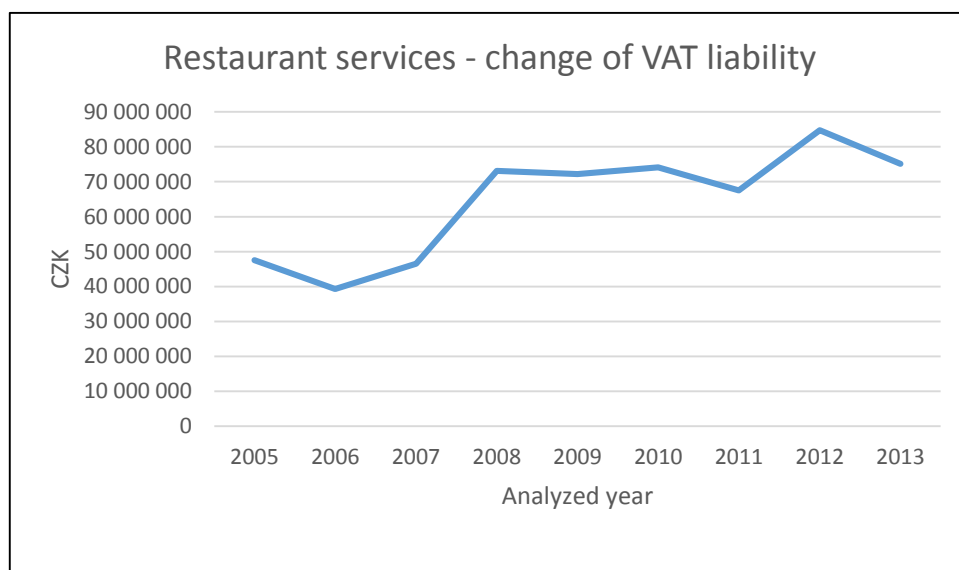


Fig. 2 – Change of VAT liability of restaurant services. Source: authors' calculation according to the questionnaire research and GFD.

### 4.3 Results of the hairdressing services category

It is clearly evident in Fig. 3 that the transfer of hairdressing services from the standard to the first reduced VAT rate would mean a significant reduction of VAT liability of these services suppliers and thus a decrease in VAT revenue in terms of Moravian-Silesian Region.

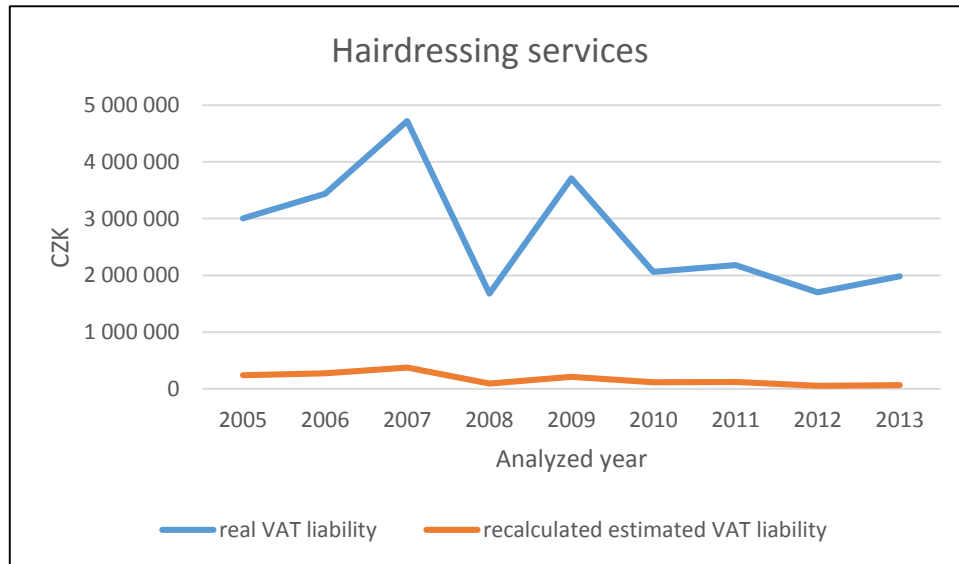


Fig. 3 – Real and recalculated estimated VAT liability of hairdressing services. Source: authors' calculation according to the questionnaire research and GFD.

Fig. 4 expresses the recalculation of VAT liability decrease of the suppliers of hairdressing services in Moravian-Silesian Region. The decrease is reflected in the range of about 1.5 to 4.3 million CZK annually. The biggest change would be arise in case of the mentioned legislative change in 2007, when there was also expressed the highest real VAT liability. This case illustrates very clearly the influence of the economic crisis that began in 2008. In this year, there was high decrease of the real VAT liability and after a temporary growth in 2009 it fell down again and this trend continued until 2013.

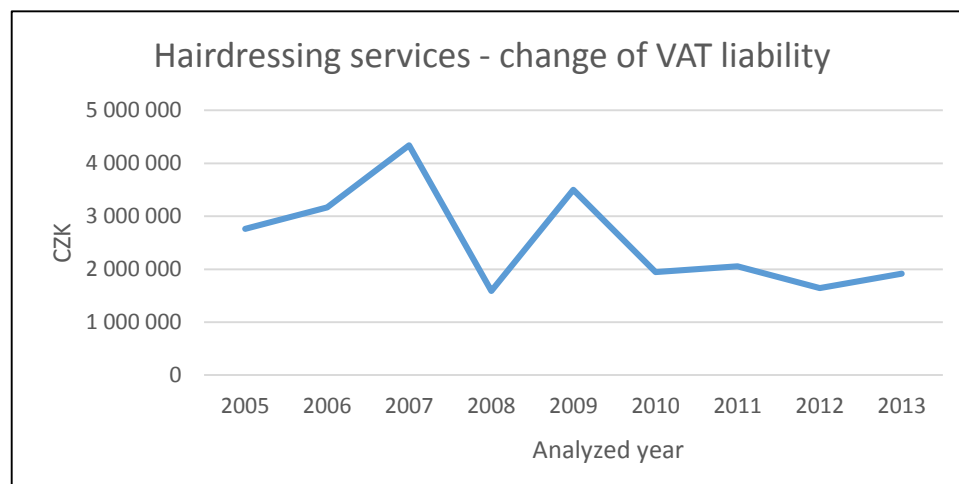


Fig. 4 – Change of VAT liability of hairdressing services. Source: authors' calculation according to the questionnaire research and GFD.

#### **4.4 Results of the category of minor repairing of shoes and leather goods**

Fig. 5 shows a clearly evident the drop of both the real and estimated VAT liability of suppliers of minor repairing of shoes and leather goods. The significant decrease of VAT liability occurred in 2009 and the trend continued until 2013. On the one hand, it can be caused by the ongoing economic crisis or, on the other hand, the decrease could happened due to reduction of prices of new goods in which case the customers prefer buying the new goods than letting the older ones repaired.

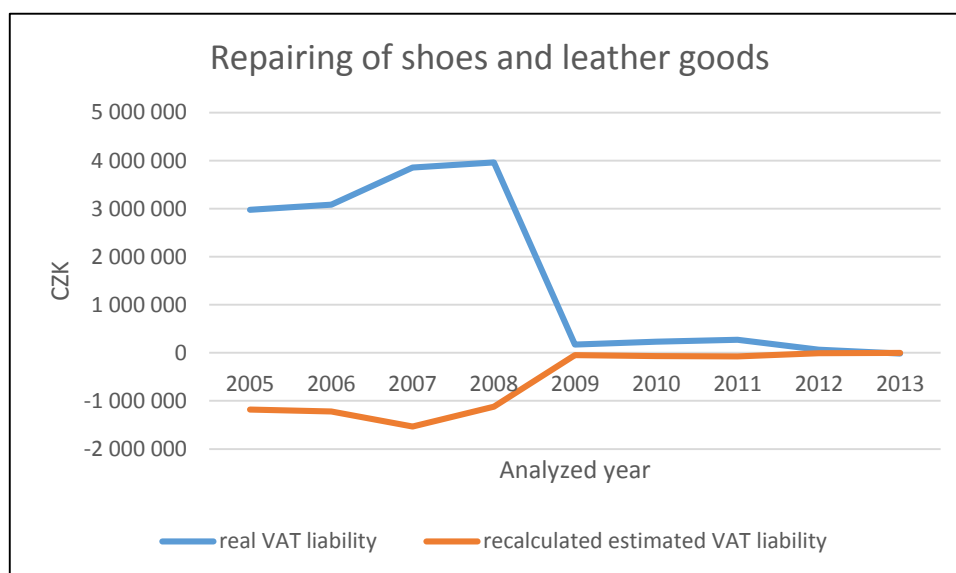


Fig. 5 – Real and recalculated estimated VAT liability of repairing of shoes and leather goods.  
Source: authors' calculation according to the questionnaire research and GFD.

Fig. 6 shows the biggest decrease of recalculated VAT liability of the suppliers of minor repairing of shoes and leather goods in the Moravian-Silesian Region, which reflects quantification of a potential transfer of these services from standard to reduced VAT rate. However, regardless of this assumption, there is a clear influence of more factors, see comments to Fig. 5. The decrease of VAT liability is reflected in the range of about 13 thous. CZK to 5 million CZK per a year.



Fig. 6 – Change of VAT liability of minor repairing of shoes and leather goods. Source: authors' calculation according to the questionnaire research and GFD.

#### 4.5 Results of the category of repairing of bicycles.

The last category for the analysis is suppliers of repairing of bicycles. This category, unlike previous categories, demonstrates very balanced results. Fig. 7 shows that a potential transfer of these services from the standard to the reduced VAT rate would cause a significant reduction of VAT liability, actually an occurrence of excessive deductions in all analyzed years.

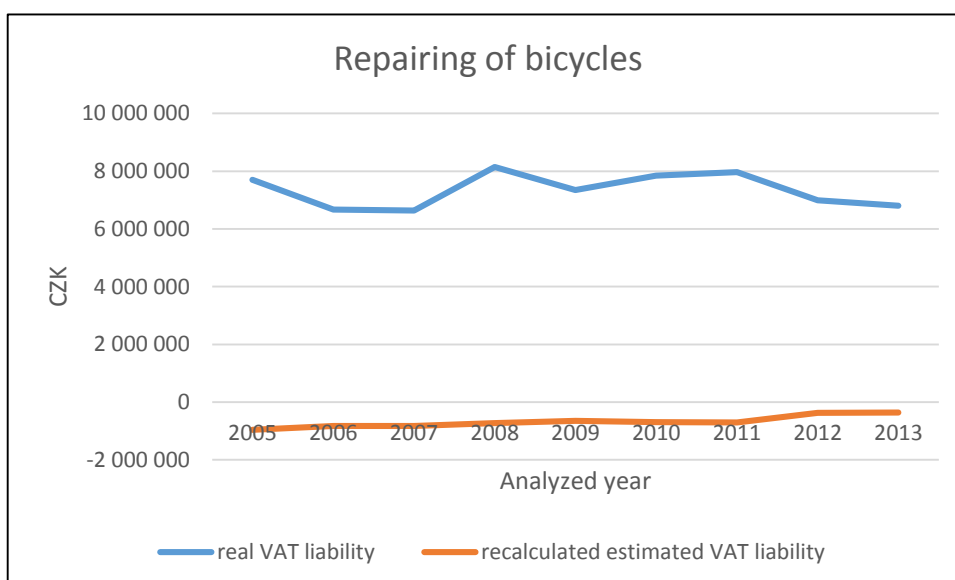


Fig. 7 – Real and recalculated estimated VAT liability of repairing of bicycles. Source: authors' calculation according to the questionnaire research and GFD.

As it has been already mentioned in the comment to the Fig. 7, the change of VAT liability in case of transfer of these services from the standard to the reduced VAT rate was relatively balanced in each of analyzed years. The change of VAT liability was approximately between 7.1 million CZK to 8.6 million CZK.

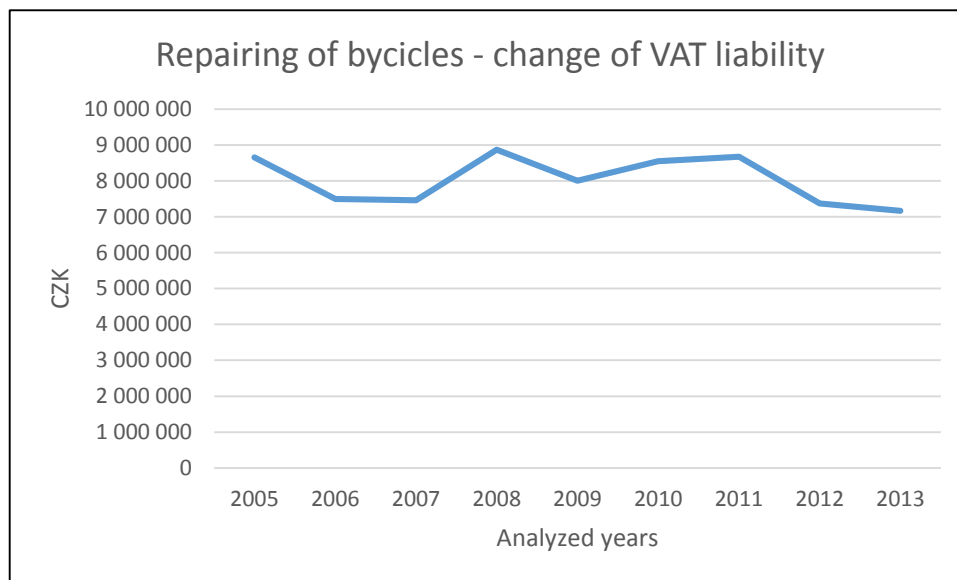


Fig. 8 – Change of VAT liability of repairing of bicycles. Source: authors' calculation according to the questionnaire research and GFD.

## **5 DISCUSSION AND CONCLUSION**

VAT is a substantial part of tax revenues in the Czech Republic. The issue of application of reduced VAT rates on the selected labour-intensive services is a long term discussed topic in the Czech Republic. That is why the authors have also decided to focus on the analysis of influence of this possible legislative change on the VAT revenue. Owing to the location of the respondents the analysis has been focused on the conditions of the Moravian-Silesian Region so far. Although it is clear at the first sight that this legislative change would have a negative impact on the VAT revenue, in the opinion of the authors it should be useful when deciding about the application of VAT rates to take into account other aspects such as investment into the business.

Anyway, the decrease of VAT liability of restaurant services suppliers and potential VAT revenue is reflected in the range of about 40 to 85 million CZK annually. In case of suppliers of hairdressing services is the decrease is shown in the range of about 1.5 to 4.3 million CZK annually when the biggest change could be seen in 2007 and 2008 because of the visible influence of the global economic crisis.

The biggest decrease of VAT liability is expressed by the category of minor repairing of shoes and leather goods (change of VAT liability in the range of 13 thous. to 5 mil. CZK). This situation appears independently on the recalculation of VAT liability in the case of VAT rates changes, but it is a phenomenon that is predominantly caused by other factors, e.g. the economic crisis or change in the consumers' behavior. The category of repairing of bicycles demonstrated very positive influence on VAT liability on the suppliers of these services in

each of analyzed years. It would bring excessive deductions. The change of VAT liability in this category was approximately between 7.1 million CZK to 8.6 million CZK.

According to the authors' opinion, the government should transfer at least restaurant and catering services to the first reduced VAT rate, since a reduced VAT rate is applied to most of their inputs, which leads in high proportion to their high VAT liability. Even if it may be a subjective view, this legislative change could help to reduce tax evasion in a form of reduction of revenues and avoidance of exceeding a turnover for compulsory registration to VAT. Particularly in the situation when the limit for the compulsory registration is maintained at the level of one million CZK for twelve consecutive calendar months (for more about threshold limit value for the VAT registration see Sobotovičová, Blechová, and Janoušková, 2013). The potential legislative change might also lead to the elimination of price increase in restaurants during the planned introduction of the cash transactions fiscalization.

The authors are also aware that the results of this paper represent only one of possible ways of quantification of the impacts of this possible legislative change on VAT revenue. This problem has been analyzed in a lot of the Member States and each analysis brought different results. Compare for example Goos, Konings, and Breemersch (2013) and Lomas (2010) in case of Germany or in case of Finland see Kosonen (2013) and Kosonen and Harju (2013). Due to this reasons, in their opinion, this problem deserves further research.

### **Acknowledgement**

*This paper was created with financial support from the Student Grant Competition Faculty of Economics, VSB – Technical University Ostrava in the project SP2012/147 “Application of Impacts of Value Added Tax Rate Changes to the Labour-intensive Services”.*

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## **PREDICTIVE ABILITY OF THE INDEX OF CREDITWORTHINESS**

*Michal Kuběnka*

### **Abstract**

The creditworthy models shall define the level of financial health of analysed economic entity. As well as the bankruptcy models the creditworthy models are usually made of a combination of chosen ratio indexes and assigned weights. Models are, in several cases, based on the points system. In case of bankruptcy models the accuracy of their prediction can be verified on samples of companies that went into the insolvency or even bankrupted. The question is how to evaluate the accuracy of creditworthiness models evaluation. This text presents the created methodology and results of research focused on the creditworthiness index accuracy evaluation. The goal is to set the index of creditworthiness accuracy on the base of own methodology. For this purpose the economic data of 1260 companies from the processing industry sphere were analysed.

*Keywords: creditworthiness, index of creditworthiness, creditworthy models, ROE, implicit costs, EVA*

JEL Classification: G24, G33

### **1 WORLD OF CREDITWORTHY MODELS**

The company used to be evaluated by several stakeholders who are economically linked to the company. In the sphere of finances it mostly means the business partners, current or future owners and current and future creditors. The financial analysis that evaluates the company mainly based on chosen absolute and ratio indexes are the tool for evaluation of a company in the financial sphere. The company is usually separately evaluated by ratio indexes in the area of profitability, liquidity, indebtedness and activity. Particular indexes can show antagonistic indicia on the financial health of analysed entity. For example the high indebtedness versus high profitability, wrong liquidity versus high property turnover etc. Thus the financial analysis can be completed with one of several creditworthy models that can evaluate the financial situation of company by one grade. The creditworthy models are various:

- Kralicek's Quick test - original version (see more in Kralicek, 1993),
- Kralicek's Quick test - modified version (more in Vochozka, 2011),
- Grünwald's index (see more in Grünwald & Holečková, 2007),
- Rudolf Doucha's Balance analysis I., II., III. (see more in Doucha, 1996),
- Tamari risk index (see more in Růčková, 2001, Sedláček, 2001 ),
- KAMF model (see more in Kraftová, 2002),
- Index of creditworthiness (see more in Zalai, 2010),
- IN99 (see more in Neumaierová 2002),
- IN05 – bankruptcy & creditworthy model (see more in Neumaierová, Neumaier, 2005)

The model accuracy was defined only for IN99, IN05 and Tamari risk index from all of them. As for the creditworthy model IN99 the authors state (according to Neumaier, 2002) the

accuracy of 47%, i.e. there is the probability of 47% that the company classified in the creditworthiness category reaches in the following accounting period the positive economic value added (EVA). It is the case when IN99 reaches the value higher than 2,07. The model includes also the so-called grey zone (resulting value within the interval  $\langle 0,684; 2,07 \rangle$ ) in which it is not possible to unambiguously decide on the financial company health. In case of  $IN99 < 0,684$  the company does not produce any economic value added. Initially the models accuracy was at 85% at the moment of its creation.

Values of bankruptcy & creditworthy models IN05 can be also divided in three intervals, in the bankruptcy zone, grey zone and the creditworthiness zone that is linked to the positive value of EVA. If IN05 exceeds the limit 1,60, the analysed company is not likely to bankrupt at the probability of 92 % and shall create a value with the probability of 95 %. The grey zone of interval  $\langle 0,90; 1,60 \rangle$  indicates that the company has 51% of bankruptcy probability and that it shall reach the positive EVA at the probability of 71 %. If the analysed company does not reach the value of IN05 of 0,90 at least, it is directed towards the bankruptcy with the probability of 97% and with the probability of 76 % it reaches the negative value of EVA.

The accuracy verification, i.e. the predictive ability of Tamari risk index, was performed with a sample of financial data of 130 companies from the year 1958. Subsequently, with a time distance of 2 years, the index value was compared between years 1958 and 1960. From the below shown table 1 it results, among others, that 52 % of companies classified in the category “low” went bankrupted in two years. The insufficiency of this research is based on the fact that there is no information on how much the companies ranked as “high” in following years were really creditworthy (i.e. if they reached the positive profitability and in what amount).

Tab. 1 – Tamari risk index – prediction accuracy. Source: Sedláček, 1998

Index	Number of companies for 1958	Change of the risk index after 2 years – number of companies in 1960			
		high	middle	low	Activity stopped
High	59	45 (76 %)	12 (21 %)	-	2 (3 %)
Middle	50	16 (32 %)	25 (50%)	6 (12 %)	3 (6 %)
Low	21	2 (10 %)	3 (14 %)	5 (24 %)	11 (52 %)
Total	130	63	40	11	16

The author of this text has not met any other creditworthy model at which the predictive ability is measured in any way, it means for example:

- To compare if the entity classified under the category “creditworthiness” had any financial problems in following periods (outstanding debts after the maturity day, insolvency, bankruptcy),
- To find out if the entity classified under the category “wrong financial health”, “insolvency risk” etc. had really such problems in following periods or not,
- To compare if the entity under the category “creditworthiness” achieved the positive economic value adder or the positive profitability at least in following periods.

The goal of this article was to set the accuracy of the index of creditworthiness on the base of own methodology, and to evaluate its predictive ability.

The question is where is the border of ROE for author of IC model for classification for bankruptcy or creditworthy. The setting in tab. 3 seems logical but the author could have different view on financial stability (characteristic features of creditworthy and bankruptcy). Also another creditworthy models have not set the criteria for verification of accuracy of model. The question is where is the border for classification of company into category “creditworthiness” and “noncreditworthiness”?

In contrast, bankruptcy models have clearly defined criteria for a successful prediction (bankruptcy occurred in the future or not?), Probably because it dealt with a number of authors to explore and improve their accuracy. Between the best-known and most frequently discussed in the literature include Beerman’s discriminant function (see more Sedláček, 2009), Beaver’s bankruptcy model (Beaver, 1966), Altman’s Z score (Altman, 1968), Altman’s Z’ score (Altman, 1993), Altman’s Z’’ score (Altman, 2006), Taffler index (Agarwal & Taffler, 2007) and IN95 (Kislingerová&Neumaierová, 2000).

## **2 METHODOLOGY AND DESCRIPTION OF ANALYSED SAMPLE**

The determination of the financial model accuracy is typical for bankruptcy models. As the recent researches show there is a series of factors that can fundamentally influence the accuracy of tested models. Kuběnka (2014, p. 364) notes, regarding this matter, that the accuracy of the existing models may be decreased for several reasons:

- the author created the model on a small sample of heterogeneous firms,
- the author failed to consider the differences and specificities of the sector in which the model should be applied,
- in determining the accuracy of the prediction model the author did not consider the possible disparity of the success of the prediction derived from the size of the analysed entities,
- both market conditions and legislation change with the passage of time, while some models are several decades old.

For the maximum accuracy the sample of companies dealing in one branch was chosen, from the branch of processing industry. In order to get the higher homogeneity of the sample 501 companies, with annual turnover over 1 billion CZK, and 759 companies, with annual turnover over 300 mil. CZK, were chosen, i.e. 1260 companies in total.

For the reason that it was possible to export all input financial data necessary for calculation from the MagnusWeb database of the company Bisnode the Index of creditworthiness was chosen. The index of creditworthiness (hereinafter abbreviated as “IC”) has the following form:

$$\mathbf{IC = 1,5X_1 + 0,08X_2 + 10X_3 + 5X_4 + 0,3X_5 + 0,1X_6} \quad (1)$$

where:  $X_1$  = Cash Flow / Total liabilities and Equity

$X_2$  = Total Capital / Total liabilities and Equity

$X_3$  = EBIT / Total Capital

$X_4$  = EBT /Revenues

$X_5$  = Inventory /Total Assets

$X_6$  = Equity/Total Capital

The calculated value of IC of analysed company must be compared with following evaluation scale (tab. 2).

Tab. 2 – Index of creditworthiness – evaluation scale. Source: Vochozka, 2011

Result	Rating	Company
$IC \in < 3 ; \infty )$	extremely good financial position	creditworthiness
$IC \in < 2 ; 3 )$	very good financial position	
$IC \in < 1 ; 2 )$	good financial position	
$IC \in < 0 ; 1 )$	problematic financial position	
$IC \in < - 1 ; 0 )$	bad financial position	bankrupt
$IC \in < - 2 ; - 1 )$	very bad financial position	
$IC \in < - \infty ; - 2 )$	extremely bad financial position	

It results from the evaluation scale that with growing IC the creditworthiness of company increases. That is why the value from 1 up to 7 will be assigned to particular evaluating intervals, whereas the value 7 shall represent the highest creditworthiness, see the table 3.

The IC model accuracy will be evaluated based on the calculation of IC value for particular companies based on final accounts of 2012. The result will be compared with economic results of these companies in following year 2013. More specifically, based on the fact if the company achieved the positive return on equity (abbr. ROE) and in what amount in the following year. The following situation will be assessed:

$ROE < 0$	Owners get no remuneration for their invested capital, the company is classified under the category “active”
$ROE \in < 0; r_f >$	Owners do not reach the evaluation of their capital even not at the level of risk-free evaluation (risk-free rates, $r_f$ )
$ROE \in < r_f; r_e >$	Profitability of equity exceeds the risk-free evaluation but does not reach the level of implicit costs of equity ( $r_e$ )
$ROE > r_e$	Company achieves the positive EVA, it generates the economic profit.

Tab. 3 – Created system of grades for IC and ROE. Source: author

Index of creditworthiness (IC) 2012		Return on Equity (ROE) 2013		
Result	Assigned grade	Result	Assigned grade	Generating of EVA
$IC \in < - \infty ; - 2 )$	1	X	X	X
$IC \in < - 2 ; - 1 )$	2			
$IC \in < - 1 ; 0 )$	3			
$IC \in < 0 ; 1 )$	4 $\Rightarrow$	$ROE < 0$	4	NO
$IC \in < 1 ; 2 )$	5 $\Rightarrow$	$ROE \in < 0; r_f >$	5	NO
$IC \in < 2 ; 3 )$	6 $\Rightarrow$	$ROE \in < r_e; r_f >$	6	NO
$IC \in < 3 ; \infty )$	7 $\Rightarrow$	$ROE > r_e$	7	YES

If the company generates the economic profit ( $ROE > re$ ) and is active and solvent at the same time, then it is creditworthy. That is why the company, that achieves the positive EVA in 2013, will be assigned with the grade 7. With decreasing ROE value the assigned grade shall decrease up to the value of 4, see the table 3. The purpose of assigned IC grades for 2012 and of ROE grades for 2013 is to quantify the prediction (year 2012) and the reality (year 2013) with a distance of one year. The prediction inaccuracy will be expressed as the difference between grades.

### 3 APPLICATION OF IC AND DETERMINATION OF MODEL ACCURACY

IC was applied on the sample of 1260 companies from the processing industry and the total frequencies of achieved creditworthiness of these companies for 2012 are shown in the following table 4. Subsequently the IC model accuracy is determined based on comparison of these values and the ROE value achieved in the following year 2013.

Tab. 4 – Rating of companies pursuant to IC in the year 2012. Source: author

Grade	Frequency	Financial situation	Company classification	Economic value added
1	31	extremely bad	bankruptcy	- EVA
2	22	very bad		
3	77	bad		
4	304	problematic	creditworthy	
5	330	good		
6	208	very good		
7	288	extremely good		
Sum:	1260	x	x	+ EVA

All analysed companies were active one year later and showed no symptoms of collapse (insolvency, bankruptcy). From this point of view IC should include most of companies rather into the category “creditworthiness” (it means from category “problematic” to category “extremely good”) than into the category “bankruptcy” (from category “bad” to “extremely bad”). Nevertheless the fact that the company does not show any collapse symptoms is not sufficient to determine the company as being creditworthy. The good financial situation, including the satisfying profitability, is expected from such company. The table 4, in its absolute value, and the following fig.1 in its percent expression, show that the used IC has, at first sight, a very good predictive ability regarding the fact that only 10% of companies were classified into the category “bankruptcy”. The categories “good” up to “very good” comprise 66 % of tested companies.

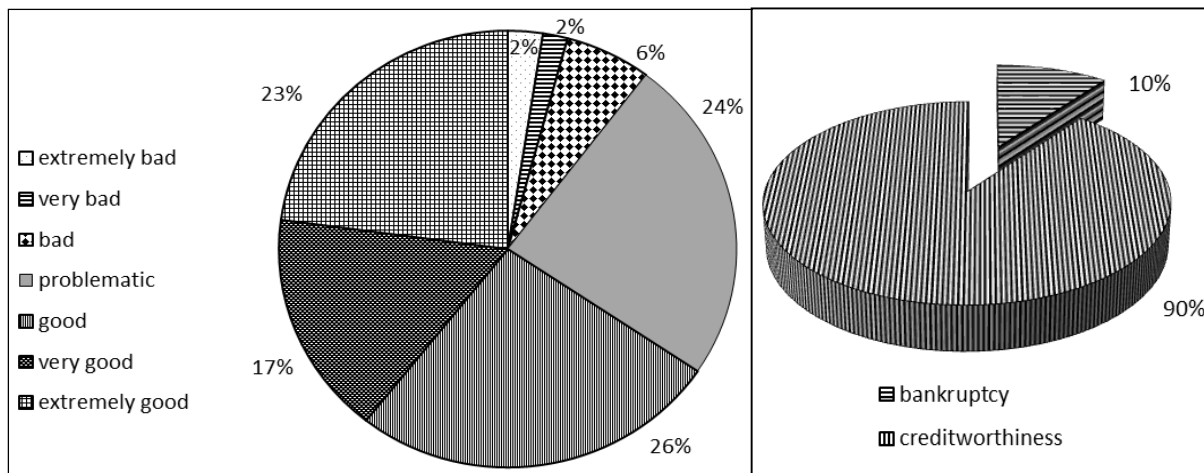


Fig. 1 – Results of IC application in the year 2012. Source: author

The ROE value was calculated based on financial statements of same companies for the year 2013 and then compared with the risk-free rate  $r_f$  and the value of implicit costs of equity  $r_e$  for the branch of processing industry. According to MPO (2014) the  $r_{f2013}$  is 2,26 % and the  $r_{e2013}$  is 12,11 %. The average value of ROE of analysed set of companies was 13,76 %,  $ROE_{max}$  385,05 %,  $ROE_{min}$  -107,73 %, median ROE 10,23,%,  $\sigma$  - standard deviation 28,18, variance ROE 794,48. By comparing of achieved values of ROE of particular companies, with critical limit 0 and rates  $r_f$  and  $r_e$ , the following frequencies were found:

ROE < 0	In 2013 196 companies of 1260 ones were found in loss, which represents 15,56 % of analysed sample. At the same time, these companies are the “active” companies without any payment troubles. That is why this category was used as the equivalent of IC within < 0 ; 1 with designation as “problematic“,
ROE $\in$ <0; $r_f$ >	86 entities, i.e. 6,83 % of companies achieved the positive appreciation of equity but not exceeded the appreciation going over the risk-free rate $r_f$ for the branch of processing industry, the companies achieve the profit in their accounts,
ROE $\in$ < $r_f$ ; $r_e$ >	433 of companies, i.e. 34,37 % exceeded the $r_f$ value but not covered the value of implicit costs of equity, they do not show any economical profit,
ROE > $r_e$	545 of companies, i.e. 43,25 % achieve the positive EVA and generate the economical profit.

Table 5 shows final results of accuracy of creditworthiness determination in the year 2012 using the creditworthy model Index of creditworthiness. The column “Fault” represents the difference between the reality (degree of ROE in 2013) and the calculated value (degree of IC 2012).



Tab. 5 – IC 2012 vs. ROE 2013 Source: author

Row	Fact is:	Fault	Frequency	In percent	
1	5 degrees worse	-5	0	0 %	
2	4 degrees worse	-4	0	0 %	
3	3 degrees worse	-3	3	0,29 %	
4	2 degrees worse	-2	16	1,57 %	
5	1 degree worse	-1	99	10 %	Σ 61 %
6	<b>fact meets prediction</b>	<b>0</b>	<b>415</b>	<b>41 %</b>	
7	1 degree better	1	99	10 %	
8	2 degrees better	2	241	23,65 %	
9	3 degrees better	3	107	10,50 %	
10	4 degrees better	4	20	1,96 %	
11	5 degrees better	5	6	0,59 %	
12	6 degrees better	6	13	1,28 %	

The figure 2 shows the frequency of accurate prediction of IC and the frequency of variation degrees between IC 2012 and degrees of achieved value of ROE in the following year 2013. The scheme shows that the frequencies have no standard distribution.

It exactly determined the model of creditworthiness of a company for the following year pursuant to the table 5 as well as the figure 2 for 415 companies, i.e. 41 % of analysed sample (line 6). If we take the variation +/- 1 degree as the accurate result of IC, the accuracy of the IC model would be at 61 % (line 5 + 6 + 7). If we are even more benevolent, and we accept also the variation +/- 2 degree, then the IC model correctly define the creditworthiness for 870 companies of 1260, which is 85 % (line 4 up to 8). Fault median is 1, fault standard deviation  $\sigma$  is 1,3420 and fault variance 1,8024.

The Index of creditworthiness for 2012 classified 288 companies at the highest level of creditworthiness (degree 7), of which 220 achieved the positive economical profit (positive EVA), i.e. 76,39 %.

This results is comparable with presented accuracy of the model IN99 (based on the positive value EVA) amounting to 47 % at the prediction accuracy verification for this model in the year 2002 and the accuracy IN05 in the sphere of creditworthiness prediction (based on the positive value of EVA) amounting to 95 %.

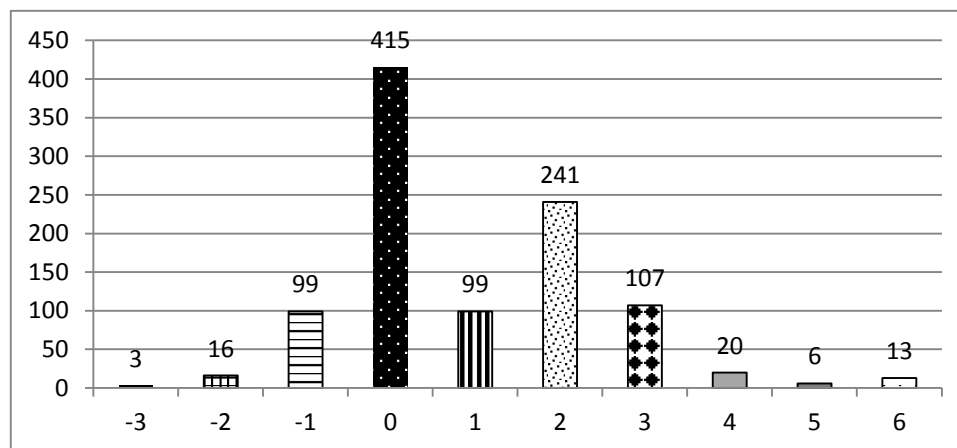


Fig. 2 – Accuracy of IC model. Source: author

#### **4 CONCLUSION AND POLEMIC ON RESEARCH RESULTS**

The chosen methodology plays the key role in determination of creditworthy model accuracy. The bankruptcy models were made based on mathematical and statistical methods, as for example multidiscriminant analysis, linear discriminant analysis, probit analysis, neural networks, etc. are, and based on the fact if the chosen companies went bankrupted in one or two years following their financial statements analyses (of if they were in financial troubles).

The creditworthy models (or their evaluating parameters and evaluating scales) were created by intuition and thus it is difficult to verify their accuracy in evaluation of which companies can be considered as creditworthy and which one not. There is probably the only one exception, the Czech models of husbands Neumaier, for whom the creditworthy company is such that generates the economic profit (positive EVA) and their creditworthy models IN99 and IN05 work on this base. These two models try to classify as “creditworthy company” only such companies that are going to generate a value for the owner.

The different methodology was chosen for determination of chosen creditworthy model accuracy within this research. The creditworthy company means a company that does not show any symptoms of wrong financial health and was active in the year 2013 (all of 1260 companies of analysed sample fulfilled this condition). Within the creditworthiness four intervals (see the table 3) were created, based on the achieved ROE value. Only one interval includes companies generating the economical profit and thus represents the highest level of the creditworthiness. This scale was compared to the evaluation of companies using seven degrees of the creditworthy index from the previous year 2012.

The Index of creditworthiness accurately predicted the creditworthiness degree at 41 % of companies. It made a mistake by one degree (of seven degrees evaluation scale of IC) in 20 % of examples and by two degrees at 25,22 % of companies. The fault standard deviation is 1,3420 of evaluation degree. With the benevolence of difference by one degree, the accuracy of model grows up to 61 %. With the benevolence of difference by two degrees the accuracy reaches 85%. The knowledge of this accuracy with two-degree benevolence can make a difference in case the company is evaluated by IC in seventh degree (the highest degree of creditworthiness). In such case there is probability of 85% that the company is going to generate the profit in following year.

These results are not directly comparable with the accuracy of model IN99 (47 %) and IN05 (95 %) as these predicate only the positive EVA. If we are focused, as for IC, only on the prediction ability of EVA, the accuracy of model is 76,39 % pursuant the chosen methodology of research.

The creditworthiness of companies was set in comparing ROE vs.  $r_e$ . Controversial can be the way of  $r_f$  and  $r_e$  setting. The author of this paper used the Neumaier's method (used Ministry of Industry and Trade). Application of different method for  $r_e$  setting can probably generate dissimilar  $r_e$  value. The effect can be different border for EVA. Research of these effect should be the object of further research.

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## **BANKRUPTCY PREDICTION AND QUALITATIVE PARAMETRES: THE OHLSON'S MODEL AND ITS VARIANTS**

*Dana Kubičková*

### **Abstract**

The recent developments of the global economy have affected the thinking and decision-making of many economic entities. The attention of them has shifted to various methods and tools that allow reliable identification of companies' financial situation and stability and effectively affect them. This has led to increased focus on prediction models. But the financial situation and effectiveness of companies has at present been affected by new factors, the original factors change in their intensity; in addition to financial characteristics, various qualitative characteristics are gaining ground. The construction of new prediction models is thus associated with efforts aimed at involving parameters outside of financial statements. A method that offers opportunities for applying new parameters is the econometric method of logit regression that has made it possible to include discontinuous and qualitative values in the analysis. One of the lesser-known bankruptcy prediction models is the model of Professor J. A. Ohlson. Its creation is based on the logistic regression method and exists in many variants that have resulted from the verification of its reliability in different national economic environments and in different periods. The objective of this paper is to characterize such model and its variants and related research questions.

*Keywords: Bankruptcy prediction models, Ohlson model, logit regression analysis*

JEL Classification: M21, G32

### **1 INTRODUCTION**

The recent developments of the global economy have affected the thinking and decision-making of many economic entities. Company managers, owners, investors, and other stakeholders have shifted their attention to various methods and tools that allow reliable identification of companies' financial situation and stability and effectively affect them. More than ever before, there has been a strong demand after such methods and tools that could indicate potential problems in advance, thus making it possible to adopt corrective measures before any critical events actually occur. In terms of the financial theory, this has led to increased focus on various tools in the form of prediction models, explored since the 1960s or the 1930s, as appropriate. Using appropriately selected indicators, these models should predict whether a company would be successful within its further business activity or whether it would face serious problems. Originally, these models had been developed with a view to identify potential financial problems in the future. Consequently, they have been referred to as bankruptcy prediction models. However, the general practice later required more detailed characteristics of an overall financial situation – not only information about potential financial problems, but also the specification of the degree of financial health/soundness. This prompted the creation of financial standing models, models that measure the financial health of a company.

Various attempts at creating such models started to emerge more in the 1950s and 1960s, developed by researchers from different countries, who relied on the specific conditions of their respective economies, thereby creating models intended for their given environments.

The underlying idea behind the construction of these models was the comparison of the financial situation characteristics for companies that thrive and for those that experience financial problems resulting in the end of operation. The comparison of identified differences for both groups became the basis for the model construction. The financial situation characteristics were usually described and compared by means of financial ratios based on accounting data (Klečka, Scholleová 2010). In terms of mathematics, the multiple discriminant analysis (MDA) became the basis for identifying such characteristics as well as the intensity of their impact. The aforementioned process allowed emergence of various bankruptcy and financial standing models used today: Altman Z-score, IN index of Ivan and Inka Neumaier, Taffler model, etc.

On the one hand, authors of these models currently focus on older models, where the prediction reliability is verified under existing conditions, with the models being adjusted accordingly. On the other hand, new models are being developed, reflecting the new conditions of company operations as well as the advancement in economic modeling and development of mathematical processes applicable for this purpose (Shumway, 2001). The financial situation of companies is affected by new factors, original factors change in terms of their intensity; in addition to financial and quantified characteristics, various qualitative characteristics are gaining ground. The financial situation is significantly affected by such factors such as market position, long-term contracts, past developments in the form of court disputes, profit generation, but also the company history, etc. Consequently, the construction of new models is associated with various efforts aimed at increasing the number of parameters included in the financial situation identification as well as efforts aimed at involving parameters outside of financial statements.

These parameters cannot be appropriately identified by means of the method that has been used for the derivation thereof (MDA). Another significant limitation of the method also consists in the fact that the resulting model value must be further classified and limits must be defined that separate healthy companies, “grey area” companies, and companies headed to bankruptcy (Divišová, 2013). All these factors represent reasons why focus has been shifting to other processes, some of which were also known previously; however, there was no sufficient need to address the integration of non-accounting and qualitative characteristics, etc., for example. The econometric method of logit regression is a method that offers opportunities for applying new parameters within the assessment and provides unambiguous answers in terms of the characteristics being examined.

The logit regression method is a method that expands the range of characteristics involved within the financial situation analysis and assessment (Režňáková, Karas 2014). One of the models that apply this method for deriving the characteristics included in the model is the model of J. A. Ohlson. The model was created in 1980, relying on accounting data – similarly as other models. However, the logit regression method also made it possible to include several characteristics that were not based on accounting data. The derivation of such characteristics and the specification of weights thereof relied, once again, on the comparison of prosperous companies and companies experiencing financial difficulties.

The basic model of J. A. Ohlson of 1980 has gradually been updated in reaction to further development of conditions and findings arising in connection with the application of the model, thereby resulting in new model variants. Indicated close relation to national conditions, in which companies operate, was reflected in the construction of models for individual economies (United States, Turkey, China, Iran, etc.). Verified significant sensitivity of the model to signals dating back to the period, in which the model was derived, resulted in the construction of updated variants (1993, 2003, and 2010). The Czech economic literature does not mention the Ohlson model as often as the Altman Z-score; consequently,

there is no sufficient information about the model effectiveness. Therefore, the objective of this paper is to introduce various variants of the Ohlson model published so far.

## 2 LOGIT REGRESSION

Logit regression (sometimes also referred to as “logistic regression”) is used for statistical evaluation of various data in situations where regression and discriminant analyses are not suitable. Regression analysis itself is a technique that determines the relation of a dependent variable  $Y$  and one or more independent variables  $X$ :  $Y = b_0 + \sum b_i x_i$

Linear regression analysis assumes a continuous dependent variable. However, discontinuous variables are often analyzed, with discrete, dichotomous values – binary (0;1) (bankruptcy vs. prosperity) or probability, etc. Independent variables  $X$  may be discrete, continuous (e.g. company age, liquidity), multi-criterial (e.g. company size, indebtedness), as well as binary (e.g. court disputes, long-term contracts).

In case we assume that there are  $n$  realizations of the dependent variable  $y_n$  (financial problems 1 = yes 0 = no for  $n$  companies), then the following applies:

$y_i = 1$  with the probability of  $p_i$  and  $y_i = 0$  with the probability of  $1-p_i$ ,

The quotient  $Q = p_i / (1 - p_i)$  compares the probability of 1 and the probability of 0. The values of the quotient are within the interval of  $<0; +\infty$ ). In order to obtain values from the entire interval  $(-\infty; +\infty)$ , it is necessary to use logarithmic transformation:

$$\eta_i = \ln (p_i / (1 - p_i)) \tag{1}$$

In order to create a logit model, it is assumed that the variable  $\eta_i (y_i)$  has linear dependence on the independent variables  $x_1, x_2, \dots, x_k$ . The resulting relationship can be described in the form of a linear dependence equation:

$$\eta_i (y_i) = \beta_0 + \beta_1 x_{1i} + \beta_2 x_{2i} + \dots + \beta_k x_{ki} , \quad \text{where } i = 1, 2, \dots, n \tag{2}$$

The resulting value  $\eta_i (y_i)$  may be both positive and negative. Consequently, it is necessary to apply the above mentioned logarithmic transformation  $\eta_i = \ln (p_i / (1 - p_i))$  to the calculation. The matrix notation of the equation is as follows:

$$\eta = \beta X \tag{3}$$

where  $\eta (\eta_1, \eta_2, \dots, \eta_n)$  are the dependent variable values,  $X$  is the matrix with  $n \times (k+1)$  of independent variables;  $\beta (\beta_1, \beta_2, \dots, \beta_k)$  are the inquired model parameters (variable weights). Adjustments to the equation (1) lead to the relationship for the probability  $p_i$ , as follows:

$$\begin{aligned} \ln (p_i / (1 - p_i)) &= \beta_0 + \beta_1 x_{1i} + \beta_2 x_{2i} + \dots + \beta_k x_{ki} , & (4) \\ p_i / (1 - p_i) &= \exp \beta_0 + \beta_1 x_{1i} + \beta_2 x_{2i} + \dots + \beta_k x_{ki} \\ p_i &= \exp \beta_0 + \beta_1 x_{1i} + \beta_2 x_{2i} + \dots + \beta_k x_{ki} / (1 - p_i) \end{aligned}$$

The resulting matrix notation for the probability calculation is as follows [Šedivá 2012]:

$$P = \left( \frac{1}{1 + e^{-Q}} \right)$$

The result gives the probability for the given event – i.e. dependent variable  $Y$  (i.e. potential bankruptcy) – to occur [Liao 1994].

### 3 CHARACTERISTICS OF THE OHLSON MODEL VARIANTS

#### 3.1 Structure of the Ohlson's model

J. A. Ohlson constructed the basic model in 1980; it relied on the corporate data in the United States that reflected the situation of the 1970s and 1980s (Ohlson, 1980). It ultimately gives the probability (ranging from 0.00 to 1.00 or from 0% to 100%, as appropriate) that the assessed company would in fact experience financial problems, with a predetermined period of time (i.e. one year, two years, or five years). It comprises nine financial ratios based on accounting data identified from the group of analyzed companies as most sensitively reacting to future financial problems. Weights are attributed to individual indicators, with their values being integrated within the resulting variable Q based on the following relationship:

$$Q = \beta_0 + \beta_1 * x_1 + \beta_2 * x_2 + \beta_3 * x_3 + \beta_4 * x_4 + \beta_5 * x_5 + \beta_6 * x_6 + \beta_7 * x_7 + \beta_8 * x_8 + \beta_9 * x_9 \quad (5)$$

Where  $\beta_1, \dots, \beta_9$  are weight coefficients for individual characteristics (financial and other ratios  $x_1, \dots, x_9$ ),  $\beta_0$  is a constant by which the sum of weighted values of indicators is increased.

The characteristics ( $x_1, \dots, x_9$ ) included in the model are constructed as follows:

$$X_1 = \log \frac{\text{total assets}}{\text{GNP price-level index}}$$

$$X_2 = \frac{\text{total liabilities}}{\text{total assets}}$$

$$X_3 = \frac{\text{working capital}}{\text{total assets}}$$

$$X_4 = \frac{\text{current liabilities}}{\text{current assets}}$$

$$X_5 : \begin{cases} X_5 = 1, & \text{if total liabilities} > \text{total assets,} \\ X_5 = 0, & \text{if total liabilities} < \text{total assets} \end{cases}$$

$$X_6 = \frac{\text{net income}}{\text{total assets}}$$

$$X_7 = \frac{\text{funds provided by operations}}{\text{total liabilities}}$$

$$X_8 : \begin{cases} X_8 = 1, & \text{if the sum of net income for the two previous periods is less than 0} \\ X_8 = 0, & \text{if the sum of net income for the two previous periods is more than 0} \end{cases}$$

$$X_9 = \frac{NI_t - NI_{t-1}}{|NI_t| - |NI_{t-1}|}$$

where:  $NI_t$  is the net income for the current period and  $NI_{t-1}$  is the net income for the previous period, and  $|NI_t|$  and  $|NI_{t-1}|$  are the absolute values of the net income for current / previous period.

However, Q is only an interim result that must be applied in the probability calculation relationship [Šedivá 2012]:

$$P = \left( \frac{1}{1 + e^{-Q}} \right) \quad (6)$$

#### Assessment of the resulting variable:

P describes the probability that bankruptcy occurs for the company being analyzed; it may have different values from the interval of (0; 1) or 0% to 100%, as appropriate. The



probability calculation relation also suggests that the higher the value  $Q$  as the sum of values of individual indicators, the higher the propensity to bankruptcy; on the other hand, low  $Q$  values characterize stable situation:

- If  $Q < 0$ , then  $P \rightarrow 0$  ( $P$  converges to 0);
- If  $Q > 0$ , then  $P \rightarrow 1$  ( $P$  converges to 1);
- If  $Q = 0$ , then  $P = 0.5$ .

The aforementioned relations may be used to estimate the significance of individual indicators for the model construction. The indicator significance is characterized by positive or negative value – negative impact of an indicator with positive value, as it reduces the total  $Q$ . On the other hand, negative indicator value has a positive effect, as it increases the total  $Q$ . The indicator weight relates to the significance of the characteristic measured by the given indicator.

The fact that the calculation results in immediate information about the company bankruptcy probability rate was considered the main benefit of models derived by means of logit regression by Ohlson (and probably the only benefit, according to the author himself). It does not require any artificial scales for the result interpretation, it allows more precise characterization and layering of the measured characteristics, and eliminates the problem of extreme values. The probability of 50% is the limit for determining whether a company is headed for bankruptcy or whether it is financially sound. However, it is also suitable to add the so-called “grey area” to the aforementioned distribution, covering the interval of 45% to 55%. This potentially eliminates the assessment insensitiveness around the 50% limit.

### **3.2 Ohlson’s Model 1980**

The original 1980 study of Ohlson did not feature just one model; it comprised three model variants and one additional variant: data from financial statements of selected companies were divided into the following three sets: data from financial statements one year prior to bankruptcy, data from financial statements of surviving companies, and data from financial statements two years prior to bankruptcy. Two statistical characteristics – average and standard deviation – were identified for these subsets and each indicator. The logit regression method was then applied. Ohlson used data from the period of 1970-1976 for his study. He worked with a relatively large sample of companies – 2163 companies in total, with 105 failing companies and 2 058 financially sound companies (Ohlson, 1980). The objective was not to find new, special indicators of financial distress, but to rely on simplicity and application of experiences gained so far: first six indicators were used, because they appear in most publications dealing with financial situation assessment / bankruptcy prediction.

In the followings years, Ohlson’s prediction function was verified in other economic environments as well – in the United States, Turkey, Iran, and other countries, also with longer period of time from the model creation (Kupilík, 2013). The results of such verifications brought important findings that later encouraged the creation of other model variants. Subsequent verifications suggest that, in terms of the three variants of the original 1980 model, the first model, with the prediction horizon of one year, should best predict the development of a company.

In all three variants, the highest weight and negative impact is attributed to  $x_2$ , which describes the company indebtedness level. Significant impact is also attributed to  $x_5$ , which describes excessive debt of a company from another perspective (total liabilities greater than total assets); however, corrects the impact of the indebtedness indicator through its negative

value. Significant positive impact on the overall financial situation (high weight) is associated with  $x_8$  (net income in the past two years) and  $x_6$  (expressing return on assets after taxation).

#### **a) Ohlson Model (1980) 1**

The first model should predict bankruptcy within the period of one year. In case the resulting model value is more than 50%, the given company is at risk of bankruptcy or serious financial problems (as appropriate) in the current or the following year. The model form is as follows:

$$Q = -0,407 x_1 + 6,03 x_2 - 1,43 x_3 + 0,0757 x_4 - 2,47 x_5 - 1,83 x_6 + \\ + 0,285 x_7 - 1,72 x_8 - 0,521 x_9 - 1,32 \quad (7)$$

The highest weight and negative impact is attributed to  $x_2$ , which describes the company indebtedness level. The highest positive impact is associated with  $x_6$  (expressing return on assets after taxation) and  $x_8$  (net income in the past two years). On the other hand, the lowest impact is associated with  $x_4$  that describes liquidity (reciprocal of current liquidity).

#### **b) Ohlson Model (1980) 2**

The second model of the original study was supposed to predict bankruptcy for the period of next two years. The following should apply: in case the results suggest bankruptcy for a company, it should not take place during the current year, but rather during the next year and the year after that.

The model varied from the first variant by the weights of individual indicators reflecting their significance in terms of the financial problems prediction. It slightly reduced the importance of  $x_2$  (indebtedness level), while increase the weight of return on assets ( $x_6$ ). On the contrary, the weights of  $x_4$  (reciprocal of current liquidity) and  $x_7$  (debt coverage) were significantly increased. The negative impact of  $x_9$  (income growth dynamics) changed to positive, similarly as for  $x_7$  (debt coverage). Furthermore, the constant amount changed, while also changing from positive to negative impact (negative value to positive). The calculation equation is as follows:

$$Q = -0,519 x_1 + 4,76 x_2 - 1,71 x_3 - 0,297 x_4 - 2,74 x_5 - 2,18 x_6 - \\ - 0,780 x_7 - 1,98 x_8 + 0,4281 x_9 + 1,84 \quad (8)$$

#### **c) Ohlson's Model (1980) 3**

The third model included in the original study was supposed to predict company bankruptcy / serious financial problems one or two years in advance. It is expressed as follows:

$$Q = -0,478 x_1 + 5,29 x_2 - 0,990 x_3 + 0,062 x_4 - 4,62 x_5 - 2,25 x_6 - \\ - 0,521 x_7 - 1,91 x_8 + 0,212 x_9 + 1,13 \quad (9)$$

Compared to the first variant, the weight of  $x_2$  (indebtedness level) decreased, with simultaneous increase in the weight of  $x_6$  (return on assets) and slight decrease of impact of  $x_3$  (working capital to assets ratio). The assessment of impact of  $x_7$  (debt coverage) changed from negative to positive, with other minor changes of weighted coefficients.

### **3.3 Ohlson's model 1993 (for USA)**

In 1993, the models of Altman and Ohlson were tested in order to determine whether the respective model parameters changed over time compared to the original variants. A new variant was constructed for the purpose of the testing, using 99 failing companies and 1 980 prosperous companies, with data from the period of 1981-1990. Once again, the data set intentionally omitted companies from the sector of transportation and finance. Two variants were constructed; the first one should have predicted bankruptcy one year in advance, with the second one predicting bankruptcy two years in advance.

Original indicators and their calculation were used in the new model; changes occur in terms of weights attributed to individual indicators and in the constant included in the calculation.

**a) Ohlson's model 1993 - 1**

In terms of this model for prediction of problems within one year, the weight and negative impact of indebtedness indicator ( $x_2$ ) significantly declined. The weight and impact assessment of  $x_5$  (excessive debt level) and of  $x_9$  (income development in the past two years) changed. A different weight was attributed to  $x_8$  (net income in the past two years), also changing from negative to positive.

$$Q = -0,1659 x_1 + 1,7518 x_2 - 0,8496 x_3 + 0,035 x_4 - 0,2911 x_5 - 2,5018 x_6 - 2,362 x_7 + 0,9512 x_8 - 0,5192 x_9 - 2,2473 \quad (10)$$

**b) Ohlson's model 1993 - 2**

With regard to this variant intended for prediction of developments two years in advance, the weight and negative impact of  $x_2$  (indebtedness indicator) further declined, whereas the weight and positive impact of  $x_3$  (working capital to total assets ratio) increased. The positive impact of indicators  $x_7$  (debt coverage) and  $x_8$  (net income in the past two years) increased. Moreover, the constant declined considerably.

$$Q = -0,1639 x_1 + 0,8749 x_2 - 2,0623 x_3 - 0,2224 x_4 - 0,0916 x_5 - 6,1045 x_6 - 1,6608 x_7 - 0,1286 x_8 - 0,3576 x_9 - 0,7325 \quad (11)$$

**3.4 Ohlson's model 2003 (for USA)**

The 2003 model is based on the test results under different conditions in 1993 and the following years and on the finding that indicators and coefficients are sensitive to the conditions and period, from which they originated. According to the performed calculations, the model accuracy decreases: being the highest in the period closest to the variant creation period (1988-1991), gradually declining going forward (1992-1999). Compared to another logit regression-based model (Zmijewski), for which the accuracy for both samples fluctuated around 80%, the accuracy of the Ohlson model did not exceed 50% for either data set. This means that the original Ohlson model failed to indicate the company development correctly in 50% of all cases. Therefore, the authors decided to recalculate the model in 2003, based on the verification results of the model by Zmijewski. The work was associated with deliberations on whether it is necessary to link prediction to bankruptcy or whether it would be more useful to focus the model to the prediction of a "moderate variant" – i.e. the financial distress prediction. The new variant construction relied on a relatively large sample of 1059 companies, of which 153 were in financial distress. A verification set was compiled to test the new model – with a similar number of companies / failing companies.

This resulted in three new sets of coefficients. The first one was derived from the entire sample, the second one from the subset with unstable companies only (i.e. with financial problems), and the third one from the subset with industrial companies only (both healthy and in financial difficulties).

**a) General model** – it was derived from the entire sample, with the following structure and weights:

$$Q (2003) A = -0,777 x_1 + 3,224 x_2 - 0,323 x_3 + 0,589 x_4 + 0,041 x_5 - 2,86 x_6 - 2,854 x_7 + 0,372 x_8 + 0,206 x_9 \quad (12)$$

Compared to the previous model of 1993, the constant was omitted for this and other two variants, whereas the weights of individual indicators were adjusted. Significant changed occurred in this first/general variant in terms of the weight of  $x_1$  (company size) and  $x_7$  (debt

coverage), with positive impact on the result. On the other hand, higher weights and thus also a negative impact were attributed for  $x_3$  (working capital to assets ratio) and  $x_6$  (ability to cover liabilities). The weight/negative impact increased considerably for  $x_2$  (indebtedness indicator), whereas the impact of  $x_4$  (current liabilities / current assets) changed from negative to positive.

**b) Model for failing companies** – it was recalculated from the set of companies that showed serious financial problems (failing companies):

$$Q(2003)B = -0,881 x_1 + 3,931 x_2 + 0,054 x_3 + 0,166 x_4 + 0,645 x_5 - 0,548 x_6 - 2,886 x_7 + 0,656 x_8 - 0,3 x_9 \quad (13)$$

Compared to the first (general) variant, the weights and impact direction of nearly all indicators changed for this variant. However, this variant does not use a constant either. High negative impact is still attributed to  $x_2$  (indebtedness level), with opposite – i.e. negative impact- attributed to indicator  $x_3$  (working capital to total assets). In case of  $x_5$  (excessive debt indicator), the impact assessment changed from positive to negative, similarly as for  $x_8$  (net income for current / previous year).

**c) Model for industrial companies** – it was composed for industrial companies from the set of failing and healthy companies, with the following structure:

$$Q(2003)P = -0,706 x_1 + 2,204 x_2 - 1,25 x_3 + 0,455 x_4 + 0,553 x_5 - 3,79 x_6 - 4,591 x_7 + 0,157 x_8 + 0,309 x_9 \quad (14)$$

In terms of its weights and significance, the structure of this model goes back to the first variant of this year. Compared to the first variant, a lower weight is attributed to  $x_2$  (indebtedness), with higher weight associated with  $x_3$  (working capital to assets). Higher negative impact is attributed to  $x_5$  (excessive debt) and  $x_7$  (debt coverage).

The new variants eliminated the low reliability of the original Ohlson model. The prediction accuracy of the three new model variants increased. The testing confirmed, once again, that prediction accuracy is higher for models, the derivation of which is closer to the period, from which the tested data originate. The test results also led to the finding that recalculated models are not sensitive to the area of activity, i.e. that they can be used to predict financial distress for companies from various sectors without any significant impact on the prediction reliability. Furthermore, the final assessment unambiguously focused on the prediction of serious financial problems, and not bankruptcy / end of company operations.

### **3.5 Ohlson's model 2009 (for Turkey)**

This model resulted from the testing of the Ohlson model variants under the conditions of Turkish economy, as the results of applying existing variants were not sufficiently reliable. Therefore, a new variant was created, based on the analysis of a relatively small set of Turkish companies (70). Using logit regression, a model was constructed that used the same indicators and the method of their calculation; however, the weights and importance (positive, negative) for the overall financial situation assessment changed:

$$Q = -0,228 x_1 + 7,186 x_2 - 0,073 x_3 + 0,613 x_4 - 1,714 x_5 + 3,264 x_6 - 4,187 x_7 + 0,438 x_8 - 0,154 x_9 - 4,582 \quad (15)$$

Compared to the general model of 1993, this model uses a constant once again, which complements and standardizes the sum of all other indicators. However, the constant amount significantly increased. Moreover, the weights of nearly all indicators increased. Furthermore, the impact direction of selected indicators changed:  $x_4$  (current liabilities to current assets) and

particularly  $x_6$  (return on assets), with change of nearly ten units. Importance (weight) of  $x_7$  (debt coverage) significantly increased.

### **3.6 Ohlson's model 2010**

In 2010, the Ohlson model was recalculated again- by economists from the University of Queensland in Australia. They tried to find new weights – not only for the Ohlson's model, but also for the Altman Z-Score, and the models of Zmijewski, Shumway, and Hillegeist. Following their verification and recalculation, a new model was created based on the results, in which indicators used in all of the five aforementioned models were used.

Compared to other modifications, the calculation used much larger sample of companies for the calculation of new models: 50 611 companies, of which 887 failing companies, and 49 724 financially healthy companies. Data from the period of 1980 to 2006 were used. The model constructed by analysts of the Australian University looks as follows:

$$Q(2010) = -0,17 x_1 + 3,69 x_2 - 1,87 x_3 + 0 x_4 - 0,54 x_5 + 0,03 x_6 - \\ - 0,06 x_7 + 1,16 x_8 - 1,02 x_9 - 7,2 \quad (16)$$

Compared to the 1993 model, which can be considered as the last “international variant, impact direction and weight of  $x_6$  (return on assets) changed. Moreover, the impact direction of  $x_8$  (income development in the past two years) changed as well. The indicator  $x_4$  (current liabilities to current assets) was excluded from the model, as it was assigned a zero weight. The weight of  $x_7$  (debt coverage) changed significantly, while the weights of other indicators only changed marginally. The constant also significantly increased, outweighing changes in other indicators through its negative value.

### **3.7 Ohlson's model 2010 (for China)**

Chinese economist Ying Wang and American Professor Michael Campbell created the Ohlson model variants for the Chinese economy (Wu, Gaunt, Gray, 2010). Using data from Chinese companies from the period of 1998 to 2008, they constructed (similarly as Ohlson in 1980) three model variants, with different period of prediction of bankruptcy / serious financial problems.

#### **a) Ohlson's model 2010 (for China) 1**

This model is to predict financial problems one year in advance. While the number of indicators remains identical with the original model, their weights were set as follows:

$$Q(2010C1) = -0,8983 x_1 + 0,9546 x_2 - 0,9234 x_3 + 0,00248 x_4 + 2,9508 x_5 - 0,0109 x_6 - \\ - 0,033 x_7 + 3,2088 x_8 + 0,5871 x_9 - 1,3128 \quad (17)$$

Compared to the original variant of 1980, different weights were attributed to individual indicators. The most significant change (significant reduction) took place for  $x_2$  (indebtedness). In case of  $x_4$  (current liabilities to current assets), the weight was reduced very significantly, with the resulting indicator value converging to zero. The indicator  $x_6$  (return on assets) was significantly reduced as well. Moreover, the change of impact direction (from positive to negative) and a significant weight increase for  $x_8$  (income development in the past two years) are also important. Change in the impact direction; however, with a lower intensity (weights), also occurred for  $x_7$  (debt coverage) and  $x_9$  (income growth dynamics).

#### **b) Ohlson's model 2010 (for China) 2**

This model is to predict problems two years in advance; the weights of individual indicators, which remain the same, were set as follows:

$$Q(2010C2) = -0,2786 x_1 - 0,2152 x_2 - 0,2132 x_3 - 0,0207 x_4 + 1,4666 x_5 - 0,00755 x_6 - 0,0541 x_7 - 4,157 x_8 - 0,9292 x_9 - 5,5238 \quad (18)$$

Compared to the second variant of 1980, weights of nearly all indicators were significantly modified:  $x_2$  (indebtedness indicator),  $x_3$  (working capital to assets) and  $x_5$  (excessive debt). Furthermore, there were changes in the impact direction of indicators:  $x_2$  (indebtedness indicator),  $x_4$  (current liabilities to current assets),  $x_5$  (income development), and  $x_7$  (debt coverage). Very low weight was attributed to  $x_4$  (current liabilities to current assets), and  $x_6$  (return on assets). Moreover, the constant increased nearly four times.

### c) Ohlson's model 2010 (for China) 3

According to this model, problems should be predicted one or two years in advance. While the indicators and their calculation remain identical, their weights were set as follows:

$$Q(2010C3) = -0,5974 x_1 - 0,4991 x_2 - 0,4699 x_3 - 0,00164 x_4 + 2,0091 x_5 - 0,01 x_6 - 0,042 x_7 + 3,7182 x_8 - 0,1823 x_9 - 2,48 \quad (20)$$

Compared to the 1980 model variant constructed for the same purpose, different weights were attributed to individual indicators. The most significant change – considerable decrease – occurred for  $x_2$  (indebtedness). In case of  $x_4$  (current liabilities to current assets), the weight was reduced very significantly, with the resulting indicator value converging to zero. The indicator  $x_6$  (return on assets) was similarly reduced. Moreover, significant change of impact direction (from positive to negative) and significant weight increase for  $x_8$  (income development in the past two years) are also important. There was a less intensive change for  $x_7$  (debt coverage) and  $x_9$  (income growth dynamics).

### 3.8 Ohlson's model with adjusted set of indicators (Ohlson 2010 for China U)

The construction of these new variants for the Chinese economy resulted from doubts whether the number of variables included in the model is justified, and whether all indicators in fact contribute to the model sensitivity. With a view to increase the explanatory power and simplify the model application, three new alternative models were constructed with only five variables/indicators selected from the original model; the calculation method is identical. Five indicators were selected for the new variants:  $x_2$  (indebtedness),  $x_3$  (working capital to assets),  $x_4$  (current liabilities to current assets),  $x_5$  (excessive debt), and  $x_8$  (income development in the past two years). The constant is also used. By assigning weights to individual indicators, three model variants were constructed for the Chinese economy – varying in the time horizon for prediction of problems, as in the previous case:

**a) Ohlson's model 2010 for China U1** – it determines the probability of financial problems within the period of one year, with the following weights for individual indicators:

$$Q(2010CU1) = -0,9925 x_2 - 0,9865 x_3 + 0,00237 x_4 + 3,3802 x_5 + 3,11 x_8 - 7,5113 \quad (21)$$

**b) Ohlson's model 2010 for China U2** – it determines the probability of financial problems in the course of two years, with the following indicator weight structure:

$$Q(2010CU2) = -0,1404 x_2 - 0,1591 x_3 - 0,0231 x_4 + 1,5255 x_5 + 4,2852 x_8 - 7,4331 \quad (22)$$

**c) Ohlson's 2010 for China U3** – it determines the probability of financial problems in the course of one or two years, with the following indicator weight structure:

$$Q(2010CU3) = -0,417 x_2 - 0,4086 x_3 + 0,00177 x_4 + 2,1839 x_5 + 3,8624 x_8 - 6,7685 \quad (23)$$

The verification has demonstrated that the results of these models with only five variables do not significantly differ from the results of nine-variable models. None of the three variants differs in the determined impact direction of individual indicators. Weights vary by up to 0.5 or three times the initial variant (U1), as appropriate,  $x_4$  is relatively reduced more due to low amount. The lowest weight for all three model variants is attributed to  $x_4$  (indebtedness), while the highest weights for all variants are attributed to  $x_8$  (income development in the past two years).

### **3.9 Ohlson's model 2011 (for Iran)**

The Ohlson model of 2011 for Iran resulted from the testing of the four most famous bankruptcy prediction models (Ohlson, Zmijewski, Shumway, and Altman) for the economy of Iran (Grice, Dugan, 2003). The application of these models promoted the construction of a new Ohlson model variant. It relied on a data set for more than 1 500 Iranian companies, of which 142 ended their activities due to financial problems; no financial / transportation companies were included. The model applied the set of nine indicators and a constant, only attributing new weights to indicators based on the conditions of the Iranian economy:

$$Q(2011) = -0,14 x_1 + 14,58 x_2 - 2,92 x_3 - 0,6 x_4 - 0,17 x_5 - 1,4 x_6 - \\ - 2,6 x_7 + 3,79 x_8 - 0,25 x_9 - 12,87 \quad (22)$$

Compared to the original model of 1980, weights of  $x_1$  (company size),  $x_5$  (excessive debt),  $x_6$  (return on assets),  $x_7$  (debt coverage), and  $x_9$  (income growth dynamics) are lower. On the other hand, higher weights were assigned to  $x_2$  (indebtedness),  $x_3$  (working capital to assets),  $x_4$  (current liabilities to current assets), and  $x_8$  (income development in the past two years). Changes in the impact direction occurred for  $x_4$ ,  $x_7$ , and  $x_8$ . Moreover, the constant increased nearly ten times; it is deducted from the sum of indicators, similarly as for the original model.

This is the last known variant of the Ohlson's model.

### **3.10 Comparison of the variants**

Based on comparison of all the model variants can be concluded, that the variants of Ohlson's model do not vary in the construction of included indicators. They vary in the weights attributed to individual indicators, in the constant and in the number of indicators included within individual models (some models). Furthermore, some differences exist for individual variants in terms of the fields / industries, for which they are intended, and the purpose / time horizon, in which they predict potential problems. The following Table No 1 allows the comparison of construction of all the variants, particularly the coefficients of individual indicators, including the numbers and types of indicators.

The construction of each additional variant was associated with higher degree of knowledge relating to the application of bankruptcy / prediction models, which were immediately applied and reflected in the new variants. Particularly significant is the identification of the factor of time and local (national) conditions, under which a model emerged / analyzed companies operate, similarly as gradual elimination of differences arising from industry-related specificities of company operations. Furthermore, the experience with the scope of included indicators may be considered significant in terms of the construction and development of additional models, as it proved that the prediction reliability of models with a lower number of appropriately selected indicators does not differ from models with a higher number of indicators.

Tab. 1 – Overview of coefficients used in the Ohlson bankruptcy prediction model  
Source: Own elaboration

	$x_1 = \log(\text{assets} / \text{price index})$	$x_2 = \text{liabilities} / \text{assets}$	$x_3 = \text{net working capital} / \text{assets}$	$x_4 = \text{current liabilities} / \text{current assets}$	$x_5 = \text{liabilities} > \text{assets}$ a) yes =1; b) no = 0	$x_6 = \text{net income} / \text{assets}$	$x_7 = \text{funds provided by operations} / \text{liabilities}$	$x_8 = \text{income for past two years} < 0$ : a) yes=1; b) no=0	$x_9 = \text{income increase} / \text{absolute income increase}$	Constant
Q	$\beta_1$	$\beta_2$	$\beta_3$	$\beta_4$	$\beta_5$	$\beta_6$	$\beta_7$	$\beta_8$	$\beta_9$	$\beta_0$
1980/1	-0.407	6.03	-1.43	0.0757	-2.47	-1.83	0.285	-1.72	-0.521	-1.32
1980/2	-0.519	4.76	-1.71	-0.297	-2.74	-2.18	-0.780	-1.98	0.4281	1.84
1980/2	-0.478	5.29	-0.990	0.062	-4.62	-2.25	-0.521	-1.91	0.212	1.13
1993/1	-0.1659	1.7518	-0.8496	0.035	-0.2911	-2.5018	-2.362	0.9512	-0.5192	-2.2473
1993/2	-0.1639	0.8749	-2.0623	-0.2224	-0.0916	-6.1045	-1.6608	-0.1286	-0.3576	-0.7325
2003A	-0.777	3.224	-0.323	0.589	0.041	-2.86	-2.854	0.372	0.206	0
2003B	-0.881	3.931	0.054	0.166	0.645	-0.548	-2.886	0.656	-0.3	0
2003P	-0.706	2.204	-1.25	0.455	0.553	-3.79	-4.591	0.157	0.309	0
2009 T	-0.228	7.186	-0.073	0.613	-1.714	3.264	-4.187	0.438	-0.154	-4.582
2010	-0.17	3.69	-1.87	0	-0.54	0.03	-0.06	1.16	-1.02	-7.2
2010 C1	-0.8983	0.9546	-0.9234	0.00248	2.9508	-0.0109	-0.033	3.2088	0.5871	-1.3128
2010 C2	-0.2786	-0.2152	-0.2132	-0.0207	1.4666	-0.00755	-0.0541	-4.157	-0.9292	-5.5238
2010 C3	-0.5974	-0.4991	-0.4699	-0.00164	2.0091	-0.01	-0.042	3.7182	-0.1823	-2.48
2010 CU1	0	-0.9925	-0.9865	0.00237	3.3802	0	0	3.11	0	-7.5113
2010 CU2	0	-0.1404	-0.1591	-0.0231	1.5255	0	0	4.2852	0	-7.4331
2010 CU3	0	-0.417	-0.4086	0.00177	2.1839	0	0	3.8624	0	-6.7685
2011 I	-0.14	14.58	2.92	-0.6	-0.17	-1.4	-2.6	3.79	-0.25	-12.87

Similarly important is the finding that it is more useful to focus on the prediction of serious financial problems than on bankruptcy and/or end of company operations/existence.

#### 4 SUMMARY AND CONCLUSION

Virtue of its design the Ohlson's model is ranked to those model which use also qualitative parameters for the assessment of the financial situation of companies and moving towards bankruptcy Positive for its construction is also unambiguous interpretation resulting values without additional scales. The emergence of different variants of this model is the deepening of past experience with the application of predictive models, which when used in other conditions than where originated, did not produce reliable results. Different conditions of use are to be understood on the one hand as different national economy, and on the other hand as different period as compared to the one in which it was created. The variants of this model do not vary in the included indicators. They vary in the weights attributed to individual indicators, in the constant, and in the number of indicators included within individual models (some models).

Despite the benefits of Ohlson's model construction the concept of its structure and derivation of its variants and their comparison raises some questions. One of them is whether it is possible to sufficiently capture the other conditions by a change in the weight of ratios that are



included in the model. These different conditions can be manifested also (or maybe better) through other indicators than which are included in Ohlson's model.

Another question may relate to construction of indicators included in the model. The inclusion of the absolute value (even if it is corrected price index and converted to a logarithmic value) usually leads to a distortion resulting values.

A problem that does not concern only to this model is the usage of indicators based on accounting data for indicating financial situation and predicting next development of it. It is assumed the usage of data based on national accounts. If the model is used in different national economic, this is different from accounting, in which model was created, the result could not be reliably due to this different way of financial statements compilation. Has already application of older models finds out that accounting does not give reliable information about the financial situation (Altman, 2002). The differences between Anglo-Saxon and continental accounting are mentioned as one of the reasons of decreasing the reliability of their prediction. Although the accounting is currently in a number of countries under the influence of international accounting harmonization, the extent of their use is usually small and is not the same in all national areas. On the other hand usage the International Accounting Standards provides a different set of accounting data and led to the different prediction of the further firms' development (Kubičková, 2012). The prediction ability and reliability of these models can in these conditions decrease even under the data source, not under the really financial condition. This problem Ohlson's model does not solve.

Another general problem that arises from the comparison of different variants of Ohlson's model is the question which other qualitative indicator determine the future development of the company. In the construction Ohlson's model these indicators are included, but only to a limited extent and in substance on the border of qualitative and quantitative/financial ones (size of the firm, previous two-year development of profit, overload loan). Determine the other qualitative characteristics (market share, the age of the company, innovation etc.) and the way how to include them in the model construction is the task of further investigation.

The assessment ability of Ohlson's models was compared with ability of the other models in many research projects (Klečka, Sholleová, 2010, Divišová, 2013, Kubičková, 2015). The results showed that there are differences as compared to the models of the same origin (Altman Z-score) and compared with models of different origins (IN 05, Taffler model, Grünwaldův model). The verification of these results and its reasons can be the research question for the other projects.

### **Acknowledgements:**

*This paper was funded by The institutional support for long-term conceptual development of research organization the University of Finance and Administration, Prague, as a result of Research project IGA (No 7762) "Historical and cultural aspects of accountancy as a factor determining the process of IFRS implementation (with special accent on CEE countries)."*

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## **MEASURING AND EVALUATING THE INVESTMENT PERFORMANCE OF PENSION FUNDS**

*Petr Kupčák*

### **Abstract**

This article focuses on the impacts various performance of pension funds to the amount of lifetime pension in selected European countries. Comparison of the performance of pension funds is determined by means of the Sharpe ratio in the time period 2005 - 2013. This paper aims to identify and assess the impact of the Sharpe ratio on the payment of lifetime pensions in postproduction period. It is necessary to differentiate data of pension companies with conservative investments and more risky investments in the empirical analysis. This distribution is made in order to fulfillment of paper objectives. I identified the different influence of the Sharpe ratio for conservative and risky investments on lifetime pension. The results of pension funds from Visegrad countries demonstrate weak performance in comparison with Sweden, Switzerland and the Netherlands. Conclusion of the paper is focused on evaluation performance of pension funds with an emphasis on changes in the amount of the lifetime pensions paid out by Czech pension company. The results of the article identified the importance of measuring and evaluating the investment performance because increase of the nominal appreciation of 1 percentage point will cause a change of lifetime pension of 28 %. This is a substantial increase in pension for participants in postproduction period.

*Keywords: Sharpe ratio, Performance, Lifetime pension, Pension Fund*

JEL Classification: G22, H55, L25

### **1 INTRODUCTION**

The ageing population is a major problem for pension systems in many European countries. Pension systems are divided into several pillars. The first pillar function mainly as a pay as you go system (so called „PAYG system“). Private pension companies are part of the second and third pillar, which are based on the accumulation of assets of participants and their assets are invested by pension companies in the financial markets.

Investments of pension companies are very specific because their assets are intended for the payment of pensions. It represents a very long investment horizon corresponding to the certain risk profile of investments. For this reason, the author of the paper decided to focus on the performance of pension companies in selected countries. Author used method of Sharpe ratio in order to a comparison of pension performance. This method compares the nominal appreciation of the assets with the risk-free interest rate and this difference weighs standard deviation. (Sharpe, 1994)

### **2 THEORETICAL BACKGROUND**

Performance of pension funds is monitored and evaluated by the World Bank and The Organisation for Economic Co-operation and Development (OECD). The method of Sharpe ratio was used in the publication of the OECD: Financial Performance of Pension Fund: An

Exploratory Study. In this study compare multiple tools to assess the performance and recommend using of Sharpe ratio. (Walker & Iglesias, 2010)

The performance of pension companies was explored with using the Sharpe ratio researchers CERGE-EI, Mr. Schneider and Hlavac. They identified large differences in the performance of pension companies in Central Europe. (Hlaváč & Schneider, 2011)

Mr. Chov and Lai (2015) used the method of Sharpe ratio to measure the performance of equities. They evaluates Sharpe ratio as one of the modern manner of measuring portfolio performance because includes the risk profile of the investment. (Chow & Lai, 2015)

Sharpe ratio can take of positive and negative values. When assessing of negative results Sharpe ratio we have to consider the size of the standard deviation of returns in each case. The cause is that a large standard deviation overestimates the results. (Grable & Chatterjee, 2014)

There are many indicators for evaluating the performance of financial institutions. Comparative studies show that there are significant differences between the indexes. There are many indicators for evaluating the performance of financial institutions. Frequently used are these indicators: Sharpe ratio, Traynor ratio, Information ratio and Sortino ratio. For evaluating the performance of pension funds is recommended Sharpe ratio. (Bansal, Garg, & Saini, 2012)

The above-mentioned authors did not deal with a guaranteed pension funds and non-guaranteed pension funds. I divided the nominal performance data into two groups. The first group consists of data from guaranteed pension funds and the second group consists of data non-guaranteed pension funds. This separation is important because guaranteed pension funds are a favorite in Czech Republic and Slovakia but investment performance have better non-guaranteed pension funds.

The methodology of the calculation Sharpe ratio is the same as used the above-mentioned authors, however, the results are different because time period contains credit crunch. Evaluation of performance of pension funds is performed using calculation of the lifelong pension. The importance of Sharpe ratio of pension companies on the amount of lifetime pensions has not been examined.

### **3 OBJECTIVES AND METHODOLOGY**

The main objective of this paper is to estimate the influence the Sharpe ratio of pension companies on the payment of lifetime pensions in postproduction period. The secondary objective of this paper is to highlight the differences in performance of pension funds from the Visegrad countries and Switzerland, Sweden and the Netherlands.

The first step in the project was to collect data on investment performance of pension funds in selected countries in the period 2005 - 2013. I focused on the Visegrad countries (Czech Republic, Slovakia, Poland and Hungary) and Sweden, Switzerland and Netherlands. Sweden, Switzerland and the Netherlands were added to analyse because I wanted to show a differences between a developed and less developed fully funded system (Visegrad countries). Summary of input data is in Tab. 1.

I performed a selection countries according to the Melbourne Mercer Global Pension Index. Based on this index is the Netherlands pension system considered one of the best pension systems in the world. The Netherlands pension system has a rating B plus with Australia in 2014. Sweden and Switzerland has a rating of B, Poland has a rating of C. Slovakia, Hungary and the Czech Republic have ratings E. Melbourne Mercer Global Pension Index indicates the

country with the evaluation of E as a country with a poor pension system that may be in the early stages of development or a non-existent system. (Mercer, 2014)

Data was obtained also for the risk-free interest rate in the time series 2005 - 2013 in the selected countries from database of the Eurostat. The paper using two alternative specifications for the risk free asset: a short-term local rate (SIR) and a long-term local rate (LIR). (Eurostat, 2014)

Tab. 1 – Overview of the input data for the period 2005 - 2013. Source: Local associations of pension companies

<b>Countries</b>	<b>Number of pension companies</b>	<b>Average rate of return in %</b>	<b>Standard deviation rate of return</b>
Czech Republic	11	2.05	0.80
Slovakia	6	2.16	2.24
Poland	13	7.38	9.72
Hungary	17	4.45	12.90
Switzerland	10	4.14	6.70
Sweden	4	7.08	11.26
Netherlands	2	7.33	10.77

I obtained pivotal data from these associations and governmental organizations:

- Association of pension companies in the Czech Republic. (APF CR, 2014)
- Hungarian Financial Supervisory Authority. (HFSA, 2014)
- Investments office. (Investments office, 2014)
- Pensioenfonds ABP. (Pensioenfonds ABP, 2014)
- The Organisation for Economic Co-operation and Development. (OECD, 2013)
- Ministry of the Treasury in Poland. (Steindl, 2013)
- Swedish National Pension Fund - AP1, AP2, AP3. (Swedish National Pension Fund – AP1, AP2, AP3, 2014)

The second step in the project was to estimate the Sharpe ratio. The Sharpe ratio is the average rate of return minus the risk-free return, divided by the standard deviation of the return. Sharpe ratio (SR) is determined according to the following formula No. 1.

$$SR = \frac{R - R_f}{\delta} \quad (1)$$

$R$  – Nominal rate of return

$R_f$  - Risk-free interest rate

$\delta$  - Standard deviation

Data of performance were divided into two groups: non-guaranteed and guaranteed funds. Non-guaranteed funds (NF) include a portfolio which is very conservative and consists

mainly bonds and treasury bills. It is usually the funds that are managed by strict regulation. Guaranteed funds (GF) represent investment portfolio with a high percentage of shares, usually in combination with bonds.

I determined values Sharpe ratio for individual countries, groups of countries (Visegrad countries vs. countries with developed fully founded pension systems) and for guaranteed and non-guaranteed pension funds.

I calculated accumulated amount of money through equation of long-term savings No. 2. (Joshi, 2008). Prerequisites were to determine the monthly deposits in the amount of 2 000 CZK and time savings of potential participant for 40 years.

$$s = m * v * \frac{(1 + i)^n - 1}{i} \quad (2)$$

*s* - Accumulated amount of financial resources

*m* - Number of deposits in one year

*i* - Annual interest rate

*v* - Regular deposit amount

Based on the amount of accumulated financial resources of potential participants, I determined the amount of lifetime pensions. Lifetime pensions are paid in the base period and in the period after base period until the end of life of potential participant. The basic period is the time taken to reach the upper age limit. The upper age limit for the potential participant is determined based on reaching retirement age in the Czech Republic. The upper age limit is unchanged. The upper age limit was used median life expectancy according to mortality tables of the Czech Statistical Office. (Czech Statistical Office, 2014)

These mortality tables are the basic parameters for creating the mortality tables of pension funds. Pension funds can change parameters of the mortality tables (extend life expectancy by adding additional parameters).

I used the formula of early paid pension by the pension companies on the Czech market with an expected median payment period of *r* years. I used the selected formula from the pension plan IV pension company AXA. The reason was that the pension company AXA is a multinational company operates in several selected countries and the calculation of pensions in the Czech pension companies are on a similar basis because pension plans must be approved by the Czech National Bank. (AXA pension company, 2014)

The annual amount of lifetime pension is expressed formula No. 3.

$$P = \left( \frac{(1 + j)^n}{1 + 0.5j} \right) * \left( \frac{j}{(1 + j)^n - 1} \right) * C \quad (3)$$

*C* - The total amount of financial resources

*j* - Minimum appreciation

*n* - The period of draw pensions

The author used these simplifying assumptions. The retirement age of potential participant is 67 year and the technical interest rate is 1 %. Life expectancy is extended by 4 points (sum of all parameters) in order to achieve real results. The author used the mortality tables for men because men have a shorter life expectancy and the differences in the amount of life annuity will be reflected more.

## 4 RESULTS

### 4.1 Sharpe ratio of selected countries

This section discusses the main results of a portfolio performance analysis of pension funds that consists in estimating Sharpe ratio. Overview of results Sharpe ratio is in Tab. 2.

Tab. 2 – Sharpe ratio of selected pension funds. Source: The author's research

Selected countries	SR LIR	SR SIR	SR NF	SR GF	Average SR	Average SR
<b>Czech Republic</b>	- 2.09	0,11	x	- 0.99	- 0.99	-0.45
<b>Slovakia</b>	- 1.19	0.10	- 0.34	- 0.75	-0.55	
<b>Poland</b>	0.20	0.29	0.24	x	0.24	
<b>Hungary*</b>	- 0.45	-0.40	- 0.12	- 0.72	-0.42	
<b>Switzerland</b>	0.33	0.48	0.41	x	0.41	0.42
<b>Sweden</b>	0.36	0.47	0.41	x	0.41	
<b>The Netherlands</b>	0.38	0.49	0.44	x	0.44	
<b>Average SR</b>			0.17	-0.82		

\* *Second pillar was closed in 2010*

The author described in the article: *Reform of the third pillar of the pension system in the Czech Republic after 1 year of operation* (Gottwald & Kupčik, 2014) the position of the pension system in the Czech Republic. We have noted that the new pension participant funds contain very few participants and their assets are not invested in accordance with their statutes. For this reason, the results of Sharpe ratio Czech Republic do not include data of non-guaranteed pension funds.

Sharpe ratio of guaranteed funds (- 0.82) is lower than Sharpe ratio of non-guaranteed funds (0.17). This is due to strong restrictions on the investment of pension funds and very conservative investments mainly in a government bonds. Sharpe ratio of guaranteed funds (Czech Republic, Hungary and Slovakia) in a comparison with domestic government bonds with a maturity of 10 years is negative. Savings and investments for retirement should have a long-term horizon, for this reason, it is a very bad result for pension companies

The results are better by non-guaranteed funds only with the exception of Slovakia and Hungary, where this is caused by the negative political influences. It is very important to highlight the excellent results of the non-guaranteed pension funds in Poland (0.24), Sweden (0.41), Switzerland (0.41) and the Netherlands (0.44). Pension funds overcame from these countries the interest rate government domestic bonds with a maturity of 10 years.

The Hungarian pension funds have even the worst performance of all the selected countries. Polish pension funds have worse performance than the Swedish pension funds, but it must be said that Polish pension funds have the best performance from the Visegrad countries. The countries with developed fully funded system have higher Sharpe ratio (0.42) than the Visegrad countries (-0.45). The large difference is mainly due to several reasons. Especially small investment limits, progressive investment portfolios, other culture and mentality people and investors. The Netherlands (0.44) achieves the best results of all the selected countries.

### 4.2 Lifetime pensions

Sharpe ratio depends largely on risk (volatility expressed as standard deviation). For this reason, Sharpe ratio is variously sensitive to changes in investments with stable revenues

(small standard deviation) and variable income (large standard deviation). From the research data is obvious that pension companies from the Czech Republic and Slovakia have common a very low standard deviation of returns (indicated in Tab. 1). Other countries are characterized by dynamic investments with a large standard deviation. Based on the above is distinguished influence of Sharpe ratio on lifetime pension for conservative and dynamic investments.

### **Influence of Sharpe ratio on lifetime pension for conservative investments**

Pension funds in the Czech Republic and the Slovakia have very low Sharpe ratio, nominal appreciation of the assets and a very small standard deviation of returns. This is due to extremely conservative investments of pension funds. These countries have common data: risk-free interest rate of 2.99 % and standard deviation of 1.52. On the basis of these informations have been calculated Sharpe ratio and according to the methodology have been calculated accumulated financial resources and lifetime pension. I have processed detailed results in Tab. 3.

Tab. 3 – Overview of auxiliary results. Source: The author's research

<b>Sharpe ratio</b>	<b>Rate of return in %</b>	<b>Accumulated financial resources in CZK</b>	<b>Lifetime pensions in CZK</b>
0.007	3.0	1 809 630	8 711
0.336	3.5	2 029 207	9 768
0.666	4.0	2 280 612	10 978
0.995	4.5	2 568 728	12 365
1.325	5.0	2 899 195	13 956
1.654	5.5	3 278 535	15 782
1.984	6.0	3 714 287	17 879
2.313	6.5	4 215 166	20 290
2.643	7.0	4 791 243	23 063
2.972	7.5	5 454 156	26 254
3.301	8.0	6 217 356	29 928
3.631	8.5	7 096 381	34 159



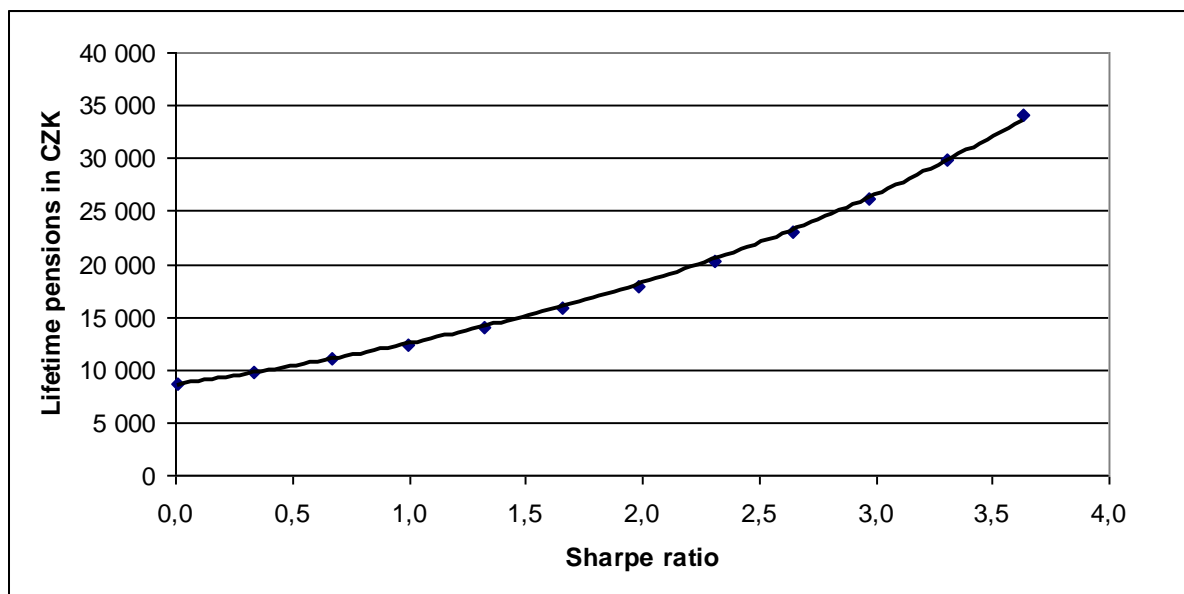


Fig. 1 – Influence of Sharpe ratio of conservative investments on lifetime pension. Source: The author's research

The regression equation of the Fig. 1 has an exponential form:

$$y = 8541.5e^{0.3775x} \quad (4)$$

From the above formula No. 4 is evident that the size of the lifetime pensions is low sensitivity to changes in the values of Sharpe ratio. We have to compare equation of No. 4 and 5 then is evident a smaller slope of the tangent of equation No. 4.

#### **Influence of Sharpe ratio on lifetime pension for dynamic investments**

Pension funds in the Poland, Hungary, Switzerland, Sweden and Netherlands have high value of Sharpe ratio (except Hungary), nominal appreciation of the assets and a standard deviation of returns. This is due to dynamic investments of pension funds. These countries have common data: risk-free interest rate of 4.04 % and standard deviation of 10.27. On the basis of these informations have been calculated Sharpe ratio and according to the methodology have been calculated accumulated financial resources and lifetime pension. I have processed detailed results in Tab. 4.

Tab. 4 – Overview of auxiliary results. Source: The author's research

Sharpe ratio	Rate of return in %	Accumulated financial resources in CZK	Lifetime pensions in CZK
0.045	4.5	2 568 728	12 365
0.093	5.0	2 899 195	13 956
0.142	5.5	3 278 535	15 782
0.191	6.0	3 714 287	17 879
0.240	6.5	4 215 166	20 290
0.288	7.0	4 791 243	23 063
0.337	7.5	5 454 156	26 254
0.386	8.0	6 217 356	29 928
0.434	8.5	7 096 381	34 159
0.483	9.0	8 109 179	39 034
0.532	9.5	9 276 480	44 653
0,580	10,0	10 622 221	51 131

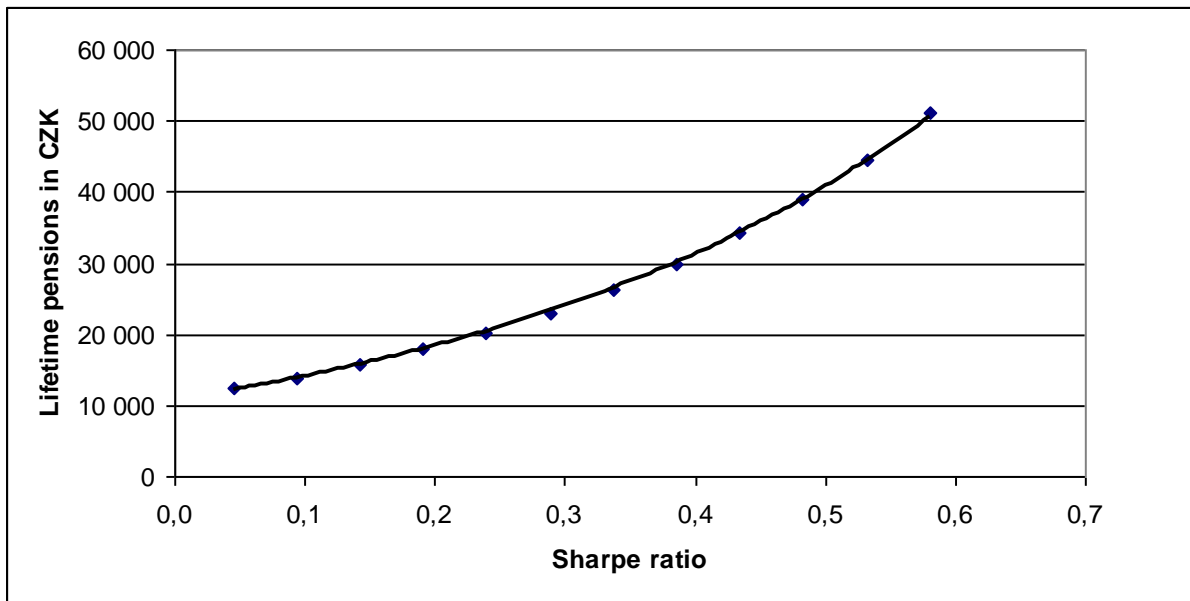


Fig. 2 – Influence of Sharpe ratio of dynamic investments on lifetime pension. Source: The author's research

The regression equation of the Fig. 2 has an exponential form:

$$y = 10826 e^{2,6539x} \quad (5)$$

From the above formula No. 5 is evident that the size of the lifetime pensions is high sensitivity to changes in the values of Sharpe ratio.

## 5 DISCUSSION

Walker and Iglesias (2010) in the article: *Financial Performance of Pension Fund: An Exploratory Study* described performance of pension funds on Latin American countries, Central and East European countries. They had identified a similar performance of pension funds in the Netherlands (Sharpe ratio - SIR 0.39; Sharpe ratio - LIR 0.14) in accordance with my results. Different results have achieved pension funds in Hungary (Sharpe ratio - SIR 0.3; Sharpe ratio - LIR 0.43). Data of Hungarian pension funds are from the time period 1998-2007. The credit crunch struck pension funds assets in 2008 (the size of the nominal appreciation of conservative funds -1.1 %, balanced funds -11.9 %, dynamic funds -21.5 %). It is evident that the Hungarian pension funds under pressure from bad investment results and negative political influence to get into a difficult situation. This situation culminated when 95 % of participants in pension savings returned to the PAYG system in 2010.

Hlaváč and Schneider (2011) in the article: *Financial Performance Pension Funds in Central Europe: Why are the worst czech funds?* described performance of pension funds in the Czech Republic, Bulgaria, Croatia, Hungary, Poland and the Slovak in the different time period. They identified from selected countries, the highest performance of Polish pension funds in the time period 2000 - 2010 (Sharpe ratio - SIR 0.13; Sharpe ratio - LIR 0.15). The results are worse compared, because results are for the various time periods time, however, it is evident tendency of Polish pension funds that they achieve the best performance of the Visegrad countries.

One of the the determinants of Sharpe ratio is a risk-free interest rate. I estimate the problem in defining the risk-free rate because in my opinion on the current financial market does not exist risk-free asset. For purposes of comparison the performance of pension funds across various countries, I used as a riskless assets of local government bonds because they express a certain degree of credibility and they can used as a common denominator for all the selected countries.

## 6 CONCLUSION

I compared in this article performance of pension funds in Visegrad countries (Poland, Hungary, Czech Republic and Slovakia) with Sweden, Switzerland and the Netherlands.

Measuring the performance of pension funds were conducted with using the Sharpe ratio and evaluation of the performance was focused on comparing the amount of lifetime pensions.

Sharpe ratio of guaranteed funds (- 0.82) is lower than Sharpe ratio of non-guaranteed funds (0.17). This is due to strong restrictions on the investment of pension funds and very conservative investments mainly in a government bonds. Sharpe ratio of guaranteed funds (Czech Republic, Hungary and Slovakia) in a comparison with domestic government bonds with a maturity of 10 years is negative. These pension funds have their portfolios consisting mainly of government bonds. Pension funds failing to diversify their portfolios and thus does not create added value for the participants in the form of higher returns over the risk-free interest rate.

Non-guaranteed pension funds have great results of Sharpe ratio only with the exception of Slovakia and Hungary, where it is caused by negative political circumstances. Excellent results of non-guaranteed pension funds have in Poland (SR 0.24), Sweden (SR 0.41), Switzerland (SR 0.41) and the Netherlands (SR 0.44). These pension funds overcame the interest rate government domestic bonds with a maturity of 10 years. Sufficient degree of portfolio diversification generates for participants additional revenue over the risk-free interest rate. The structure of the portfolio has a higher volatility than a portfolio composite

only of government bonds but investments for retirement have a long horizon and short-term fluctuation is compensated by long-term growth of markets.

The results of the Sharpe ratio of pension funds from Visegrad countries demonstrate weak performance (SR -0.45). Exceptions are Polish pension funds that achieve high performance mainly due to the low regulation, economies of scale (financial resources in a total volume of 640 billion CZK) and dynamic investments. Polish pension market have intervened legislative changes. Consisting primarily of reduce the contribution to the second pillar from 7.3 % to 2.3 % and the seizure of government bonds by the State. All Visegrad countries suffered in the monitored period negative political intervention.

The indicator Sharpe ratio includes the risk profile of the investment. I have identified from the available data, two segments with various volatility of returns.

The first segment consists of countries Czech Republic and Slovakia. Pension funds from these countries invest very conservatively. It is reflected in the low standard deviation of their returns. Changes of the Sharpe ratio cause small changes in the lifetime pensions paid out of the pension funds. If the risk profile of investments will not change and risk-free interest rate also remains constant, so we can conclude for example: if the Sharpe ratio 0.336 increases by 10 %, the interest rate will change by 0.05 percentage points and lifetime pension increases only by 1.2 %.

The second segment consists of countries Poland, Hungary, Switzerland, Sweden and the Netherlands. Pension funds from these countries invest very dynamic. It is reflected in the high standard deviation of their returns. Changes of the Sharpe ratio cause big changes in the lifetime pensions paid out of the pension funds. If the risk profile of investments will not change and risk-free interest rate also remains constant, so we can conclude for example: if the Sharpe ratio 0.336 increases by 10 %, the interest rate will change by 0.34 percentage points and lifetime pension increases by 9.3 %.

Generally, the amount of lifetime pensions depends mainly on the size of the nominal appreciation of the assets which reach pension funds. Based on the obtained data and results is evident that increase of the nominal appreciation of 1 percentage point will cause a change of lifetime pension of 28 %.

The above results demonstrate the importance of monitoring and evaluating the performance of pension funds, because small changes in the performance of pension funds cause very large changes in the amount of lifetime pensions.

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## **THE ECONOMIES SCALE OF AGRICULTURAL PRODUCT PROCESSING COMPANIES LISTED ON STOCK EXCHANGE IN HOCHIMINH CITY AND HANOI, VIETNAM**

*Le Thanh Tung, Pham Thi Quynh Nhu, Nguyen Hai An*

### **Abstract**

This study applied the Cobb-Douglas production function to identify economic efficiency of 18 agricultural product processing companies listed on the Stock exchange in Ho Chi Minh City (HOSE) and Hanoi (HNX) in such sectors as fisheries, rubber and sugar in the period 2009-2013. The method employed FEM and REM models using panel data. The results showed that performance of all and each sector in this study has increasing returns to scale. In particular, firms in the sectors of fisheries and rubber primarily relied on raising capital to increase their output value, while those in the sugar sector mainly increase labor to improve their output value. Finally, the paper also provides some policy implications to improve the efficiency of capital and labor in the agricultural product processing companies.

*Keywords: economics of scale, listed companies, agricultural processing companies*

JEL Classification: J43, Q13

### **1 INTRODUCTION**

According to the data from Vietnam General Statistics Office (GSO) in 2013, the agricultural sector contributed 18.4% to Vietnam's GDP. Besides, the agricultural industry provided jobs for 25.16 million employees (accounted for 46.9% of total labor force) and about 60.4 million people are living and working in rural areas (about 46.8% of total population). The role of agricultural industry is essential in the Vietnam economy. Therefore, the industrialization and modernization of agricultural and rural sector attracts a lot of attention. Particularly, the center of cohesion between industrialization and modernization is to connect and transform raw materials and outputs of agricultural sector to inputs of industrial sector. Thenceforth, the production value chain for agricultural product manufacturing and processing firms is formed to enhance the industrialization and modernization of agricultural industry in Vietnam.

Currently, for the case of agricultural product processing companies in Vietnam, the sectors of rubber, sugarcane and fisheries play the most important role. These companies provide goods not only for domestic market, but also for exporting markets such as USA, Japan, South Korea, China, Malaysia, India, etc. Due to their characteristics of production, the agricultural manufacturing need to utilize lots of labor, capital and materials for increasing their outputs. However, their most common mistakes is to select outputs that cause labor shortage or surplus and utilize capital ineffectively that results in capital shortage. Therefore, it is essential and indispensable to conduct deeper study and analysis on effectiveness of input utilization (capital, labor) in production and business activities at companies.

This paper studied the economics scale of agricultural companies listed on HOSE and HNX from 2009 to 2013. The research used panel data regression with quarterly data. The research objective is to answer two questions: (i) What kind of economics of scale for each sector and all sectors (ii) Does capital or labor determine the increase in output of each sector and all sectors? Finally, this paper also suggests some solutions to enhance the efficiency of management to better utilize capital and labor at agricultural product processing enterprises.

## 2 LITERATURE REVIEW AND MODEL RESEARCH

The studies about economics of scale at levels of firms, regions or whole economy have been implemented in many countries in the world. Many types of production function have been proposed to illustrate the relationship between output and inputs, and the most common is Cobb–Douglas production function. The production function theory was developed by Charles Cobb and Paul Douglas (1928) after verification using the conditions of the US economy. The Cobb – Douglas production function stated that output (Q) depends on labor (L) and capital (K). In addition, the relationship among the variables of production functions is determined by level of science, technology and management that are called Total Factor Productivity (TFP).

In recent decades, many studies have successfully applied Cobb – Douglas production function into economics of scale research in such fields as industry, trading and service. A study of Ingene and Lusch (1999) with the application of Cobb – Douglas function for trading sector in USA showed that for the case of all grocery stores, return to scale remains constant while the small grocery stores have increased returns to scale. Hossain et al. (2004) also studied returns of scale for 21 sectors in Bangladesh. The results showed that only 14 sectors have increasing returns of scale while 7 sectors have diminishing returns of scale. Yuan et al. (2009) used Cobb-Douglas function in research of energy consumption in China, the result showed that improvement in technology declines the energy intensity of industrial sector by 6.3 percent per year. Hossain and Al-Amri (2010) also applied Cobb-Douglas function in Oman for 9 important sectors in industry. The research found that there are 7 sectors with increasing returns of scale and 2 sectors with decreasing returns of scale.

Based on Cobb-Douglas production function, the research model about economics of scale for the case of agricultural product processing company listed on HOSE and HNX will be written as follows:

$$Q_{it} = AK_{it}^{\alpha}L_{it}^{\beta} \quad (1)$$

If  $\alpha + \beta > 1$ , this production function has increasing returns to scale. 1% increase in inputs (labor, capital) results in more than 1% increase in outputs.

If  $\alpha + \beta = 1$ , returns to scale of the function remains constant. If inputs (labor, capital) increase by 1%, outputs increase by the same level of 1%.

If  $\alpha + \beta < 1$ , the function has diminishing returns to scale. If 1% increase in inputs (labor, capital) improves the outputs less than 1%.

After transforming both sides of the equation (1) into logarithm form, we have the following equation (2):

$$\ln Q_{it} = \ln A + \alpha \ln K_{it} + \beta \ln L_{it} + \varepsilon_{it} \quad (2)$$

$$i = 1, 2, 3, \dots, n$$

$$t = 1, 2, 3, \dots, m$$

Where: Q is total output of the sectors, A represents TFP, L is quantity of labor, and K is quantity of capital.  $\alpha$  and  $\beta$  denote the output elasticity on labor and capital respectively. When conducting regression model using panel data,  $i$  denotes  $i^{\text{th}}$  firms ( $i: 1 \rightarrow n$ ) and  $t$  denote time ( $t: 1 \rightarrow m$ ).



### 3 METHODOLOGY AND DATA

#### 3.1 Econometrics method

To accomplish the research objectives, this paper applies panel data regression with two methods of FEM and REM, and then uses the Hausman test for selecting appropriate method.

According to Gujarati (2004) and Gujarati and Porter (2009), panel data regression model is written as following:

$$Q_{it} = \beta_1 + \beta_2 X_{2it} + \beta_3 X_{3it} + \dots + \beta_k X_{kit} + u_{it} \quad (3)$$

Assume that the slope coefficients are unchanged across companies but intercepts vary across units. Thenceforth, model (3) can be rewritten as follows:

$$Q_{it} = \beta_{1i} + \beta_2 X_{2it} + \beta_3 X_{3it} + \dots + \beta_k X_{kit} + u_{it} \quad (4)$$

The difference in intercept may reflect the features of each company in terms of managerial philosophy or managerial style. Model (4) is known as the Fixed Effects Model (FEM). FEM is appropriate for the study using sample with short period.

In the Random Effects Model (REM), instead of treating  $\beta_{1i}$  as fixed, we assume that it is a random variable with a mean value of  $\beta_1$  (without  $i$  denotation). The intercept for a specific company can be represented as follows:

$$\beta_{1i} = \beta_1 + \varepsilon_i; \quad i = 1, 2, \dots, N \quad (5)$$

Where,  $\varepsilon_i$  is a random error term with a mean value of zero and variance  $\sigma^2_{\varepsilon}$ .

It can be understood that the companies in the sample are derived from a larger sample set and have a common mean of intercept ( $\beta_1$ ). The individual difference in intercept value of each company is reflected via the error term  $\varepsilon_i$ .

Substituting equation (5) into equation (4), we obtain:

$$Q_{it} = \beta_1 + \beta_2 X_{2it} + \beta_3 X_{3it} + \dots + \beta_k X_{kit} + \varepsilon_i + u_{it} \quad (6)$$

$$Q_{it} = \beta_1 + \beta_2 X_{2it} + \beta_3 X_{3it} + \dots + \beta_k X_{kit} + w_{it} \quad (7)$$

Where:

$$w_{it} = \varepsilon_i + u_{it} \quad (8)$$

The equation (7) is called Random Effects Model (REM). The composite error term  $w_{it}$  is constituted of two components:  $\varepsilon_i$  denotes the cross-section or individual-specific error term, and  $u_{it}$  denotes the combined time series and cross-section error term.

#### 3.2 Data

The study used quarterly data for the period from the first quarter in 2009 to the end of fourth quarter in 2013. Each company has the number of observations of 20 quarters. Data are derived from transparent reports, quarterly and yearly audited financial reports. The samples were surveyed at 9 fishery firms, 5 rubber firms and 4 sugar firms listed on HOSE and HNX. Total observations is 360 (20 periods multiplied by 18 firms). When conducting the research model, all data are transformed to natural logarithm form.

Tab. 1 - List of enterprises use statistical research data. *Source:* Research data from HOSE and HNX

No	Name	Listed	Field	Stock Code
1	Cuu Long An Giang Fisheries Import Export Joint Stock Company	HOSE	Fisheries	ACL
2	An Giang Fisheries Import and Export JSC	HOSE	Fisheries	AGF
3	Nam Viet Joint Stock Company	HOSE	Fisheries	ANV
4	NTACO Joint Stock Company	HOSE	Fisheries	ATA
5	Basa Joint Stock Company	HOSE	Fisheries	BAS
6	Number 4 Fisheries Join Stock Company	HOSE	Fisheries	TS4
7	Vinh Hoan Join Stock Company	HOSE	Fisheries	VHC
8	Bac Lieu Fisheries Join Stock Company	HNX	Fisheries	BLF
9	Number 1 Fisheries Join Stock Company	HNX	Fisheries	SJ1
10	Hoa Binh Join Stock Company	HOSE	Rubber	HRC
11	Dong Phu Rubber JSC	HOSE	Rubber	DPR
12	Phuoc Hoa Rubber JSC	HOSE	Rubber	PHR
13	Thong Nhat Rubber JSC	HOSE	Rubber	TNC
14	Tay Ninh Rubber JSC	HOSE	Rubber	TRC
15	Bien Hoa Sugarcane JSC	HOSE	Sugarcane	BHS
16	Lam Son Sugarcane JSC	HOSE	Sugarcane	LSS
17	Thanh Thanh Cong Tay Ninh Sugarcane JSC	HOSE	Sugarcane	SBT
18	KonTum Sugarcane JSC	HNX	Sugarcane	KTS

## 4 RESULTS AND DISCUSSION

### 4.1 Firms' Returns to Scale by sectors

This section estimates firms' returns to scale by sectors for the case of 9 fishery companies (180 observations), 5 rubber companies (100 observations) and 4 sugarcane companies (80 observations). Regression methods with panel data are employed using FEM and REM model. The regression results are presented as follows.

Tab. 2 - Regression Results by Sectors (Fishery - Rubber – Sugarcane)

Variables	Dependent variable: LnQ					
	Fishery Branch		Rubber Branch		Sugarcane Branch	
	FEM	REM	FEM	REM	FEM	REM
C	-1.351*	-1.569*	0.952	0.340	1.112	0.844
LnL	0.524**	0.479**	0.540**	0.432**	0.876**	0.480**
LnK	0.764**	0.806**	0.521**	0.628**	0.408**	0.766**
R <sup>2</sup>	0.859	0.850	0.877	0.812	0,822432	0.691
Adjusted R <sup>2</sup>	0.840	0.848	0.843	0.808	0,758140	0.683
F-statistics	45.718	501.498	26.385	209.589	1279218.000	85.950
Probability	0.000	0.000	0.000	0.000	0.000	0.000
Hausman test	0.301		0.167		0.005	
Observations	180		100		80	

*Note:* \*\* and \*: significant at 1% and 5% respectively

After conducting regression analysis for each sector, Hausman test is also applied to determine whether FEM or REM is appropriate. Table 2 shows that P-value of fishery firms equals to 0.301 and that of rubber branch is 0.167; that is, these values are more than 0.05. Therefore, for the case of fishery and rubber sectors, REM is more suitable than FEM. In contrast, the Hausman test for sugarcane sector with P-value = 0.005 < 0.05 indicates that FEM is more appropriate than REM.

**Tab. 3 - Results of Production Function by sectors (Fishery - Rubber – Sugarcane)**

Industry	Production function using equation (2)	Production function using equation (1)
Fishery	$\text{Ln}Q = -1.569 + 0.807\text{Ln}K + 0.479\text{Ln}L$	$Q = 0.208K^{0.807}L^{0.479}$
Rubber	$\text{Ln}Q = 0.34 + 0.629\text{Ln}K + 0.433\text{Ln}L$	$Q = 1.405K^{0.629}L^{0.433}$
Sugarcane	$\text{Ln}Q = 1.112 + 0.408\text{Ln}K + 0.876\text{Ln}L$	$Q = 3.089K^{0.408}L^{0.876}$

Table 3 shows that all the three sectors have increasing returns to scale with  $(\alpha + \beta) > 1$ . In particular, the value of fishery industry, rubber industry and sugarcane is 1.286, 1.061 and 1.285 respectively. The rubber enterprises have the lowest increasing returns to scale. The results also show that the production function of fishery and rubber industries has contribution of capital higher than that of labor (due to the coefficient  $\alpha > \beta$ ). On the other hand, the contribution of labor toward output in sugarcane industry is larger than that of capital (due  $\alpha < \beta$ ). Additionally, in terms of Total Factor Productivity (TFP), the sugarcane industry was the highest (3.089), followed by the rubber industry (1.405) and the fishery industry (0.208).

#### **4.2 Returns to scale of all firms in three sectors: Fishery, Rubber and Sugarcane**

18 enterprises in all three sectors with 360 observations are used for calculating returns to scale. Results from panel data regression method using FEM and REM are presented in Table 4.

**Tab. 4 - Regression results of all firms in three sectors**

Dependent variable: LnQ				
Variable	FEM		REM	
	Coefficient	t-statistics	Coefficient	t-statistics
C	-1.759**	-3.181	-1.719**	-3.198
LnL	0.167*	2.566	0.171**	2.655
LnK	0.937**	16.727	0.932**	17.297
R <sup>2</sup>	0.670		0.653	
Adjusted R <sup>2</sup>	0.650		0.651	
F-statistics	32.699		336.135	
Probability	0.000		0.000	
Hausman test	0.3017			
Observation	360			

*Note: \*\* and \* : significant at 1% and 5% respectively*

The result of the Hausman test indicates that REM is better than FEM with p-value of 0.3017. From Table 4, the production function for the case of all firms in three sectors is written as follows:

$$\begin{aligned}\ln Q &= -1.719 + 0.171 \ln L + 0.932 \ln K \\ Q &= 0.839 K^{0.932} L^{0.171}\end{aligned}$$

The results indicate that for the case of all firms in three sectors, there exists increasing returns to scale with the value of  $(\alpha + \beta)$  higher than 1 ( $\alpha + \beta = 1.103$ ). The coefficient of  $\alpha = 0.932$  is higher than  $\beta = 0.171$ , which indicates that the increase in output is mainly due to capital while the contribution of labor is limited. The value of Total Factor Productivity (TFP) equal to 0.839 reflects the contribution of technology and management to the firms' outputs in all three sectors.

## 5 CONCLUSION AND POLICY IMPLICATIONS

This research applied panel data regression method using FEM and REM to estimate production function for the enterprises listed on HOSE and HNX in three sectors including fishery, rubber and sugarcane in the period of 2009-2013. Generally, this paper has contributed to the existing theoretical framework literature in two main ways: (1) it provided an experimental evidence about the operation of firms in Vietnam, an emerging economy in Asia; (2) it also supplied some useful policy implications in SMEs area in developing countries.

In particular, the research results indicate that the enterprises in three sectors and each sector have increasing returns to scale. It is also found that the fishery and rubber sectors primarily rely on the increase in capital to improve the quantity of outputs while the sugarcane sector mainly uses more labours to increase output value.

Therefore, the results partly show that the growth pattern of Vietnamese enterprises in the period of 2009 –2013 is chiefly dependent on capital leverage. Therefore, when the government decided to contractionary monetary policy, raise interest rates, reduce money supply and credit growth in this period immediately, a lot of enterprises had difficulties in their production activities. This is considered as an obvious evidence for the growth model that primarily relies on credit and banking system in Vietnam in the past period.

From the findings, this research proposes some policy implications to improve production and business management in the future:

**Firstly:** Because Vietnam has abundant labor force, the enterprises need to focus on labor-intensive production to boost up their output. Furthermore, firms should pay special attention to labor productivity factor to increase the contribution of labor to firms' output. Firms should organize training, retraining and advanced training activities to improve qualification and skills, as well as arrange and utilize labours for appropriate jobs.

**Secondly:** Firms should continuously invest in innovation, technology improvements to increase the contribution of science and technology to outputs. Moreover, the advanced methods of production methods and organization should be actively applied to improve outputs value. Additionally, the connection between enterprises and the agricultural sector should be tightened to diversify processing products in order to construct a strong value chain in processing agricultural products industry for domestic consumption and export.

**Thirdly:** Capital-intensive production model should be adjusted into model with harmonious combination of labor and capital; henceforth, the effect of diminishing marginal productivity of capital can be inhibited. Moreover, firms need to be less reliant on capital to reduce the dependence on banks' credit growth and the increase in the economy's money supply.

**Fourth:** The policy makers need to establish medium- and long-term development orientations and plans for firms in each sector and the whole economy. Besides, the management agencies in each sector should also provide consultancy for firms on an appropriate specific model. On that basis, firms will construct their production and business plans to take best advantage of inputs, thereby enhance their competitiveness in the market, create more jobs as well as contribute to economic growth in the future.

On the other hand, this study also had limitations too among them followings can be mentioned: the research sample is quite small because there are only 18 firms in three sectors in agricultural in Vietnam and the study period only is from 2009 to 2013. The future study might develop more by adding more companies in these sectors in Vietnam and take data in longer period to make this topic be more better.

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# **THE ROLE OF CREDITORS AND AUDIT FIRMS TOWARD THE TRANSPARENCY EXTENT OF FINANCIAL INFORMATION OF LISTED COMPANIES: AN EXPERIMENTAL STUDY ON THE VIETNAMESE STOCK MARKET**

*Le Thi My Hanh, Vo Van Nhi*

## **Abstract**

This study aimed at examining the current transparency extent of financial information of listed companies on the Vietnamese stock market, under evaluation by investors upon investigating 178 listed company samples on Ho Chi Minh Stock Exchange. The questionnaire assessed the transparency index built on the OECD Corporate Governance Principles (2004) on information disclosure and transparency. This study also explored the role of creditors (based on the financial leverage) and audit firms toward the transparency extent of financial information of Vietnamese listed companies. The study results showed that, according to the judgment of investors, the transparency extent of financial information of Vietnamese listed companies was just at fair good point, factors of financial leverage and audit firms also affected to the transparency extent of the listed companies' financial information.

*Keywords: Transparency, disclosure, financial statement, leverage, audit firms, Vietnam.*

JEL Classification: G32, M41, M48

## **1 INTRODUCTION**

The Vietnamese stock market has operated for nearly 15 years. For the stock market, the information is an indispensable factor when carrying out investment activities. Particularly, the financial information plays a very important role in the decisions of investors. However, the Vietnamese stock market in recent years has been operating inefficiently. The public and investors lost confidence in the quality of information, especially financial information that the listed companies published because of a series of crash or suspended trading of listed companies. The security of the audit firms on the quality of the information is no longer much trusted. All those matters are derived from the fact that the financial information is presented and published with a lack of transparency.

In the report of Corporate Governance Scorecard 2012, the International Finance Corporation (IFC) of the World Bank concluded that the financial statements' quality of the top 100 companies listed on the Vietnamese Stock Market (including Ho Chi Minh and Hanoi) went down in all of the fields. Financial Statement is one of the weak points that were emphasized; there was a common lack of transparency in sharing information about how the company was run (From IFC, 2012). IFC's Corporate Governance Scorecard marked these 100 companies with an average score of 42.5%. Although the report of "Corporate Governance Scorecard from IFC" in 2013 said that the Vietnamese listed companies also had the positive efforts in 2013 and had improved scores in all aspects of evaluation, they had been very low when compared to other countries in the ASEAN region. Experts pointed out that transparency and Corporate Governance that were weak were two main reasons why Vietnam lost points in the evaluation.

Basing on the foresaid comments, this paper aimed at analyzing how the financial information of listed companies was announced, what extent of disclosure and transparency was. At the same time, this study examined the role of creditors and audit firms toward the transparency extent of financial information of Vietnamese listed companies. On this basis, the article proposes solutions and policy recommendations to enhance the transparency of financial information of listed companies in particular, and of other public companies in general. With this goal, following this introduction, section 2 will present the theoretical backgrounds related to the study content. A brief presentation of research methodology and research data was mentioned in section 3 and the results of the study and discussions were stated in section 4. Finally, this article gave some conclusions and suggestions to enhance the transparency of financial information of the Vietnamese listed companies.

## **2 LITERATURE REVIEW AND THEORETICAL FRAMEWORK**

### **2.1 Literature review**

Researches on the transparency extent of financial information disclosure and the factors that affect the information transparency have brought about many different results. For example, Bushman et al. (2001) analyzed the information transparency of listed companies based on two groups of factors: the transparency of financial information and transparency of governance information. Through the study, Bushman et al. concluded that transparency in corporate governance closely related to legal mechanisms, while financial information transparency related mainly to economic policies. Archambault J. and Archambault M. (2003) studied the model of factors affecting the information transparency of the companies. At the corporate level, the experimental results of the authors said that most of the factors reflecting the characteristics of finance and operational processes of the businesses would affect the level of information disclosure in general and financial information in particular. In addition, the authors also indicated that the financial disclosure decision for a company was complex and influenced by many national and corporate factors.

Cheung et al. (2005) examined the extent of information disclosure and transparency of listed companies in two markets of Thailand and Hong Kong. Empirical results showed that financial characteristics explained some of the variation in the degrees of corporate disclosure for firms in Hong Kong but not for firms in Thailand. Michael et al. (2006) came up with the model of the level of information transparency. This study formalized the transparency was the most important criteria for evaluating the financial statements in views of external users. In addition, Bert (2006) referred to the difference in the perception of investors and the report makers on the transparency of financial statements. Bartley et al. (2007) showed that auditor fees had effected firm transparency. Improving the auditing standards made to increase the accounting disclosure of public companies (Zhou, 2007; Sami & Zhou, 2008). Phillips et al. (2010) showed that company managers had the desire of setting financial statements based on accounting standards, while investors and creditors are in favor of establishing financial statements based on the rules. The Report on Corporate Governance Scorecard of the International Finance Corporation (IFC, 2012) presented the issues related to information transparency and corporate governance of listed companies on the Vietnamese stock market. Through survey findings and research data of 100 listed companies on the Vietnamese stock market, the research showed that the listed company provided less information publicly and the quality and transparency declined. The listed company “lowered standards of information disclosure, provided only general and incomplete information for the market.”



## 2.2 Theoretical Framework

### *Definition of financial information*

In term of the accounting information systems, the financial statements are considered the output of the accounting information system processed and provided by the accounting systems or in term of accounting information the users, financial statements provide a source of financial information useful for making economic decisions. Within the scope of this study, the term “financial information” at small scale means similar to “information on the financial statements”. Thus, the article used the term financial information that means information on the financial statements.

*Financial information relates to cash flows, results and (balance sheet) positions associated with them. The information has a direct link with the financial registration system and can be historical or prospective. Financial information is expressed in monetary units and can be measured exactly. (Nivra, 2008, p.10).*

### *Definition of financial information transparency*

Below is a summary of definitions of information transparency and financial information transparency in the previous studies (Table 1)

Tab. 1 - Summary of definitions of information and financial information transparency.  
Sources: Summary of previous studies

Number	Research	Definition of financial information transparency	Research perspective
1	Basle (1998)	Financial information transparency was announced to the public the timely and reliable information to ensure that information users can accurately assess financial situation and results of banks, business activities and associated risks	In banking activities
2	Vishwanath & Kaufmann (1999)	Information transparency was complete, reliable and timely information on publishing and easy access for the public on such adequacy, reliability and timeliness of information	In financial markets
3	Robert Bushman et al. (2001)	Financial information transparency was the availability of specific information about the company to investors and outside shareholders.	Company perspective
4	Kulzick (2004)	Financial information transparency means information disclosure must ensure the following characteristics: the information must be accurate, consistent, relevant, complete, clear, timely and convenient	Information users
5	OECD Corporate Governance Principles (2004)	Relating to information disclosure and transparency: “Information disclosure must be timely and accurately in all important matters relating to the company, including financial status, operational status, ownership and corporate governance”.	Corporate governance
6	Bert. (2006)	Transparency of financial information was the disclosure of financial information must be useful and timely, and the disclosed information must be reliable, comparable and comprehensive.	In perspective of certified accountant

From the above-mentioned concepts, according to the authors’ opinions:

**“Financial information transparency is that provision of financial information must be reliable, timely, accurate, complete and consistent in the manner in which the public can access easily and conveniently.”**

### ***Measuring the extent of financial information transparency***

Throughout the research results of authors and organizations around the world, criteria for measuring information transparency extent and financial information transparency extent can be summarized in Tab. 2.

Tab. 2 - Summary of criteria for measuring the extent of information transparency and financial information transparency. Sources: Summary of previous studies

No.	Research	Measuring transparency extent of financial information
1	Vishwanath & Kaufmann (1999)	Using the criteria of concept of information transparency including attributes such as accessibility, comprehensiveness, relevance, quality and reliability of information.
2	Standard & Poors (S&P) (2002)	Using T&D Index, this index was based on the investigation of listed companies about disclosing information with 02 main topics consisting of Information about its ownership structure, shareholder rights and financial information, operations of the company.
3	Bushman et al. (2001), Jeffrey & Marie.Archambault (2003)	Using CIFAR index, which the center of analysis and international finance research (IAAT - International Accounting and Auditing Trends) built in 1995, consisting of 90 items of financial and non-financial information published in Annual Report of the listed companies.
4	Cheung et al. (2005)	Building a questionnaire based on the OECD management principles to measure the level of information transparency.
5	Lin et al. (2007)	Using index "ranking system of information transparency and disclosure ITDRS". These were index of rating information transparency and disclosure of listed companies built in Taiwan. This index included 88 published items.

### ***Factors affecting financial information transparency***

Through the results of previous studies, it can be generalized the model of factors affecting transparency of information in general and financial information in particular in Tab. 3.

Tab. 3 - Summary of factors affecting the extent of information transparency.Sources: Summary of previous studies

No.	Research	Factors affect to transparency index of financial information	Research perspective
1	Meek & Gray (1995), Zarzeski (1996)	Export sales, financial leverage and company size	Company
2	Robert Bushman et al. (2001)	Law affecting transparency in corporate governance; economic policy affecting transparency extent of financial information where enterprise size affects transparency extent of financial information	Company
3	Jeffrey and Marie Archambault (2003)	Power distance determination, individualism, preventing instability, neo-patriarchal, education, religion	Cultural system
		<b>Politics:</b> law, media	National system
		<b>Economics:</b> development, inflation, capital markets <b>Finance:</b> ownership, listing status, dividends, auditing, financial leverage <b>Operate characteristics:</b> company size, industry, export revenues.	Company
4	Cheung et al. (2005)	<b>Finance:</b> company size, financial leverage, financial position, collateral asset and efficiency of asset. <b>Corporate Governance:</b> ownership concentration, board structure and board size.	Company

### ***Theoretical backgrounds***

Theory of asymmetric information firstly occurred in the 1970s. Asymmetric information in the stock market occurred when one or more investors knew private information or

information announcement that others did not know (Akerlof, 1970; Kyle, 1985). When the managers act as their short-term interests, deliberately conceal or delay the information disclosure, the investors will suffer the disadvantages. If this situation occurs frequently, investors will fall into the adverse selection. The market will survive the bad stocks and the prices will be lower than those are willing to be paid by investors. Therefore, the stock market has a risk of the collapse.

Following *Asymmetric information, Agency theory* (Jensen & Meckling, 1976; Fama, 1980) appeared in the context of business administration associated with the studies of the behaviors of employers and employees through the contracts. Agency theory is often used to explain the information transparency and increase the voluntary disclosures of the manager (Hossain, 1995; Bushman & Smith, 2003). The behaviors of the agent (manager) increase the transparency and disclosure extent of information when they consider the benefits and costs of the disclosure. If the contract between the owners and the managers is efficient and the interests of the managers are assured, they will act entirely in the interests of owners and increase the transparency extent to serve the interests of the owners.

### 3 RESEARCH METHODOLOGY

#### 3.1 The study process

The process of research was carried out as follows:

- **Firstly, Materials researching, modeling and scale building** included (1) Materials researching (2) Building research hypotheses, and (3) developing the first questionnaire as a basis for building scale.
- **Secondly, Qualitative research** was carried out through group discussion: each group consisted of 20 people conducting questionnaire discussions or direct interviews with experts in the field of securities, finance, and accounting.
- **Finally, Quantitative research** was conducted through direct interviews and random sampling with the sample size of 178 listed companies and 1,780 survey questionnaires. This step was carried out through scale testing by Cronbach alpha and EFA factor analysis to evaluate the reliability of the scale and choose the best scale reflecting the transparency extent of financial information of listed companies.

This study process was summarized through the following diagram:

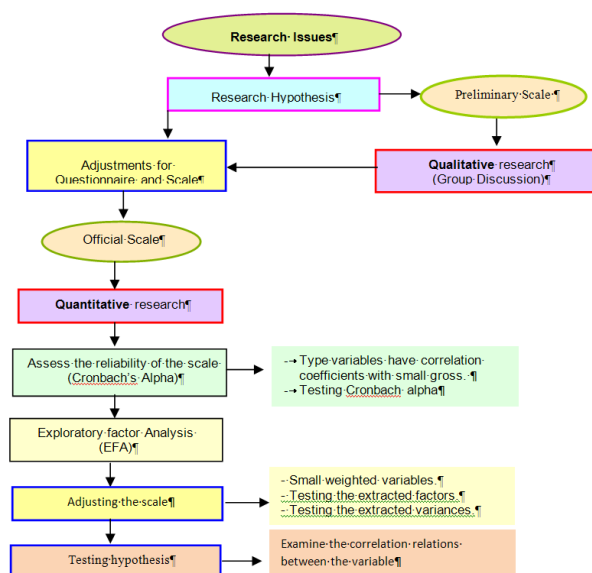


Fig. 1: Study Process

### **3.2 Measurement of the financial information transparency extent of the listed companies**

This paper used the disclosure and transparency scores extracted from a survey instrument designed to rate disclosure practices of publicly listed companies by using the OECD Corporate Governance as an implicit benchmark. In this OECD, the paper used six components on disclosure and transparency Principles to design the questionnaire.

### **3.3 Hypothesis and Measurement of the impacted factors**

Beside dependent variable is the financial information transparency extent of the listed companies measured by collecting data from surveys of investors, the independent variables include of the financial leverage and audit firms built into the hypothesis measured as follows:

#### *(1) The financial leverage*

The role of creditors was considered through the financial leverage in this study. Some previous studies stated that the company, which had a high financial advantage, would publish more information than the company would of a low financial leverage. Ahmed and Courtis (1999), Robert et al. (2003) had found that when firms had a high financial advantage, they would be more supervised from the related parties. Creditors will require businesses to provide more information to ensure their interests. Managers will persuade creditors to loan by publishing more information to reduce the cost of debt. Through *agency theory*, it can be seen that this is the way that the managers reduce the agency costs. To enhance the level of disclosure and transparency of information will reduce the asymmetry of information between creditors and managers, thereby reducing agency costs.

***Hypothesis H1: Companies with high financial advantage, their extent of financial information transparency is higher.***

*The financial advantage variable (LEV)* was calculated as the ratio of total debt and total assets (the calculation that Cheung et al (2005) and experts selected in qualitative researches):

#### *(2) Audit firm variable*

Many studies showed that the financial statements might be affected by the fact that whether listed companies were audited by large or small-sized audit firms (Fargher et al., 2001; Archambault, 2003; Zhou, 2007; Sami & Zhou, 2008). According to the agency theory, Jensen and Meckling (1976) said, reaching out to the large and prestigious audit firms as a way to reduce capital costs - costs of agency (in case the company wanted loans) or to reduce agency costs and increasing role in monitoring the behavior that managers can make. Using the large audit firms is an affirmation with the shareholder of audit results' transparency and the reliability of financial information that corporate disclosure

*Audit firm variable (AUD)* was used to distinguish the size and reputation of audit firms that listed companies hired to be the independent audit firm to audit financial statements for the year ended on December 31, 2012. This variable was nominal variables so this topic used dummy variables to replace and to consent that company was audited by Big 4 denoted by one, whereas (Non Big 4) was zero.

***Hypothesis H2: Company that was audited by one of Big 4 issuing published more information than other companies (Non Big 4).***

### 3.4 Research data

#### *The sample*

The sample consists of listed companies on the Ho Chi Minh Stock Exchange (HOSE). Although Vietnamese stock market has currently two exchanges including Ho Chi Minh Stock Exchange (HOSE) and Hanoi Stock Exchange (HNX), in which HOSE's operating time and scale are longer and larger than HNX's.

On HOSE, the market capitalization was close to 805.679 billion VND, representing nearly 90% of the total market capitalization (total value of capitalization on the Vietnam stock market was 902.992 billion VND), the transaction value accounted for 84% of the whole market. (Data was accessed from vietstock.vn on July 10, 2013). In addition, according to the World Bank (Report Corporate Governance Scorecard 2012, IFC, 2012), HOSE was the main stock market in Vietnam. It can be seen that the choice of HOSE ensured the representation, and might reflect the operations of the Vietnamese stock market.

On HOSE, there were 308 listed companies (HOSE's website on July 10, 2013). We excluded the listed companies started in 2012 and 2013 (because of short operation time, insufficient information for the research) and 23 companies in the field of banks and finance (since their financial statements were prepared in accordance with their special regulatory environment). Of the 269 companies, the researchers selected 178 listed companies to include in the sample for the formal quantitative research.

#### *Data collection*

The researchers carried out a survey to collect investors' opinions on financial information transparency of the listed companies that they invested. After surveying and selecting, there were about 1,700 responses from 178 listed companies (about 15 listed companies had respondents from 11 to 15 responses, 22 listed companies had from 5 to 7 responses and remaining listed company had an average of 10 responses). Transparency extent of each listed company was calculated by taking the average of the surveys (average of 10 responses/a company).

## 4 FINDINGS AND DISCUSSIONS

### 4.1 Preliminary results (discussing with experts - Qualitative method)

Discussions about "*The impact of financial leverage and audit firms toward the financial information transparency of the Vietnamese listed companies*"

Tab. 4 - Summary of assessing the impact of these factors to the financial information transparency of Vietnamese listed companies. Sources: Results discuss with expert.

<i>Factors</i>	Impact levels										
	No impact (1)		Little impact (2)		Impact (3)		Strong influence (4)		Power influence (5)		Total
	Number of answers	%	Number of answers	%	Number of answers	%	Number of answers	%	Number of answers	%	No. of answers
1. Financial leverage	0	0%	0	0%	10	50%	9	45%	1	5%	20
2. Audit firms	0	0%	0	0%	8	40%	5	40%	4	20%	20

Tab. 4 showed that most of the reviews said that the factors mentioned in the paper affected from the level of influence to very strong influence, in which, the financial leverage was

evaluated with the level of the strong and very strong influence, accounted for 50%. Audit firm was evaluated with the level of strong and very strong influence, accounted for 60%.

#### 4.2 Official results by quantitative method

In this step, we used SPSS software as a tool to support and process information about the survey results from investors.

##### *The credibility and value of the scale of transparency of financial information of listed companies.*

The scale was designed to assess the financial information transparency according to the investors' views with 17 questions. After three times running Cronbach  $\alpha$ , the results were shown in Tab. 5

Tab. 5 - Result of evaluating the reliability of scales – After running Cronbach  $\alpha$  for three times. Sources: Author's calculation

Reliability Statistics	
Cronbach's Alpha ( $\alpha$ )	The number of items
.78	13

Tab. 5 showed that the scale of financial information transparency of listed companies was composed by 13 observed variables after the third analysis with coefficient  $\alpha = 0.78 > 0.6$  ensuring the necessary reliability. In addition, the correlation coefficients of the variables with total of remaining variables were  $>0.3$ . In general, the scale (including 13 questions) had enough reliability and a pretty good basis to measure transparency extent of financial information of listed companies in the research.

##### *Results assessing the scale value - exploratory factor analysis (EFA)*

Next, the authors continued to carry out the exploratory factor analysis (EFA) to determine the focused questions to clarify the assessments of the transparency extent of companies in the sample. In addition, EFA was carried out to determine whether the questions clarified each characteristics and concept of financial information transparency or not. The results were shown in Table 6.

Tab. 6 - The test results of KMO and Bartlett's Test and evaluating scale value of transparency extent. Sources: Author's calculation

Kaiser-Meyer-Olkin Measure of Sampling Adequacy	.752
Bartlett's Test of Sphericity	Approx. Chi-Square
	1241.358
	Sig.
	.000

Observed variables	Measurement attributes of transparency index of financial information			
	Component E (Convenient and timely)	Component A & B (Full and consistent)	Component D (Trust)	Component C (accurate)
Q. 17: High transparency index of financial information	.779			
Q. 16: Information can be equal other investors	.756			
Q. 15: Web regularly and fully updated	.723			
Q. 14: Timely financial statements	.658			
Q. 13: Investors have multiple channels to know information	.646			

Q. 4: Full and good quality financial statements	.653	<b>.467</b>		
Q. 3: Transparency at cross ownership		<b>.807</b>		
Q. 7: All methods of accounting are accepted by accountant		<b>.769</b>		
Q. 5: Using and compliacing with Vietnamese accounting standards and reaching international accounting standards		<b>.489</b>		
Q. 11: Independent auditors are selected objectively			<b>.984</b>	
Q.12: Publishing service remuneration is not related to accountant			<b>.983</b>	
Q. 9: Full acceptance of financial statement				<b>.906</b>
Q. 10: Accuracy and consistency financial statement				<b>.867</b>
<b>Extracted variance</b>	<b>70.883%</b>			
<b>Eigen-value</b>	<b>4.530</b>			

From Tab. 6: KMO was to test conditions of carrying out EFA that were satisfactory: KMO coefficient= 0.752 > 0.5 and Sig. = .000 < 0.05 with high significance level. Thus, EFA was appropriate to be implemented for these factors. In the next table, there were four factors that were extracted with a total extracted variance of 70.883% > 60%. This showed that the overall scale that contributed to measurement of the transparency extent of the listed companies' financial information was larger than private parts and error. This proved that scales were a good explanation for measuring transparency extent of financial information of listed companies. In terms of load of observed variables, all observed variables had load factors varying from 0.467 to 0.984 (> 0.4).

### ***Descriptive statistics results***

Table 7 showed the statistic results of financial information transparency extent of listed companies in the research samples. The average of transparency extent of listed companies was 3.7 points, a fair good point. The gap between companies with the lowest transparency extent and the highest ones was pretty far. Thus, under judgments of investors, there were companies that were highly evaluated in term of transparency by investors; however, there was a lack of companies' transparency as evaluated by investors.

A deep analysis of transparency characteristics showed that the characteristics of completeness, consistency, reliability, timeliness and convenience of financial information had an average point similar to a general transparency extent, at a fair good point. However, the accuracy of the information had an average point that did not equal remaining characteristics, at a fair good point.

Tab. 7 - Transparency extent of financial information of listed companies in the research samples. Sources: Author's calculation

Variables	N	Minimum	Maximum	Mean	Std Deviation
Transparency extent	178	2.8	4.4	3.72	.2889
Completeness - Consistency (Component A & B)	178	3.00	4.75	3.77	.3620
Accuracy (Component C)	178	1.50	4.75	3.57	.4468
Reliability (Component D)	178	1.00	5.00	3.70	.9825
Timeliness and convenience (Component E)	178	2.90	4.46	3.77	.2639

### ***Results of testing in research model***

#### *Testing hypotheses*

Method of testing the hypotheses (the use in Archambault's study, 2003) was presented in Table 8:

Tab. 8 - Analysis technique and testing method of research hypothesis. Sources: Author's studying

No.	Variables	Measurement variable	Hypotheses	Testing method
1	<b>Financial leverage (LEV)</b>	The ratio of total debt on the total value of assets	H1	Testing of Pearson correlation coefficient
2	<b>Audit firm (AUD)</b>	Big 4 and Non Big 4	H2	Testing of different Independent T-test

### ***Results of testing hypothesis***

This paper primarily used the parameters testing to test the hypothesis. Results of testing the hypothesis were carried out as follows.

#### **(1) The results of testing the hypothesis of financial leverage**

***Hypothesis H1:*** Companies with higher financial leverage, their extent of financial information transparency is higher.

With parameters testing, this model conducted Pearson correlation coefficient and the results were presented in Table 4.6.

Tab. 9 - Correlation between Financial Leverage Variable and transparency extent Variable.  
Sources: Author's calculation

Variables		Financial Leverage
<b>Parameter Testing</b>	Pearson correlation	0,133*
	Sig. (1-tailed)	<b>0,038</b>
(*) : Correlation in the sense 5%		

It can be seen from Table 4.6 that there was a positive correlation between the financial leverage and transparency extent with a sense at 5%. Therefore, hypothesis H1 was accepted with reliability of 95%. It is concluded that companies had greater financial leverage, the higher the extent of financial information transparency was. This result was consistent with the findings by Ahmed and Courtis (1999), Jaggi and Low (2000).

#### **(2) Audit firm hypothesis**

***Hypothesis H2:*** Companies that were audited by one of the big audit firm (Big 4), the audit conclusion was based on more reliable evidence, published more information than others that were audited by small audit firms (Non Big 4).

For this hypothesis (testing between quantitative and qualitative variables), the testing was conducted through the intermediary hypothesis:

***Hypothesis H2a:*** Transparency extent of companies audited by large audit firms (Big 4) and the companies audited by other audit firms (Non Big 4) are the same.

Parameters testing was carried out by testing differences of Independent T-test; the results were shown in Table 10.



Tab. 10 - Testing the differences between variables of companies audited by Big 4 and companies audited by Non Big 4 with transparency extent. Sources: Author's calculation

Descriptive statistics				
Audit firms	Quantity	Average	Standard deviation	Std. Error Mean
Non Big 4	129	<b>3.691</b>	.2999	.0264
Big 4	49	<b>3.824</b>	.2345	.0335
			Transparency extent	
			Equal variances assumed	Equal variances not assumed
Levene Testing	F		4.027	
	Sig.		<b>.046</b>	
T-test	t		-2.800	-3.123
	Sig. (2-tailed)		.006	<b>.002</b>

The value of Sig. = 0.046 < 0.05 of the Levene testing showed that the variance

The value of Sig. = 0.046 < 0.05 of the Levene testing showed that the variance between the two types of audit firms are different. The t-test at the Equal variances had value Sig. = 0.002 < 0.05 so hypothesis H2a is rejected, which means “*Transparency extent of companies audited by large audit firms (Big 4) and the companies audited by other audit firms (Non Big 4) are not the same*”.

In addition, reviewing descriptive statistics: average values of transparency index of companies audited by Big 4 are always larger than companies audited by Non Big 4. Therefore, H2 was accepted. This result was consistent with the findings by Fargher et al. (2001), Archambault (2003) but differed from findings by Wallace et al. (1994), Ahmed and Courtis (1999).

In conclusion, the two theories were accepted.

**Hypothesis H1:** *Companies with higher financial leverage, their extent of financial information transparency is higher.*

**Hypothesis H2:** *Companies that were audited by one of the big audit firms (Big 4) had audit conclusion based on more reliable evidence, published more information than other companies audited by small audit firms (Non Big 4).*

### 4.3 Findings discussions

Through the above-mentioned analysis, we can see the transparency extent of listed companies' financial information has improved more than before because of the strict rules related the information disclosure and high sanctions, however, it was still low, or at a fairly good extent. In addition to a number of listed companies complying with the rules in the publication and presentation of information, there are still a lot of listed companies that do not perform the information disclosure well.

The testing results of correlation coefficient between the dependent variable (transparency extent) and each independent variable have a significant explanation. Therefore, it can be concluded that there is a relationship between the financial transparency extent of listed companies and financial leverage and audit firms (Non Big 4 or Big 4). From the foresaid results, discussions are given as follows.

- The correlation between the financial leverage and financial information transparency extent of listed companies showed that many listed companies on the stock market, usually joint-stock companies, and their debts mainly borrowed from banks or credit organizations. When they loan, one of the most important requirements that the credit department of the bank requires is that companies provide financial statements with full information. In addition, these statements must be audited by the big and

prestigious audit firms. Thus, the firms with high debt ratio in the capital structure will receive more supervision of the involved parties than the businesses operating primarily in equity. Creditors will require these businesses provide more information to ensure their interests. According to the agency theory, agency costs will increase in correspondence with the debts in the capital structure of the company. Managers will persuade creditors to loan by disclosing more information to reduce interest expenses. The companies with more debts have an awareness to enhance the information transparency to make creditors feel secure, loan and evaluate them well, so that they can achieve the interest expenses lower than normal. Therefore, companies often try to create a financial information transparency in order to reduce the supervision cost of creditors and limit debt recovery or continue new loans.

- For audit firms factor: Correlation between audit firm factor and transparency extent of financial information shows that large audit firms try to build their reputation and quality as well as improve the usefulness of the financial statements by requiring their customers give more information. The big audit firms have many customers, less economic dependence on a few individual customers, and their customers choose them since their reputation has been established on the market and for investors. Meanwhile, the small ones often has economic dependence on the clients, if they lose any clients, it will be difficult for them, so they often ignored requirements of providing more information. According to the agency theory, choosing a large and prestigious audit firm is a method to reduce the cost of capital - agency cost and to increase supervisory role for behaviors that managers can do to adjust information for their benefits. According to the theory of asymmetric information, financial statements audited by a large and prestigious audit firm are reliable for information seekers due to the imbalance information between inside and outside objects of company. On the stock market, external objects are typically investors that tend to base on accounting information as an important material for economic decisions (such as lending decisions of banks, signing of economic contracts or stock purchasing or investing in new companies). Choosing a large audit firm is a signal or an affirmation about transparency of audit results and reliability of publicized financial information for shareholders.

## **5 CONCLUSIONS AND RECOMMENDATIONS**

### **5.1 Conclusions**

This study was carried out with hard efforts to examine whether the relationship between financial leverage and audit firms actually affect the transparency extent of financial information of Vietnamese listed companies so that the conclusions and policy recommendations given can have more persuasive basis and evidence.

The study results showed that, under the evaluations of investors, transparency extent of financial information of listed companies on Vietnamese stock market only achieved a fair good extent. Upon judgment of investors, there were companies that were highly evaluated in term of transparency by investors, but there was lack of companies' transparency. The gap between companies with the lowest transparency extent and the highest ones was fairly far. This showed that there was uneven transparency extent of listed companies. Among the features that create transparency of financial information, accuracy of the information is the most underrated compared to characteristics of completeness, consistency, reliability, timeliness and convenience.

Correlation of financial leverage, audit firm variables and transparency extent of testing results showed that financial leverage, audit firms affected to transparency extent of financial information. These results proved and confirmed the significance of the agency theory or the theory of asymmetric information in the Vietnamese stock market. The results also confirm the supervision of managers and creditors interacts together and the supervision improvement will make the process of information disclosure better and increase the transparency extent. The audit firms are also a positive factor in increasing the transparency extent of financial information. Therefore, the auditing quality control is an important factor in the process of finding solutions to promote the listed companies' transparency.

## **5.2 Recommendations**

The recommendations were made to suggest a number of policies relating to subjects that have a direct or indirect relationship to enhancement of the financial information transparency of the Vietnamese listed companies.

### ***For listed companies***

*Listed companies should:*

- Enhance responsibility awareness of the listed companies in increasing the transparency extent of financial information, develop a company information system especially management information system, and improve the quality of enterprise accounting system.
- Perfect the system of corporate governance in which the Board must strengthen supervisory activities by using prestigious audit firms to protect the rights of shareholders, limit abuse of right or taking private benefits from managers. The board must also develop a code of conduct and ethics in businesses as well as improve the relationship with shareholders, investors and the public. This is considered as a good method to signal to the market for investors to distinguish good and bad securities.

### ***For The State Securities Committee and Ministry of Finance***

- To complete the rules on information disclosure and contents presented in the financial statements.

The study results also showed that the size and reputation of audit firms affected the transparency extent of financial information. This shows that the auditing quality is highly evaluated by the investors when considering the transparency extent of financial information. Auditing should be paid much attention in order to contribute to enhancing the transparency. Therefore, the Ministry of Finance should:

- Enhance the auditing quality or improve the quality standards of the auditing firms when carrying out the audit of listed companies, and issue the full national audit standards and gradually approach with international auditing standards in order to improve the quality of audits.
- Issue regulations in which audits must commit and ensure the independence of the auditors, as well as strengthen the role of the auditors as the independent verifier of financial statements.
- Improve the professional standards, national accounting and auditing rules in order to ensure providing the appropriate, accurate and timely information on all significant financial matters of the company for the investors.
- Strengthen the sanction measures for violations of information disclosure obligations and the lack of transparency of published information on the stock market, particularly the differences before and after auditing results with great value. Ministry of Finance

or the State Securities Commission Securities should give specific provisions on kinds of penalties for violations of published financial information.

### ***For other stakeholders***

Financial leverage may affect the transparency extent of financial information according to evaluations from the investors. This means the creditor has a significant role in making business provide more information that contributes to increasing the financial information transparency. Results also showed that managers would enhance the transparency extent when they owe more, because it helped them reduce the cost of capital. Therefore, the creditors should strengthen the supervision more tightly with the companies that are their debtors. The strict supervision by the creditors, banks or credit organizations are a pretty good solution to enhance the financial information transparency of the listed companies. In addition, organizations such as banks and other lending institutions, and investors should supplement requirements on corporate governance to their customers.

Audit firm variable shows that investors highly evaluated the role of audit firms in monitoring activities of managers. Audit firms that belong to Big 4 group were highly evaluated by investors although previous scandals can affect investors' trust. However, the survey results also showed that Vietnamese audit firms group was highly rated. The gap of transparency extent of listed companies audited by Big 4 and listed companies audited by Non Big 4 is not highly different (3.82 point compared to 3.69 point). This showed that investors also had a certain confidence on the audit results from audit firms outside the Big 4. Hence, audit firms need to improve the audit quality to enhance public confidence in their audit results.

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## **PATIENT SATISFACTION AS PART OF MEASURING PERFORMANCE UNDER THE CONDITIONS OF HEALTH FACILITIES**

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Anton Korauš*

### **Abstract**

The paper deals with the issue of performance measurement in medical establishment with the concentration on the criterion of patient satisfaction. After the presentation of alternatives for measuring performance it justifies the importance of monitoring patient satisfaction. Satisfaction includes among the wealth generating non-financial of performance measurement of health facilities.

It deals with as well with monitoring patient satisfaction in an international comparison. The contribution follows the conclusions of several studies devoted to the problem of patient satisfaction (Kotler 1997, Sardana 2003, Sharma and Chacha 2004, Raftopoulos 2005, Wilson 2007, Kamarasamy 2012, Ramez 2012).

Consequently, it focuses on the patient in the context of reforms of health care of SR and the importance of evaluation of customer satisfaction. It justifies the substantiation of monitoring and evaluation of patient satisfaction. Patient satisfaction is seen as one of the indicators of quality of health care. Patient satisfaction is assessed in terms of health insurance companies, but also in terms of providers of health care. With an example of a selected health facility are presented partial results of the measurement of patient satisfaction. The conclusions of the survey provide to management of a selected health facility arguments for improving managerial activities. The results help to identify the areas of patient dissatisfaction as well. The survey does not serve only to verify the quality and satisfaction of existing health services, but also to detect changes that may positively affect the quality of healthcare services in the future and a better reputation of the medical institution.

*Keywords: performance of health care facilities, patient satisfaction, health care facility, exploration, patient satisfaction measurement*

JEL Classification: C8, I1, I2, M3

### **INTRODUCTION**

In today's highly competitive environment is for any business subject important to be able to responsibly manage its performance. One of the important problems of modern management is therefore a performance management not only of business but also of health facilities. The performance is seen as a comprehensive system of financial and non-financial indicators, among which runs the interactions. While financial indicators provide particular insight into the past, non-financial indicators have the ability to terminate the prospects of a business. In the present paper we will focus on one particular indicator and thus the patient and his

satisfaction. Increasing of patient-perceived added value can only babble a competitive advantage to specific health care facility.

## **1 THEORETICAL BACKGROUND**

Performance measurement systems play a key role in the development of corporate strategy and evaluating the achievement of organizational goals. In today's highly competitive environment is for any business important to be able to responsibly manage its performance. One of the important problems of modern management is therefore a performance management organization. The performance is seen as a comprehensive system of financial and non-financial indicators, among which runs the interactions. Financial indicators accurately reflect past activities and serve a retrospective view of the competitive position of the company. They can fairly accurately predict the short-term development of the company.

Enterprise, respectively any entity operating in the market providing health services is performing from a long term view, when reaching a predetermined performance targets defined in the strategy. Enterprise performance management is the process by which management of the enterprise affects firm performance towards achieving the objectives. Mentioned issues are dealt in their work by authors as Wagner (2009), Vlachynský (1993), Zalai (2007), Varcholová (2007), Neumaierová-Neumaier (2002).

The history of the used indicators and approaches to the evaluation of business performance dates back to early last century. Measurement of business performance was initially oriented to detect profit and its relation to the amount of capital invested. This was reflected by indicators of profitability ROI, ROA, ROE. Later, the performance evaluation expanded to other indicators of market value and the end of the century it was economic value added (EVA). Explanatory power of traditional performance indicators was based on the view of information obtained in the past. These, however, did not provide an objective view on the growth performance of the company in the future. Currently, the best known and most sophisticated performance measurement systems are methods of Six Sigma Tkač, Lyocsa (2010), DEA Cooper, Seiford, Tone (2006). Inaccuracies in measures of financial performance led to innovations in performance measurement. Therefore, when considering the future success of the enterprise started using approaches favoring measurement of business performance in terms of increasing its value.

According to Varcholová (2007), critics of traditional financial measures argued that the success factors in many sectors been more intangible assets in the form of intellectual capital and customer loyalty, than hard assets based on the financial statements.

That is why there has consequently focused attention on the measurement of non-financial indicators such as no tangible assets (intangible assets), intellectual capital to balanced scorecard systems that integrate financial and non-financial measure. The main advantage of the use of non-financial performance indicators compared with financial indicators is closer link to long-term corporate strategies. Proponents of modern concepts of measuring corporate performance affirm that the recovery in the non-financial indicators, there will be some improvement in financial performance.

Among the wealth generating non-financial indicators to measure the performance of health care facilities we can include therefore, patient satisfaction, employee satisfaction, innovation, quality, and so on.

Despite the fact that patient satisfaction is only one of the possible indicators of performance measurement in the present paper we will focus our attention on quality and patient satisfaction, which will be seen in close interconnection.

### 1.1 Health policy of European countries and concentration on patient

Swedish organization Health Consumer Powerhouse has issued since 2005 EHCI ranking that compares different setting of health policy in the European countries. The focus of attention is a consumer of health services. Final evaluation refers to the extent of the orientation on the patient's needs. It is an independent monitoring of health care in 36 countries. On January 27, 2015 was the eighth edition that was published and it was the comparison of key values in health care. Results are presented through the first graph.

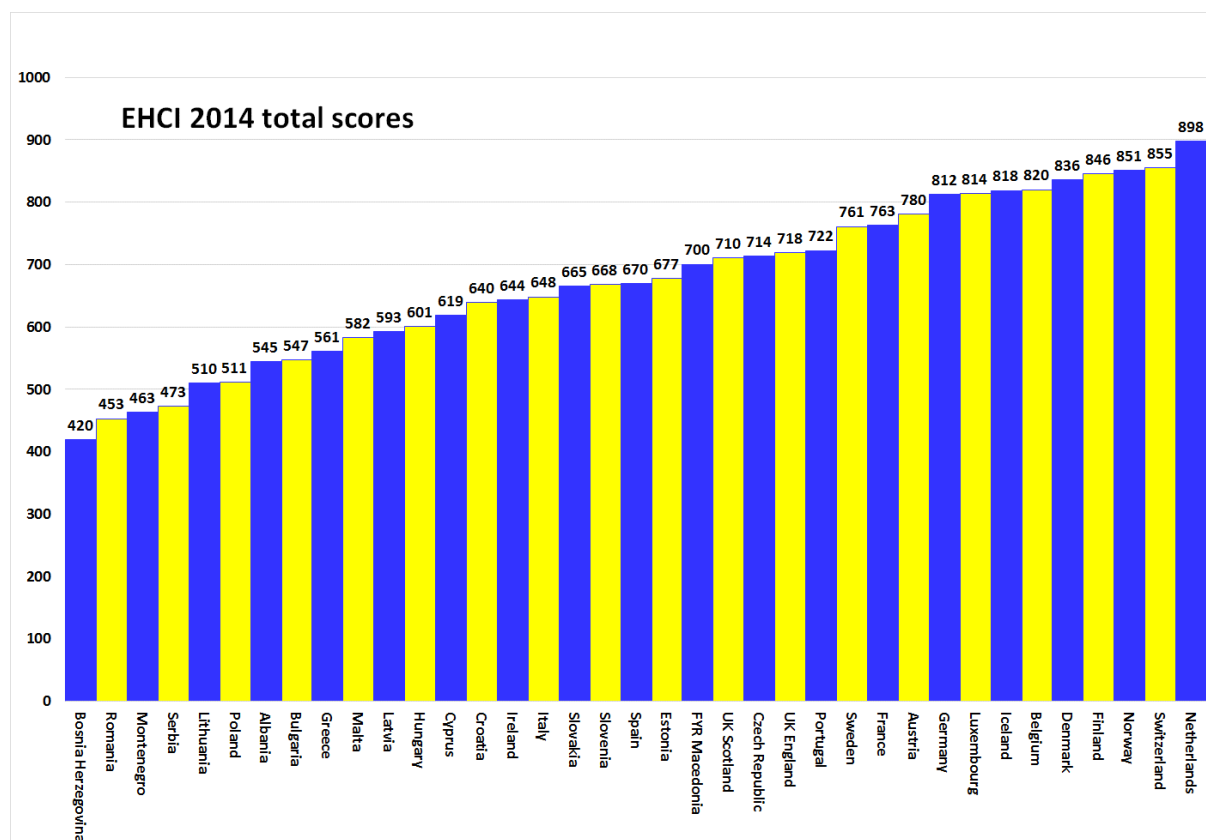


Fig. 1: EHCI 2014 total scores  
Source: Health Consumer Powerhouse

The methodology of comparison is adjusted each year, therefore year comparisons do not necessarily reflect objective changes. Despite several shortcomings in the sources of comparable data, however EHCI provides at least a card of health care systems. As is clear from the above, Slovakia was placed in 2014 with the number of points 665 as 21<sup>st</sup>, which is a positive step compared to 2009, where it gained a score of 560 and reached 28<sup>th</sup> rung. The issue of monitoring patient satisfaction also applies in international comparison and offers the opportunity to identify priorities on which the health policy-makers should focus. Despite some reservations about the data and methodology there is used a valuable feedback.

### 1.2 Quality of service and patient satisfaction

Czech Technical Standard EN 15224 of 2013 in paragraph 0.1.4: defines quality as the degree of fulfillment of the requirements of inherent characteristics, which are: corresponding



appropriate care, availability, continuity of care, effectiveness, efficiency, equality, evidence-based work, **care focused on the patient**, including physical, psychological and social integrity, patient engagement, patient safety, timeliness and availability

In any organization is the base of marketing and its principles achieving customer satisfaction. Satisfaction is a feeling of a person. The result is a comparison of performance or results of purchase with the expectations of a particular person. (Kotler, 1997) The concept of customer satisfaction is characterized by (Wilson, 2007) the fact that it can vary over time, may be complex, but also may be a result of a combination of experience before, during and after the time at which it is measured. Reasons for patient satisfaction may be difficult to explain, especially when it comes to services that are not tangible. The reasons for the dissatisfaction of the patient can be expressed more easily than the reasons for its satisfaction

Quality of health care is an important part of maintaining an effective model of health care. Therefore, it is now expected that doctors do not only treat their patients, but also play an important role in the prevention and patient education to a healthy lifestyle. If the objective is to improve the quality of health care it must continuously be conducted the evaluation of patients, how they perceive the different dimensions of the service provided. Experience of patients are a useful basis for improving the quality of health care services (Morrow et al., 2010), and patient satisfaction is an important indicator in evaluating the quality of national health care (and Sajid Baig, 2007).

Identification of factors leading to increasing the patient satisfaction can also help managers in their efforts to improve existing services (Tucker, 2002). Generating patient satisfaction and building a strong health care system is essential for improving the quality of life and prosperity of the whole society. Customer satisfaction is a complex concept, and therefore it is difficult to define. Over the years have been created various definitions (Dimitriades, 2006). The study of Giese and Cote (2000) found that in marketing was generated about 20 definitions of the concept within 30 years (1970 to 2000). More than half a century, scientists in research activities in the health sector have been seeking to define "patient satisfaction". Stewart et al. (1979) in their study found that the satisfaction of the patient has a significant effect on a relationship between patient and physician throughout the treatment process. The current researches are trying to find a new look at the question of how patients perceive the services and try to obtain information on the reasons for patient satisfaction. This information is the basis for developing strategies of companies, which can provide a competitive advantage.

## **2 MATERIALS AND METHODS**

The health sector is among the most problematic and also the most difficult reformable fields of public life. Although there is a considerable discrepancy between the expectations of patients and the volume of available resources, it is necessary to appreciate the efforts to change the system - health care reform.

In the context of national policy from 2005 onwards, the Ministry of Health developed quality indicators for the evaluation of health care provision which are the part of the Government Regulation 752/2005. One of these indicators is the "patient satisfaction", where is ranked the provision of medical care and patient perception of care, which is carried out by questionnaire survey, according to the methodology of health insurance in place to ensure the representativeness of each department. Other entities providing information on patient satisfaction is the Institute for Economic and Social Reforms (INEKO) in collaboration with

Transparency International Slovakia. The project partners were DÔVERA health insurance company, Ltd. and Union Health Insurance Ltd.

When choosing it is possible for a candidate of information to modify according to his won interest some indicators, facility and expertise. In the category of indicators is among other indicators also a category of PATIENT SATISFACTION. There are covered many different attributes to which they have the opportunity to make their own opinion addressed respondents who visited the health facility and therefore have personal experience of being recorded. Ranking the satisfaction is on five grade scale, while the ranking 1 is the satisfaction and dissatisfaction is marked by 5. Below final figure thus expressed more satisfaction, while a higher score means lower satisfaction. The structure of the problem areas that are monitored and evaluated by patients in the category of patient satisfaction is following.

**Patient satisfaction**

Overall patient satisfaction  
The behavior of physicians of the department  
Information about your disease and examinations by the attending physician  
The behavior of nurses in the department  
Care of physicians in the department  
Care of nurses in the department  
Quality of accommodation in the department  
Quality of meals in the department  
Quality of cleaning in the department  
Provision of health care  
Information from the attending physician on the next steps during the home treatment  
Information from nurses on the next steps during the home treatment  
Improving the health status after hospital discharge

Fig. 2 – Attributes category patient satisfaction by INEKO

As in the case of INEKO, even if the case of selected health facilities was used a similar methodology for measuring patient satisfaction. Between the months of October, November 2014 was conducted research on patient satisfaction survey. The questionnaire survey of the content and wording of the questions followed the recommendations scoping criteria in terms of methodology of INEKO.

There were 365 respondents taking part in the survey. For the purpose of statistical treatment were appropriate 290. From specialized clinics were evaluated 237 questionnaires and 53 respondents rated patient satisfaction in the context of hospital beds. The condition was hospitalization for more than 4 days. Ranking the patient satisfaction were on the five grade scale, the grade 1 meant satisfaction and dissatisfaction was marked by 5. Below final figure thus expressed more satisfaction, while a higher score means lower satisfaction. For the management of selected health facilities was important to determine whether:

1. there are some statistically significant differences in the evaluation of patient satisfaction of individual clinics in terms of age and sex of the respondents?
2. there are significant differences in ratings of attributes of patient satisfaction?

Subsequently were formulated the hypothesis

H1: There is statistically significant difference in the satisfaction based on gender

H 2: There is a statistically significant difference in the satisfaction based on age

Tests were carried out by means of SPSS software. When processing the data, we used nonparametric tests, since we assume a normal distribution of test variables will not be met. When assessing patient satisfaction in terms of gender, we used the Mann Whitney test.

Respondents who evaluated patient satisfaction with selected hospital were divided by age into three groups. The first age group represented patients aged 18-40 years, the second group were patients from 41-62 years and the third group comprised patients older than 63 years.

Within the hospital were studied 22 clinics and 6-bed compartments. During the evaluation we have worked with selected outpatient clinics and departments that have approximately the same frequency of questionnaire responses, suitable for processing. If we were working with variables that have more than two variations, we used nonparametric ANOVA and Kruskal-Wallis test for significance level 0, 05.

### 3 RESULTS

For the management of selected health facilities was important to determine whether:

- there are some statistically significant differences in the evaluation of patient satisfaction of individual clinics in terms of age and sex of the respondents?
- there are significant differences in ratings of attributes of patient satisfaction?

Gradually, we verified the hypothesis

H1: There is statistically significant difference in the satisfaction based on gender

Tab. 1 - Results of patient satisfaction of inpatient care by gender

	<b>Men</b>	<b>Women</b>	<b>p-value Mann_Whitney Test</b>
regimen	1,48	1,56	0,953
doctor approach	1,18	1,19	0,684
communication with nurse	1,45	1,48	0,733
treatment	1,19	1,29	0,541
care	1,32	1,26	0,392
hygiene	1,55	1,39	0,222
room equipment	1,82	1,68	0,485
Food	1,82	2,11	0,331
Orientation	1,91	1,84	0,663

*Source:* created by authors

As is clear from the above, in no case was confirmed a statistically significant difference in responses regarding patient satisfaction of inpatient care hospital facilities selected by sex.

In the case we monitored patient satisfaction on various surgeries by sex, we found that statistically significant differences in responses by gender arised in two cases. It is a time of waiting for the results of examinations and evaluation of satisfaction with office hours. Men achieve higher score in evaluation what means that they are less patient than women. Even with surgery hours in clinics men are less satisfied than women. The results are presented in Table 2.

Tab.2 - Output Surgeries Gender

	Time spent in waiting room	time in surgery	time spent for results	ordering	office hours	listening
Mann-Whitney U	5987,000	6066,500	5122,000	5263,500	5348,000	5979,000
Z	-1,191	-1,112	-3,009	-1,800	-2,429	-1,357
Asymp. Sig. (2-tailed)	,233	,266	,003	,072	,015	,175

a Grouping Variable: Gender 0\_M, 1\_Z

Source: created by autors

	communication with doctor	communication with nurse	cleanliness	orientation	security	privacy	buffets
Mann-Whitney U	6036,500	6462,500	6324,000	6234,500	5803,500	5811,500	5108,500
Z	-1,288	-,082	-,221	-,419	-1,172	-1,179	-,383
Asymp. Sig. (2-tailed)	,198	,935	,825	,675	,241	,239	,702

a Group Variable: Gender 0\_M, 1\_W

Source: created by autors

H 2: There is a statistically significant difference in the satisfaction based on age

We found using the analysis that the most satisfied with inpatient care are the oldest patients in the age group over 63 years. With the declining age has risen dissatisfaction of patients. Most were dissatisfied patients in the youngest group of respondents aged 18-40 years. Statistically significant differences emerged when assessing satisfaction with time spent in waiting rooms, differences were also in satisfaction with waiting time for test results and in satisfaction with office hours. Younger patients had reservations to communicate with a doctor and a willingness to explain the necessary information relating to health. Interesting was also to find that younger patients had major problems with orientation than older patients. The results are presented in Table 3 and 4.

Tab.3 - Statistically significant differences in the evaluation of patient satisfaction based on age

Number of respondents	48	98	92	Kruskal-Wallis Test
Age categories	18-40	41-62	63 a viac	
Variable	Mean	Mean	Mean	p-value
Time spent in waiting room	2.38	2.10	1.86	0,018
time spent for results	2.2	1.68	1.46	0,003
office hours	1.74	1.80	1.58	0,049
explaining	1.74	1.34	1.30	0,007
communication with doctor	1.51	1.28	1.18	0,050
orientation	2.28	2.3	1.88	0,005

Tab. 4 – Statistically significant differences in the evaluation of patient satisfaction based on age

	time waiting room	time in surgery	time for results	ordering	office hours	listening	explaining
Chi-Square	7,994	4,482	11,329	1,155	6,023	3,708	9,823
df	2	2	2	2	2	2	2
Asymp. Sig.	,018	,106	,003	,561	,049	,157	,007

a Kruskal Wallis Test

b Grouping Variable: ages

Source: created by autors

	communication with doctor	communication with nurse	cleanliness	orientation	security	privacy	buffets
Chi-Square	6,011	3,174	,179	10,426	1,115	1,040	,439
df	2	2	2	2	2	2	2
Asymp. Sig.	,050	,205	,914	,005	,573	,595	,803

a Kruskal Wallis Test

b Grouping Variable: ages

Source: created by autors

In the case of tracking patient satisfaction by age group on bed section of was not confirmed a statistically significant difference of mean values of respondents' answers on the significance level 0.05, as it is shown in Table 5.

Tab.5 - Patient satisfaction on ambulances based on age

Variable	Mean	Mean	Mean	p-value
age	36.43	53.56	70.46	Kruskal-Wallis test
regimen	2.40	1.47	1.38	0,074
doctor approach	1.43	1.28	1.7	0,195
communication with nurse	2.00	1.33	1.43	0,061
treatment	1.71	1.17	1.19	0,053
care	1.57	1.28	1.21	0,416
hygiene	1.60	1.33	1.52	0,329
room equipment	2.20	1.61	1.74	0,389
food	1.60	2.00	2.4	0,548
orientation	2.43	1.83	1.75	0,052

Source: created by autors

Nevertheless, the hospital management found that in the age group 18-40 years was manifested the greatest dissatisfaction about awareness of ongoing treatment. In the age groups of elderly patients the satisfaction was higher.

The data obtained provide a far wider range of patient satisfaction ratings. We may compare the different parameters, depending on several factors. Whether for hospital care, or bed departments comparing attributes of satisfaction of various departments, as well as surgeries. We may follow in the case of questionnaire extension the patient loyalty as well. The ideal is to identify patient satisfaction at regular intervals. The information obtained can significantly facilitate to management to reassess besides patient view to improve internal processes as well as to increase employee activities, what ultimately also results in meeting the financial goals of the organization.

#### **4 DISCUSSION**

Quality of health care is closely connected with satisfaction. Quality generally involves two basic dimensions, which is the "voice of customer" and "voice of the process". It concerns about therefore subjective gathering of feedback from users and objective quality measurement using appropriate indicators. A holistic approach to the patient, based on satisfying all its needs, significantly influences their satisfaction. Among other things it eliminates stress in hospital and has a positive impact on the survival of the patient's pain.

Monitoring patient satisfaction has in the quality management system its utmost importance:

- serves for the evaluation of the quality of work of individual departments
- Provides information on the quality and equipment of departments
- Provides a basis for organizational changes
- Monitors the effectiveness and impact of the changes made to the quality of care in terms of patients
- It provides a basis for comparison of subjective quality of care in different hospitals.

The importance of measuring patient satisfaction are realized by not only health insurance, but also all hospitals. Modification of the questionnaire survey in the spirit of the vision should focus on the principles of:

- The concentration on the relationship doctor and patient
- Individualized approach to care and awareness throughout the whole time
- Care based on knowledge
- Participation of patients in decisions about their own care
- The minimum time for inclusion in the diagnostic and treatment process
- Communication, information, coordination at all levels
- Sufficient financial performance
- Inclusion of means of measuring processes, satisfaction, financing and results results
- Continuous improvement and reduction of losses in all processes and services
- The modeling work and cooperation in the relevant area.

As is clear from the above, patient satisfaction is devoted to solve to several subjects. Whether it is health insurance, independent institution, directly or healthcare providers. Nevertheless, a consistent methodology is not present, a comprehensive approach and sometimes a representativeness of research samples. However, it should be accepted the efforts of obtaining feedback from the patients and the wider public. Customer satisfaction is very closely intertwined with the quality of health services provided. As a result of findings

could be more intensive detecting of changes that may be reflected in a better quality and increase of customer value added.

## CONCLUSION

Determination of patient satisfaction is very closely associated with several activities. Whether it's ability to correctly name the research problem, interpret research objectives, formulate research questions, process appropriate project design, to ensure the credibility of the research to the ability to correctly interpret findings to management. It is necessary, however, to perceive the same restrictions of patient satisfaction research. It is useless to measure patient satisfaction if their expectations are unreal and can not be met. In case we find that the expectations of patients are unreal, it is just the research that should uncover such facts. The health care provider should with the help of appropriate communications inform and familiarize patients with the restrictions in service. Patients' expectations before making health services constitute one of the most important elements of patient satisfaction. The expectation, however, is very difficult to manage. That is more important to conduct research in the right direction for help of activities before research. Research should unify three complementary types namely: quantitative, qualitative and mixed research. The sample should be collected from the potential, not only current patients of health care facility. Ultimately consistently it should be directed to the creation of such methodologies and systems of indicators that would allow international comparisons of performance of hospitals in which would be included the measurement of patient satisfaction too.

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# **THE EFFECTS OF CORRUPTION ON FIRM PERFORMANCE: EVIDENCE FROM VIETNAMESE FIRMS**

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## **Abstract**

This paper investigates the effects of corruption on firm performance in Vietnam. Using the panel data of Vietnamese Small and Medium Enterprises (SMEs) conducted in 2005, 2007, 2009 and 2011, we find that corruption has positive effect on firm revenue and labor productivity. Employing the network, owners' previous working experience, innovation process and investment experience as explanation variables, we show that this result holds under several regression specifications. We further document that location is also the most important factor affecting the relation between corruption and firm performance: firms in big cities tend to pay more bribes and generate more revenue. Meanwhile, firm size has an insignificant impact on the probability of corruption. We provide several explanations for these findings and also have some investigations the Vietnam's institutional environments.

*Keywords: Corruption, Bribery, Unofficial payment, Firm performance, Economic growth.*

JEL Classification: D00, H4, H7

## **1 INTRODUCTION**

Corruption recently has become one of the most severe problems in both democratic and emerging economies, which is defined as a result of market failures (Friedman et al. 2000; Acemoglu and Verdier, 2000). In general, corruption is defined as illegal transactions or misuse of public resources/services for private benefit (Gaviria 2002, Gbernkorn 2012, p3). Corruption is also described as an amount of money pay for bureaucrats in order to get better access to government services or smooth operations of regulations which resulted in change in firm performance (Athanasouli, Antoine & Skilias, 2012). Besides, corruption can be defined as the cost of purchasing government contracts or simply the involuntary tax paid by the firms to government officials for purchasing different contracts. According to Rand and Tarp (cited in Tam 2014), corruption can be defined as bribery or unofficial payments. This concept was also first defined by Solo (1989) and supported by (Friedman et al. 2000) and Johnson et al (2000). Based on the basis literature and availability of the data, the concept of corruption is defined as bribery or unofficial payment.

Assessing the impact of corruption and firm performance has been one of the central debates in the economic, politic and academic agenda, and the effect of corruption on firm performance differentiate on long-term basis and short-term basis, as well as vary from countries to countries. Generally, most studies show that corruption is considered as an important factor to slow down economic growth, distorting investment, impeding the efficiency of public services and inequality around the world (Bolgarian, 2011; Wang and You, 2012; Keefer and Knack, 1997; Ades and Di Tella, 1999; Méon and Sekkat, 2005; Shleifer and Vishny, 1993). Corruption has been identified as a critical issue for the growth of many economies: Greek, Cameroon, Turkey and a major impediment for the implementation

of necessary structural reforms (Ayaydin & Hayaloglu, 2014; Gbetnkoum 2012; Athanasouli, Goujard & Sklias 2012).

There have been many researches and experiments that investigate this relationship at country level (Ades and Di Tella, 1999; Méndez and Sepúlveda, 2006; Ahlin and Pang, 2008), but there is a lack of empirical research focusing on examining the relationship between corruption and firm performance at the micro level, where the role of SMEs can be considered as both sufferer and driver of corruption. Especially, in developing countries, bribery or unofficial payment becomes the most common problems, which account for 20% of their revenue (Djankov et al. 2002). In Vietnam, the country has experienced a high level of corruption (i.e., ranking 119 out of 175 globally in the Corruption Perception Index 2014) has defined corruption is the continuing serious problem for the economic development of the country (Corruption Perception Index 2014). According to USAID and VCCI (2010), more than a half of Vietnamese firms in the survey on Vietnam Provincial Competitiveness Report, confirmed that unofficial payment is deemed popular for carrying out business smoothly in Vietnam.

To the best of our knowledge, there is a lack of available data and experimental researches focus on investigating the relationship between corruption and firm performance and a shortage of capacity to deal with the endogeneity of corruption measurement, which requires further specific quantitative researches to quantify. By using data achieved from a collaboration study conducted by the Center Institute for Economic Management (CIEM), Institute of Labor Science and Social Affairs and University of Copenhagen with 2600s firms in 10 different cities and provinces in Vietnam, this paper attempts to provide an empirical analysis of the comprehensive relationship between corruption and firm performance based on micro-level data of SMEs across cities and provinces in Vietnam in the period from 2005 to 2011. The paper builds on this existing literature and contributes two main empirical analyses which doesn't discuss in previous studies. First, it examines the association between corruption and SMEs performance in Vietnam and identifies the most affected factors among firms' characteristics: innovation, investment, firm size, and location. Second, the detailed analysis of the multifaceted impact of corruption on the firm level and the contextual effect of corruption at the sector level allows new policy conclusions to be drawn.

The rest of the paper is organized as follows. Part II presents an overview of the literature on the relationship between corruption and firm performance. Followed is Part III which describes data and Part IV presents methodology. Part V presents the empirical results and discussion of the effects of corruption on firm performance. Section V presents main conclusions and policy implications.

## **2 LITERATURE REVIEW**

Firms' performance has been a central topic of firms' profit maximization (Ayaydin & Hayaloglu 2014), which can refer to increase in sales, revenue, employment growth, labor productivity, investment and innovation. Shleifer et al. (1993) also defined firm performance based on four main indicators: labor productivity, technical efficiency (TE), import-export, and profit. According to a recent study from the data of European Countries developed by Kachanova (2012), firms performance is mainly measured by the increase in sale revenue and labour productivity. Moreover, their business performances usually much depend on market shares, contracts which they can win from their competitors or get cheaper inputs by approaching public servants or bureaucratic. Thus, these firms can increase their sale revenue, have a better access to inputs or loans which can leverage their performance.

The relationship between corruption and firm performance and their measurements might

vary due to the collected data available and different theories and practices. Theoretically, the literature has identified the effects of corruptions on firm performance into two main consequences. The first consequence of the effects is that corruption shows positive impacts on firm performance. It has been supported that corruption could increase economic development because bribery is considered as 'commercial wheels' to overcome bureaucratic delays and increase incentive for government authorities to work (Ayaydin & Hayaloglu 2014). Additionally, Rock and Bonnett (2004) revealed that bribery and unofficial payment contribute to economic development and firm growth in East Asian countries. At the macro level, some studies have indicated that bribery can be a rapidity of the 'commerce's wheels' or 'a lubricant' in some special cases which results in promoting the development of firms in aspects of creating the favorable conditions for SMEs overcome bureaucratic fences and timely delayed processes (Wei, 1998 cited in Athanasouli, Goujard & Sklias 2012). This argument is also supported by the research conducted by Dabla-Norris, Gradstein, and Inchauste (2008) with the evidence of 41 countries. At the micro level, a study across China's firms revealed that firms with external resources have better performance than the internal ones in dealing with administrative procedures, which directly influences to firm performance (Hallward-Driemeier et al. 2004). Wang and You (2012) stated that corruption could contribute to firms' growth. In a research for the case of enterprises in China, Jiang and Nie (2014) concluded that there is a positive impact of corruption on performance of private firms, but this impact is not statistically significant for the case of state-owned enterprises. Therefore, at both macro and micro level, corruption appears positive effects on the performance of firms (Dreher and Schneider 2010). These effects tended to be accelerated in the shadow economies with shortage of legal regulations and instruments (Misati 2010). It can be said that from above studies, corruption is cost effectiveness of firm performance and economic growth.

The second consequence is that corruption has negative impacts on firm performance. In the existing literature, several empirical studies on the relationship between corruption and economic growth reveal significant negative. These results indicate that corruption tends to discourage innovative activities and damper firm performance, which are consistent with other findings that the lower perceptions of corruption may lead to higher increase in economic development (La Porta et al., 1999; Ales and Di Tella, 1999; Treisman, 2003). These empirical researches indicate that corruption as a severe impediment on growth which lower level of investment and higher government negotiation cost to secure contracts or licenses, especially in the countries having high level of FDI inflows (Pradhan, 2000). Kochanova (2012) shows that bureaucratic corruption negatively affects both the sales and labor productivity growth of firms. The World Bank (2003) shows that corruption is considered as one of the most obstacles of firm growth and social development in terms of reducing in sale revenue and technical efficiency. Recently, many researches have found that bribery has distorted business environment and damaged firm performance as the results of a lack of transparent regulation and a weak legal system. This argument is also supported in several studies of Latin American countries (Dal Bo & Rossi, 2007; Laeven & Woodruff 2007). However, in many researchers by North (1990), Shleifer and Vishney (1993), Romer (1994), corruption is proved to be an obstacle to economic growth. Fisman and Svensson (2007) stated that bribery is considered as taxes on firms, and the conclusion is that higher bribery results in reduction in firm growth. In a research using a sample of 46 countries, Mo (2001) concluded that higher level of corruption may result in lower economic growth. Mauro (1995) also concluded that corruption inhibits economic growth in long run due to the distortion of resource allocation. Méndez and Sepúlveda (2006) investigated the impact of corruption in long run economic growth. They concluded that corruption at low level increases growth rate; however, that of high level is detrimental to economic growth. The

negative effects of corruption on firm performance again examined in across sectional study in Greece (Athanasouli et al., 2012). The study reveals that performance of the firms including investment and innovation mostly depended on government public services, taxes and quotas (Beck et al., 2003; Athanasouli et al., 2012). Most interviewees in the survey confirmed that their business activities are connected with government lobbies and bribes and small firms seem to suffer more from corruption than other medium ones. However, the relationship between corruption and firm growth may vary across industries and countries, which is needed to be defined by further experiments. In short, in some countries and regions, corruption might impede economic growth by discouraging investment, innovation, wasting resources, distorting the tax collection and hampering the implementation of regulation and legal transparency.

The existing literature about the effects of corruption on firm performance showed that there are inconsistent results across countries and regions. The question of whether there exists a critical value that the effects of corruption turn out from positive into negative relationship and vice versa has initiated a lot of debate. While some studies indicated that corruption tends to hurt economy and distort the firm performance, others showed that corruption acts 'commercial wheels' to push up firm performance. Some researchers investigated that corruption fosters firm performance at low levels of economic development and becomes disadvantageous to firm performance at the higher level of economies (Méndez and Sepúlveda, 2006; Neeman et al., 2008; Méon & Weill, 2010). Meanwhile, some research stated that corruption has no impact on firms' performance. In a research by World Bank (2003), corruption has negative impact on firms sales but this impact is statistically insignificant. In the research of firms in Latin America and Caribbean, Murat Şeker & Yang (2014) found that bribery has significant negative impact on firms growth. However, a research at firm level by Asiedu and Freeman (2009) found that there is no evidence for the impact of corruption on investment growth rate.

In Vietnam, several studies investigating on the impacts of corruption and firms performance presented contradict results. Rand and Tarp (2010) used panel data from 1,661 Vietnam SMEs and concluded that bribe and informal payments have damaged firm performance. In other research, Nguyen and Dijk (2012) also investigated the relation between corruption and firm growth for private firms and state-owned enterprises (SOEs) in Vietnam and demonstrated that corruption negatively hampers the growth of private sector, but corruption does not impede the state sector performance (Nguyen and Dijk, 2012). Other survey conducted by Vietnam General Statistics Office and the Chamber of Commerce and Industry of Vietnam from 2009 to 2011 indicated that each company in the sample average pays from 460 to 600 million VND unofficially, but they still earned an average of 512-646 million VND for pre-tax profits each year (The Saigontimes 2014). It means that the benefits from corruption are positive. The most recent study, Nguyen et al. (2014) investigate the relationship between corruption and firm performance in term of formalization and reveal the urban firms is more likely to involve in corruption than those located in the rural ones and informal firms tend to pay bribes more than formal one.

### **3 DESCRIPTIVE STATISTICS**

#### **3.1 Sampling**

The data is achieved from four SME surveys conducted in 2005, 2007, 2009, and 2011. These surveys cover more than 4000 manufacturing enterprises in 10 provinces (Ho Chi Minh City, Ha Noi and Hai Phong, Long An, Ha Tay, Quang Nam, Phu Tho, Nghe An, Khanh Hoa and Lam Dong). For purpose of the study, the authors divided study areas into two main groups:

big city group (HCMC, Hanoi and Hai Phong) and rural city group (Long An, Ha Tay, Quang Nam, Phu Tho, Nghe An, Khanh Hoa and Lam Dong). The purpose of this study is to examine the effect of corruption on firm performance under the variance of location and firm size and firm age. Using panel data, the sampling was adjusted over time to accommodate the rapidly changing business environment in Vietnam, other aspects, including the questionnaires, were maintained virtually identical. After data cleaning and checking consistency of time-invariant variables between the four surveys, we achieved a strong balanced panel of 2006 observations in each year.

### 3.2 Descriptive data

Table 1 summarizes descriptive statistics for the key variables. The number of observation is 663 which achieved from a strong balance panel data of 2600 firms in the survey. Three dummy variables include Innovation, Investment and Location which their mean values are 0.291, 0.707 and 0.449, respectively. In which, Innovation received maximum value at 1 if the firms introduce new product and new technology, otherwise at 0. Similarity, if Investment equals to 1, which means firms, invest new capital and vice verse. During study period, on average, firms introduced 2 times innovation and 7 investment. For location, if firms located in Hanoi, Ho Chi Minh city and Hai Phong city, Location equals to 1 and vice verse. Corruption variable is a value from 1 to 4, which mean the frequency of firms bribe is range from 1 to 4 times in the study period with a mean value is 2.011, indicates that the average of firm paying bribe in this study is 2 times. As can be seen from the table, the maximum value of SMEs size is 300 employees. Additionally, the total revenue growth ranges from 1.825 to 12.060 (billion Vietnam Dong).

Tab. 1 - Descriptive statistics. Source: Calculation from data

<b>Variable</b>	<b>Obs</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
Corruption	663	2.011	0753	1	4
Innovation	663	0.291	0.455	0.00	1.00
Investment	663	0.707	0.455	0.00	1.00
Location	663	0.449	0.497	0.00	1.00
Firm_Size	663	20.137	31.176	0.00	300
Indt_thuc	663	6.207	1.491	1.825	12.060

Table 2 compares the mean of corruption affecting on firms' performance between rural areas and urban areas. The results show that firms in rural areas those who have lower level of corruption also have the lower growth rate of real sale. Meanwhile, enterprises in city have more corruption behaviors that will have higher growth rate of real sale.

Tab.2 – Comparison of enterprises in rural areas and city. Source: Calculation from data

<b>Location</b>	<b>Real Sale</b>	<b>Corruption</b>
Rural areas	5.874	0.898
City	6.614	0.916

Table 3 reports the correlation coefficients between variables. The relationship between

Revenue Growth and Firm Size is highly positive correlated (0.7580) while the measures of location and investment is a significant negatively correlated (-0.720). All remaining variables have positive correlation with corruption, but their relationships are insignificant.

Tab. 3 - Correlation among variables. Source: Calculation from data

	<b>LnRe</b>	<b>Corruption</b>	<b>Investment</b>	<b>Innovation</b>	<b>FirmSize</b>	<b>Location</b>
LnRe	1.000					
Corruption	0.2233	1.000				
Investment	0.2221	0.0399	1.000			
Innovation	0.2637	0.0927	0.0837	1.000		
Firm_Size	0.7580	0.2132	0.2270	0.2967	1.000	
Location	0.2430	0.0219	-0.720	0.1218	0.2145	1.000

From the figure 1, it shows that access to public services is the main reason for SMEs in Vietnam doing corruption. Following is to deal with tax and tax collectors and other purposes. Other reasons with nearly the same percentages are to get licenses and permits, to gain government contracts and to deal with customs. The percentages around these reasons do not significantly change from 2005 to 2011.

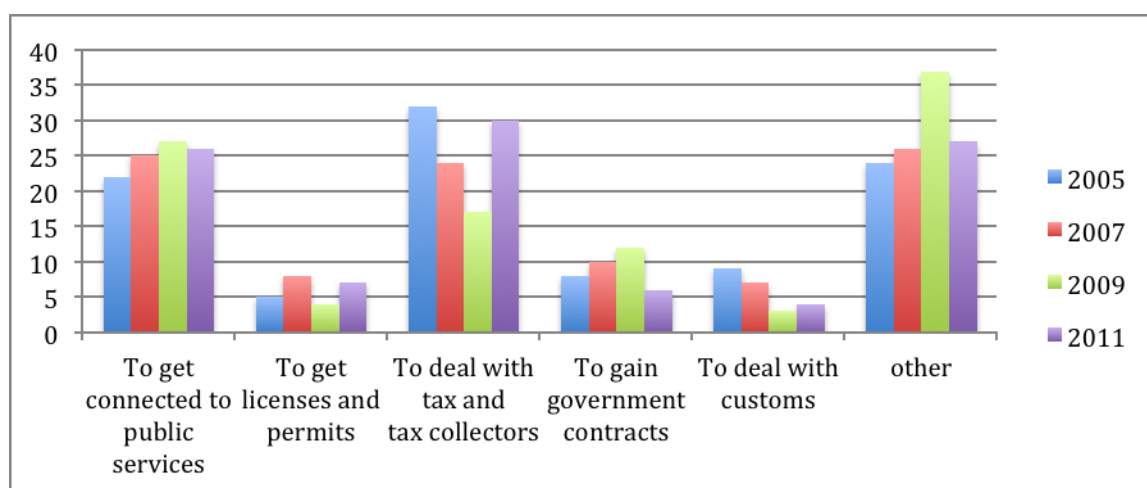


Fig. 1 - What is the Bribe payment used for?. Source: Calculation from research data

For the frequency of corruption, on average more than a half of corrupt firms involving from 2 to 5 times of unofficial payments for one year. The next significance is only once for corruption. Only 5.43% corrupt firms have pay more than 10 times.

Tab. 4 - Frequency of corruption. Source: Calculation from data

Frequency	Percentage
Only once	22.32%
2-5 times	59.73%
6-10 times	12.52%
More than 10 times	5.43%

For the probability of corruption varies depend on the size of firm. The micro enterprises tend to be more likely to have unofficial payment and bribes. Next, small enterprises are less likely to corrupt. Meanwhile, the least significant probability of corruption is medium enterprises. This indicates that the probability of corruption is not conditional on firm size, or firm scale does not much influence on probability of corruption.

Tab. 5 - Probability of corruption by firm size. Source: Calculation from data

Firm size	Probability of corruption
Micro enterprises	55,8%
Small enterprises	43.9%
Medium enterprises	0.3%

#### 4 THE HYPOTHESIS AND MODEL SPECIFICATION

Vietnam is a developing country faced severe problems of the lack of legal instruments and weak regulation compliance. As a result, there is a higher share of bribe payments amongst firms. These things probably come from Vietnam's business cultural, "corruption" as an instrument to smooth business' activities, otherwise, firms will face difficulties in getting contracts and business growth in the short term. Payment of bribes is considered as a part of firms' operative costs. However, in the long-run, corruption will hamper firms growth and it should be eliminated to ensure the level playing field of business in the economy. Regarding to our reliable data on bribers involvement of Vietnam SMEs We, therefore, argue that firms will be more likely to be higher growth if they have previously been engaged in corruption in an attempt to smooth their activities in short-run. The main research questions are:

- (1) Does payment of bribes in the previous period will be positively associated with firms performance in the current period?
- (2) What factor has the most influence on firm bribes?

To examine this research question, we test 2 hypotheses.

*H1: Corruption foster firms performances in the short-run.*

*H2: The firms located in big cities have to be engaged more in bribery.*

To test the hypotheses, the model will be explored below:

*Model: The effects of corruption on Revenue Growth (LnRe)/ Labor Productivity (LnLP)*

$$\text{FIRM PERFORMANCE (LnRe, LnLP)} = \beta_0 + \beta_1 * \text{CORRUPTION} + \beta_2 * \text{INNOVATION} + \beta_3 * \text{INVESTMENT} + \beta_4 * \text{LOCATION} + \beta_5 * \text{FIRMSIZE} + \beta_6 * \text{FIRMAGE} + \mu$$



*Model* is estimated by using OLS regression to test the effects of corruption on firm performance. In this model, firm performance includes increase in sale revenue (LnRe) and labour productivity (LnLP) as the dependent variables. Independent variables include Corruption, Innovation and Investment, other Control variables are Firm size and Location. Dependent variables are constructed by dividing revenue by GDP deflator coefficient for each year, then take the natural logarithms of real sale (LnRe) and the natural logarithms of real sale growth divided by number of workers (LnLP). This measurement is also applied by Kochanova's paper (2012) in investigating the impact of bribery on firm performance in the Central and Eastern European countries.

To measure the effect of corruption at the firm level, there are several methods. Svesson (2001) investigate the impact of corruption indirectly by collecting cost data of the provision of public services. Another way is more directly by estimating graft for firms with the same line of business (Svesson 2002). In another research, corruption at firm level is to measure by answering the question "On the average, what percent of revenues do firms like yours typically pay per annum in unofficial payments to public officials?". Corruption here is also defined as a binary variable which equals to 1 if a firm spent at least 2% of its revenue to government officials and 0 otherwise (Asiedu and Freeman 2009).

Similarly, with respect to our research, in the context of Vietnam SMEs survey we ask enterprises about whether they have to pay unofficial payment or not and if yes, how often they have to pay. The questions are asked for all enterprises. Along with this, we also have information on economic and labour status. Thus, we can estimate the influences of corruption on firms' performances.

Tab. 6 - Variable definitions. Source: Summary from data

<b>Variables</b>	<b>Definition</b>
LnRE	Natural logarithms of real sale growth
LnLP	Natural logarithms of real sale growth divided by number of workers
CORRUPTION	Frequency of involving bribes in the previous year. CORRUPTION=1 if enterprises had to pay just only once. =2 if they involved in bribes from 2-5 times, =3 if the times of unofficial payments from 6-10 times, and CORRUPTION=4 if they had to p
OWNER EXPERIENCE (IV)	Indicates the previous main work status of owners, if they had ever worked for State owner enterprises, OWNER EXPERIENCE=1, otherwise OWNER EXPERIENCE=0.
NETWORK (IV)	Dummy variable. Network indicates the participation of enterprises in business association. If yes, NETWORK (IV)=1, otherwise NETWORK (IV)=0.
INNOVATION	Dummy variable. Innovation is measured by the probability of introducing new product, new technology or improving current products. If yes, INNOVATION=1, otherwise INNOVATION=0.
LOCATION	Dummy variable. The location of firms. If firms locate in Hanoi, Hochiminh city and Haiphong, LOCATION=1, otherwise LOCATION=0.
FIRM SIZE	Number of firm's employment

INVESTMENT                      Dummy variable. The investment stats of firms since last survey.  
If yes, INVESTMENT=1, otherwise INVESTMENT=0.

## 5 EMPIRICAL RESULTS

The overall findings present a positive relationship between bribe payment and firms' performance including Revenue Growth and Labour Productivity.

### 5.1 The effects of corruption on firm performance

#### *The effects of corruption on Revenue Growth (LnRe)*

To quantify this relationship between corruption on firm performance in correlation with other firms' characteristics and firm performance indicators, an empirical model of OLS regressions is used to test for the relationship of the dependent variables LnRe (Revenue Growth). The testing results are reported in Table 7. Column 2 of the table reports the testing results of the model in the nested case, which includes Corruption, Innovation, and Investment as explanatory variables and Firm size, Location as control variables. From Column 3 to Column 6 of each table report the results of the model with the change in the explanatory variables and control variables, the details are presented in Table 7 below.

Tab. 7 - The relationship between corruption and firms' revenue (LnRe). Source: Authors' calculation

Independent variables	Dependent variable: Log of Revenue					
	1	2	3	4	5	6
<b>Corruption</b>	.2318*** (.0611)	.3317*** (.0721)	.3923*** (.0755)	.2553*** (.0624)	.3926*** (.0731)	.2481*** (.0636)
<b>Investment</b>	.415*** (.1019)	.5677*** (.1193)				
<b>Innovation</b>	.394*** (0.1035)	.7902*** (.1196)				
<b>Firm size</b>	.0225*** (.0015)			.0247*** (.0015)		.0260*** (.0015)
<b>Location</b>	0.503*** (.093)			0.4992*** (.0947)	0.7398 *** (.1105)	
<b>const_</b>	4.651*** (.1516)	4.908*** (.1721)	5.482 (.0270)	4.9710 *** (.1395)	5.0852*** (.1647)	5.1844*** (.1361)
<b>R<sup>2</sup></b>	0.3878	0.1334	0.1292	0.3571	0.1003	0.3299
<b>Observations</b>	663	663	3440	663	663	636

Notes: \*\*\*, \*\* and \* significant at 1%, 5% and 10% level, respectively; Standard error in parentheses;

From Table 7, revenue growth is seen to be significant positively associated with bribe payment, which can be also explained by other explanatory variables such as innovation, investment, firm size, and location of the firms. The results indicate that corruption has a significant positive impact on firm performance in the sense of the revenue growth in the six models tested above respectively (.2318; .3317; .3923; .2553; .3926; .2481, significant at 1%). It implies that firm involved in corruption will have higher revenue growth than firms do not

involve. Additionally, the effect was likely to be different due to firm characteristic such as firm size, location and the type of firms which indicates that in some cases, corruption can be a motivation to promote firm performance. These issues can be explained that firms involved in paying bribe or unofficial payment can gain benefits from better access to government services or inputs of their production and earn more contracts from government and partners which resulted in revenue growth. In the study on Chinese firms, Wang and You (2012) also provide firm-level evidences of the relation between corruption and firm growth under the financial development. The results show that corruption is likely to contribute to firms' growth if financial markets are underdeveloped. Obviously that, under certain circumstances, corruption in developing countries will have positive impact on firm performances.

However, when we use other explanatory variables as Investment, Innovation, Location, the level of corruption seems to be less and less significant. It implies that Innovation and Investment can help firms improve revenue growth and directly reduce the level of firm bribes, simultaneously. The level of corruption appears in the lowest of the nested case where including only 3 explanatory variables (Corruption, Innovation, Investment) and 2 control variables (Firm size, Location). The highest value of corruption (Column 5) appears in the test of the relationship between the Revenue Growth and Corruption, Location only. This underlines the fact that although corruption has a significant effect on firm performance if firms located in big cities, regardless of no introduction of investment or innovation. In Column 1, with the introduction of the innovation process and investment, the coefficient of bribe payment turns out to be slightly less significant (reduces from .2553 to .2318, at 1% significant). It may infer the fact that, along with corruption, the process of innovation and investment activities also enhances the firm performance. The frequency of corruption on real sale will be reduced because corruption is not only the factor affecting firm performance.

Interestingly, firm location shows the highest positive impact at the value around 1 in both nested and un-nested cases which are .0526 (model 1), 1.0775 (model (4), 1.1898 (model 5). This underlines that location has a significant effect on firm performance, which indicates that firms in three big cities (Hanoi, HCMC and Hai Phong) seem to perform better with the higher level of corruption. The result can be interpreted that location is one of the most significant factor influencing on the firm performance. Firms in big city such as Hanoi, HCMC and Hai Phong tend to pay more bribes to get better access to government services or inputs to generate higher real revenue. Another reason is that, government system in big city has more power to require firms to pay unofficial or extra payment to get services. Otherwise, in big cities, probably, a lot of companies are established every year, which leads to crowd in accessing to public services. Therefore, firms want to get services quickly and they are willing to pay unofficial payments. Yankovskyy (2003) has the same conclusion that firms located in the Capital, Center have engaged more in the probability of corruption. This is because that firms in the centre are force to queue in order to access to public services.

Besides, firm size presents a less effect on firm performance. This can be explain that in the short period from 2005 to 2011, the firm size had not changed much and they report a little effect in these models. Interestingly, the firms, which are not, applied innovation process and investment in urban areas reveals higher level of corruption than the applied ones, but lower level of corruption than firms who are not applied in rural areas. In this case, bribery to the officials has a positive effect on the firm's exporting performance, which is also supported by the concepts of corruption as 'grease the wheels' as well as 'sand the wheels' mentioned in the literature review.

### ***The effects of corruption on Labour Productivity (LnLP)***

In this part, we test the effects of corruption on the firm in the aspect of labor productivity.

The result is presented in Table 8. From the table, we can see that the labour productivity of the firms is indirectly affected by corruption. Overall, the result reveals that the effects of corruption on firms labour productivity and their effects reveal less significance than their effects on the revenue growth in the previous part.

Tab. 8 - The relationship between corruption and firms' labor productivity. Source: Authors' calculation

Independent variables	Dependent variable: Log of labor Productivity (LnLP)					
	1	2	3	4	5	6
Corruption	.0849** (.0274)	.0852** (.0273)	.1025*** (.0272)	.1115*** (.0261)	.2062*** (.0246)	.1001*** (.0267)
Investment	.0497* (.0259)	.0497* (.0259)	.0683** (.0257)			.0610*** (.0253)
Innovation	.0462 (.0331)	.0457 (.0331)	.0640* (.0330)			
Firm size	.0038*** (.0007)	.0038*** (.0007)		.0019*** (.0004)		.0018*** (.0004)
Location	.4507*** (.0379)	.4513*** (.0379)	.4852*** (.0376)	.4414*** (.0356)		.4519*** (.0364)
const_	3.4330*** (.0282)	3.431*** (.0281)	3.448*** (.0280)	3.4907*** (.0234)	3.664*** (.0176)	3.453*** (.0272)
R <sup>2</sup>	0.0773	0.0959	0.0854	0.0834	0.0342	0.0859
Observations	663	663	3440	663	663	636

Notes: \*\*\*, \*\* and \* Significant at 1%, 5% and 10% level, respectively; Standard error in parentheses;

Corruption, a proxy variable presents for the frequency of firms paying bribes is also a positive determinant on the performance of firms. This underlines that the firms have more motivations involving in government lobby or unofficial payment to get better access to government services and training which can enhance their employees' productivity, then increase the firms performance. This result is also consistent with the previous part. Three explanatory variables (Corruption, Investment, Innovation) are positive coefficients and two control variables: Firm size and Location report a positive relation. Interestingly, in both cases, firms' location remains the most significant influent factor with the highest coefficients moving around 0.45, at 1% significant. This can be explained that firms in three big cities like HN, HCMC and Hai Phong are higher involving in paying bribery and unofficial payments in order to access better trainings from government or attract more talented or qualified employees which directly influenced to labor productivity of firms.

Since Corruption, Innovation, Investment and Location are inter-related with the positive sign for labor productivity and report a higher level of corruption, the positive relationship may imply that policy obstacles are found in the big cities where have better available government services and resources for the firms. It also indicates that approach bureaucracy often get better access to government support program and production inputs, which in turn enhances their productivity. Our results of the model 1 and 3 also indicate that bribery and unofficial payment, investment and innovation have positive spillover effects on the labor productivity of the firms, which is indeed an empirical result. In this case, the intercept coefficient is quite high and also consistent with the previous findings. Besides, firm size shows very little effect,

which implies that in the short period (from 2005 - 2010), these firms might not have enough time and capacity to increase their firm sizes. These results somewhat corroborate with the findings of McArthur and Teal (2002) for the African firms. In this case, bribery to the officials has a positive effect on the firm's exporting performance, which is also supported by the concepts of corruption as 'grease the wheels' as well as 'sand the wheels' mentioned in the literature review. It also corroborates the finding of Chavis (2006) with suggestion the paying of bribes does not seem to vary with firm size.

In the context of Vietnam economy, the business environment in Vietnam is not really creating favorable conditions for enterprises to perform business activities. In addition, complex procedures, cumbersome apparatus, lack of coordination, and civil servants are not associated with specific individual responsibility, which are also considered as reasons for corruption of firms increase. It is very popular in Vietnam, firms involving in bribery could be more easy to access to certain inputs, training or process administrative procedure timely, which help firms reduce cost of production, cost of transactions, then indirectly impact on firms' revenue growth. Especially, in Vietnam, for some export-import firms, the requirements of several clearances and licensing from the government bodies cause the increase in corruption to secure their business; therefore positive effects of corruption are likely to be obvious, as bribe-paying firms can obtain licenses and clearance relatively more easily. These issues are also relevant with the finding of Misati (2000), which also confirmed that the shortage of legal regulations and instruments tended to be accelerated in the shadow economies. On the other hand, due to the introduction of the innovation process and investment activities, the level of corruption might reduce slightly which leads to an interesting question of how much cost and benefit of corruption on firm and society in the certain period. Thus, we can conclude that for the country with the high level of corruption, bribery and unofficial payment might provide incentives for firm in doing their business in terms of increase in their revenue. However, another aspect of corruption may reveal inefficiency, which are not covered in this study.

From above analysis, it can be concluded that there is a significant positive effect of corruption on firm performance in the study period from 2005 to 2011. In the short term, corruption might enhance the accessibility to inputs resource fully, increase market share or win big contracts, which directly increase in the revenue growth. It can be seen that, the results of our study are consistent with the research of Hanoteau and Vial (2012) on Indonesian manufacturing industry. This also assesses the impact of corruption at plant-level on output and productivity growth. In the view of an Asian paradox, the finding is that corruption in the form of bribes and indirect tax payments, has a positive and statistically significant effect on firms' performances.

Corruption is still ambiguous and difficult to measure and its effects on an economy in the short period. In policy analysis and impact assessment, omitted variable is often a problem that is also relevant to this case of corruption. The method on instrumental variable (IV) is exploited with new variables as Owner Experience and Network are created. An assumption for Owner Experience and Network is made which are correlated with the explanatory variable Corruption and uncorrelated with error term ( $u$ ).

## **5.2 Does Corruption endogeneity?**

The following part, we address the endogenous problem of our corruption measurement by using the two-stage least square (2SLS) and the Durbin-Wu-Hausman (DWH) test for endogeneity, under-identification test and Weak IV to test for weak instrumental variables. The results are reported of the two-stage least square (2SLS) and three above testing results. In the first stage, Corruption is used as dependent variable, with exogenous variable in the right

hand side including Innovation, Investment, Firm Size, Location and Network, Owner Experience are used as IVs of this testing. The results are consistent with previous testing model with positive significant effects. It also supports for the conclusion that we made in the previous Model, all above explanatory variables relevant to firm performance show a significant positive effect on firms' level of corruption, in which, Investment, Innovation and Network reveal the highest significant level. The details of testing are presented in the Table 9 below:

Tab.9-Two stages least square and a Dubin-Wu-Hausman test  
Source: Authors' calculation

<b>2rd Stage Results</b>	<b>(LnRe as dep. Var)</b>	<b>(LnLP as dep. Var)</b>
Corruption	.6110 (1.132)	1.5873 (1.3254)
Investment	.3887** (.1308)	-.0159 (.1532)
Innovation	.3621* (.1429)	-.0539 (.1673)
Firm size	.0215*** (.0036)	-.0020 (.0042)
Location	.5165*** (.1030)	.3173** (.1205)
Const_	3.93 (2.1466)	.6607 (2.5128)
<b>1<sup>st</sup> Stage Results (Corruption as dep. Var)</b>		
Investment	.07353 (.0650)	.0735 (.0650)
Innovation	.0875 (.0662)	.0875 (.0662)
Location	-.0331 (.0595)	.0028** (.0010)
Firm size	-.0331** (.0595)	-.0331 (.0595)
Owner Exper	-.0483 (.0636)	-.0483 (.0636)
Network	.0803 (.0650)	.0803 (.0650)
Const_	1.8474 (.0803)	1.8474*** (.0803)
Observations	663	663
Under-identifying test (P-val)	0.0079	0.0002
Weak instrument robust tests (Wald F-stat)	6.29	5.43

Note: \*\*\* denotes at the 1% level or lower; \*\* denotes 5% level; \* denotes 10% level

The first stage is used to quantify the level of corruption using OLS regression with frequency of corruption as a dependent variable. Other variables include Innovation, Investment, Owner Experience, Network as independent variables while Location, Firm size as control variables.

The results are reported in Table 9. It is clearly shown in the table that all variables have insignificant positive effects on the frequency of corruption. In which, Innovation, Investment and Location are also found to be less significant in bribe payment. When their P-values reveal significantly high which allow us to accept the Null Hypothesis as we can conclude that these coefficients are insignificant. It underline the fact that, having better access to credits, funds or technology, trainings and licenses, can promote the process of innovation and investment activities within firms, which tend to reduce level of firms' bribe. Interestingly, results of the analysis indicate that location is insignificantly on the frequency of corruption. Overall, these results reveal three important characteristics of the bribe paying firms including innovation, investment and location.

The second stage presents an estimation of Firm Performance as the dependent variable using estimated residual getting from the 1<sup>st</sup> stage, with the exogenous variables on the right hand side. We found that Corruption, Investment, Innovation and Location to be significant when assessed as independent variables against Firm Performance as a dependent variable. In the context of this research, some contributors for firms' bribe might be omitted such as pre-working experience of the firms' owners (Owner Exper) or social network of firms (Network) such as the participation of enterprises in business association. To consistently estimate our model, we must find Instrumental Variables (IV) that satisfies certain properties including uncorrelated with error term and correlated with Corruption variable. We dominate 2 instrumental variables (IV) namely Network and Pre-work of owners. The first IV indicates that if enterprises are the members of business association, they have more connections, transactions with other businesses and agencies, leading to higher the frequency of bribe. For Pre-work of owners, if previously the owners work for State Owner Enterprises, they might have habit of paying more extra money to smooth their business activities. It can be partly explained by the culture of developing countries like Vietnam. While firm in urban areas with high demand of innovation and investment, the level of corruption is more likely to be higher than those who in the rural areas. The result is also consistent with the previous testing result. However, the magnitude of the effects is quite different. While corruption seems to be the highest factor influenced to the firm performance.

Besides, the Dubin-Wu-Hausman (DWH) test is conducted by using the residuals from the first stage regression for testing whether those residuals are significant in the original OLS equation. The result of DWH test indicates that they are significant, we failed to reject the Null Hypothesis which eliminate the endogeneity problem. In addition, the tests for under-identification and weak instrumentation are both satisfactory. Following this, the effects of corruption on firm performance are assessed, in combination with other explanatory variables in the estimated model. So the IV regression estimators are more preferable.

## **6 CONCLUSIONS**

The effects of corruption on firm performance have attracted much attention and initiated debate across countries and regions. Theoretical and empirical results indicate that corruption is widespread in both developed and developing countries, which hamper the growth prospects at the country level. However, the impacts are contradict and more complicated at the industry and firm levels. The effects depend on the level of the development of each country, characteristics of firms, business environment, policy, regime and institutions, which require more specific study to quantify.

Based on the Vietnamese firms' characteristics of the collected data, the findings reveal that there is a causal positive relationship between corruption and firms' performance in Vietnam. The findings contribute several importanta points to theoretical and empirical result on assessing the impact of bribe payment on performance indices Vietnamese SMEs. First, to

measure effect of corruption on firm performance based on two important indicators of firm: Revenue Growth and Labor Productivity. Besides, the effect is also measured based on four other factors: innovation, investment, firm size and location. Second, the results reveal that there is a significant positive relationship between corruption on firm performance and a strong inter-correlation between corruption, innovation, investment and location to the performance of firms. Among these factors, location presents for big cities (Hanoi, Hai Phong, HCMC) reveals the highest corruption levels while the firm size is likely to less influential on the relationship between corruption and firm performance in the short period of the study. Thus, we might conclude that there is a complexity in the system of policies or bureaucratic in Vietnam which potential raise the level of corruption which may increase the firm performance in the initial stage in the short period.

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# **THE IMPACT OF FAMILY CONTROL ON PROFITABILITY, LEVERAGE AND LIQUIDITY: EVIDENCE FROM THE CZECH MANUFACTURING INDUSTRY**

*Ondřej Machek, Jiří Hnilica, Daniela Kolouchová*

## **Abstract**

Family businesses represent an important portion of the Czech economy. However, the role of family companies has been neglected in the past research. This paper deals with the differences in return on assets, debt ratio and cash liquidity between family and non-family businesses. To explore the differences, we use the matched-pair investigation approach. On a sample of 271 firms from the Czech manufacturing industry, we show that the differences are statistically significant in 2007 and 2012. The results suggest that Czech family businesses operating in the manufacturing industry are more profitable, carry less debt and have a higher liquidity which is consistent with prior research carried out in other countries.

*Keywords: family business, performance, Czech Republic, manufacturing*

JEL Classification: L22, M10

## **1 INTRODUCTION**

The fact that for many the phrase “family business” connotes a small or medium-sized company with just a local significance does not reflect the powerful role that family-controlled enterprises play in the world economy. They are not just companies like Walmart, Samsung, Tata Group, or Porsche, but they account for more the 30% of all companies with sales in excess of \$1 billion (Kachaner, Stalk, and Block, 2012). In most countries, regardless of company size, family business account for a major share of business ((Astrachan & Kolenko; 1994 (United States); Gallo & Estape, 1992 (Spain); Martinez, 1994 (Chile); Maury, 2005 (western Europe); Owens, 1994 (Australia); Reidel, 1994 (Germany)). Family businesses are thus significant in terms of employment, turnover, added value, investments and accumulated capital (Allouche, Amann, Jaussand, and Kurashina, 2008).

Therefore it is no wonder that interests of academicians have been attracted towards studying family businesses. However it is important to mention that family business as an academic discipline is relatively new – it was first anchored by establishing Family Firm Institute in 1986 and by issuing the first number of Family Business Review in 1988 (Sharma, Chrisman, and Gersick, 2012), a scholarly publication devoted exclusively to exploration of the dynamics of family-controlled enterprise.

Family businesses represent the major share in economies around the world (Allouche et al., 2008). However, in the Czech Republic, the true role of family businesses has never been mapped. In this article, we explore the differences in return on assets, debt ratio and cash liquidity between family and non-family businesses operating in the manufacturing industry. To explore the differences, we use the matched-pair investigation approach.

## **2 THEORETICAL BACKGROUND**

What we know is that the Industrial Revolution led to establishment of many manufactures that remained in family control after the death of the founder such as herb liquor producer Becher (1794), confectionery company Fiedor (1840), furniture manufacturer Thonet (1841), Moser glass works (1857), piano manufacturer Petrof (1865), or shoe manufacturer Bata (1894). With the collapse of the Austro-Hungarian Empire, Czech family owned firms were rapidly developing (Hanzelková, 2004). Family businesses such as Bata or the largest engineering company of the former Czechoslovakia Kolben and Daněk (ČKD) were the backbone of the economy.

In most countries family businesses account for a major share of business and significantly influence employment, turnover, added value, investments and accumulated capital (Allouche et al., 2008). Current research activities on this topic suggest that about 70% – 80% of enterprises are family businesses, with however quite significant ranges based upon different definitions – e.g. in Denmark the possible range goes from 36% to almost 95% (Mandl, 2008).

In the Czech Republic the role of family businesses has been neglected. Some research has been conducted at VUT Brno, BIBS, Masaryk University, and University of Economics, Prague (Koráb, 2008; Hanzelková, 2004; Odehnalová & Olševiřová, 2009; Machek, Brabec, and Hnilica, 2013, Machek & Hnilica, 2013, Machek, Hnilica, and Brabec 2014). The newest study has been published by Forbes in May 2014 (Mašek et al., 2014) in which 50 biggest Czech family enterprises are just ranked in terms of averaged sales and EBITDA, i.e. no deeper scholarly research has been realized.

As an emerging field the family business discipline has been establishing especially in the two following directions:

- Defining family business: The very definition of family business is crucial because usually the research outcomes do compare family and non-family businesses from many perspectives. In spite of the fact that there is no unanimous agreement upon it each definition of family business include three dimensions (Massis, Sharma, Chua, and Chrisman, 2012):
  - one or several families hold a significant part of the share capital;
  - family members retain significant control over the company, which depends on the distribution of capital and voting rights among nonfamily shareholders, with possible statutory or legal restrictions;
  - and family members hold top management positions.
  - Researchers (e.g. Carney, 2005) conclude that due to unique institutional legal contexts in states across the globe it makes no sense to come up with a definition that could be universally applicable. Nevertheless each study must explicitly state what is understood under the family business because different definitions do lead to different findings (Westhead & Cowling, 1998).
- Performance differences between family and non-family businesses: Most empirical investigations find superior financial performance of family businesses compared to non-family ones (e.g. Anderson & Reeb, 2003; Craig & Dibrell, 2006; Kachaner et al., 2012) whereas others investigate both financial and non-financial dimensions of performance such as growth or alternative qualitative indicators.

The results are often interpreted by more effective management due to familial nature of businesses, with the followings emphasized:

- Reduction of agency costs within family businesses: The separation of ownership and control in companies may lead to agency costs, i.e. because the interests of owners (principals) and hired managers (agents) are not the same managers may act in order to maximize their own utilities instead of those who hired them (Fama & Jensen, 1983). This separation is mitigated in family businesses as managers in family businesses (often family members or family “friends”) act more like stewards (Carney, 2005; Davis, Schoorman, and Donaldson, 1997).
- Long-term orientation of the shareholders’ family: The intention of family business owners is usually to preserve the family inheritance for its transmission to following generations. This leads to better investment policies in comparison to non-family businesses (James, 1999; Stein, 1989).
- Reduced levels of debt in balance sheets: Modern corporate finance considers a judicious amount of debt as a good thing because through financial leverage it may create value. On the other hand debt decreases room to maneuver if a setback occurs. Family firms are very risk averse and as a result carry less debt (Kachaner et al., 2012; McConaughy, Matthews, and Fialko, 2001) – therefore they do not need to make big sacrifices to meet financing demands during recessions.
- System of values: Values shared across family business stakeholders (such as managers, owners, employees, suppliers) generate synergistic effects (Habbershon & Williams, 1999).

In the Czech Republic, and post-communist countries in general, the family businesses have been getting an issue recently especially due to “succession issues”. While by the beginning of 1990’s we could hardly speak of any family businesses (with possibly an exception of those somewhat drawing upon the heritage of their predecessors who ran their own family businesses before the nationalization), then some 25 years later it is quite common that owners (fathers and mothers) already have transferred their businesses to their heirs or have at least started considering it.

Manufacturing industry is the largest Czech sector of economic activities, representing almost 50% of the whole Czech economy (Hnilica, Machek and Hanuška, 2014). It is composed of individual divisions (as classified by CZ-NACE system) out of which the following divisions represent approximately 60% of the industry: manufacture of fabricated metal products, manufacture of machinery and equipment, manufacture of food products, manufacture of rubber and plastic products, and manufacture of motor vehicles, trailers and semi-trailers. Other divisions are less important, so the authors do not list all of them.

### **3 METHODS**

To date, there is no database of Czech family companies and businesses have no legal obligation to disclose whether they are family companies or not (Machek & Hnilica, 2013). In order to identify family companies we used the surname matching principle (Machek et al., 2014; Hnilica and Machek, 2015).

In order to analyze the differences between family and non-family firms we used the matched-pair investigation method (see e.g. Allouche et al., 2008; McConaughy et al., 2001; or Menéndez-Requejo, 2006). This methodology systematically compares family and non-family businesses which have the same operating conditions. First, pairs of businesses which match in their industry and size are established. Subsequently, a paired t-test is applied in order to compare the differences in means of selected variables.

To create the pairs, we assigned to every family company operating in the manufacturing industry a set of non-family manufacturing companies with the closest number of employees. If there were multiple companies with the same headcount, we selected the company with the closest turnover. This way, we eliminated differences due to firm size. After having eliminated observations with incorrectly disclosed accounting data (see e.g. Tyll and Pohl, 2014), we obtained a final sample which contains 271 pairs of large and medium-sized family and non-family firms.

After having created pairs of businesses, we applied Student t-tests to determine the statistical significance of mean differences (the null hypothesis is that the average difference of means is zero) of selected indicators:

- Return-on-assets (EBIT / Assets),
- Debt ratio (Debt / Assets), Interest coverage ratio (EBIT / Interest expenses),
- Cash ratio (Cash / Current liabilities).

Similarly to Allouche et al. (2008), we use two years (2007 and 2012) to avoid overdependence on a single year of data. The first year represents the situation before the arrival of the 2008 economic crisis which had a significant effect on the Czech economy. The latter year (2012) represents the year when the Czech economy has already recovered.

## 4 RESULTS

Tab. 1 displays basic central tendency (mean, median) and variability (standard deviation) features of the data in this study. Return on assets, debt ratio and current ratio are presented separately for family and non-family businesses and for both years under consideration.

Tab. 1 - Descriptive statistics for 2007 and 2012

	Return on assets [%]		Debt ratio		Current ratio	
	FB	NFB	FB	NFB	FB	NFB
<b>2007 (N = 271)</b>						
Mean	7.673	6.524	0.523	0.564	0.480	0.305
Median	6.000	4.905	0.532	0.563	0.140	0.130
Standard deviation	8.426	6.781	0.226	0.248	1.130	0.471
<b>2012 (N = 271)</b>						
Mean	4.873	3.868	0.477	0.536	0.489	0.373
Median	3.820	2.940	0.461	0.497	0.170	0.110
Standard deviation	6.655	7.335	0.263	0.372	0.774	0.659

Note: FB = family businesses; NFB = non-family businesses

Source: Authors

Tab. 2 displays the results of Student's paired t-tests on the matched pairs dataset. Return on assets shows significant difference between family and non-family businesses which is valid for both periods. This indicates that family firms are comparatively more profitable from the point of view of shareholders and creditors. The debt/assets ratio shows significant difference

in favor of non-family businesses, which means that family firms carry less debt. The difference in cash/short-term liabilities ratio significantly favors family firms, which suggests that family companies are more careful regarding their financial policy.

Tab. 2 – Matched-pair investigation results

	Return on assets		Debt ratio		Current ratio	
	Difference	<i>p</i> -value	Difference	<i>p</i> -value	Difference	<i>p</i> -value
<b>2007</b>	1.149	0.080*	-0.041	0.055*	0.175	0.019**
<b>2012</b>	1.005	0.095*	-0.059	0.037**	0.116	0.075*

Note: \*\* - Significant at 5% level; \* - Significant at 10% level

Source: Authors

## 5 DISCUSSION

Prior to discussing the results, it should be noted that the authors are aware of the fact that all firms operate in the manufacturing industry, so the results can't be generalized to all industries. While the manufacturing industry represents approximately 50% of the whole Czech economy (Hnilica, Machek and Hanuška, 2014), the results are predicative to a certain extent, but it should be stressed that all results concern only family and non-family businesses from this sector, as well as large and medium-sized companies.

The choice of return on assets (ROA) reflects the fact that it has been the most widely used indicator of profitability in past studies on performance gaps between family and non-family firms (Machek, Hnilica and Brabec, 2014). Indeed, according to the past literature, family firms do best when their performance is assessed by ROA, a measure that is not as influenced by financial structure as ROE (Wagner et al., 2015). The results suggest that Czech manufacturing family businesses are more profitable, which is consistent with past literature. The most important factors which could explain such difference are related to agency problems and to a long-term perspective. Family relationships are supposed to reduce agency costs and allow for a better dissemination of knowledge and personal motivation of the owner to achieve better financial performance. Factors such as loyalty, trust, quick and flexible decision-making, stability, and a common interest to build a positive reputation of a family firm may together contribute to a greater profitability of a family business. However, it should be noted that higher profitability may not necessarily imply higher efficiency (Gorriz and Fumas, 1996). From the financial point of view, Sraer and Thesmar (2007) suggest that several factors affect profitability, namely, firms are more profitable if their production process uses less capital, labor productivity is higher, and wages are lower. The analysis does not allow discovering which of these factors play the major role.

From the point of view of capital structure, the results suggest that Czech family firms operating in the manufacturing industry use less debt than their non-family counterparts. This is consistent with the hypothesis that family businesses have a stronger reserve against debt than non-family firms which is supported by prior research. However, it is still not clear cut what exactly drives the capital structure decisions of family firms. One of the possible reasons is the risk-aversion due to the fact that a possible loss of family control over a company, together with a strong interest to care about the reputation of family firms, may lead to a lower use of external resources (debt). Of course, there are other factors than family control which affect capital structure as well. Among the most important ones, we should mention

firm size and industry (which was however mitigated by the matched-pair approach used in this study), firm age (older firms tend to use more debt than younger firms) and structure of assets (for instance, the proportion of tangible and intangible assets, see e.g. Ampenberger et al., 2013).

The differences in liquidity are also important since the Czech manufacturing family businesses had a significantly greater current ratio than non-family businesses from the sample. These results can be explained by the above-mentioned hypothesis on a greater risk-aversion of family firms. Broadly speaking, liquidity ratios are a measure of financial policy of firms; a greater liquidity indicates a more conservative, yet less profitable position; lower levels of liquidity indicate a more risky but more profitable financial policy. The risk-aversion of family businesses is reflected in a more conservative financial policy which is accompanied by employing more short-term financial resources (cash) to cover short-term obligations, or by employing less short-term liabilities and more long-term debt, everything else being equal. However, it should be noted that only one measure of liquidity (current ratio) was used in the analysis. Other measures, such as quick ratio or cash ratio, would provide more detailed information on the structure or liquid assets (for instance, inventory or cash and cash equivalents).

## **6 CONCLUSION**

Family firms belong to the most important organizational forms of businesses. Their differences from companies owned or managed by independent professionals, among which we may cite the trust and loyalty, may have beneficial effects on efficiency and profitability. On the other hand, some factors like conflicts among family members, or conflicts between work and family, may harm the profitability. In the Czech Republic, the issues of family business have been neglected in the academic literature to date.

In this study, we used the matched-pair investigation to observe the differences in return-on-assets, debt ratio and cash ratio on a sample of 271 pairs of family and non-family firms. The authors are aware of the fact that the methodology is not based on random sampling so the results cannot be generalized to all companies in the Czech Republic. The study shows that family firms from the sample exhibit a greater return on assets (profitability), lower debt ratio (leverage), and higher current ratio (liquidity).

However, it should also be noted that the study has several limitations. Although the manufacturing industry represents the largest part of the Czech economy, the results may not be valid in other important sectors of economic activity, such as wholesale and retail, construction, or transportation and storage. The second limitation is the size of analyzed companies. The sample of firms contains only large and medium-sized companies, while most family businesses are supposed to be small or micro-companies (European Commission, 2009). The third limitation concerns the years under observation. The data covered two years (2007 and 2012) in order to avoid dependence on one year of data. However, a longer time series would certainly have a greater predictive ability.

With respect to these limitations, rather than drawing general conclusions, we can acknowledge that the results suggest that there exist differences between Czech family and non-family firms which are consistent with prior research carried out in other countries.

However, further analysis is warranted in order to make general conclusions on performance gaps between family and non-family firms. The further research will be focused on building a



greater database of family firms. Especially small firms must be included to the sample since their importance in the economy is crucial (see e.g. Dasan, 2013). The future research will focus on the reasons *why* family businesses actually are more profitable, prefer less debt and have greater liquidity. Such an analysis will have to be qualitative in nature.

### **Acknowledgements**

This work was supported by the Internal Grant Agency of the University of Economics in Prague, project no F3/55/2015 “Family Businesses in the Czech Republic – performance, governance, succession”.

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## **HOW TO PREDICT POTENTIAL DEFAULT OF CULTURAL ORGANIZATIONS?**

*Ondřej Machek, Luboš Smrčka, Jiří Strouhal*

### **Abstract**

Cultural industries have received increasing academic attention over the past decades. The prediction of default represents a vast area of finance and accounting. Since the companies operating in these industries are considered to be very specific, the performance of classical methods of default prediction is questionable. This paper explores the possibilities of using methods of default prediction in the area of companies operating in cultural branches. On a sample of 3,158 observations of companies operating in the Czech cultural sector, we develop the use of multiple discriminant analysis and logistic regression to predict the financial distress of these companies. The results suggest that these methods can have a high predictive ability, provided the coefficients are accurately estimated.

*Keywords: bankruptcy indicators, culture, financial performance, distress*

JEL Classification: G30, Z1

### **1 INTRODUCTION**

The sector of cultural industries has in the last three decades become a highly monitored specific economic area. This is connected with numerous facts, one of which is the deep societal changes which have occurred in the most developed countries over the last 50 years. A marked rise of demand for “entertainment” was characteristic even for a part of the 20s and 30s in the 20th century, although during this time this was a demand socially limited to the extremely wealthy and the wealthy echelons of society, whereas the demand among lower income brackets was satisfied with what was essentially folk art in the form of cinematography. A growing demand beginning on the 50s of last century and lasting essentially to the present is, however, characteristic in developed countries in its mass character and insofar as it is highly structured. The entertainment of our time is usually highly innovative, it works with constant emendation of technologies, it is subject to fashions and constant changes, and it has lost the style-creative characteristic for art until the first half of last century. The growing demand has brought about the formation of what is truly an essentially industrial structure in this sector, which has led to the emergence of entirely new branches, such as programming of computer games and applications for mobile devices. If we have mentioned the style-creative role of art lasting until the first half of the 20th century, then our century is characterized by a new style-creativity, where entertainment and productions of the cultural industry express social life, inter-human relationships and numerous other social facts.

The emergence of an evolution of creative industries has become the subject of numerous surveys, and it would be unsuitable here to treat this problem in a more comprehensive manner – it has been explained many times. In this regard, we can refer especially to the work of Florida (2002), Holden (2004), Hesmondhalgh (2007); from the Czech environment might be mentioned comprehensive study of Cikánek et al. (2009). Although the views of individual authors differ in many respects, a core of sorts is always formed by activities which are commercial and at the same time artistic or entertaining.

The significance of creative industries for the economic development of the European Union and specifically also the Czech Republic can be documented by Němec (2013): “*According to our approximate calculations made on the basis of CSO data, cultural and creative industries contributed more broadly to the CR GDP in 2010, almost by 4.9 % (of which cultural industries accounted for 1.9 % and creative industries 3 %).*”

The prediction of financial distress represents a vast area of finance and accounting. However, due to the specifics of cultural companies, the possibilities of using the methods of default prediction, especially in the Czech Republic, remain relatively undiscovered. Although there exist some models adapted to the Czech environment (such as the Altman’s Z-score), their predictive ability for the companies operating in cultural industries is questionable and needs to be tested.

The goal of this paper is to analyze the possibilities of using methods of default prediction in the area of companies operating in cultural branches and to develop a set of coefficients which allow a sufficient predictive ability of such methods. We will present the use of multiple discriminant analysis and logistic regression to predict the financial distress of these companies and test their predictive ability.

## **2 SAMPLE ANALYSIS**

We will focus more comprehensively on the methodology of predicting financial distress, and then on a definition of the data sets and finally on the analysis itself and the results thereof.

### **2.1 Methods Predicting Financial Distress**

Numerous statistical methods are used for the prediction of financial distress. The following can be mentioned:

- One-dimensional (univariational) analysis (e.g. Beaver, 1966);
- Multiple discriminant analysis (e.g. Altman, 1968);
- Multiple logistic regression (e.g. Doran, 1989);
- Neuron networks (e.g. Etheridge and Sriram, 1997);
- The method of support vector machines (e.g. Hui and Sun, 2006);
- Models that take into account the evolution of firm’s financial health over time, such as terminal failure processes (Du Jardin, 2015).

For specific sectors, other methods can be applied, such as the general equilibrium analysis to predict bank and their clients’ default (see e.g. Machek et al., 2014). Most often, the methods are based on the values of financial ratios. While it is known that accounting information is not always reliable (see e.g. Tyll and Pohl, 2015), it is perhaps the most practical source of information that the users of bankruptcy prediction models can quickly obtain.

Multiple discriminant analysis (MDA) is a statistical method which is used in economics not only in the theory of investment but also for the assessment of banking house client credibility, especially in the area of predicting financial distress. It began to be used especially after the publication of Altman’s paper (1968). MDA is a statistical technique used for classifying a certain object into previously given classes in dependence to the values of several factors. The first step is the formation of so-called training aggregates, i.e. observation aggregates where the class to which they belong is known. The formation of a decisive rule, which enables univocal classification of objects into one of the classes, occurs. In the case of a linear discriminant function, the decisive rule has the shape of a linear combination of several signs. The output of linear MDA, therefore, is an aggregate of discriminant coefficients, including a linear member. The discriminant function (the decisive rule, also the

Z-score) has the following shape in the case of the n-sign (in this article  $Z_k$  will continue to denote the discriminant function for businesses in the culture sector in the Czech Republic):

$$Z_k = a_0 + a_1x_1 + a_2x_2 + \dots + a_nx_n \quad (1)$$

where  $a_i$  is the discriminant coefficient,  $x_i$  is the value of the sign and  $n$  denotes the number of signs.

Multiple logistic regression is another statistical classification method which enables the prediction of category variables on the basis of independent variable values. Probability-describing outputs are modelled with the aid of logistic functions. The output of logistic regression is the probability that the given object belongs to a different class, i.e. the logarithm of proportion of probability that the given object belongs to a certain class, and the probability that it belongs to another referential class. Expressed formally,

$$L_k = \ln\left(\frac{p}{1-p}\right) = a_0 + a_1x_1 + a_2x_2 + \dots + a_nx_n \quad (2)$$

where  $L_k$  will continue to signify the score for businesses in the culture sector in the Czech Republic,  $p$  denotes the probability that the objects fall into a certain class,  $a_i$  denotes the regression coefficient,  $x_i$  is the value of the sign and  $n$  denotes the number of signs. The regression coefficients thus reflect the effect of independent variables on the relative probability that the object falls into a certain class as against the referential class.

The advantage of the above-mentioned approaches is their simplicity and fast and practical applicability for the classification of objects into classes. A clear disadvantages that it is an approximation of reality which is almost always burdened by a certain error and should therefore not be utilized mechanically, but rather in the context of deeper analysis (Neumaierová and Neumaier, 2014).

In this regard, it should also be mentioned that subjects from the culture sector are usually considered highly specific for various reasons. Firstly, their financing usually does not fulfill standard concepts insofar as multi-source financing occurs in numerous areas. Therefore, turnovers for sold products and services (turnovers from ticket sales in the given case) are only one of the incomes, often by no means the main one. This aspect can often transpire to be problematic in the case of application of methods to the “culture” sector, for placing it into a context for deeper analysis appears to be almost impossible here. In the following passages we will show that input data are necessary for the implementation of analytical methods, whilst we will see that none of these data touch the specific problems of the branches which, for the purpose of simplification, we have defined as “multi-source” financing, with the awareness that the real range of particularity is substantially larger and is connected with both economically impalpable terms such as “fashionability”, “artistic value”, “individuality of taste” or “national feeling”. From the economic perspective this aspect is analysed by Kislingerová (2012).

On the other hand, these terms may necessarily play a significant role in the case of “creative” industries, but not in relation to past data. The preceding data are always given as firm and will withstand essentially standard economic research. An important moment, however, is the ability of the prediction and whether the models would – at least theoretically – fail in a larger degree than usual, which should be given by uncertainty in the issue of incomes dependent to non-economic decision-making processes. What is at issue is that incomes dependent on political or other decisions should in essence be of higher risk as regards prediction of acquisition or non-acquisition thereof than funds from ticket sales or collected in another economically definable manner. As we will demonstrate later on specific results, it seems that these funds are with high probability at least as predictable as standard incomes.

## **2.2 Specifying the Dataset**

Data from the Bisnodecompany, or more precisely the MagnusWeb interface working over the Albertina database, were used. On the basis of available data, companies with at least five employees and doing business in the CZ-NACE 90 were selected. In general, creative, artistic and entertainment activities, especially the scenic arts, supportive activity for the scenic arts, artistic creation and operation of culture facilities belong here.

The acquired sample of companies has been cleared of unusable observations (incorrectly reported data, such as zero or nonsensically high indicator values), by which the number of observations was reduced to a total of 3,158 cases. This sample was divided into two classes – “safe” and “distress”. The “distress” class included observations among which events of the “bankruptcy”, “inability to repay”, “forfeiture recorded” and “negative equity” types were recorded. The remaining companies were classified as “safe”. A training aggregate for MDA and logistic regression was gained from this sample.

The condition of five employees ensures that an adequately representative number of companies will be contained in the sample; at the same time, individual activities with a dominance of artistic creation among which the concept of default caused by entrepreneurial activity can be conceived only with difficulty have been eliminated. The acquired number of subjects is marked, among others, clearly due to the fact that trading companies in this sector emerge once only as production grounds for specific performances or a smaller number of performances; in the event of failure, they depart from the economic environment fairly rapidly; contrariwise, in the event of success they continue for a longer period.

## **2.3 Employed Methodology**

MATLAB (Statistics Toolbox) software was used for classification – specifically, the following functions:

- discriminant functions for multiple discriminant analysis;
- the `mnrfit` function for multiple logistic regression.

The results were subsequently verified on other companies circulating in the culture sector, and comparison with other bankruptcy models – Taffler’s model (Taffler and Tisshaw, 1977) and Altman’s model (the modified version for 2000)– was also undertaken; verification of ability to predict default over a longer period – which we consider to be an especially interesting attempt towards a logical conclusion as regards higher riskiness of multi-source financing (under the assumption that one or more financial sources are dependent on political decisions connected with handling public funds or on the decisions of sponsors) – was also undertaken. In contrast to classical models, the so-called “grey zone” was not defined, for its univocal delimitation is impossible with respect to the available data, and a warning signal, i.e. classification into the grey zone area, can be provided by a  $Z_k$  or  $L_k$  value approaching zero. This applies especially in the context of the time development of these indicators. From the nature of the classes, moreover, the requirements for classification into the “safe” class are relatively strict: Negative equity is sufficient for classification of a company as “distress”.

The fact of negative equity is among the numerous specifics of subjects in the culture sector. This of course does not concern all entrepreneurial activities. However, in the NACE-CZ 90 category, the appearance of negative equity will, with a high degree of probability, be relatively common. Especially among productions, there are no grounds to expect other real assets besides gathered know-how. In this regard, it represents rather a potential than a real knowledge or capability advantage on the market. Moreover, it is not the property of a trading company or other subject – producer which is at issue, but ability and potential gained on a contractual basis in the form of providing services or performances by the carriers of this



know-how. As we can see, the position of the producer is very weak and vulnerable in this sense, and investors are no doubt aware of this. If the main asset of a production is the right for temporary utilization of abilities on the basis of contractually bound creative and other workers – carriers of know-how required for creating a cultural good, we must then consider this entire sector as extremely risky from an investor's perspective.

But let us return to the basic assumption that, even given maximally “creative” accounting, it is not possible in the case of a production – unless a strong investor injects capital into the business – to achieve a state of affairs where the trading company (producer) would not be in a state of over-indebtedness, i.e. that its liabilities would not exceed its assets. As we have argued above – in the bounds of our assumption, this is given to a significant extent by the logic of doing business in this sector as such. From the perspective of insolvency law, this is one of the few situations where the expression of Section 3 para. 3 of Insolvency Act is justified – where over-indebtedness is indeed defined as a situation in which the sum of the debtor's liabilities exceeds the value of its property, although when fixing the value of its property, account is taken of further administration thereof, possibly of the further operation of its business if it can reasonably be assumed, whilst bearing in mind all circumstances, that the debtor will be able to continue in the administration of property or in the operation of the business. In recent times, several analyses have been undertaken of situations resulting in insolvency proceedings, from which it stems that this expression is misused more often than it is used (Smrčka et al., 2013; Schönfeld et al., 2014). This is to say that entrepreneurial subjects which fulfill the condition of over-indebtedness as one of the forms of debtor bankruptcy have a tendency not to make their bankruptcy public and utilize the largest possible timeframe either for attempts to rescue the company by means of high-risk trades, or contrariwise for excision of property from the creditors' reaches. Both of these approaches have the same result for the creditor – minimization of the recoverability of their receivables.

This all means that over-indebtedness can be a fairly standard state of affairs in numerous companies or any other organizational structure used as a legal form of activity in the area of the creative industries, culture or artistic creation. Despite this, we will retain as valid the rule that negative equity is a reason to classify a subject into the “distress” group.

For classification, the same signs which appear in Altman's bankruptcy model (see Altman, 1968 and Altman, 2000) were used,

- $x_1$  = net working capital / assets
- $x_2$  = retained earnings / assets
- $x_3$  = EBIT / assets
- $x_4$  = total equity / total liabilities
- $x_5$  = sales / assets

Sign  $x_1$  expresses the hypothesis that companies with a deteriorating financial situation will have rather a negative liquidity expressed with the aid of net working capital. Sign  $x_2$  reflects the stability of the company, for it contains retained earnings from previous years. Sign  $x_3$  is the level of a company's asset viability when abstracting from tax influences and capital structures. Sign  $x_4$  expresses the extent to which the company's assets can lose their value before the company's liabilities exceed the value of its assets and the company becomes unable to repay. Sign  $x_5$  is the classic asset turnover and thus measures the efficiency of the company's asset usage.

We can find even here several problematic moments or parameters which we should perhaps relativize whilst taking into account the particularity of the branch. For instance, “retained earnings from previous years” is a concept in numerous legal forms utilized in this area of the problem, for the entire system of multi-source financing is in essence usually fixed so that no

undivided profit arises, and if so, it should be conserved in the form of marginal reserves. It applies that injections from public funds secure the remainder of financing for estimated incomes from turnovers and from sponsoring or supplementary entrepreneurship, as the case may be. Under the concept of “remainder”, it is most certainly impossible to expect that some or other “surplus”, i.e. profit, is to be generated.

Despite this, we have decided also in this case to retain all parameters in the original form insofar as prior to proceeding to the expression of an adjusted bankruptcy model, it is necessary first to test its standard form. Moreover, as we will speedily show, a significant moment of each model is the expression of decisive rules.

#### 2.4 Multiple Discriminant Analysis

The decisive rule can be expressed with the aid of acquired coefficients. The resulting classifying functions have the following forms, and the resulting Z-score can be expressed with the aid of the following function:

$$Z_k = 0.142 + 1.615x_1 + 1.03x_2 + 0.437x_3 + 0.001x_4 + 0.013x_5 \quad (3)$$

If the value of the function is higher than 0, the business is classified into the “safe” category. Otherwise, it is possible to classify it into the “distress” category. We can define the above-mentioned “grey zone” as an area of results approaching zero insofar as the more the result approaches zero, the more problematic the subject.

#### 2.5 Logistic Regression

The regression function for the natural logarithm of the proportion of probability can be expressed with the aid of the following function:

$$L_k = -0.32 + 2.905x_1 + 2.083x_2 - 0.839x_3 + 0.277x_4 + 0.624x_5 \quad (4)$$

The statistical significance of the estimated coefficients is described in the following table. It is clear that the estimate is relatively precise; only the coefficient at sign  $x_3$  is statistically insignificant.

Tab. 1 – The Statistical Significance of Model Coefficients (Logistic Regression). Source: our analysis

Coefficient	P-value	Standard Error
-0.32*	0.0838	0.189
2.905***	8.348e-11	0.447
2.083***	3.414e-11	0.314
-0.839	0,110	0.525
0.277***	1.285e-06	0.057
0.624***	2.619e-05	0.148

Note: \*\*\* -  $p < 0.001$ , \*\* -  $p < 0.05$ , \* -  $p < 0.1$

It can be deduced from the relation (2) that the probability that the object falls into the “distress” class is given by the relation

$$P_{distress} = \frac{1}{1 + e^{L_k}} \quad (5)$$

This relation, however, does not have to be utilized in practical applications, for a negative  $L_k$  value signifies that the given probability is higher than 50 %, which suffices for classification into the “distress” category. If the  $L_k$  value is positive, the object can be classified as “safe”.

The following tests were conducted to test the reliability and prediction ability of the models. First, the discriminant ability of the given five signs for business conditions in the culture sector (or more precisely, CZ-NACE 90, i.e. a specific sample of businesses in the culture sector) was tested in the form of a bi-selective pair t-test for a mean value.

## 2.6 Discriminant Ability of the Signs

The discriminant ability of individual signs has to be verified in order to verify the reliability of the model. To verify that the averages of values of individual vary for the “safe” and “distress” classes, a bi-selective pair t-test on a mean value was used on a sample of 321 randomly selected companies in both classes. The results are shown in table 2. The differences in the mean values of all the signs are statistically significant, which is suggested by the highly marked differences in the averages of individual signs in the “safe” and “distress” categories. Financially healthy companies demonstrate higher values in these signs than firms threatened by bankruptcy.

Tab. 2 – Mean Values of the Signs and the Significance Test. Source: our analysis

Sign	Meanvalue „safe“	Meanvalue „distress“	T-statistic
x <sub>1</sub>	0.27	-0.08	8.59*
x <sub>2</sub>	0.03	-0.66	7.14*
x <sub>3</sub>	0.02	-0.31	9.55*
x <sub>4</sub>	5.89	0.50	4.18*
x <sub>5</sub>	1.08	0.79	4.68*

Note: \* Statistically significant ( $p < 0.001$  on the level  $\alpha = 0.05$ ).

## 3 PREDICTIVE ABILITY OF THE MODELS

The predictive ability of the models was tested for one up to four accounting periods (tables 3 and 4). It is clear that the predictive ability drops in time, yet it nevertheless remains relatively high even four years prior to recording a negative event. From the perspective of longer-term prediction ability, multiple discriminant analysis demonstrates a slightly higher success rate in a series of 1-3 %; it is identical in the case of four years until bankruptcy.

Although Altman (1968) suggests not using discriminant analysis for more than a two-year historical period, it is clear that the predictive ability does not fall in a dramatic way in this case of prediction ability. It is evident that the values of all five signs drop with an approaching bankruptcy. The real predictive ability of classic bankruptcy models is also telling for a similar period (Machek, 2014). On the other hand, it is adequate in practical applications of a 1-2 year period for timely detection of a signal of negative development of a company’s financial situation.

Tab. 4 – Predictive ability of the Model (Multiple Discriminant Analysis). Source: our analysis

Number of years until bankruptcy	Number of observations	Number of correct detections		Number of bad detections	
		Number	%	Number	%
1	354	277	78.25	77	21.75

2	306	232	75.82	74	24.18
3	232	155	66.81	77	33.19
4	149	90	60.40	59	39.60

Tab. 5 – Predictive ability of the Model (Logistic Regression). Source: our analysis

Number of years until bankruptcy	Number of observations	Number of correct detections		Number of bad detections	
		Number	%	Number	%
1	354	275	77.68	79	22.32
2	306	219	71.56	87	28.44
3	232	149	64.22	83	35.78
4	149	90	60.40	59	39.60

## 4 DISCUSSION

Multiple discriminant analysis and multiple logistic regression are, in the case of subjects defined as NACE-CZ 90, capable of longer-term prediction of financial distress. The high ability of models to predict financial distress in the sector of subjects operating in the culture sector (CZ-NACE 90 in the given connection) is therefore surprising and it will be apposite to attempt an interpretation of this state of affairs.

A highly probable explanation appears to be the assumption that the influence of multi-source financing and the approaching uncertainty of future incomes connected therewith are lower than we expected at the beginning of the work. One can arrive at this from two related, albeit not identical reasons. The first is the possibility that, of the surveyed subjects, only a minority suffer real dependence to financing from public funds, so the influence of this phenomenon is not large. Although we do not have the possibility to present more detailed statistical data, we consider this to be probable to a relatively small degree. With respect to the CZ-NACE 90 characteristic, we are convinced that the dependence to public budgets must necessarily be marked especially in groups 90.01 and 90.04.

The second possible reason is the variant that financing from public funds – although based on potentially uncertain decision-making of a political type, i.e. an economically irrational method – is adequately reliable and predictable in time as one of the incomes.

The decision as to which of these theses is more correct and corresponds more to the situation is not possible without a series of detailed case studies and especially without the possibility to survey thoroughly the influence and development of individual income layers of subjects accepted into to the surveyed aggregate. As was stated above, we consider the second possibility more probable, i.e. that the irrationality of political decision-making in the public funds sector aimed at culture is constant and in principle predictable thanks to this. A certain role can then be played also by the “enforceability” of support from public funds, when the pertinent subjects react adversely to attempts to change the system and adjustment of subsidy flows, likewise to potential changes in the mechanisms of the division thereof, which then leads to more frequent retention of the status quo than to advancement of changes.

Another possible explanation seems to be the circumstance that support from public budgets is in many cases placed in a truly predictable manner, at least within a certain time horizon – this concerns the places and bodies of the state administration or self-government which proceed along the path of apportionment of long-term grants (three or five-year), which clearly increases the financial stability of the environment as a whole. In other cases, culture facilities are connected directly to the municipal budget, and its fulfillment is decided upon to some degree in advance, which enables adjustment also of activity and costs. Of course, this

then means that such facilities are able to reduce or strengthen their activity in dependence to the degree of certainty the pertinent budget provides to them. Then, however, financial distress could occur only through criminal or extremely irresponsible conduct on the parts of the managers of the production or culture facility.

## 5 CONCLUSION

While companies operating in the cultural sector are very specific and deserve academic attention, the past literature has been particularly silent on the possibilities of default prediction for these companies. In this article, we presented the use of multiple discriminant analysis and multiple logistic regression to predict financial distress and tested their predictive ability. We suggest that when the coefficients of the models are accurately specified and adapted to a particular environment, their predictive ability can be considered high, even in long term.

Several managerial implications arise from the study. Since the application in practice of these models is quick and straightforward (the financial ratios can be obtained directly from the financial statement of a particular firm and the relationships are linear), the models can be used by professionals to predict a potential financial distress of a company, and to take timely measures to avoid it.

The study also has some limitations. In contrast to classical models of bankruptcy prediction, the so-called “grey zone” was not defined. However, a decreasing value of zero of the models’ function, or a value approaching zero, can be and seen as a warning signal.

There are multiple challenges for the future research. First, the predictive ability on an international level should be analyzed as well. While there are undeniable differences of companies operating in Czech cultural industries from other companies, it would be interesting to observe if the same differences exist in other countries, and if the bankruptcy prediction methods (in particular, the multiple discriminant analysis and multiple logistic regression) perform well enough. Second, the cultural industry as defined by this study is relatively broad and it does certainly not capture the great variability in cultural company forms. The development of a model which takes into account such variability would be interesting and could represent one of the directions of the future research.

### Acknowledgment

*This study was supported by projects NAKI DF11P01OVV024 and IGA VŠE F3/2/2014.”*

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## **VALUATION OF FINANCIAL ASSETS IN THE INSURANCE COMPANIES**

*Anna Majtánová, Andrea Snopková*

### **Abstract**

Insurance industry is a specific sector of the national economy, which is subject to very strict regulations. Insurance companies are required to keep accounting and prepare financial statements and properly valued financial assets. Accounting information is important for internal users, financial management, financial analysis of insurance companies and external users, i.e. consumers - clients of the insurance company. The aim of this paper is to define and compare the measurement of financial assets in the accounting of insurance companies in theory and practice based on the processing issues of valuation in the context of current national and international legislation. Content of review are two selected insurance companies and analysis of the valuation of financial assets, which is important for the consumer - the client's insurance company, which financial resources are also part of the investment. In this context, the contribution is the output of a research project of Ministry of Education VEGA No. 1/0178/14 "Common the EU consumer policy and its implementation in the Slovak Republic with an impact on consumer education" which is solved on the Department of Marketing, Faculty of Commerce, University of Economics in Bratislava. The results of the analysis demonstrate that individual financial statements of selected insurance companies were developed on the basis International Financial Reporting Standards (IFRS), but in the use of information show disunity reported information. Although each insurance company complied with the mandatory requirements in the individual financial statements, disunity of reported information for the items that each insurance companies considered significant (indicated in the financial statements) was demonstrated at deeper analysis. In the research of the valuation of assets, which accounted for the largest part financial investments in financial assets, the disunity of of data also demonstrated, but it can be stated that in the valuation of financial assets did not reveal a significant differences.

*Keywords: consumer, insurance company, valuation, financial assets*

JEL Classification: G22

### **1 INTRODUCTION**

Insurance business is a specific sector of the national economy, which is subject to very strict regulations on the part of the competent State, as well as from the European Union. Business entities are obliged to keep accounts in a market-oriented economy and to prepare their financial statements that it informs about their economic activity. Valuing banks, insurance companies and investment banks has always been difficult, but the market crisis of 2008 has elevated the concern to the top of the list of valuation issues. (Damodaran, 2013) The widespread acceptance of International Accounting Standards (IAS) / International Financial Reporting Standards (IFRS) makes it timely to examine their technical determinants as well as their implications for the accounting profession and the process of accounting harmonization. (Carmona & Trombetta, 2008)

Valuation is one of the most important problems of accounting theory and practice. It is a process in which the monetary amount is assigned to the item of the financial statements with

major impact explanatory power of accounting information. Accounting information is important for internal users, financial management and financial analysis of insurance companies. They are also very important input for external users - consumers – clients of insurance companies.

The basic objective of the accounts of insurance companies is to give a true and fair view of the facts that are subject to accounting and financial condition of insurance companies.

The aim of this paper is to define and compare the measurement of financial assets in the accounting of insurance companies in theory and practice from the treatment of the issue of valuation in the context of current national and international legislation.

The contribution examines two selected insurance companies operating in the Slovak market. They have an obligation to prepare individual financial statements in accordance with International Financial Reporting Standards (IFRS).

This knowledge about the valuation of these assets is important for the consumer - the client of the insurance company. His resources are essentially also part of the investment.

In this context, the contribution is the output of a research project of Ministry of Education VEGA No. 1/0178/14 "Common the EU consumer policy and its implementation in the Slovak Republic with an impact on consumer education" which is solved on the Department of Marketing, Faculty of Commerce, University of Economics in Bratislava.

## **2 LEGISLATIVE MODIFICATION OF VALUATION IN THE ACCOUNTING**

"Accounting is a specific scientific discipline with its own subject of examination and methodological means. It can be stated that the accounting and financial statements are the fullest and the most perfect sources of information about the business unit - the insurance company." (Majtánová & Palacká, 2005)

Accounting of insurance companies in the individual member states of the European Union is subject to both national and international legislation and it is defined by Directive 91/674 / EEC of 19 December 1991 on the annual accounts and consolidated accounts of insurance companies. The directive applies to commercial insurance companies, which are based with the aim to make a profit. This group of insurance companies does not cover health insurance companies and Social insurance company.

### **2.1 Transnational legislation**

Globalization causes deepening of international economic relations and the increase in the usefulness of economic information. Accounting entities achieve mutual comparability of financial statements using international harmonization of accounting. One of the instruments of international harmonization of accounting are International Accounting Standards (IAS) / International Financial Reporting Standards (IFRS) and US Generally Accepted Accounting Principles (US GAAP). (Martinière, 2005) International Accounting Standards (IAS) have been developed by the International Accounting Standards Committee (IASC). In 2001, the International Accounting Standards Board (IASB) became responsible for issuing standards and began to use the term IFRS. The aim was to point out the standardization of reporting and not standardization of accounting.

The aim of the International Accounting Standards (IAS) and International Financial Reporting Standards (IFRS) is the comparability of financial data, especially financial



statements. These accounting standards represent a recommendation or guidance for business entities (they are not mandatory).

International Financial Reporting Standards (IFRS) "are one of the instruments of international harmonization of accounting and they are used in preparing the financial statements of business subjects and also in financial reporting, they regulate the methodology of accounting and bookkeeping." (Staríčková, 2013) The International Financial Reporting Standards (IFRS) are composed of certain components, such as introductory provisions, scope and objective of standard, own content in standards, additional submissions and annexes.

Regulation of the European Parliament and of the Council 1606/2002 establishes the obligation for selected companies to prepare consolidated financial statements in accordance with IFRS. Since 2005, the financial statements are obliged to compile companies whose securities are admitted to trading on a regulated market in a Member State. Regulation also provides for Member States selectivity of decision in expanding the use of IFRS to other consolidated financial statements and the individual financial statements. Slovak Republic to take this opportunity in 2005 and 2006.

## **2.2 National legislation in the Slovak Republic**

Slovak Republic, in transition to a market economy, adopted into force of The law no. 563/1991 Coll. on accounting as amended, which was the first independent accounting law in history. It has changed the basic philosophy of accounting. The law comprehensively defined the basic accounting concepts, accounting systems and documents, accounting entries in the books, reporting in the financial statements, valuation of assets and liabilities, inventory of assets and liabilities. This law was designed according to the requirements of Council Directives of the European Union, but because of the close approach to the legal standards of the Slovak Republic with the European Union, the National Council of the Slovak Republic has developed and approved a more progressive legal standard. (Šlosár, 2008)

With effect from the first of January 2003 was adopted the new Act no. 431/2002 Coll. Accounting, as amended, which aim is to achieve complete content comparability with relevant European Union directives. Valid Act is a general legal standard intended for all types of entities. Responsible for determining the specificities in the accounting of different types of entities was the Ministry of Finance of the Slovak Republic, and by issuing measures (validity of measures to thirty-first December 2005).

The methods of valuation of assets and liabilities, as well as the valuation of other assets and liabilities are established for an insurance company, as well as for any other entity in the fifth part of the Act No. 431/2002 Coll. on Accounting as amended. The insurance company is obliged to appreciate assets and liabilities at the date of valuation, which is defined in § 24 paragraph. 1 as (Act No. 431/2002 Coll. on Accounting as amended):

- the transaction date,
- the date on which financial statements preparation,
- to another date in the accounting period.

Act No. 431/2002 Coll. on Accounting, as amended, was revised in October 2013 and changes entered into force on 01.01.2014. In this paper we will point out only the selected changes that have an impact on accounting of insurance companies.

Insurance companies have a duty to impose financial statements covering the thirty-first December 2013 in the register of financial statements. The introduction of the concept of registry of financial statements held in 2012. The amendment introduced new provisions regarding the obligation saving the financial statements in collection of documents

of commercial register. It also introduced the merging obligation to publish a balance sheet, profit and loss statement and information about the auditor's opinion on the financial statements in the Commercial Bulletin.

The various types of assets and liabilities measured at cost, own costs, face value, replacement cost, fair value. Amendment has changed the field of use of market prices and area of quantified estimate.

The fair value can be determined by the market price, qualified estimate or opinion of an expert. Quantified estimate may be used if it is not available market price or fair value is not reflected correctly.

The market price is defined as the final value made public at the stock market on the valuation date according to § 24 paragraph 1 of Act No. 431/2002 Coll. on Accounting, as amended, or as the most numerous price of the tender on the valuation date according to § 24 paragraph 1 or if this price was not declared, so can use the price from the immediately preceding day, the earliest from the tenth day before the date according to § 24 paragraph. 1.

The fair value is determined by quantified estimate in the case if the market price can not be determined reliably. Valuation models based on quantified estimates are based on the present value of future expenditure on property and income from property. Quantified estimate is based most often from the current value of future cash flows from the asset and future cash outflows of assets The discount rate is characterized as internal rate of return required by investors for the type property on the date of valuation.

### **3 GENERAL ASSUMPTIONS AND ACCOUNTING PRINCIPLES**

In the scientific literature, the authors do not match in the definition, classification and nomenclature of individual accounting assumptions and accounting principles. Therefore, we will introduce their the widest definition (Cushing, 1977) and point out the specific accounting principles used in the accounting of insurance companies.

The source of the correct valuation of assets and liabilities in the accounting is assumption of the accounting entity, the assumption of measurement using monetary unit, assumption of constant purchasing power of the accounting entity, the accrual principle, the assumption of preserving of the assets, assumption of periodic survey of income from operations and financial situation of the company. We pay attention to the first three assumptions. The assumption of the accounting entity allows legislative definition of the accounting entity as a bounded whole (natural or legal person), whose duty it is to keep accounts and prepare financial statements. Assumption of measurement using the monetary unit is the obligation of the accounting entity (insurance company) to value assets, liabilities, the difference between assets and liabilities in monetary units applicable in the country where it is based and conducts its business. Accrual principle provides accruals of costs and revenues in the accounting period which they arise.

The application of generally accepted accounting principles in practice is accepted, though not always individual principles are included in the legislation. (Nobes, 2005)

For the primary accounting principle is called the principle of true and fair view, which is superior to all other accounting principles. (Horton & Macve, 1995)

Insurance companies have different financial transactions than most other businesses. Insurance companies make their income in two ways. One is through the premiums they receive from those who buy insurance protection from them and the other is income from the investment portfolios that they maintain to service the claims. (Damodaran, 2013) For the

area of accounting of insurance companies are defined specific accounting principles from which we closer specify only some.

General accounting principle of compensation is applied in the accounting of insurance companies at commercial - liability relationships. It can not be used in compensating of assets and liabilities of insurance.

The insurance company has a duty to respect the principle of the compilation of analytical accounts to synthetic accounts at specified items of assets and liabilities. The compilation of analytical accounts is subject to several requirements that are extended with respect to insurance and reinsurance business in the accounting of insurance undertakings, such as the obligation to keep analytical accounts for technical results from the insurance and reinsurance.

The principle of creation and use of reserves is very important in the accounting of insurance companies. The insurance company is legally obliged to create technical reserves sufficient amount. This is in order to cover future liabilities resulting from insurance and reinsurance business.

The principle of creation and accounting of adjusting entries directs creation of adjusting entries to assets which is not carried at fair value. Impairment of assets is only a temporary nature.

In theory and practice, we can identify valuation principles as the specific rules which apply for selecting a specific price. Currently most applicable principles are the principles of valuation of historical prices, the principle of normal value or their combination. In theory and in practice, we know the other measurement principles, namely (Pakšiová, 2011):

- Imparity principle,
- The principle of lower price in measuring,
- The principle of replacement cost,
- The principle of fixed accounting price,
- The principle of future prices.

#### **4 VALUATION IN INDIVIDUAL FINANCIAL STATEMENTS**

"Financial statements are a structured representation of the facts that are subject to accounting, provided to persons who use such information. An accounting entity prepares financial statements in cases established by this Act and in the structure, which follows the accounting system used in the entity. The financial statements represent a whole." (Act No. 431/2002 Coll. on Accounting, as amended, § 17 paragraph 1). The financial statements must contain the general requirements specified in § 17 paragraph (2), as a business name or name of the accounting entity, identification number, date of preparation and the date on which it is established and more.

Financial statements in accordance with national accounting procedures must contain only three basic components, namely the balance sheet, profit and loss statement, notes.

Since 2006, commercial insurance companies prepare financial statements in accordance with IFRS. The first financial statements according to IFRS compiled by commercial insurance company to the thirty - first December 2006, if the accounting period was the calendar year. The duty of insurance companies in preparing the financial statements in accordance with IFRS was preparing its opening IFRS balance sheet at first of January 2005. The aim of compilation of an opening IFRS balance sheet was the possibility of data comparability.

The transition to the compilation of financial statements under IFRS led to a number of significant changes. (Foroughi & col., 2012) In the issue of valuation we can emphasize a

broader range of valuation base, finding the differences in the valuation of assets and liabilities and their valuation differences from revaluation.

In the International Accounting Standard IAS 1 - Presentation of Financial Statements is defined financial statements as a structured representation of the financial position and financial performance of an entity.

The objective of financial statements is to provide information about the financial position, financial performance and cash flows of an entity that are useful to a wide range of users in making economic decisions. Financial statements also show the results of management's stewardship of the resources entrusted to them. To meet this objective, financial statements provide in connection with the entity, information on (IAS 1 - Presentation of Financial Statements):

- Property,
- Liabilities,
- Equity,
- Revenues and costs, including profits and losses,
- Other changes in equity,
- Cash flows.

Financial statements according to IFRS must include five components, namely the balance sheet, statement of comprehensive income, statement of changes in equity, statement of cash flows, notes.

The concept of the balance sheet is not in the International Accounting Standard IAS 1 - Presentation of Financial Statements since 2009, when it was replaced by the designation statement of financial position. Insurance companies and other accounting entities may continue to use the name balance.

The balance sheet, as the most important part of the financial statements of the insurance company, provides information to users of the financial statements about the financial position the insurance company to the balance sheet date. "The balance sheet is the tabulated form of the composition of view of the business assets (assets) and the composition of the sources of business financing (liabilities) in monetary terms to a certain time." (Krištofik, 2011)

The insurance company must comply the minimum specified range of items in preparing the balance sheet of the relevant standard. Strict requirements on structure and reporting of individual items are not included in IFRS. The supervisory authority of the financial market determines the obligation to report specific items in the Ppn (BIL) 01-04.

"For banks, insurance companies and other financial institutions that do not implement their performance within a clearly defined operating cycle, but it is more appropriate to draw up a balance sheet not in terms of long duration and the short-term assets and liabilities, but in terms of liquidity, such as the presentation of the balance sheet provides the user more reliable and relevant information." (Krištofik, 2011) The insurance companies, as well as other entities, have the obligation to divide assets on current and non-current.

The insurance company publishes a summary of significant accounting principles in the notes, which includes valuation methods in preparing the financial statements and other significant accounting principles according to IAS 1 - Presentation of Financial Statements.

#### **4.1 Valuation of assets of financial investments**

Assets of insurance company are economic resources controlled by an insurance company that:

- It would be guaranteed economic benefits in the future
- They are a result of past events.

An important part of accounting of insurance companies is the issue of financial investments (investments). Necessary component is the acquired assets to identify, to charge and to report according to the sources from which they are acquired.

Financial investments may be paid from foreign sources or from its own sources of insurer. Foreign sources represent financial investment of technical reserves. Technical reserves are primarily formed to cover future liabilities arising from insurance amounts. Value of technical reserves must comply with criteria established by Act No. 8/2008 Coll. on Insurance as amended, and measures taken by financial market supervision. Own funds are equity funds. In the case of financial investments from its own sources, there is no legislative restriction. The insurance company must ensure solvency reporting. The insurance company may use its own and foreign sources for investment in assets, through (Meluchová, 2009):

- Financial investments in real estate,
- Financial investments in commercial companies,
- Other financial investments,
- Financial assets held for trading
- Financial assets available for sale and other equity,
- Financial investments in the name of the insured,
- Deposit by active reinsurance.

## **5 COMPARISON OF VALUATION OF ASSETS IN SELECTED INSURANCE COMPANIES**

In this part of the paper we present the results of research that we conducted on selected insurance companies of the Slovak Republic. The choice of insurance companies was made on the basis statistical comparison of important indicators for example the size of the share capital, size of the financial investments, volume of premium income or profit insurance companies. The aim was to analyze methods of valuation of financial assets. Every asset, financial as well as real, has a value. (Damodaran, 2012) The output we present the results only two selected insurance companies, and INSURANCE COMPANY 1 and INSURANCE COMPANY 2 that mandatory compile individual financial statements according to international standards IAS / IFRS. INSURANCE COMPANY 1 is an institution that plays an important role in the insurance market, the Slovak Republic and the individual variables are at high levels. INSURANCE COMPANY 2 is a company that operates in Slovak Republic shorter period of time and the results are average.

The content of the research was the valuation of assets with a focus on financial investments in financial assets, which we obtained by analyzing information from the accounting of selected insurance companies for the period 2008 - 2013. International Financial Reporting Standards (IFRS) do not determine the binding structure of the individual reports of individual financial statements, but for financial assets we consider in the insurance company:

- Financial assets at fair value through profit or loss,
- Financial assets held for sale,
- Financial assets available-to-maturity
- Loans and receivables,

- Cash and cash equivalents.

### 5.1 Characteristics of selected insurance companies

INSURANCE COMPANY 1 had a total share in the insurance market over 26.00 % in 2013. The share in the life insurance is lower than in the non-life insurance.

The value of assets was recognized in the amount of 2,035,242 thousand EUR in 2008. In 2009 was increase in assets the largest during the period 2008 to 2013, and by 94 518 thousand EUR more. At the end of 2012, the volume of assets achieved value 2,223,291 thousand. EUR and in 2013 had a value 2,245,663 thousand EUR. We observe an increase in value (eg. acquiring of new assets), as well as reduction in the value (eg. depreciation of assets) for each type of asset in the period 2008 - 2013. In the period 2008-2013 were active following items, namely property, plant and equipment ; investment property, intangible assets, equity investments in the subsidiaries and associates, financial assets available for sale, financial assets available-to-maturity financial assets at fair value through profit or loss, loans and receivables, the share of reinsurers on technical provisions, deferred tax claim, active accruals, cash and cash equivalents.

INSURANCE COMPANY 2 is an insurance company, which began to operate by merging the two insurance companies\_. Insurance activities during the period 2008 - 2013 performed as a universal insurance company, whose share of the total insurance market is slightly enlarged\_. The insurance company recorded an increase in the market for life insurance and non-life insurance\_. In 2013 the total share was in the Slovak insurance value around 3%\_. Assets recorded in the amount of 88,585 thousand EUR in 2008. By 2013, total assets increased in the absolute amount of 57,749 thousand EUR. The largest increase in assets occurred in 2010, namely 18 395 thousand EUR.

### 5.2 Financial investments (investments) in financial assets

The largest part of the assets of selected insurance companies in the period 2008 - 2013 consisted of investments in financial assets, which can provide achievability of future liabilities from insurance and investment contracts\_.

Financial assets in the separate financial statements of the selected companies in the period 2008 - 2013 we incorporated into five categories according to the purpose of acquisition, opportunities of merchantability in active markets and insurance companies plans.

Tab. 1 – Overview of the inclusion of financial assets into individual categories. Source: The individual financial statements of selected insurance companies 2008 - 2013 (own processing).

Insurance company	Financial assets available for sale	Financial assets available-to-maturity	Financial assets at fair value through profit or loss	Loans and receivables	Cash and cash equivalents
<b>INSURANCE COMPANY 1</b>	✓	✓	✓	✓	✓
INSURANCE COMPANY 2	X	✓	✓	✓	✓

Table 1 provides an overview of the inclusion of financial assets in individual category. Category of the financial assets available for sale are non-derivative financial assets that are not included in another category or classified as belonging to this category.

Financial assets available-to-maturity include the non-derivative assets with fixed validity and with determined or determinable payments. Each insurance company is willing to hold these assets to maturity.

Another category of financial assets are financial assets at fair value through profit or loss, which insurance companies have acquired for the primary purpose of trading. INSURANCE COMPANY 1 includes in this category:

- Financial assets available for trading
- Financial assets which have been classified as measured at fair value through profit and loss account from the beginning,
- Financial investments in the name of the insured at fair value through profit and loss statement.

The structure of financial assets in INSURANCE COMPANY 2 comprises:

- Debt securities
- Mutual funds,
- Financial investments in the name of the insured.

Loans and receivables are non-derivative financial assets with fixed or determinable payments and they also are not quoted in an active market.

The last category of financial assets insurance companies refer as cash and cash equivalents. They include cash on hand, demand deposits, valuables and other cash equivalents, such as bank overdraft loans.

Table 2 reflects the differences in value of financial assets during the period 2008-2013 in the analyzed insurance.

Tab. 2 - Financial assets in thousands EUR. Source: The individual financial statements of selected insurance companies 2008 - 2013 (own processing).

Year/ Insurance company	Financial assets available for sale	Financial assets available-to-maturity	Financial assets at fair value through profit or loss	Loans and receivables	Cash and cash equivalents	Financial assets together
<b>2013/INSURANCE COMPANY 1</b>	1 079 071	470 993	237 503	146 687	12 422	<b>1 949 676</b>
<b>2013/INSURANCE COMPANY 2</b>	0	65 118	29 641	9 240	481	<b>104 480</b>
<b>2012/ INSURANCE COMPANY 1</b>	1 011 698	522 741	227 640	137 231	12 879	<b>1 912 189</b>
<b>2012/ INSURANCE COMPANY 2</b>	0	59 447	28 169	10 709	373	<b>98 698</b>
<b>2011/ INSURANCE COMPANY 1</b>	904 863	572 108	225 321	145 074	10 368	<b>1 857 734</b>

<b>2011/ INSURANCE COMPANY 2</b>	0	53 524	22 296	10 352	550	<b>86 722</b>
<b>2010/ INSURANCE COMPANY 1</b>	898 858	572 003	218 579	146 783	2 502	<b>1 838 725</b>
<b>2010/ INSURANCE COMPANY 2</b>	0	44 172	22 140	9 989	341	<b>76 642</b>
<b>2009/ INSURANCE COMPANY 1</b>	800 942	588 868	186 805	208 234	7 039	<b>1 791 888</b>
<b>2009/ INSURANCE COMPANY 2</b>	0	42 032	12 892	9 703	592	<b>65 219</b>
<b>2008/ INSURANCE COMPANY 1</b>	686 994	588 853	143 688	216 908	63 454	<b>1 699 897</b>
<b>2008/ INSURANCE COMPANY 2</b>	0	44 846	7 121	8 479	427	<b>60 873</b>

We can state that in terms of the proportion of the volume of financial assets to total assets of specific insurance companies during the period 2008 – 2013, is not as striking difference between insurance companies. All insurance companies allocated the most of available resources in financial assets, which brings them income (interest rate, from the revaluation). This income should cover activity of insurance company, profit of insurance company and provide appreciation of life insurance contracts of insurance.

#### **Determination of fair value of financial assets**

INSURANCE COMPANY 1 determined the fair value of financial instrument using market prices (quoted) in an active market for the financial instrument. If these data were not known in an active market, it is a market for a financial instrument was not active, the insurance company determined the fair value of a qualified estimate. The insurance company has defined a qualified estimate with valuation methods, which included:

- Discounted cash flow analysis,
- Comparison to similar instruments for which already exist the market price,
- Valuation models of options,
- Use of recent executed transactions on normal commercial terms.

Specifically, we characterize the valuation of bonds in each category of financial assets for which to the date of preparation of individual financial statements was not available market rate. Bonds related to financial assets available for sale was valued at fair value, which was calculated using a discounted cash flow with a fixed discount rate. The discount rate is distinguished for government bonds and other bonds included in financial assets available for sale.

Financial assets available-to-maturity represented in INSURANCE COMPANY 2 debt securities whose fair value determined based on the available information in the financial market. In the event that this information was not available (not traded with bonds), the fair value determined using a quantified estimate in the case of the yield curve of bonds. The same



method of determining fair value using market interest rates used for loans and advances to insured.

### 5.3 Analysis in the INSURANCE COMPANY 1

Financial assets INSURANCE 1 consisted of five categories in the period 2008-2013, namely financial assets available-to-maturity, financial assets available for sale, financial assets at fair value through profit or loss, loans and receivables, cash and cash equivalents. The structure and value terms of individual category contains Table 3.

Tab. 3 - Financial assets in INSURANCE COMPANY 1 in thousands EUR. Source: The individual financial statements of selected insurance companies 2008 - 2013 (own processing).

Financial assets	2008	2009	2010	2011	2012	2013
Financial assets available-to-maturity						
<b>Government Bonds</b>	344 072	344 208	344 316	344 497	329 822	329 406
<b>Corporate bonds</b>	92 698	92 698	92 694	92 690	92 698	92 694
<b>Mortgage bonds</b>	152 046	151 962	134 993	134 921	100 221	48 893
Financial assets available for sale						
<b>Mutual funds</b>	47 417	45 748	42 298	41 134	12 264	14 104
<b>Shares</b>	607	614	616	615	479	491
<b>Other equity</b>	1	1	1	0	0	0
<b>Government Bonds</b>	391 965	394 152	466 424	483 079	684 935	731 400
<b>Corporate bonds</b>	246 916	288 294	307 329	287 708	235 452	216 195
<b>Mortgage bonds</b>	0	72 133	82 190	75 571	79 047	117 372
<b>Government treasury bills</b>	0	0	0	16 756	0	0
Financial assets at fair value through profit or loss						
<b>Corporate bonds</b>	3 135	4 979	7 875	11 041	1 151	1 489
<b>Hedge - RSU</b>	195	577	871	1 168	2 103	3 317

<b>Hedge - SAR</b>	31	424	564	284	561	519
<b>Mutual funds</b>	33	31	26	20	104	1 980
<b>Financial investments in the name of insured</b>	140 294	180 794	209 243	212 808	223 722	230 198
Loans and receivables	216 908	208 234	146 783	145 074	137 231	146 687
Cash and cash equivalents	63 454	7 039	2 502	10 368	12 879	12 422
<b>Financial assets together</b>	<b>1 699 897</b>	<b>1 791 888</b>	<b>1 838 725</b>	<b>1 857 734</b>	<b>1 912 189</b>	<b>1 947 167</b>

In the monitored period, the insurance company allocated most resources in the range of 33.75% - 55.44% into financial assets available for sale, which accounted for mutual funds, shares, other equity, government bonds, corporate bonds and mortgage bonds.

Fixed-income securities included government bonds, corporate bonds, mortgage bonds and treasury bills. Since 2008, the value increased gradually. The objective of investing in securities with fixed income was to ensure the long-term stable income to cover obligations towards the insured.

Securities with variable income accounted for mutual funds, shares and other investments, whose volume during the reporting period decreased in 2012 compared to 2008 by 35 761 thousands EUR. Their share of financial assets available for sale decreased from 6.99% to 1.21%. The insurance company preferred investments in securities with fixed income before investments in securities with variable income in this category. Securities with variable income provided an increase in overall revenue (in the medium and long term) and higher quality of risk diversification.

Investments in the category of financial assets available-to-maturity included only securities with fixed income in the period 2008 - 2013. Among them, the insurance company had in possession government bonds, corporate bonds and mortgage bonds. The aim of investing in this category was consistent with the aim of investing in securities with fixed income in the category of financial assets available-to-maturity.

Financial assets at fair value through profit or loss consisted in the period 2008 - 2013 the mutual funds, hedge - RSU, hedge - SAR and financial investments in the name of insured. An important item was investments for the insured, which accounted investments primarily in share, mixed and bond fund.

To a subgroup loans and receivables included insurance company deposits in banks, loans and advances, receivables from insurance and reinsurance, other receivables and tax assets in the period 2008 - 2013. Their total value had a decreasing trend, while the biggest decrease recorded in 2010 and it about 29.51%. In 2013 the situation changed and the value increased. Deposits in banks represented embedded resources in the banking sector, which were not payable on demand. The least important item was tax assets.

Cash and cash equivalents were the least important item in financial investment in financial assets during the period. The last category of financial assets included cash and demand deposits.

Portfolio of Investments in financial assets can be described as conservative. The insurance company has placed the largest part of their resources in instruments with low risk and high-rated issuers.

INSURANCE COMPANY 1 was able to ensure sufficient funds to meet all obligations (from insurance contracts) through financial investment in financial assets in each year in the period 2008 - 2013. These conclusions are documented by figure 1, which shows that the volume of placement in financial assets exceeds the capacity of technical reserves.

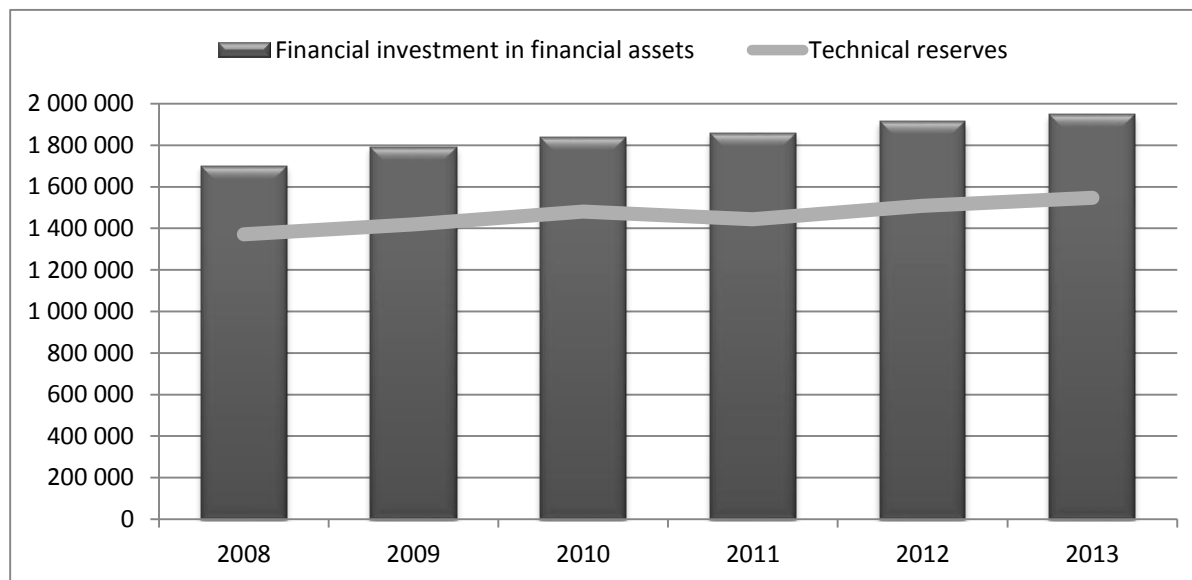


Fig. 1 – Comparison of technical reserves and financial investment in financial assets. Source: The individual financial statements of selected insurance companies 2008 - 2013 (own processing).

#### 5.4 Analysis in the INSURANCE COMPANY 2

Financial investment in financial assets in the INSURANCE COMPANY 2 for the period 2008 to 2013 formed category of financial assets available-to-maturity, financial assets at fair value through profit or loss, loans and receivables, cash and cash equivalents, as outlined in the table 4.

Tab. 4 - Financial assets in INSURANCE COMPANY 2 in thousands EUR. Source: The individual financial statements of selected insurance companies 2008 - 2013 (own processing).

Financial assets	2008	2009	2010	2011	2012	2013
Financial assets available-to-maturity						
<b>Government Bonds</b>	35 839	35 839	39 646	43 085	49 022	52 636
<b>Mortgage bonds</b>	8 178	5 853	4 526	10 438	10 425	12 482
<b>Corporate bonds</b>	679	340	0	0	0	0
Financial assets at fair value through profit or loss						
<b>Mutual funds</b>	1 818	2 912	4 335	5 089	6 372	6 773

<b>Mutual funds (financial investments in the name of the insured)</b>	2 560	7 201	12 410	12 183	15 852	16 955
<b>Government bonds</b>	2 021	2 061	4 670	4 359	5 130	5 097
<b>Business bonds</b>	721	718	725	665	816	816
Loans and receivables	12 505	22 208	25 074	23 309	19 859	19 434
Cash and cash equivalents	427	592	341	550	373	481
<b>Financial assets together</b>	<b>64 748</b>	<b>77 724</b>	<b>91 727</b>	<b>99 678</b>	<b>107 849</b>	<b>114 674</b>

As the largest category we can select financial assets available-to-maturity. From the total financial investments in financial assets consisted from 48.16% (2010) to 69.03% (2008) The portfolio of financial assets available-to-maturity included government bonds, mortgage bonds and business bonds During the reporting period, the value of government bonds increased in 2013 by 16, 797 thousand EUR compared with 2008. INSURANCE COMPANY 2 allocated the most resources into financial assets available to maturity in order to reduce excessive volatility of profit or loss and equity capital.

In 2008, the insurance company allocated to financial assets at fair value through profit or loss 7 120 thousand EUR by mutual funds, government and business bonds. Their value has increased gradually acquisition of mutual funds and bond purchases by 22 521 thousand EUR to resultant 29641 thousand EUR in 2013. The largest part of the reporting period accounted investments in the name of the insured in mutual funds managed by various management companies, such as Spängler IQAM Invest (Austria), THEAM (France), IAD Investments.

INSURANCE COMPANY 2 had allocated resources in the subgroup loans and receivables in term deposit, loans, insurance claims, reinsurance claims and other claims. Cash and cash equivalents represented the least significant item of the financial assets of the insurance company in the period 2008 - 2013, which funds were allocated to current accounts in banks, cash and cash equivalents.

By comparing the volume of financial investments in financial assets with a volume of technical reserves established in Figure 2, it can be stated that the INSURANCE COMPANY 2 was able to secure sufficient funds to meet its obligations where necessary.

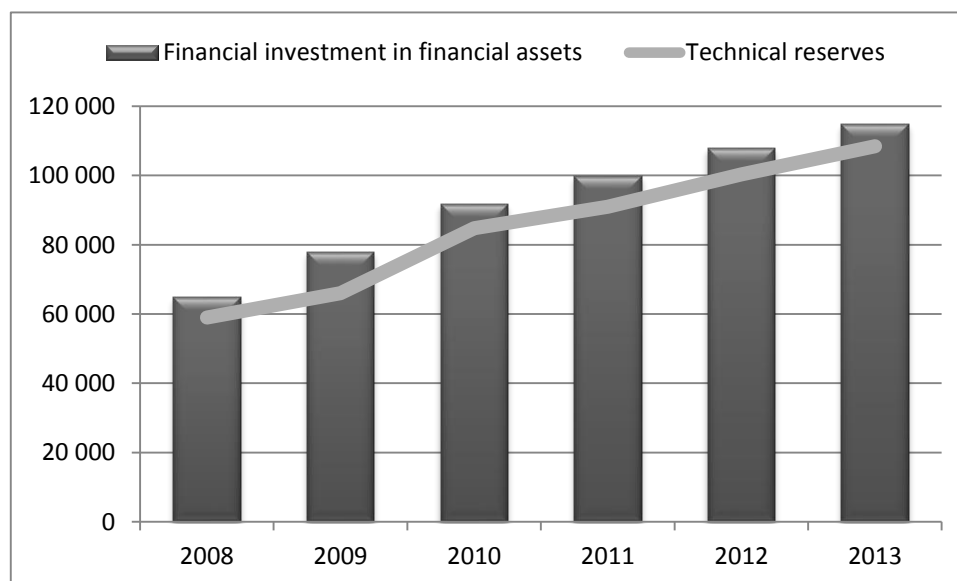


Fig. 2 – Comparison of technical reserves and financial investment in financial assets. Source: The individual financial statements of selected insurance companies 2008 - 2013 (own processing).

## 6 CONCLUSION

The implemented analysis shows that individual financial statements of selected insurance companies are prepared based on International Financial Reporting Standards (IFRS), but in the use of information demonstrate disunity of reported information in individual financial statements. Although each insurance company observes the mandatory requirements in the individual financial statements at deeper analysis, showed disunity of reported information for the items that the individual insurance companies considered significant (indicated in the financial statements).

In our research of valuation of assets, which the largest part accounted for investments in financial assets, the disunity of data also occurs, but it can be stated that the valuation of financial assets are not significant differences.

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## **SMES' REPRESENTATION ON THE EUROPEAN UNION LEVEL**

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### **Abstract**

This study is based on SMEs Situation Analysis of small and medium sized enterprises' (SMEs) interests being represented within the European Union (EU) multilevel governing system. It brings empirical research and in order to achieve a better insight into the structure of SMEs representation, to verify legitimacy in general business strategies. The cohesive and pervasive approach of the article derives from qualitative analysis of SMEs' representation sample, including broad spectrum of elements that interconnects different modes of interests representing in expert groups, SMEs representations and associations and European SMEs federations. This study analyzes forms and SMEs' options to push their interests and to enforce the proper EU decision-making process. To fulfill this, the increasing of SMEs' awareness is essential. Based on empirical study and in-depth interviews among the SMEs sample, article finds out what is the current climate for SMEs to be influential within the entire decision-making system. Choosing relevant way leads to less widespread of SME's interests' representation in the whole policy-making process.

*Keywords: Small and Medium Sized Enterprises, European Union, SMEs Interest Associations, Decision-making, EU Policy*

JEL Classification: M1, M16

## **1 INTRODUCTION**

To get access to institutions and actors in the policy-process, the SMEs have to gain legitimacy for its ideas. The company may be more successful, if it succeeds in framing its interests in an inclusive way. Hence agenda-setting is not just about having an issue considered actively by the policy-makers; it is also about how that issue would be defined once it has made its way into the agenda. It could therefore be of interest to study the way how importantly SMEs issues are regarded and how these interests are framed in the EU policy debates and processes.

Framing in this sense refers to the creation of a specific frame around an image of reality. This image involves problems, solutions, and actions within a policy domain. The EU agenda has historically been driven by a search for economic prosperity and global competitiveness. Changes in the global political economy, which enable large, global enterprises increasingly locate their industries outside of the EU, have increased awareness of the importance of SMEs to create and sustain new jobs in Europe (European Community, 2002).

The SMEs interests are therefore framed as "the backbone of the European economy and the most important creators of new jobs and economic growth". The growing concern of European leaders that an ordinary citizen feels left out of the integration process has made the Commission to consider some interests more appropriately to boost than others. The Commission has consequently promoted organizations of the least represented social interests in order to achieve a more balanced participation. Hence, through SMEs, the Commission can

promote growth and jobs in the EU, in the same way as it promotes weak and social stakeholder (i.e. a small enterprise) instead of the large multinational enterprise.

There are over 20 million enterprises in the European Union (EU) in 2007. Only about 43 000 of these are large-scale enterprises, i.e. 0,2 % of all enterprises (European Commission, 2014 a). Hence, the vast majority of enterprises are small and medium-sized enterprises (SMEs). Approximately 90 million people are employed by SMEs. In regards of their policy development, directorate general (DG) Enterprise and Industry of the European Commission (EC) is strengthening the dialogue and consultation with SMEs stakeholders. SMEs prosperity was seen as a crucial factor for achieving higher growth rates, more and better jobs in the EU. SMEs became known as a ‘backbone of the EU’s industry.

## **2 DEFINITIONS AND GENERAL CHARACTERISTICS**

### **2.1 Definition of SME and representation organization, types, source of financing**

Definitions of SME are much depending on criteria such as number of employees and turn over. In 1971, Bolton Report defined SMEs on the basis of number of employees, turnover and an economic definition that was based on the essential characteristics of the small firms. These characteristics were: a small share of the market, operating independently and an owner-managed organization.

Further, EU has also categorized macro, small and medium businesses based on number of employees. According to the EU, SMEs are defined as “any entity engaged in an economic activity, irrespective of its legal form. This includes, in particular, self-employed persons and family businesses engaged in craft or other activities, and partnerships or associations regularly engaged in an economic activity” (Commission Regulation (EC) No 70/2001). Micro and small and medium-sized enterprises are defined as enterprises employing fewer than 250 persons and which have an annual turnover not exceeding EUR 50 million and/or annual balance sheet total not exceeding EUR 43 million.

Tab. 1 - Type of Firms. Source: Commission Regulation (EC) No 70/2001

Type of the firm	Micro	Small	Medium
Number of employees	1-9	10-99	100-499

In the Czech Republic, a company is usually classified as a small and medium sized enterprise when it has up to 250 employees as per Act 47/2002 of 11 Jan 2002 amended 1/2004. It is true that a vibrant small business can make a significant impact on the local economy. Many firms have limited ambitions to grow, but provide an important source of employment in the local communities and give independence and status to their owners. At the same time size, flexibility and fast responsiveness of small businesses allow them to react quickly and change in a competitive environment. Small firms are also seen as a key source of innovation, providing new types of product and services, and new ways of delivering old services.

The representation organizations are defined as organizations that have been set up by and are representing the private sector. They can be distinguished and include SMEs in general, co-operatives and social economy enterprises, craft enterprises, women enterprises, ethnic minority enterprises, young entrepreneurs, high-tech enterprises, family business (European



Commission, 2013 a). However, the representation organizations perform a **range of activities** not only to promote the interest of their members but also support their members. This includes, among others: political lobbying, participation in fairs, exhibitions, networking, fostering cooperation and exchange of information between members, participation in business delegations, providing education and training, counseling and performing research. Support is provided in export, business transfer, starting a business, access to finance, tax policy, social security, environmental laws, health and safety laws, innovation and technology.

Some organizations also focus on more general issues such as reducing administrative burdens. Organizations receive their **finance** from membership fees. Some obtain additional income from selling products or services and government subsidies. Other sources are: European funds, donations, sponsoring and participation in projects (European Commission, 2013 a).

### **3 THEORETICAL BACKGROUND**

Current theory refers mainly to the logic of membership and adopts a 'bottom up' perspective. It asks why and under what conditions members of a group would be willing to form and join an interest association, and what associations have to do in order to recruit and keep members. The main criticism against current theories is that they ignore the social aspect of associations and the possibility to associate in order to achieve 'common goods', such as benefits from the implementation of specific policies (Olson, 1971). However, this discussion is relevant in relation to SMEs at the national and EU level. Once a decision has been made to associate at the national level it is also rational to associate at the European level.

The collective action problems are therefore no more than background factors to the constituency of EU federations (associations of associations), since these European federations, unlike the national associations, draw their membership constituency primarily from those who are already politically active. Hence, participation in an EU federation is means to advance the interests of the national grouping (Aspinwall and Greenwood, 1998).

It is widely accepted that external circumstances and institutional organization have important consequences for interest associations and their possibility to influence SMEs. It is regarded as important to retain a sense of limits as to what interest associations can and do contribute to **policymaking and SMEs** support generally (Cram, 1998). A central feature of the European lobbying system is that, it is essentially a multi-arena, multi-level, decision-making system, in which all actors necessarily participate in a complex series of 'nested games' at both national and European levels. Thus, it is a system of multiple access points created by institutionalized multi-level governance. The fact that there are so many different venues for lobbying means that the EU is a multifaceted policy process (Brodsky and Striteska, 2007).

A policy sub-domain concept, which makes it possible to study interest in different arenas, is useful when **analyzing influence of SMEs on EU policymaking**. It allows for comparison of the influence of an interest between different policy sub-domains, since the influence of this interest can differ between different areas and levels. The EU political system is therefore often described as one, in which no type of interest can routinely dominate due to the highly pluralistic, competitive, complex and multi-level system of networks, which is accessible to a range of interests.

However, according to several authors some interests can prevail over general policies under certain circumstances. According to Greenwood, (Greenwood, 2007) one example is an interest with a highly technical character, with a narrow sectional interest, where the costs are diffused widely across the society. Dominance may also arise where the interest of a particular constituency is uniformed with the broader aim of the European integration and within the climate in which policymaking takes place. This allows for the interest's constituency to define and 'frame' issues from which policy initiatives follows. Furthermore, interest will be widely shared and accepted if it is relevant to a burning issue and promises a successful problem solving (Kohler-Koch, 1997).

Several authors also emphasize that the EU and national institutions play an active role in the SME policy process (Cram, 1998). Institutions are said not just to be 'political arenas', but actors actively shaping norms and values, able to develop their own agenda - not only a structure, in which other actors - SMEs - pursue their goals. The European SME Federations (association of associations) are said to be multilevel actors through the work done at national level by National Associations. EU SMEs Federations keep contacts with the EU institutions and concentrate mainly on the agenda-setting and policy formulation. Hence, these Organizations are specialized in representing SMEs interests at the EU level during the early stage of the policymaking process.

To answer the question how, and to what degree SMEs and its associations can influence the EU policy-making, the mechanisms of influencing SMEs' associations need to be considered. Yet, they are not acting in vacuum, and therefore one also has to reconsider the structure of policymaking on both the national level and on the EU. Euro Commerce was the only federation that mentioned co-operation between different kinds of SMEs' federations, which could indicate a low degree of co-operation between horizontal and sectorial SMEs federations. Without the collaboration between general and sectorial federations, the SMEs' influence would most likely/probably be less far-reaching.

Hence, co-operation between horizontal and sectorial organizations could strengthen the SME representation in the dual EU policymaking structure. Obstacles for SMEs representation are heterogeneous preferences within the federations due to national differences, a division between service - and policy representation and competition between different federations. (Richardson, 2001)

#### **4 OBJECTIVE, EMPIRICAL RESEARCH METHODS AND LIMITATIONS**

The study examines the system of SMEs representation organizations, the cohesive and pervasive approach of the article derives from empirical research and from qualitative situation analysis of representation organizations, including broad spectrum of elements that interconnects different modes of interests representing in expert groups, SMEs representations and associations and European SMEs federations. The purpose is to reveal how these possibilities may affect or enhance SMEs' awareness, push their interests and enforce the proper EU decision-making process. The intention is to analyze current situation by conceptualizing research in this area.

Research is based on qualitative research method. Qualitative research is the process of searching for the essence, based on different methodological traditions, exploring the social or

human problem. For qualitative research it is typical that hypotheses are generated only during the research, trying to understand a new problem.

The reason for choosing this method is that this area is quite complex. It involved the collection and analysis of qualitative data. The main characteristic of the method held was an in-depth insight that has been applied.

It was an empirical study of originally 52 enterprises, but their number has been reduced to 30 in order to get statistically representative sample. SMEs were selected and divided properly by the sector so that the examined companies sample corresponds by its number and structure to NACE classification. Selected companies actively export or import and have more than 5 years of international performance experience. All of them are Czech owned and are located in Pardubice region. Data were obtained by interviews with managers or owners of businesses.

Tab. 2 - Example description. Source: Author.

	Micro	Small	Medium
Surveyed entities	11	14	5

The procedure of empirical data collection: respondents were recorded and then the text has been transcribed literally. 200 pages of text have been obtained. The research has been carried out during the past 2 years. The text confirms or refutes identified questions. Subsequently, the data were processed and analyzed.

The limitations can influence the quality of findings or ability to effectively describe research outcomes. To recognize limitations of research, following factors were found as limitations:

- used sampling technique limits to certain degree ability to make broader generalizations from our results
- qualitative sample technique a priori gathers descriptive data. This could lower ability to make statistical inferences from our sample to the enterprises being studied
- however, the degree to which this reduces the quality of our findings is a matter of debate

The reason for choosing relevant method was huge variety of respondents; hence analysis of different types of received texts seemed better way to get information about the views of respondents, rather than questionnaire. In order to create complex holistic picture of situation, the qualitative method has been selected.

To determine situation regarding SME representations and aiming to provide relevant situation analysis the empirical interviews has been selected. In order to demonstrate it substantive questions were carried out accordingly based summarizing obtained text. For this purpose following relevant clear questions were finally chosen. (See chap. 5.1.):

- *Does your company push your interests via national institutions or via supranational institutions in Brussels?*

- *If it does via supranational institutions, do you practice contact with European Commission and DG Enter or you rather prefer contact with Czech Permanent Representation?*

## **5 RESEARCH OUTCOME AND SITUATION ANALYSIS**

### **5.1 Czech SME – research outcome**

Tab. 3 - Forms of SMEs' Representation Source: Author

	Number of companies	in %
A: We push our interests via national institutions	15	50
B: We push our interests via supranational institutions in Brussels	26	86
Ba: We have regular contact with European Commission and DG Enter	12	40
Bb: We have regular contact with Czech Permanent Representation	18	60

Answers were grouped into A and B groups. In case the answer was B, second question has been asked. These answers were grouped into Ba and Bb groups.

By processing answers, there have been found and described the strongest dependencies: 50 % of companies with international performance push their interests via national institutions only. But majority of sample companies push their interests via supranational institutions in Brussels, which they see as fast and the strongest possibility to influence legislation in progress. They do it via EC Directorate General ENTER (40 %) or via Czech Permanent Representation (60 %). (Tab. 2)

Czech SMEs organizations are represented in all levels of the EU policy-process and SMEs interests have access to both national and supranational institutions. Both UEAPME and BUSINESSEUROPE are Social Partners and all groups have regular contacts with the Commission. Hence the Horizontal SMEs Federations can be seen as an 'included group' in DG ENTER (DG= Directorate General), which additionally is seen as a powerful part of the Commission. However, the distinction between more widely policy-concentrated DGs and more regulative DGs affects SMEs interests negatively since SMEs interests are less represented in the more regulative body.

Financial restrictions are mentioned by the Czech SMEs Associations as a restriction, and this could also be important in this particular case since the Structural Funds could be only seen as an indirect SMEs issue.

The Czech associations are represented in both Czech Republic and Brussels (European Union institutions) and the Czech officials seem interested in promoting SMEs interests in the EU policy-process. However, the Permanent Representation venues seem to be the least

successful. Focusing upon SMEs and their interest associations therefore adds a further dimension to the research on business interests of SMEs.

## **5.2 Mechanisms to test impact of the EU legislation**

The policy-making process in the European Union sees legislative proposals from the European Commission debated both by Members of the European Parliament and by representatives of Member States' governments within the Council of the European Union. And in general, the Commission consults with interested parties both formally and informally before it draws up its proposals, such as the Small Business Act for Europe. So there are opportunities for those affected (or potentially affected) by policy to make their views known at several stages in the process.

For SMEs - often the largest group of enterprises to be affected by new policy - there are clear difficulties in putting their views across to policy-makers. **SMEs do not usually have the resources which large firms dedicate to influencing policy-making or lobbying.** For this reason, the Commission has appointed a SMEs Envoy and encourages an effective and wide-ranging consultation of SMEs as one element of its Think Small First principle. The Commission is also encouraging Member States and regions to adopt similar measures, ensuring greater representation of SME interests at all levels of policy-making. To this end, it has sought to identify and share examples of effective SMEs consultation and involvement in policy-making.

The opinions of SMEs are important when developing new EU legislation or programs that have a direct impact on their operations. The system is called "Listening to SMEs". This is why the Commission, through the Enterprise Europe Network, operates two mechanisms to test the impact of EU legislation and programs i.e., in advance via SMEs panel and retrospectively via the SMEs feedback mechanism.

### **1. In advance via SMEs panels:**

SMEs Panels are organized to consult SMEs about forthcoming EU legislation and policies. The Enterprise Europe Network partners will select suitable SME participants, run the SMEs panels and provide the Commission with the results. The result will be used when preparing new legislative or policy proposals. SMEs panels will be operated in liaison with the SMEs Envoy to ensure that the needs of SMEs are continuously taken into account in EU lawmaking.

### **2. Retrospectively via the SMEs feedback mechanism:**

The SMEs feedback mechanism allows the Enterprise Europe Network partners to collect the views and feedback from SMEs on a broad range of EU policy initiatives, actions, legislation or programs related to the internal market. The typical policy areas where feedback will be requested include the environment, sustainability, employment and social affairs, innovation support, taxation and customs and, in more general terms, better regulation and simplification (European Commission, 2013 b).

There seems to be a general concern about SMEs issues. Still, SMEs' Interest Associations and Federations are not satisfied. UEAPME (Union Européenne de l'Artisanat et des Petites et Moyennes Entreprises i.e. the European Union of Crafts and Small and Medium-sized Enterprises) states that "better regulation" tops the list of the most frequent buzzwords in

Brussels. Additionally BUSINESSEUROPE states that much more should be done for the European SMEs, and EUROCHAMBRES says that it is time to move from “think small first” to “act small first”. Although it might be in their interest to complain, in order to further strengthen their interests and organizational power, there might be some features that complicate the realization of wider representation of SMEs interests in the EU settings.

### **5.3 Large enterprises versus SMEs**

SMEs associations are not acting in a vacuum, and to understand these associations' possibility to influence the EU and national policies, it is important to take the multilevel policymaking arrangement into account. First of all, some of the most important European Union tools for businesses in Europe, such as the Single European Market (SEM) and the Competition Policies, were created with large enterprises in mind. It is a widely held opinion that the creation of the SEM tends to favor big businesses. The SMEs Associations, Federations and the Commission also highlight the problem for **SMEs to benefit from the Internal Market**. We dare to say that „it goes without saying that the Internal Market is yet not a reality for SMEs”. Large enterprises have necessary resources to overcome trade barriers, but not the SMEs.

Legislation is still drafted from big organizations and enterprises' points of view. This is due to the fact that most officials creating legislations come from big administrations or are employees in big enterprises. There is much more focus on big firms in the EU. This focus will however be shifted step-by-step. Competition policy has a special place in the European policy environment, because it defends the essential mobilizing principle of the EU, and collective interests in economic efficiency have been secured through the creation of a common market. There seems to be a tension between competition policy and company support, such as policies to encourage SMEs, since competition policies were mainly created to reduce problems with monopolies and state aids. However, exceptions from competition policies are made for SMEs; instead of them, new legislations should be made for SMEs.

One of the reasons why SMEs are still exceptions is that only eight percent of SMEs are involved in export. Commission takes SMEs into consideration when regulating consumer goods. (Yet one can imagine these concerns to be less influential if the large enterprises are pleased.) Additionally, 90 percent of all SMEs are actually micro-enterprises, with five employees on average. These micro-enterprises account for 53 percent of all jobs in Europe, so they are of great importance to the European economy. However, large enterprises are main employers, when separating micro, small and medium-sized enterprises, with a 32.9 % share. One can therefore argue that there are still incentives for politicians and officials to take great considerations of large firms when creating European economic policies. Hence, there are still some ‘practical barriers’, such as institutional factors and economic importance of SMEs.

### **5.4 Situation analysis**

There is a large variety of SMEs business representation organizations active in the EU, such as trade and professional associations and federations, entrepreneurs associations, representative organizations of the self-employed/sole proprietorships, etc.

The wide range of enterprise constituency is probably also affecting the SME interest representation. Different European federations stand against each other and this could hinder

the possibility of working united for the interest of SMEs. This could thereby weaken the possibility for SME interests to be influential in the policy-process.

Euro centers work to act as a two-way street between SMEs and EU decision-makers to encourage enterprises to interact with policy-makers at the EU level. The policy part is restricted to distributing consultation forms from the European Commission (EC) to the SMEs members in the Network. Hence, there is a direct contact between the EC and the SMEs. Also, a majority of former European International Contractors (EIC) representatives consider the European Commission to be keen to listen to the SMEs. This method can be seen as important since all stakeholders, and not only the organized ones, have a possibility to give their feedback to the Commission. Yet, if the forms are complicated, it is less probable that there is a high degree of SMEs participation. The Enterprise Europe Network (EEN) is considered to be an important tool to promote SME Interests according to both the Commission and the European Parliament (EP), and both institutions have been involved from the very beginning. There is a trend for some parts of the European Commission to bypass Associations and Federations in favor of direct contact with entrepreneurs.

It has been argued that the main problem for business federations is not the creation of federation, but the heterogeneous rather than homogenous association members, as well as the members will to keep some autonomous characteristics. The relationship between these heterogeneous actors affects the possibility for the association to act. Furthermore, one problem with wide federations is the slow and cumbersome 'lowest common denominator proneness' that can be found among associations seeking to represent a membership wide constituency (Greenwood, 2007 and 2001).

Despite the fact that a large member constituency can cause problems, it also gives higher legitimacy in the EU policy-process (Rainer, 2009). A common position from different SME Associations strengthens the legitimacy of SME Interests. The power of Business Interests Associations (BIA) is additionally considered to depend upon the association's capacity to link several levels of the multilevel system. That is, to effectively gather support through lobbying all relevant policy areas, i.e. in both Member States and Brussels (Katz, 2001).

Associations that manage to be present throughout the different policy levels, multilevel players, are considered to be the most successful ones. SME interests need to be supported from a powerful coalition of member governments, EU and national institutions. Interest representation requires becoming influential in policymaking. Resources and market power are said to be yet another important power tool for business interests. However, Greenwood and Webster (Greenwood and Webster, 2010) argue that market power does not automatically translate into political power and claims that it is possible for BIAs with special interests to prevail in certain types of circumstances. Finally, BIAs are not rational actors, which take rational decisions.

Associations do not always understand what they are doing and what the outcomes of their decisions may be, since they are involved in a whole series of policy games at different levels of the national and EU system. This explains why they may appear to settle for sub-optimal choices.

SMEs interests should dominate in general policymaking due to their importance for the European competitiveness, its wide constituency and since its interests can be related to the European integration. Wide variety of national business representations ranges from very small to very large. Some are very experienced and professional in defending the interest of

their members and very well informed about their needs. Others are rather young and still learning. Some have mainly individual enterprises as member, others are umbrella organizations. Given the great variety of business organizations, there is room for a learning process: some organizations are so well developed and experienced that they may offer their knowledge and experience to other organizations.

## **6 CONCLUSION**

To achieve better insight into system of SMEs' representations, it is essential to take into consideration: whether they are sufficiently involved in policy making, which includes development of collective agreements, influencing policy, participation in official committees and standardization committees, whether the organization has an office in Brussels and whether it is a member of European organization. Hence, to analyze how the interests of SMEs are represented in the national and European multileveled policy-process, we examined SMEs interests seem to be considered as important by both European and Czech institutions. As such, SMEs still use the common market to a less extent than large enterprises. However, barriers and problems remain because institutional arrangements were formed especially for large enterprises.

The results show that SMEs are represented by both private and public national associations and by horizontal and sectorial federations. Czech Associations are represented at both national and European level, but it is the horizontal federations that are seen as the 'official' SMEs' organizations by the Commission. The fact that the Commission makes a distinction between horizontal and sectorial federations creates one of important issues for SMEs interests representation since many parts of the policy-process have been designed for sectorial interests. However, the wide constituency in horizontal federations gives SMEs interests legitimacy in general business strategies, but at the same time weakens representation in specific sector policies, since only sector federations are represented in particular industry policymaking.

Funding is however an important issue for the Czech SMEs. Hence if this was unfamiliar for the Czech Associations, arrangement with separated lobbying organizations and EU service providers might be problematic. The results of the EU legislative changes will be felt years after the legislative discussions. This makes the immediate effects of missed opportunities negligible, whereas the long-term consequences may be considerable. SMEs should not be regarded as uninteresting for the EU just because they are uninteresting by its structure. This may indicate that the membership incentives differ among different Czech BIAs.

The analysis and empirical research shows that SME interests can frame the EU economic objectives, but that institutional arrangements and barriers make it difficult for SMEs interests to be influential within the entire EU policymaking system. In addition, SMEs interest representation is mostly horizontal, with a cross-constituency, and EU policymaking is often conducted in sectorial settings. This leads to a less widespread SMEs' interests' representation in the EU policy-process.



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## **DECOMPOSITION OF GDP GROWTH AND CONVERGENCE OF SELECTED INDICATORS**

*Silvia Megyesiová, Vanda Lieskovská*

### **Abstract**

The real growth of the gross domestic product (GDP) depends on many factors. The aim of the paper is to find out how the real GDP change depends on the changes in productivity and employment. For analysis the indicators of 28 EU Member States were used. According to expectations the driver of GDP growth is the labor productivity. The crisis influenced the development of the convergence process of selected variables in a negative way. The variability of the employment rate, measured by the coefficient of variation, increased over time rapidly and reached its highest level in 2013. The annual GDP growth from 2000 to 2008 reached almost 2.1 % in EU-28. In the same period the labor productivity grew by 1.1 % annually and the total employment increased only by 0.9% per year. The situation changed dramatically in the recession period. The contribution of the employment to the total GDP change was negative in 2008 – 2013. While the GDP declined by 0.2 %, the total employment dropped in the same period by 0.6 % per year. The productivity in the recession showed a positive development with a moderate increase in the EU-28 by 0.3 %.

*Keywords: productivity, employment, gross domestic product, decomposition*

JEL Classification: E24, O11, O40

## **1 INTRODUCTION**

GDP, productivity, employment or unemployment are the key indicators of macroeconomic stability and sustainable development. Indicators of employment and productivity are often used to determine their individual effects to the total GDP change. For that reason the method called growth accounting was used in this paper to describe the importance of selected variables to the economic growth.

## **2 DECOMPOSITION OF THE GDP GROWTH**

Gross domestic product (GDP) measures economic activity and is one of the core indicators of economic performance. Real GDP change can be broken down into a part which is due to growth in productivity and a part which is due to increase (decrease) in employment. The economic crisis has reversed the process of convergence of the GDP per capita for two years. The recovery of the EU economies is slow; some Member States faces decrease in the real GDP for several years.

### **2.1 Gross domestic product, employment and productivity**

The GDP real growth decomposition highlights the growth in labor productivity and changes in total employment. Productivity is a key source of economic growth and competitiveness (OECD, 2013). In the paper the following formula for the decomposition of GDP was used:

$$GDP = E \cdot \left( \frac{GDP}{E} \right) \quad (1)$$

where

GDP – gross domestic product,

E – total employment (domestic concept),

GDP/E – labor productivity.

The change in GDP, employment and productivity will be expressed in form of relative change indexes of selected indicators in time  $t$  and  $t - 1$ :

$$i_{GDP} = i_E \cdot i_{\frac{GDP}{E}} \quad \text{e.g.} \quad \frac{GDP_t}{GDP_{t-1}} = \frac{E_t}{E_{t-1}} \cdot \frac{\frac{GDP_t}{E_t}}{\frac{GDP_{t-1}}{E_{t-1}}} \quad (2)$$

After taking the logarithm of formula (2) we get:

$$\log i_{GDP} = \log i_E + \log i_{\frac{GDP}{E}} \quad (3)$$

The formula (3) should be divided by  $\log i_{GDP}$  to calculate the impact of each factor, indicator to the total relative GDP change:

$$1 = \frac{\log i_E}{\log i_{GDP}} + \frac{\log i_{\frac{GDP}{E}}}{\log i_{GDP}} \quad (4)$$

Similar analysis has been adopted by Piacentini and Sulis (2000) with the attention on GDP per capita, productivity per employed person and employment calculated over the total population. Due to growth accounting method, when the GDP per capita real growth was decomposed into three components (labor productivity, labor force participation rate and the employment rate), as the main driver of per capita GDP growth the labor productivity was identified (Canada's State of Trade, 2010). Marattin and Salotti (2009) presented a decomposition of GDP per capita growth by five variables, including some supply side and demographic factors.

The annual real growth rates of GDP of all 28 EU Member States with the participation of the two most important economic indicators (productivity and employment) are presented in figure 1.

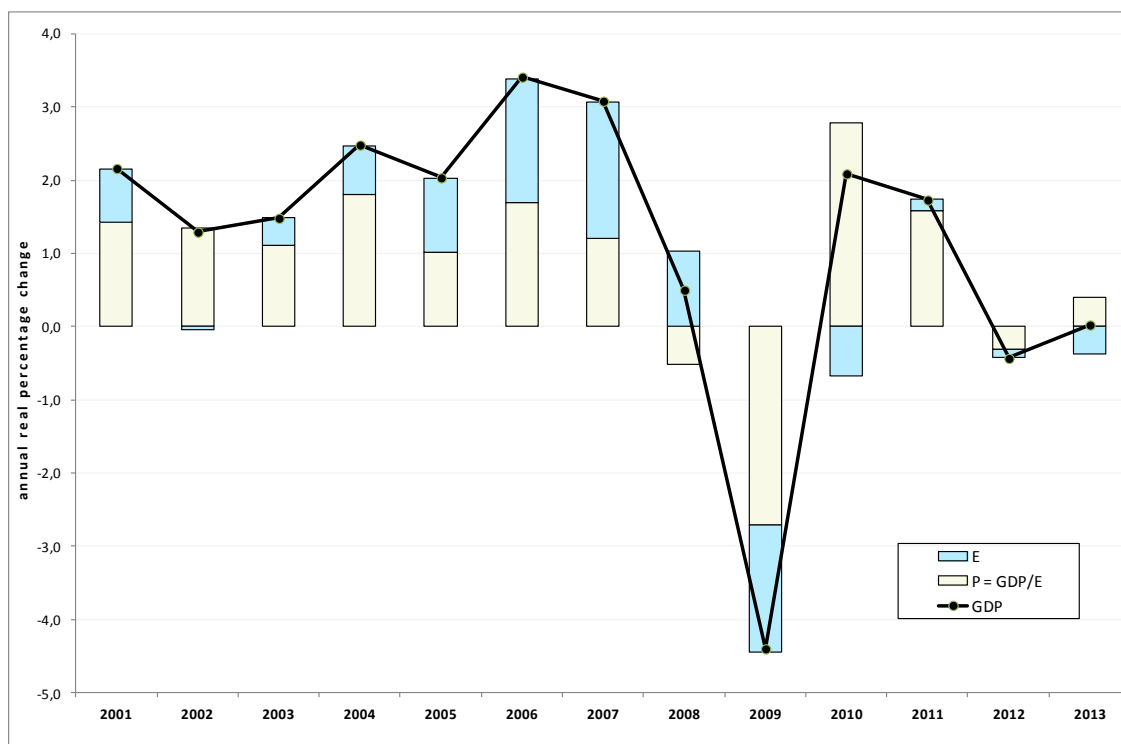


Fig. 1 – Contribution of total employment and productivity to GDP changes, EU – 28.  
Source: Eurostat, own calculations

### 3 CORRELATION AND REGRESSION ANALYSIS

Pearson's correlation coefficient between selected variables of the economic situation of the EU Member States was calculated to discover whether the statement of Pivonka – Loster (2013), that GDP and its growth can be used as a proxy of the country's productivity, is correct.

In years 2000 – 2008 the average annual GDP growth reached in EU-28 almost 2.1 %. In the same period the labor productivity grew by 1.1 % annually but the total employment increased only moderately by 0.9% per year. The situation changed dramatically in the recession period. The contribution of the employment to the total GDP change in 2008 – 2013 was negative. While the GDP declined by 0.2 %, the total employment dropped in the same period by 0.6 %. Only the productivity in the recession showed a positive development with a moderate increase in the EU-28 by 0.3 %. The situation of the decomposition of two selected indicators is visible also from the fig. 1. The total employment significantly influenced the GDP change before the recession, beginning in 2005 till 2008. The real GDP growth in 2001–2004, 2010, 2011, and 2013 was significantly influenced by real labor productivity growth.

In case of Slovakia the impact of the selected indicators is more significant. While in 2000 – 2008 the GDP increased by 6.2 % annually, the productivity grew by 4.8 % and the total employment increased only by 1.3 % per year. It means that the increase in productivity was the main source of economic growth. In time of recession (2008 – 2013) again the productivity caused the economic performance due to an annual real positive change of 1.5 %. In the same time the total employment shrunk by 0.5 % annually.

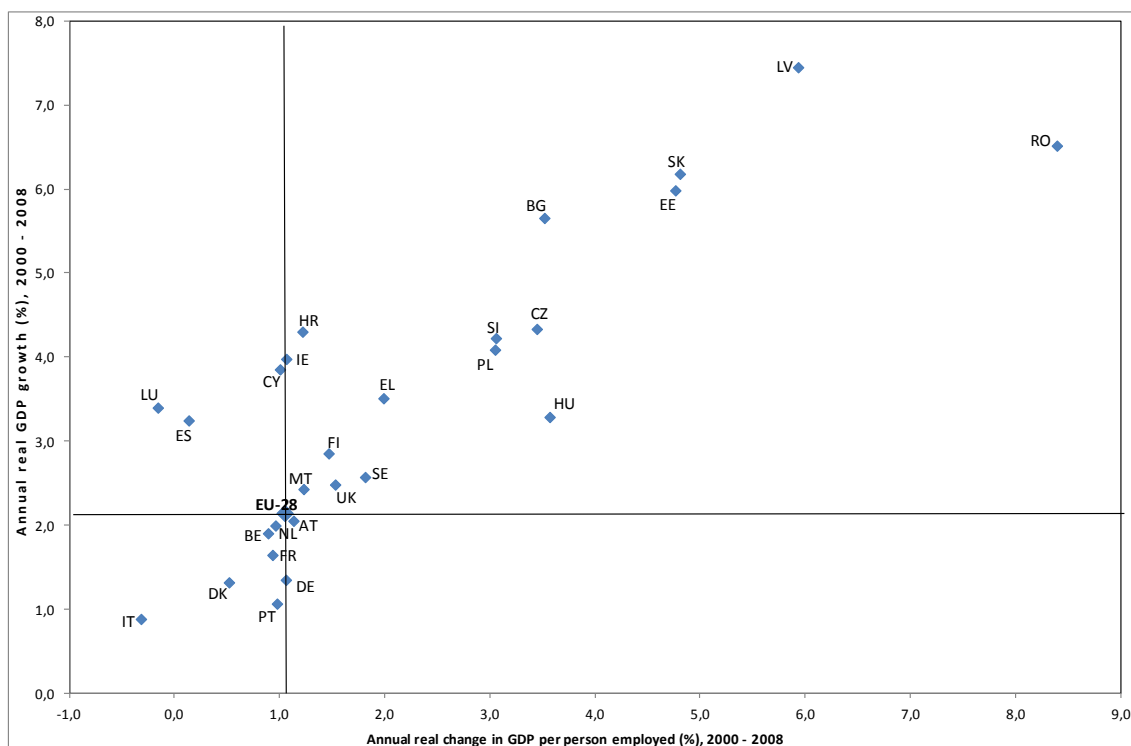


Fig. 2 – Growth in real GDP and productivity (GDP per person employed), 2000 – 2008.  
 Source: Eurostat, own calculations

Between GDP growth and productivity changes, there exists a statistically significant linear relationship. This linear relationship is evident from the figure 2, where the x-axis represents the annual real change in productivity and the y-axis represents the annual real GDP growth between 2000 and 2008. The Pearson's correlation coefficient between these indexes was as high as 0.827 ( $p < 0.0001$ ,  $p$  value – significance level of the test, correlation analysis). In countries with low GDP per capita the annual increase in GDP was very strong. For example in Romania the GDP annually increased by 6.5 % and the productivity grew by 8.4 %. In Latvia the real GDP grew by 7.4 % each year between 2000 and 2008 which was combined with an annual increase in real productivity by 5.9 %. On the other hand the countries with high GDP per capita reached only a moderate annual GDP growth combined with a moderate productivity change. This concept is very similar to the concept of  $\beta$ -convergence.  $\beta$ -convergence refers to a process in which poor regions grow faster than rich ones and therefore catch up on them (Monfort, 2008).

The correlation between the GDP growth and total employment change was not statistically significant ( $r_{xy} = 0.086$ ,  $p = 0.66$ ). In figure 4 the linear regression of the GDP growth and changes in employment in the EU Member States was investigated. And the results are naturally identical with the correlation analysis of these two selected indicators.

The Pearson's correlation coefficient was statistically significant between the indexes of productivity growth and employment. In this case the relationship was negative, which indicates that if the productivity increases the employment decreases ( $r_{xy} = - 0.488$ ,  $p = 0.008$ ).

Between 2008 and 2013 the Pearson's correlation coefficient of the GDP and productivity indexes reached only 0.33 and was not statistically significant ( $p = 0.07$ ). According the fig. 3 this result was expected. The correlation of the GDP growth and changes in employment was

positively linearly related ( $r_{xy} = 0.737, p < 0.0001$ ). In the period of recession the increase of employment is related with an increase in real GDP, which was not typical before the recession.

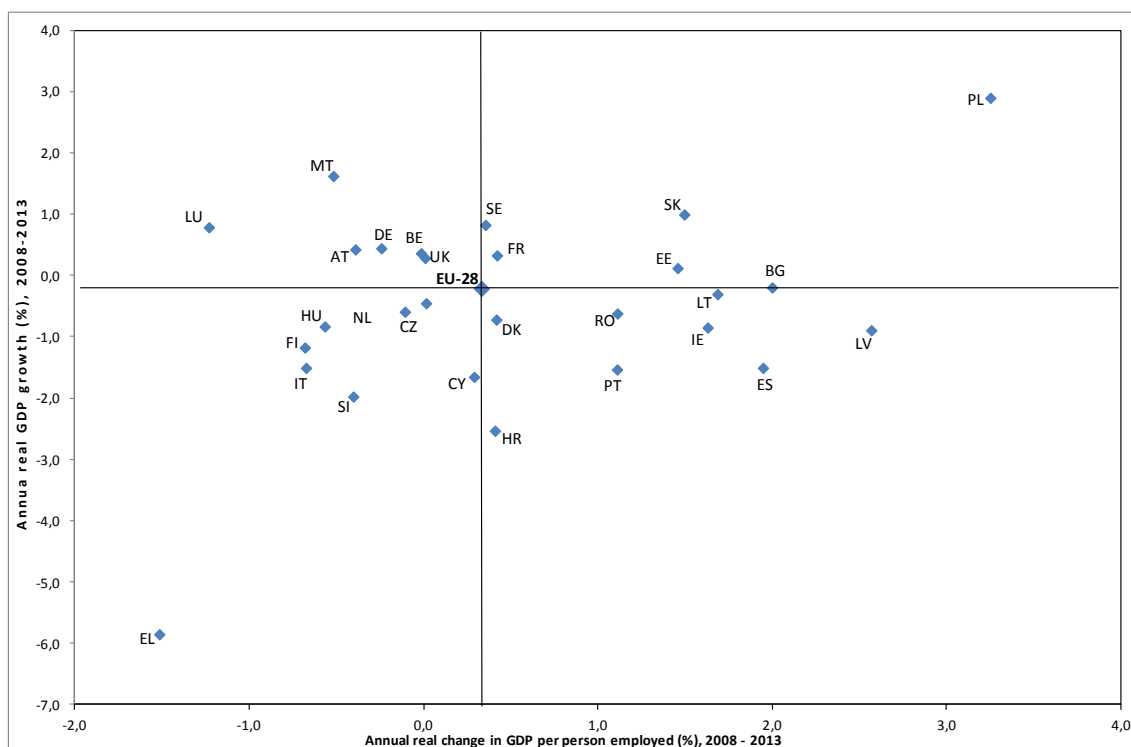


Fig. 3 – Growth in real GDP and productivity (GDP per person employed), 2008 – 2013.  
 Source: Eurostat, own calculations

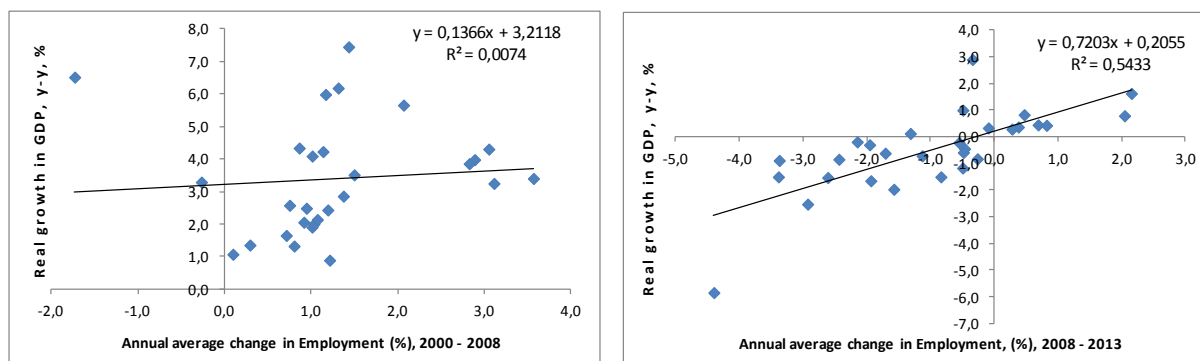


Fig. 4 – Linear regression of the annual average changes in employment and gross domestic product. Source: Eurostat, own calculations

#### 4 SIGMA-CONVERGENCE

While  $\beta$ -convergence focuses on detecting possible catching-up processes, Sigma-convergence refers to a reduction of disparities among regions in time (Monfort, 2008). The Sigma-convergence can be analyzed through variability measures like standard deviation or coefficient of variation. The crisis brought to an end a long period during which regional disparities in GDP per head and unemployment were shrinking (EC, 2013). The relative measure of variability, the coefficient of variation was calculated for GDP per capita in

purchasing power standards (PPS), productivity (GDP in PPS to total employment) and for employment rate (rate of the employment to the total population). In figure 5 the coefficient of variation (index, 2000 = 100) is presented for all selected indicators. The variability of the productivity shows a very positive development over analyzed period of time. The labor productivity between Member States was lowest, according to coefficient of variation, in 2013. The positive process of Sigma-convergence in GDP per capita was aborted in 2010, but in 2013 we can see an improvement in the variability of GDP per head. Hopefully this process will continue in the nearest future.

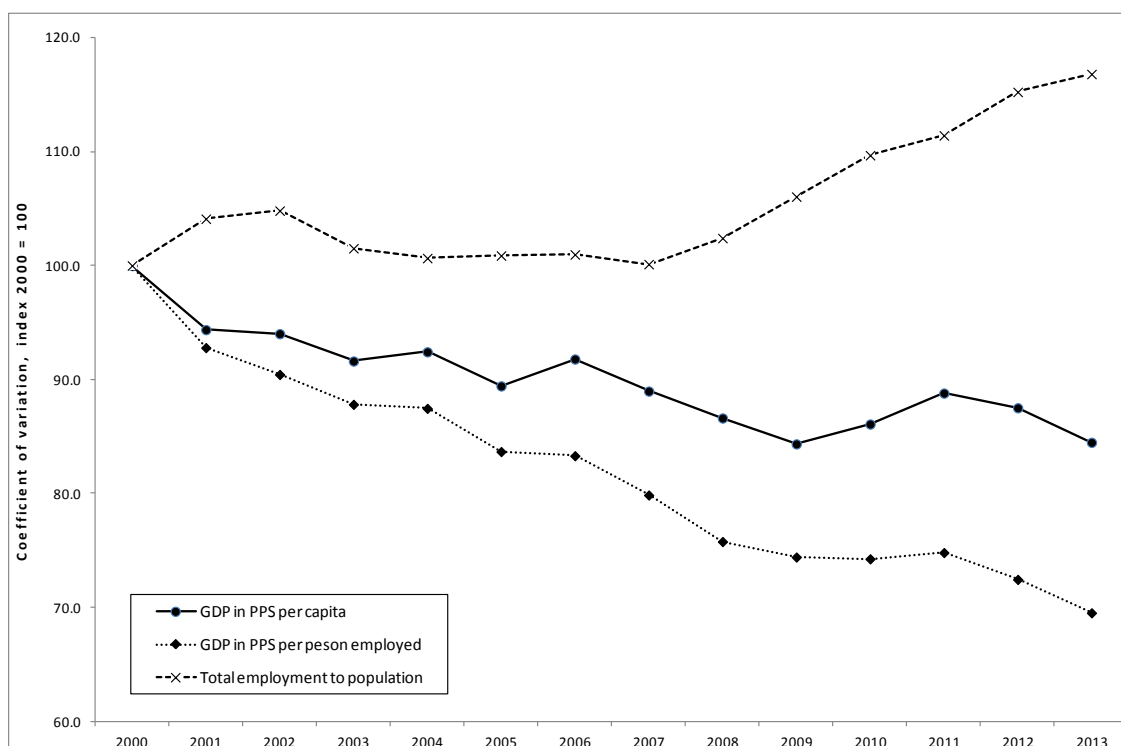


Fig. 5 – Sigma-convergence of the EU Member States. Source: Eurostat, own calculations

## 5 CONCLUSION

Statistically significant linear relationship between GDP growth and productivity changes was discovered at the beginning of the analyzed period (2000 – 2008). The Pearson’s correlation coefficient was positive and as high as 0.827. In countries with low GDP per capita the annual increase in GDP was very strong and was combined with a high real increase in productivity. On the other hand the countries with high GDP per capita reached only a moderate annual GDP growth and also a moderate productivity change. This concept is very similar to the concept of  $\beta$ -convergence in which poor regions grow faster than rich ones and so continues the catch up process. Between 2008 and 2013 the Pearson’s correlation coefficient of the GDP and productivity indexes reached only 0.33 and was not statistically significant. In this case the GDP growth cannot be used as a proxy of the country’s productivity change. In the period of recession the increase of employment is statistically significantly related to the increase in real GDP, which was not typical before the recession. Sigma-convergence process of GDP per capita and productivity over time is positive. There was an increase in variability of the GDP per head in 2010-2012, but the situation changed again in 2013. We evaluate the development of the coefficient of variation in employment negatively. The variability of the employment rate (employment to the total population) increases over time rapidly. An



increase of the total employment in less developed countries of the EU could be associated with an increase of the real GDP and also with a decrease in Sigma-convergence coefficient in the future.

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## **COMPANIES' FINANCING THROUGH THE CAPITAL MARKET IN THE COUNTRIES: AUSTRIA, THE CZECH REPUBLIC, POLAND AND SLOVENIA**

*Lucie Meixnerová*

### **Abstract**

The paper deals with comparison of capital markets in four European countries: Austria, the Czech Republic, Poland and Slovenia and primarily in terms of the possibility of obtaining external funding sources. The main quantitative characteristics are analyzed: number of accepted emissions on the stock exchange, the market capitalization of stocks and bonds, trading volume, issue costs and the gross domestic product of selected countries, the comparison is done for the period 2002 – 2014. Research has proved the existence of a positive and statistically significant relationship among trading volume, market capitalization, and the quantity of gross domestic product, i.e. existence of capital markets is essential for the further development of the company and is connected with the performance of the economy as measured by the growth of gross domestic product.

*Keywords: enterprise, external funding sources, market capitalization, stock exchange, stock market, trade value*

JEL Classification: G1, G32

### **1 INTRODUCTION**

The obstacles to the development of small and medium-sized (SMEs) enterprises pertain the lack of capital to finance the business plan. For starting small or medium-sized enterprises is often insufficient equity and obtaining liabilities is usually difficult in the early stages, and that enterprises could fully realize its potential in today's global economy, it must focus on the promotion and development of business activities and to improve the business environment not only for small and medium-sized enterprises as well as large corporations. (Koráb *et al.*, 2008)

Support for successful entrepreneurial activities requires in particular support in financing these activities and one of the possibilities of financing business development is still a little common form of external sources via the capital markets, stocks and bonds.

Based on the research of domestic and foreign research intentions, a gap is considered in research projects on the subject of external sources of corporate financing through the capital market and specifying the forms of external financing should be one of the important themes of business entities. The empirical literature, which is developing rapidly since the early 90s of the last century, supports the hypothesis that economic growth is closely related to the stage of financial development system and hundred years ago (1912), the Austrian economist Joseph Schumpeter established a direct relationship between the well-established financial system and a thriving economy. Financial economists Klaus Weber, Gerald Davis and Michael Lounsbury (2009) later defended the view that „equity markets are also a means of raising capital indicator showing the pulse of the economy and determining its future

development, a mechanism for effective monitoring and support for institutional and social change in the economy.“ The aim of the stock exchange is to provide a market for the buying and selling of shares (securities) that are liquid and open. Especially market reports provide companies with potentially long-term source of information for investment. From the perspective of economic development, it may be an effective mean of circulation assets and realization of development opportunities. In other words, although to be issues of economic development focused on the production of goods, services and trade, as well as relate to institutions in the financial and investment fields. (Moudrý *et al.*, 2007) Autor Lyandres (2007) examined the effects of costly external financing on the optimal timing of a firm's investment that show when by altering the optimal investment timing, costly financing affects current investment and the sensitivity of investment to internal cash flow. Authors (Murado *et al.*, 2014) can be seen the importance of supply of capital for corporate financing as two exogenous events, entry to the EU and the adoption of Euro, caused shifts in equity and credit markets during European integration. Following membership to EU and after the adoption of Euro, it is eased access to equity capital, firms increase equity financing and improved access to international debt capital. Authors (Bris *et al.*, 2014) studied the financing policies of European public corporations prior to the euro crisis from 11 euro countries and a control group of five other European countries for the period 1991–2006, their results showed stronger for large firms, firms dependent on external financing. The authors provided evidence that firms in the euro area increased external financing before the crisis, compared to firms from countries that did not adopt the euro. Their results showed stronger for firms from countries that previously had weak currencies and for firms that have the lowest foreign sales and they are consistent with the view that firms have increased financing because cost of financing decreased. Authors (López-Gracia *et al.*, 2014) provides empirical evidence on the relationship between external financing and cash flow, using a data panel of Spanish listed (unconstrained) and unlisted (constrained) companies covering the period 1996–2010. Their results indicate that cash flow has a significant and negative effect on external financing regardless of the dependent variable selected (that is, variation in debt, debt plus equity or just equity). This negative relationship is stronger (that is, more negative) for listed companies, which in turn implies a stronger substitution effect, as predicted. Authors (Eidenmüller *et al.*, 2015) studied the choice of issuer location and regulatory competition in the European corporate debt market. They found that, countries and that wish to attract bond issues should lower or abolish withholding taxes and in absolute terms, Germany have by far the highest outflow of debt issues, while the Netherlands, the UK, Luxemburg and Ireland see the most inflows (in that order). The main sources of funding can be diverse, and if we consider ways of funding in the economic structure of the company and by according to Czech authors Valach (2011) and Synek (2010), financing businesses realized through internal and external sources or equity and liabilities (Valach, 2011; Synek, 2010; Wöhe *et al.* 2007), when the characteristics of the distribution is perceived by different authors identically. Zinecker (2008) states that the company engaged in the production or provision of services, which implements on the market is affected by income and expenses for a given period of time when the flow is not synchronized. A specific form of external financing is a long-term outside funds, which are determined primarily by long-term bank loans, corporate bonds, leasing debt and other long-term liabilities (Valach, 2011; Synek, 2010; Wöhe *et al.* 2007). Authors Wöhe *et al.* (2007) and Zinecker (2008) add forms of debt financing on industrial bonds, convertible debentures, warrants subscriptions, subscriptions profit, profit and participatory notes, factoring, forfaiting, etc. Identify sources of financing through capital markets, private equity and venture capital are perceived by authors Zinecker (2008), Nývltová *et al.* (2007) and

Valach (2011) as a risk capital, which is inserted into the shares of non-public enterprises to finance the initial business activities, especially for financing projects and developing innovative character with high risk. The impacts of external financing can be seen mainly in obtaining the necessary capital by the company and in stimulating business environment (Nývltová *et al.*, 2007; Mishkin, 2009), further supporting the creation of new companies, companies' growth and higher competitiveness of enterprises and also in the creation of new job vacancies. External financing provides compared to internal financing a range of options, because they can finance any investment project taking into account the current economic situation and adapt to the needs of each individual.

Financing companies through securities (shares and bonds) has a large representation in the world and on the developed capital markets belongs (or it heads towards) to a traditional way of raising funds needed for business development. An important mechanism for the functioning of the financial system is a function of capital, stock exchanges and markets. On the one hand we are dealing here with private equity investors, who invest in cycles, and on the other hand with companies that are eg. forced to raise funds to finance further growth in its vicinity. Offer sources of financing business activities are currently broad and diverse.

Management of company decides how much and in what structure the sources of funding should be available to ensure smooth operation, the company's development and did not disrupt the financial stability of the company, were able to pay its obligations to creditors, owners, state and other entities involved in the development of the company. The way of management company adjusts to the structure of funding sources and one of the key aspects of the firm's choice of specific source of funding can be considered the maturity of capital markets in different countries. Capital markets have various level of maturity in different countries, which determines the ability - the market play its role so as to truly function as an instrument for dynamic growth of economic development. In this context, the individual capital markets are evaluated in terms of their liquidity, which determines the volume of capital available for businesses at certain market, rate of return on the securities corresponding to the expected risk. The capital market is not the only source of funding. The information determined by the behavior of investors, providing businesses with an indispensable tool for financial management and decision-making and capital market are considered to be a necessary part of the financial system. The need for companies to obtain financing sources both on the domestic and international capital markets and the increasing interdependence of national economies and markets, caused by high dynamics of trade in goods, capital, services and transfer of technology and know-how. (Nývltová *et al.*, 2007)

International investment enables fully exploit the income potential of different markets, however, brings not only benefits but also the obstacles, risks and additional costs. The basic feature of capital markets is that it allows the exchange of goods, ie. that there are trading money and all sorts of assets expressing money. Without the ability to obtain the necessary capital in this way the global financial system would have as well as the economic system, a different form than it currently has. (Tirole, 2006; Mishkin, 2009)

Foreign studies dealing with the importance of capital markets as external sources of financing firms mention several benefits that these markets comprise:

- attracting a number of smaller and medium-sized companies on capital markets,
- entry of firms in the domestic and international capital markets,

- providing ongoing support and ensure value for companies and investors,
- promoting local ownership of capital,
- striving for the development of links and systems,
- expanding and cooperation of financial markets,
- creating substantial long-term benefits for economic growth in both regions, and higher economic units.

Given that in the conditions of world financial markets we follow different development of the capital markets, contribution brings an insight into the problems of external financing, including the definition of its specifics. The aim of this paper is to find out whether capital markets characterized by the stock exchange in four European countries surveyed show the same characteristics of development and corporate financing options in the long term and also assess the rate importance of these criteria, depending on the evolution of financial markets in selected countries. Research also questioned the reasons that the company led to the rejection of external financing. In this paper are analyzed capital markets Austria, the Czech Republic and Slovenian, which are part of the European market and are part of the CEE Stock Exchange Group (CEESEG, which is today the largest exchange group in Central and Eastern Europe). For comparison the market was chosen capital market in Poland, because the Polish capital market plays a significant and major role in the region of Central and Eastern Europe and no country experienced such a boom as the capital market in Poland. The stock exchanges in selected countries are Wiener Börse (WB) in Austria, Prague Stock Exchange (PSE) in the Czech Republic, Warsaw Stock Exchange (GPW) in Poland and Ljubljana Exchange Stock (LJSE) in Slovenia and this selection allows us to compare capital markets in four European countries.

In the first part of this paper is briefly presented characterization and comparison of selected indicators of countries (Austria, the Czech Republic, Poland and Slovenia). The second part consists of a quantitative analysis using data of the stock market (market capitalization, trading volume and gross domestic product) and to determine the statistical significance of the estimated parameters, seasonal autoregression model type ARIMA is used. In the final part are analyzed continuity of selected indicators and capital market as forms of external financing.

## **2 ISSUE OF SECURITIES**

When deciding on the placement of the securities issue and deciding on their structure, firm management should consider the following factors:

- identification of funding needs,
- requirements for accepting emissions trading,
- the process of issuing emissions trading,
- costs associated with the process emissions,
- information obligation arising from a quotation,
- market structure and trading system of given market,

- the number of issued securities on the market and the total market capitalization,
- volumes of the transacted securities issues.

### **Issue of shares**

The general goal for the company is the issue of shares to obtain long-term capital, issuance of shares in circulation, the company acquires emitting sources of funding in exchange for the new shareholders becoming co-owners of the company. Capital thus obtained can be used by a company in the market in its field for its business plan wants to raise capital on the stock market, because it is a more viable solution than debt financing - bank loans. Another option is a company that has been placed on a market for a while, but it needs to grow, needs additional capital, while no longer manages with options available to the non-share corporation. The last case is a joint-stock company that has issued shares in the past and now wants to obtain again by another emission additional sources of financing on the capital market. Though all three cases in the literature are known as an initial public offering or IPO (Initial Public Offering), we distinguish IPO as the first two options and the third belongs to the category of SEO as it is usually given by foreign literature. The term SEO (Seasoned Equity Offering) means the emission of additional shares of the company, which already has shares traded on the public market. (Nývltová *et al.*, 2007) Newly issued securities may be placed on the market in private or public way. The decision of the company management on share issue affects several basic criteria and as the most important factor indicates the location of business activities, as if it has in a given market most of its activities and relationships with business partners, there will be more investors willing to put in your company's capital. Liquidity given issue is another aspect that investors take into account, but it depends not only on the issuer, but also on the market, where the issue is reported. Another factor on the side of the market are the actual requirements for the issuer and the issue, charges related to the issuance and other fees for the placing on the market, the regulator charges or depository.

### **Issue of bonds**

The bond issue is the second possibility of external financing companies in the capital markets. Bonds are long-term debt securities with the law of their owners to require at a certain date (in English maturity) par value (nominal, par value) of the bond and coupon payments at the end of a tenure during the terms of a bond with a coupon realization emissions the issuer becomes a debtor and bondholder (investor) the lender. The bonds are traded publicly and non-publicly. Public trading carries a higher liquidity and lower risk, investors purchasing bonds traded on a public market therefore generally require a risk premium in the form of a higher return. The advantage of bonds is the possibility of obtaining a large amount of funds at one time, longer maturity and in some respects even greater prestige and publicity. For a solvent and sufficiently large company is financing through bonds usually the cheapest way of financing and solves them the greatest part of the permanent long-term debt and the advantage of the tax deductibility of interest paid. (Ježek, 2004) In developed countries, especially in the case of small and medium-sized enterprises are often used private issue when the bonds are sold to a small group of predetermined investors, they are not registered as a publicly traded and investors usually require a higher rate of return as a premium for low liquidity. The presence of funding sources on the public market means on the other hand that the company has excellent access to financing, which may be successfully used for the development or expansion of its activities. Public bond issue consists of a set of bonds issued on the same issue terms and the same issue date, maturity and

labeling according to the international numbering system for securities identification (ISIN). If bonds placed on the domestic stock market, they are called domestic bonds. If an issuer chooses to place the bonds on the international market, these bonds are so called eurobonds. At present there are many different forms of bonds, the differences can be found among individual countries. (Nývtová *et al.*, 2007)

## 2.1 Costs associated with the issue of securities

The costs for transacting the issue of securities (stocks and bonds) and resources, which the enterprise gains, are two important factors which need not be equal and have a significant impact on the expensiveness of the whole process and emissions trading market. In a broader sense, the costs associated with the preparation, execution of issue and then costs related to the information obligations and regulations, the origin of the issuer's country, quality of the managers emissions, methods of subscription and the total volume of emissions, regular exchange fees etc. Comparison of markets in terms of charges at expensiveness issue can be found in the the authors Oxera (2006) and Nývtová *et al.* (2007). The costs that the issuer must in connection with the issuance spend depends on many factors.

Tab. 1 showed the stock exchanges in selected countries: Austria – Wiener Börse (WB), the Czech Republic – Prague Stock Exchange (PSE), Poland - Warsaw Stock Exchange (GPW) and Slovenia – Ljubljana Exchange Stock (LJSE) and we could conclude that there is minimal difference between these groups of costs and there is no significant connection. This, however, is not clear to say because with the placement of shares or by issuing bonds on the local or international market, the company must generate sufficient income to cover all taxes and costs for businesses and investors. However, it is not clear to say because with the placement of shares or by issuing bonds on the local or international market, the company must generate sufficient income to cover all taxes and costs for businesses and investors. Issue costs do not arise only by emissions but are also related to a process and trading on the local or international market, the emission processes in the euro area are built on the same principles. The advantage is that it increases the awareness of the company among potential customers and thus to the expansion of business activities.

Tab. 1 – Issue costs of shares. Source: own processing by the stock exchanges (Wiener Börse, Prague Stock Exchange, Warsaw Stock Exchange and Ljubljana Exchange Stock)

<b>WB</b>	<b>GPW</b>
5 000 EUR, max. 50.000 EUR	2784 EUR
<b>LJSE</b>	<b>PSE</b>
0,03 % 4.000 EUR, max. 20.000 EUR	1816 EUR

## 3 METHODS

The primary aim of this paper was to determine whether capital markets characterized by the stock exchange in four European countries surveyed exhibit distinct characteristics of the development and financing options of the company in the long term. The comparison was carried out for the period 2002 - 2014.

The basic prerequisites for selection of capital markets in the four countries of the euro area regard to the goal of this work was, that:

- they are european capital markets,
- they are a member of the Federation of European Securities Exchanges (FESE)
- stock exchanges are part of the CEE Stock Exchange Group (CEESEG), excluding the Stock Exchange in Poland.

The starting point for the implementation of the research was carried out documentary analysis of the data, i.e. an analysis of selected indicators Austria, the Czech Republic, Poland and Slovenia. Data was obtained through a database accessible through the website of Eurostat and of the stock exchanges in selected countries: Austria – Wiener Börse, the Czech Republic – Prague Stock Exchange, Poland - Warsaw Stock Exchange and Slovenia – Ljubljana Exchange Stock. Within the analysis, the indicators have been monitored and studied: number of received emissions on the stock exchange, the cost of issuance, market capitalization, trade value and the gross domestic product of selected countries. Qualitative data obtained by primary research has been evaluated using Microsoft Office Excel and SPSS statistical software and methods of analysis, description and comparison.

#### 4 RESULTS

Descriptive analysis confirm the long-term upward trend of gross domestic product (GDP), Fig. 1. It is shown that positive GDP significantly affects the development of stock markets and its growth creates an optimistic atmosphere. In terms of economic advancement two of the analyzed economics Poland and Austria show higher gross domestic product than the Czech Republic and Slovenia, and both economics belong to the small economics. Both markets have specifics of transition economics and it is clear that there is an area for further growth and development of the market. The Polish economy is accompanied by faster dynamics, it was not affected by the global financial crisis, because it is less dependent on exports to other countries and therefore GDP growth is upward pronounced.

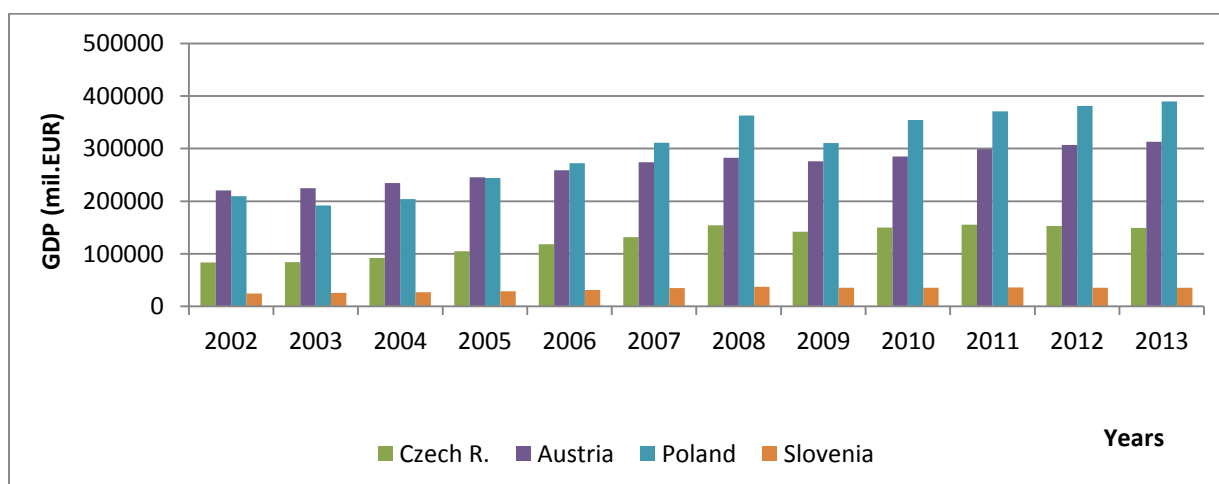


Fig. 1 – Development of gross domestic product. Source: own processing by Eurostat



As Fig. 2 shows, the most active in terms of the volume of realized bond issues are considered to be stock exchange in the Czech Republic and Poland. As the number of listed bond issues, the Slovene bond market is insignificant. On the Czech bond market is the number of listed bond issues listed twice smaller than Wiener Börse, but in terms of the volume of realized trading volumes, but in terms of the volume of realized Trade Volume this is one of the most advanced emerging markets in Fig. 3.

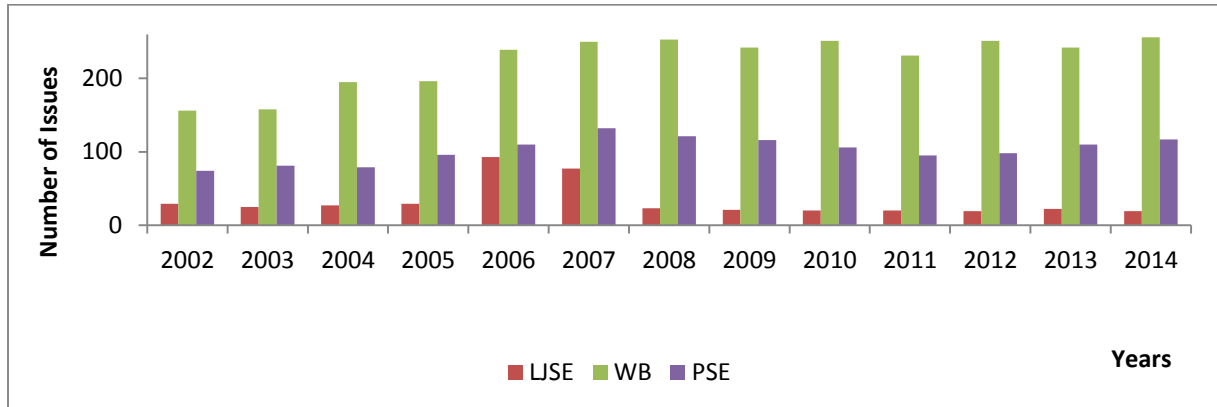


Fig. 2 – Number of Issues by bond markets. Source: own processing by the stock exchanges (Wiener Börse, Prague Stock Exchange, Warsaw Stock Exchange and Ljubljana Exchange Stock)

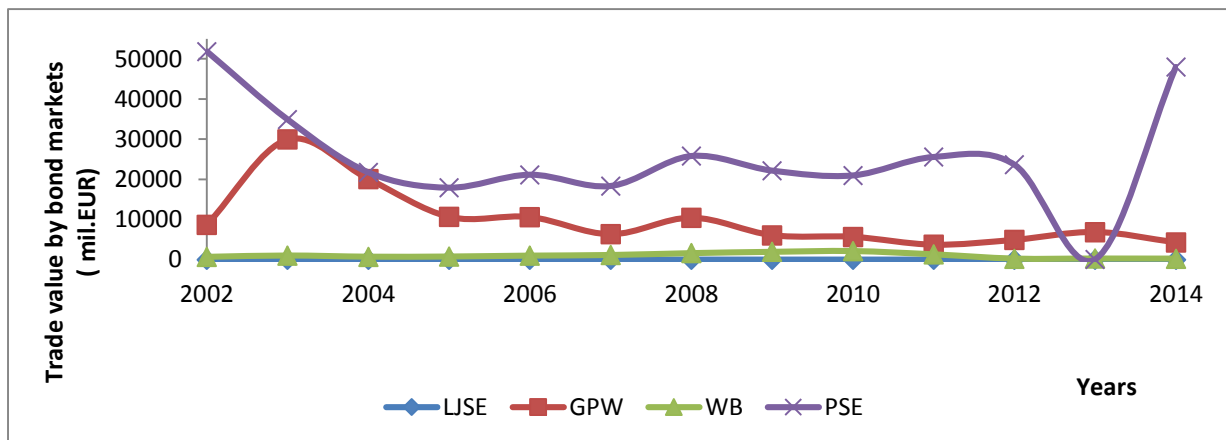


Fig. 3 – Trade value by bond markets. Source: own processing by the stock exchanges (Wiener Börse, Prague Stock Exchange, Warsaw Stock Exchange and Ljubljana Exchange Stock)

By comparing the volume of stock trades, Fig. 4, is a development on the Czech and Slovene capital market low. The volume of transactions completed in 2013 at Wiener Börse is 6 times larger than the Czech capital market, while trading volume on the Warsaw Stock Exchange was in the same period more than 9 times. By joining the European countries and the adoption of legal and regulatory rules, legislative measures changed in 2006 for firms doing business and are using financial and capital markets. Simplified access to capital, were precisely defined rules of functioning capital market-to-market for issuers and investment protection for investors and it is for companies easier to deal with the entry and acting on the capital

markets. (Meixnerová, 2009; Meixnerová, 2011). The period of 2006 - 2007 is characterized by a significant increase in activity on the capital markets and in almost all markets and its characteristics.

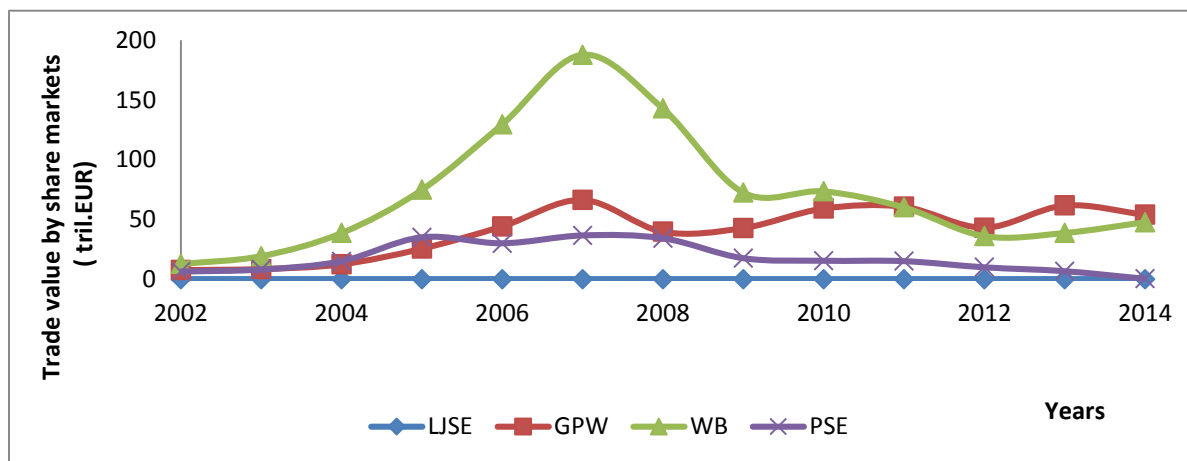


Fig. 4 – Trade value by share markets. Source: own processing by the stock exchanges (Wiener Börse, Prague Stock Exchange, Warsaw Stock Exchange and Ljubljana Exchange Stock)

Maturity of the stock market is not only determined by the volume of transactions but also the number of listed issues, Fig. 5. The early stage of the development of capital markets in Eastern Europe (the Czech Republic and Slovenia) was connected with the policy of voucher privatization as an indication of a large number of marketable securities of companies. (Beim *et al.*, 2001) The vast majority of companies, however, did not have the prerequisites for long-term effects on the market and to consolidate ownership structures and slow outflow of companies from these markets. As shown in Fig. 4, we still consider the stock exchange in the Czech Republic and Slovenia to be small. Deficiencies can mainly be seen in the number of quality small and medium enterprises on the capital market, their extension would have significantly increased capitalization and trading volumes mainly on the domestic market, strengthening its competitive position on the market and the growth of the country's GDP influence on the growth of the volume of available funding sources.

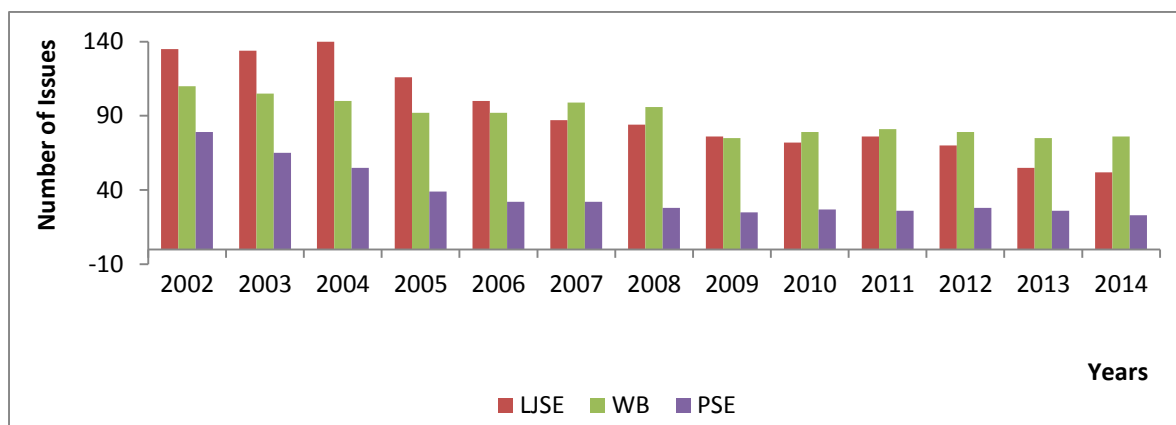


Fig. 5 – Number of Issues by share markets. Source: own processing by the stock exchanges (Wiener Börse, Prague Stock Exchange, Warsaw Stock Exchange and Ljubljana Exchange Stock)

As shown in Fig. 6, the market capitalization of shares as a share of GDP has increased development, which was interrupted by a decline in the years 2009 - 2010, that caused the European debt crisis, which has gradually developed since 2009. In the course of funding on the financial market has become for countries and companies too expensive or even impossible. There was not only an increase in government bond yields of many countries, Fig. 3, but funding threatened to get out of control. It is obvious that if the developed space for integration of local markets into the system of international markets will increase their liquidity, they will reduce market barriers and increase trading securities on the market. External sources of financing through capital markets will be more accessible and cheaper for local firms and therefore will not be difficult to enter both the local markets and international markets.

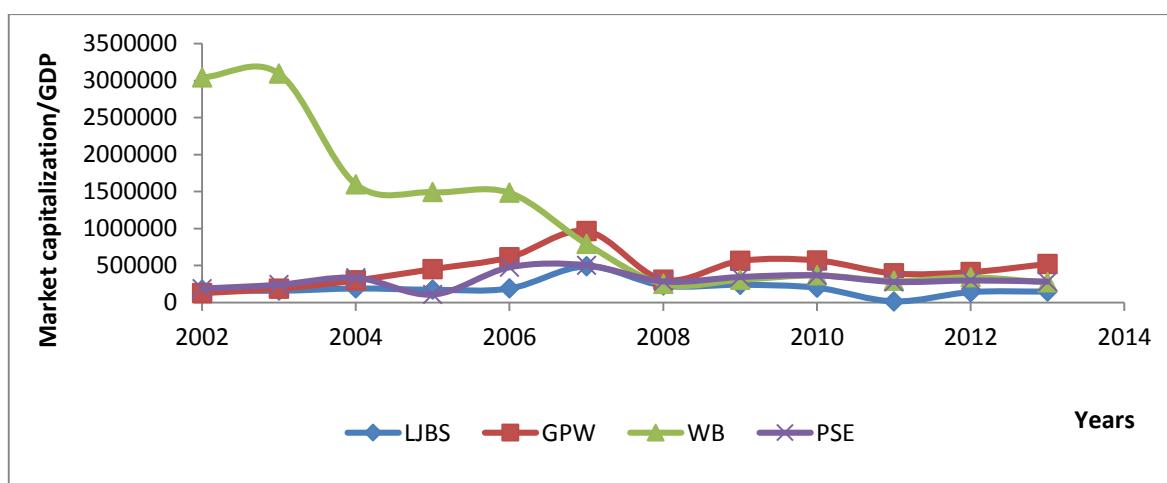


Fig. 6 – Market capitalization of shares on GDP. Source: own processing by Eurostat and the stock exchanges (Wiener Börse, Prague Stock Exchange, Warsaw Stock Exchange and Ljubljana Exchange Stock)

From the previous figure, it is clear that the market capitalization of shares / gross domestic product and trading volumes show nonstationary behavior of a time series and graph of gross domestic product shows a stationary behavior of time series. In an international comparison of interrelationships market capitalization and trading volume and the number of new issuers belong the Czech Republic and Slovenia among the least developed and it can be said that both countries are still insufficiently using the advantage of relatively well-functioning financial system. Strengthening the positions of both countries is still in the indicator of quality of small and medium sized enterprises on the capital market. There is still a concern among the firms about losing control or restrictions in society, dominate negative or no experience on the capital markets or unwillingness to accept the company's demands for greater transparency and the related time and organizational and legislative requirements of the process.

#### 4.1 Correlation analysis between variables

The advantage of the seasonal ARIMA model is that it is able to deal with the problems of seasonality, autoregression, integration and regression routine, therefore dates before to analysis could not be transformed and we used logarithmic data. Tab. 2 shows that statistically significant dependence of the estimated parameters at a significance level of 0.01 and that between all variables is a positive correlation. At LJBS defines significant relationship between logarithms trading volume and GDP and the market capitalization has small interconnection market. At PSE and WB are significant relationships between logarithms market capitalization and GDP, ie. that increasing market capitalization will lead to increase in GDP. In the case of the Czech capital market in terms of market capitalization, we see a slight degree of interconnection with the market. At GPW are significant relationships between logarithms trading volume, market capitalization and GDP and we can be said that the capital market is on a high level and soon could reach the level of advanced capital market. The paper identified statistically significant relationships and their support is tied to supporting the development of the capital market. We can conclude that the more advanced the capital market, the easier it will be for the company to obtain sources of financing on the capital markets. Furthermore, it can be argued that the capital markets countries are irreplaceable and have their own importance and positive influence on the growth of the economic performance of the country.

Tab. 2 – Correlation analysis. Source: Wiener Börse, Prague Stock Exchange, Warsaw Stock Exchange, Ljubljana Exchange Stock and Eurostat

LJBS	Turnover	MarketCap	GDP	PSE	Turnover	MarketCap	GDP
Turnover	1	0,025	0,816 ***	Turnover	1	0,238	0,174
MarketCap	0,025	1	0,047	MarketCap	0,238	1	0,915 ***
GDP	0,816 ***	0,047	1	GDP	0,174	0,915 ***	1

GPW	Turnover	MarketCap	GDP	WB	Turnover	MarketCap	GDP
Turnover	1	0,909 ***	0,776 ***	Turnover	1	0,313	0,323
MarketCap	0,909 ***	1	0,895 ***	MarketCap	0,313	1	0,999 ***
GDP	0,776 ***	0,895 ***	1	GDP	0,323	0,999**	1

\*\*\* indicates significance level at 1%

Crucial problem of external financing is firm size, low liquidity of small and medium enterprises (liquidity which facilitates the exchange of securities) and administrative costs

associated with obtaining financial resources or investments. The consequence of these problems is that these companies fall mainly into knowledge based sectors, subject to involuntary acquisitions, mainly due to lack of investment capital. If they could expand the capital markets of these SMEs, there would be a significant increase in business volume and in particular the market capitalization of shares on the market. Attention should also be focused on increasing and enlarging trade, a larger number of quality small and medium enterprises in the capital markets. The increase would be significantly strengthen its market capitalization and trading volumes and competitive position of small capital markets and their trading would be strengthen. Conveniently chosen method of external financing for the company is the decisive criterion: for its success on the market, creating value added, employment and growth potential. Companies that increasingly use capital markets to raise capital, can overcome production records, export successes, direct investment, increase spending on research and development, etc. For increasing and support of external financing through capital markets are improving and strengthening the development of the capital market and particularly the links between the company and the stock exchange. At present, the game about supply of capital involved mainly large national and multinational companies but therefore a gap in capital funding in the least prosperous regions or countries arises. But the important thing is that the opportunity was accessible for the company on the market to use all the tools, which are available to individual entities in developed markets and in my opinion this requirement the local and international capital markets meet nowadays. If companies did not have access to capital markets, they would have to rely on funding from its own resources and bank loans, etc., which would be a limiting factor for the proposed investment, growth and functioning of the company. A fundamental aspect of the significance of capital markets is the maturity of the financial system, which has a positive effect on the prosperity of companies. Existence linking the capital market and companies will contribute to a strong and long-term growth companies, and but also the economy. Financial markets of countries are characterized by good market position, even if some of the variables are analyzed in this paper show low values.

## **5 DISCUSSION AND CONCLUSION**

The importance of capital markets in rapidly growing economies in Europe is an essential aspect of the significance of the capital market for overall growth and prosperity of the company and the country. As an important form of external sources of funding can be considered capital market, which plays an irreplaceable role in local and international markets and is an important element in the further development of the company. The size of the country and the development of capital financial markets where the company operates, should be seen as an advantageous position, because in the current market system increases both liquidity of capital markets and the markets are being integrated into the system of international markets and if there is a market interconnection, we can say that markets are strong and liquid markets will contribute to a strong and long-term growth and greater opportunities and offerings for external financing.

The aim of this paper was to demonstrate that the capital markets in selected countries show the same characteristics. Czech capital market can not still be considered sufficiently liquid, since there is little primary issues, as well as and with it the related lower trading volumes. Indicators of the Slovenian capital market are while maintaining the dynamics of large capital markets low and the market is to still be small. The analysis showed a statistically significant

relationship between the volume of trading on the stock exchange market capitalization and gross domestic product and confirmed that the increase in trading volume lead to a GDP growth of selected countries.

Research findings show that the Czech and Slovenian markets are in an era of globalization and integration of financial markets irreplaceable. Existence of capital markets is essential for the further development of the company and is connected with the performance of the economy as measured by the growth of gross domestic product.

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## **THE INFLUENCE OF FOREIGN CAPITAL IN SCOPE OF BUSINESS PERFORMANCE AND INVESTMENT MANAGEMENT**

*Martina Merková, Rastislav Rajnoha, Ján Dobrovič*

### **Abstract**

The paper analyses use of tools, methods, concepts and models implemented by foreign investors, finds out differences between local and foreign firms in obtained business performance primarily, subsequently in scope of investment measurement and management. Research data were processed and valued by chosen mathematical and statistical methods, subsequently we demonstrated an influence of foreign capital on achieved better business performance, used certain practices and manners. The paper defines typical features and specifications of foreign investors against local firms and gives the answers how local firms in transitional economy benefit from the entry of multinational enterprises. The research is interested in the economy of Central Eastern Europe country – the Slovak Republic.

*Keywords: business performance, investment management, foreign direct investment, foreign-owned companies, Slovakia.*

JEL Classification: G31, G32, M2

### **1 INTRODUCTION**

In the last decade the Slovak Republic has been included in the group of attractive countries for foreign investors. This is reflected in various sectors, most significantly in the automotive industry, Slovakia became the largest producer of cars per capita in the world. Up until now, Slovakia has had some comparative advantages such as cheap and skilled labor, low transfer costs and the quality of infrastructure. After declining of FDI inflows in Slovakia during the depths of the global financial crisis in 2009, Slovakia has recorded continuous increasing of FDI inflows next 3 years (UNCTAD, 2013), despite of two facts: FDI inflows in groups of transition and developed economies decreased in 2012 (9%; 32%) and the European Union alone accounted for almost two thirds of the global FDI decline.

The relationship between Foreign Direct Investment (FDI) and economic growth has been a topical issue in vast number of publications. Insufficient domestic capital has been shown in the process of transformation in post-communist countries and a possible solution of this problem appeared the foreign direct investment. FDI brings for the country and its businesses more significant effects. We attempted them to identify and quantify in our empirical research conducted in conditions of the economy in Central Eastern Europe – Slovakia.

### **2 THEORETICAL FUNDAMENTALS**

There are several studies and analyses dealing with FDI issues worldwide or with focus on Central and Eastern Europe countries. The main conclusion in the studies generally finds a significantly positive relation between FDI and economic growth (Caves, 1974). The cumulative level of FDI is particularly high in those countries in which the transformation process was evaluated to be positive (Beyer, 2002). Empirical studies suggest that the fastest growing countries are also the biggest FDI-host countries. In the specific case of transitional countries, FDI may help to achieve modernization, industrial upgrading and improve



productivity by importing foreign technologies, diffusing knowledge and western best practices (Fabry and Zeghni, 2006). On the other hand, through the certain methods of transfer pricing (Rajnoha, Slivková & Dobrovič, 2014) of intangible assets can MNEs affect their profit in individual countries according corporate tax with the aim to increase global performance of whole corporation. In old EU member states was in all cases confirmed negative relationship between corporate tax burden and long-term economic growth (Baranová & Janíčková, 2012). Governments can influence FDI location decisions of firms through capital tax rates, countries with lower tax burdens are FDI net recipients (Lanaspá, Pueyo & Sanz, 2008). FDI is sensitive to the host country tax rates and this sensitivity is greater in developing than in developed countries (Mutti & Grubert, 2004). Transition countries have to deal with the challenge of globalization: all countries, whatever their development level and historical background, have to host inward-FDI to stay competitive (Fabry and Zeghni, 2006). However, Cedidlová (2013) means that Central and Eastern European countries behave conservatively and post-communist outlook is alive, model with strict rules for introducing FDI promotional policies is more suitable.

The analysis of locational advantages offered by the Czech Republic, Hungary, Poland, Romania and Slovakia suggests that investors in these countries are mainly interested in low labour costs coupled with a well-trained and educated workforce and an expanding market with high growth rates in the purchasing power of potential buyers (Gauselmann, Knell & Stephan, 2011). Authors Pavlínek and Smith (1998) in their research deal with FDI in the Czech and Slovak Republics. Pavlínek (2008) discussed about advantages of foreign ownership for Czech enterprises, such as access to investment capital, access to sale and distribution networks of parent companies and technology transfer.

Research concerning the FDI determinants and effects especially in Slovakia is limited. Dow & Ferenčíková (2010) directed their research dealing with specific FDI issues: predicting market selection, entry mode choice and performance to Slovakia. An impact of FDI on Slovak economy also analyzed Hošková (2001), indirect effects of FDI commonly referred to as spillovers and its potential in Slovakia defined Fifeková (2008). Positive impact of FDI in Slovakia was demonstrated in past research with the main objective to identify significant quantitative and qualitative effects of FDI; findings published Merková, Rajnoha & Novák (2012) or Merková, Drábek & Jelačic (2012). The results of the correlation and regression analysis was aimed at presenting the dependence in the period 1999-2008 and demonstrated significant dependence between FDI stocks and GDP growth of Slovakia.

The recent research analyzing the macroeconomic statistical data of whole economy was followed by the research at the microeconomic level and was aimed at businesses in various industries in Slovakia. We focused on both - traditional key indicators such as accounting profit, value added, wages and labor productivity as well as non-traditional way of performance measuring. Company managers utilize a number of concepts for the management of performance including Balanced Scorecard (BSC), Economic Value Added, benchmarking and many others (Knápková, Pavelková & Jirčíková, 2010). Petera, Wagner & Menšík (2012) deal with performance measurement and management systems with focus on BSC and they found statistically significant difference between BSC adopters and BSC non-adopters as for utilization of Activity Based Management. Lean manufacturing, team working, continuous process improvement, knowledge management and e-business are just a few of the practices that organizations are using in their search for effectiveness (Chromjaková & Rajnoha, 2012). Skokan, Pawliczek & Piszczur (2013) in their empirical study confirmed the importance of strategic management and strategic planning for gaining competitive advance and better economic results. Each enterprise should have qualified strategy and created its effective way of realization based on the latest management approach (Sujová, Rajnoha & Merková, 2014).

Managing of the company's performance and efficiency is very important. Constantly changing environment significantly affects the overall efficiency and so also the competitiveness of enterprises. One of the conditions to maintain the competitiveness and performance of the company is the ability to work properly and timely with information not only about past and present but also especially about the future (Rajnoha et al., 2014).

### **3 OBJECTIVE AND METHODOLOGY**

#### **3.1 Objective of the research**

The objective of research within solution of grant project interested in business performance measurement and management in Slovakia, financed by the Ministry of Education, Science, Research and Sport of the Slovak Republic was to analyze the extent of the use of traditional and modern indicators, methods and models of performance management on a sample of randomly selected companies in various industries of Slovakia, based on relevant mathematical and statistical methods to identify the cause and subsequent context and determine their influence in achieved business performance.

In this paper we present results of partial research and we focus on area of investment measurement and management. One of the partial objectives was to analyze investment behavior, types and objectives of investment, financing and cost of capital, factors and elements such as routing, form of investment, preparing and valuation of investment projects, we interested in the question of investment risk analysis and so on.

The aim was to demonstrate the relationship between foreign capital and investment management – application of concepts, know-how, tools and practices useful for local business due to foreign firms. Selected mathematical and statistical methods should show that the certain elements of knowledge base are typical only for firms with foreign capital and do not occur and are not used in local firms without foreign investment.

#### **3.2 Research questionnaire and sample**

There was created on-line questionnaire through internet application to build data collection of companies in Slovakia. We maintain complete anonymity of participating firms. The size of research sample was 164 counts. The relatively low frequency resulted mainly from the reluctance of companies, their negative mood and skepticism of economic development, lack of time or lack of interest. Nevertheless, the research sample of 164 firms we consider as relevant with sufficient expressive capability.

#### **3.3 Statistical methods used in the research**

Data from questionnaire were processed and evaluated by chosen statistical methods, we applied chi-squared test, which is commonly used for testing the independence between two categorical variables. The research consists from qualitative – nominal variables, their relationship cannot adequately describes the correlation coefficient. Association between variables we examined with contingency coefficients and contingency tables.

Results of chi-squared tests describe selected statistics: Pearson's ch-square and significance p-value „p“, Maximum-Likelihood chi-square and p-value, Pearson's contingency coefficient (CC), Adjusted contingency coefficient (Adj. CC) and degrees of freedom (df).

$$\text{Pearson's Chi-square: } \chi^2 = \sum_{i=1}^k \left[ (f_{oi} - f_{ei})^2 / f_{ei} \right]; \quad \text{while } \sum (f_o - f_e) = 0 \quad (1)$$

$$\text{Pearson's contingency coefficient CC: } CC = \sqrt{\chi^2 / (\chi^2 + N)} \quad (2)$$

Maximum contingency coefficient  $CC_{\max}$ :  $CC_{\max} = \sqrt{(q - 1)/q}$  (3)

Adjusted contingency coefficient:  $Adj. CC = CC/CC_{\max}$ ; while  $CC \leq CC_{\max}$  (4)

Where:

$f_{o_i}$  – observed frequency in an field of the table,

$f_{e_i}$  – expected (theoretical) frequency in an field of the table,

k – number of cells in the table

N – sample size

q – number of rows or columns (in square tables)

**The Pearson’s Chi-square** (Pearson, 1904) is the most common test for significance of the relationship between categorical variables. This measure is based on the fact that we can compute the expected frequencies in a two-way table (i.e., frequencies that we would expect if there was no relationship between the variables). The *Chi-square* test becomes increasingly significant when the observations deviate further from expected pattern. The value of the *Chi-square* and its significance level depends on the overall number of observations and the number of cells in the table.

**The Maximum-Likelihood Chi-square** (Bishop, Fienberg & Holland 1975) tests the same hypothesis as the Pearson *Chi-square* statistic; however, its computation is based on Maximum-Likelihood theory. In practice, the M-L *Chi-square* is usually very close in magnitude to the Pearson *Chi-square* statistic.

Contingency coefficient is meaningful only if there is a real dependence between variables (Lienert, 1962). This question is tested using the chi-square values. If the value of chi-square corresponds to the probability  $p > 0.05$ , the relationship between variables is not statistically significant and it is not meaningful to count contingency coefficient or analyze the residuals in contingency tables. In the case of  $p \leq 0.05$ , we can characterize the "strength" or "tightness" of relationship between two variables by the appropriate coefficient.

**Pearson's contingency coefficient** we have chosen, because this characteristic can be calculated also for tables of any size and shape (square or rectangular; if any variable is subdivided several members, the number of rows or columns  $q \geq 2$ ). In research, we analyzed the quadratic and rectangular tables; in this article we publish only the results of tables 2x2 and 6x2. In six categories was divided variable "performance" based on indicator Return on Equity (ROE) (six groups; group 0 - worst performance with a negative value of ROE, group 5 - the highest performance with ROE above 10%), all other variables have two categories. The coefficient ranges from 0 (no relationship) to 1 (perfect relationship).

Tab. 1 – Maximum values of contingency coefficient for square tables. Source: Clauss & Ebner (1988)

Number of rows or columns	2	3	4	5	6	7	8
$CC_{\max}$	0,707	0,816	0,866	0,894	0,913	0,926	0,935

Pearson's contingency coefficient may occur in **different maximum values** depending on the number of categories for the studied variables. Clauss & Ebner (1988) report the maximum values for square tables,  $CC_{\max}$  for rectangular tables can be roughly estimated by averaging the maximum values for square tables. From Table 1 we use  $CC_{\max}$  for 2x2 tables, which is

0,707, CCmax for combination of 6 columns and 2 rows we calculated (Formula 3) value CCmax 0,810.

For clear interpretation and relevant comparisons of the contingency coefficients of several analyzes we calculated **adjusted contingency coefficient** (Adj. CC), which takes into account the calculated CC and the corresponding CCmax (Formula 4). That ranges from 0 to 1, values close to 1 mean a stronger dependence of two variables.

The term **contingency table** first used Pearson (1904). It is a method of organizing and analyzing data by groups, categories or classes, which allows them to be compared. It combines the frequency distribution of two variables and represents an extension of simple frequency table. It contains the observed frequencies, expected frequencies and the difference between observed and expected frequencies (residuals).

The only assumption underlying the use of the Chi-square (other than random selection of the sample) is that the expected frequencies are not very small. The 2x2 tables would be the value of the expected frequency for each cell being in a table greater than 5. When the expected cell frequencies fall below 5, those probabilities cannot be estimated with sufficient precision. For larger tables, compliance of this condition is often problematic. The result is inaccurate approximation of the test characteristics of the chi-square probability distribution. However, according to Finkelstein & Levin (2001), for tables larger than 2x2 it is recommended to have at least 80% of the expected frequency of greater than 5 or not the expected frequency of less than 1 in more than 10 % of cases.

## **4 RESULTS**

In presenting results we focused on statistically significant dependence (p-value < 0.05, which is the alpha level associated with a 95% confidence level) between firms with foreign capital and the use of various tools, practices and manners from knowledge base of investment management. For each association we present the results of statistics and contingency tables. Just from the results of residuals we can demonstrate relevant, scientifically based findings and to state certain logical conclusions presented below.

### **4.1 Business performance**

From the descriptive statistics of variable performance (categorized according the ROE indicator into 6 groups), presented on Figure 1 shows mean 2.06, companies in average create positive, but relatively low Return on Equity in the range of 2-4 % in Slovakia. Median is at level 2. Modus, the maximum frequency is represented in the second group with a performance at the level of 0-2 % ROE, which includes 47 (29 %) of the total sample of enterprises.

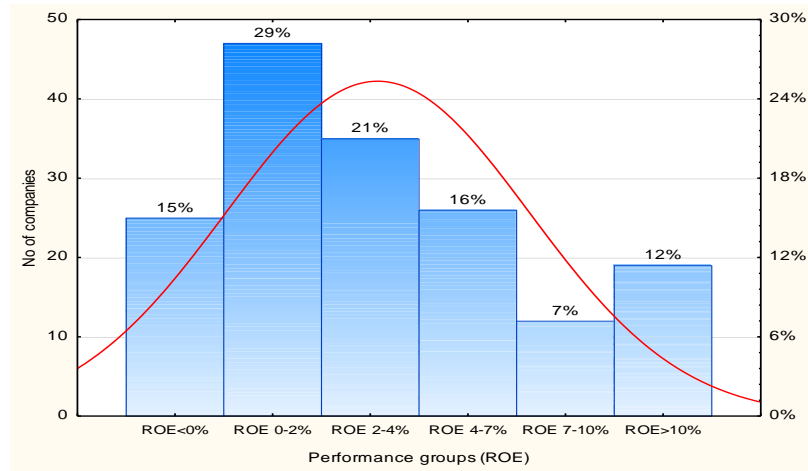


Fig. 1 – Business Performance (ROE indicator). Source: own elaboration.

The starting point of the research was to find out the difference in performance of firms with purely domestic capital compared to companies with foreign participation (partial or full foreign ownership). Analysis presented in Tab. 2 means statistically strongly significant dependence ( $p$  value  $<0.001$ ) with Adj. CC 0.40. From the values of residues (Tab. 3) we show that firms with purely domestic capital typically merit in group 1 (very low ROE in the range of 0-2%), enterprises with foreign participation are sorted in better performance groups, most typically with ROE above 10%. These results demonstrate a statistically significant impact of foreign capital in better business performance.

Tab. 2 – Contingency: Foreign ownership x Performance – Statistics. Source: own work.

Foreign investment x Performance (Statistics)	Chi-square	df	p
Pearson's Chi-square	19.20522	df=5	<b>p=0.00176</b>
M-L Chi-square	21.31605	df=5	<b>p=0.00071</b>
Contingency coefficient (CC)	0.32		
Maximum contingency coefficient (CCmax)	0.81		
Adjusted contingency coefficient (Adj. CC)	<b>0.40</b>		

Tab. 3 – Contingency: Foreign ownership x Performance – Frequencies. Source: own work.

Foreign investment x Performance	Group 0 ROE<0	Group 1 ROE: 0-2%	Group 2 ROE: 2-4%	Group 3 ROE: 4-7%	Group 4 ROE: 7-10%	Group 5 ROE>10%	Row Totals
<b>Observed Frequencies</b>							
Domestic ownership	18	44	26	16	6	10	120
Foreign ownership	7	3	9	10	6	9	44
Totals	25	47	35	26	12	19	164
<b>Expected Frequencies</b>							
Domestic ownership	18.292	34.390	25.609	19.024	8.7804	13.902	120.00
Foreign ownership	6.7073	12.609	9.3902	6.9756	3.2195	5.0975	44.00
Totals	25.000	47.000	35.000	26.000	12.000	19.000	164.00
<b>Residual Frequencies</b>							
Domestic ownership	-0.2926	<b>9.6097</b>	<b>0.3902</b>	-3.0243	-2.7804	-3.9024	0.00
Foreign ownership	0.2926	-9.6097	-0.3902	<b>3.0243</b>	<b>2.7804</b>	<b>3.9024</b>	0.00
Totals	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.00

#### 4.2 Investments to knowledge base

We asked in the questionnaire which kind of investment is dominant (crucial) in companies and were founding an association with home or foreign ownership. There is a statistically significant relationship in two kinds of crucial investment (Tab. 4 and 6):

- Intangible assets as know-how, innovations, brands, reputations, other knowledge capital, patents, licenses, rights, software, etc.,
- Investment in Research & Development (R&D).

Residual frequencies demonstrate in both cases (Tab. 5 and 7) that occurrence of these kinds of crucial investment is more typical for foreign firms. Companies with foreign investor focus on certain types of investments providing knowledge flows towards local firms.

Tab. 4 – Contingency: Foreign ownership x Intangibles – Statistics. Source: own work.

Foreign investment x Intangible assets (Statistics)	Chi-square	df	p
Pearson's Chi-square	3.831931	df=1	p=0.05
M-L Chi-square	3.729946	df=1	p=0.05
Contingency coefficient (CC)	0.15		
Adjusted contingency coefficient (Adj. CC)	0.21		

Tab. 5 – Contingency: Foreign ownership x Intangibles– Frequencies. Source: own work.

Crucial Investment: Intangible assets	Domestic ownership	Foreign ownership	Row Totals
<b>Observed Frequencies</b>			
Intangibles is not crucial investment	85	24	109
Intangibles is crucial investment	35	20	55
Totals	120	44	164
<b>Expected Frequencies</b>			
Intangibles is not crucial investment	79.7561	29.24390	109.0000
Intangibles is crucial investment	40.2439	14.75610	55.0000
Totals	120.0000	44.00000	164.0000
<b>Residual Frequencies</b>			
Intangibles is not crucial investment	<b>5.24390</b>	-5.24390	0.00
Intangibles is crucial investment	-5.24390	<b>5.24390</b>	0.00
Totals	0.00000	0.00000	0.00

Tab. 6 – Contingency: Foreign ownership x R&D – Statistics. Source: own work.

Foreign investment x R&D (Statistics)	Chi-square	df	p
Pearson's Chi-square	7.287867	df=1	p=0.00694
M-L Chi-square	6.517981	df=1	p=0.01068
Contingency coefficient (CC)	0.21		
Adjusted contingency coefficient (Adj. CC)	0.30		

Tab. 7 – Contingency: Foreign investment x R&D – Frequencies. Source: own work.

Crucial Investment: R&D	Domestic ownership	Foreign ownership	Row Totals
<b>Observed Frequencies</b>			
R&D is not crucial investment	111	34	145
R&D is crucial investment	9	10	19
Totals	120	44	164
<b>Expected Frequencies</b>			
R&D is not crucial investment	106.0976	38.90244	145.0000
R&D is crucial investment	13.9024	5.09756	19.0000
Totals	120.0000	44.00000	164.0000
<b>Residual Frequencies</b>			
R&D is not crucial investment	<b>4.90244</b>	-4.90244	0.00
R&D is crucial investment	-4.90244	<b>4.90244</b>	0.00
Totals	0.00000	0.00000	0.00

### 4.3 Comprehensive approach to investment valuation methods

There are several approaches how to value economic effectiveness of investment and which methods or indicators are used in companies. The most frequently mentioned methods in theory are Net Present Value and Internal Rate of Return (e.g. Levy & Sarnat, 1986; Khan, 1993; Brealey & Myers, 2003, etc.) considering the discount rate. Discounted cash flow valuation is based on expected future cash flows and discount rates. While discounted cash flow valuation is only one of the three ways of approaching valuation, it is the foundation on which all other valuation approaches are built (Damodaran, 2012). Brealey & Myers (2003) also deal with often used indicators Return on Investment or Return on Equity, but these methods do not take into account the time factor. Cost criteria (discounted cost method) commonly used in manufacture industries (Popesko, 2010) compare different technical and production alternatives of investments, and their goal is not maximizing the benefits, but estimating the parameters, which the investment has to fulfill (Tuček, Tučková & Zámečník, 2009).

We asked about four types of methods in questionnaire section aimed in investment valuation indicators:

- Annual indicators without time value of money (profit, cash flow, cost, earnings, payback period and return on investment) were the first group. The research demonstrated the statistically significant relationship between foreign firms and use of the ROI indicator (Tab. 8 and 9).
- In the second group were long-term indicators considering time value and cost of capital, it means methods based on discounted values (net present value, internal rate of return, profitability index and discounted payback period). In analysis of individual methods does not exist any association, but generally, use of discounted cash flow methods is statistically significant and typical for foreign firms (Tab. 10 and 11).
- The third group covered methods used in investment controlling (modified internal rate of return and net final value) and the results are similar like in the second group, for individual method no one relationship (low counts), but use of controlling methods and foreign companies means significant contingency (Tab. 12 and 13).

- The last group contained additional indicators for support decision-making (break-even point and others). There was not found out any significance.

Finally, results of the research in part of valuations methods defined several statistically significant dependences and declare comprehensive approach to investment economic valuation.

Tab. 8 – Contingency: Foreign ownership x Use of ROI indicator – Statistics. Source: own work.

Foreign investment x Use of ROI indicator (Statistics)	Chi-square	df	p
Pearson's Chi-square	5.822746	df=1	p=0.01582
M-L Chi-square	5.451510	df=1	p=0.01955
Contingency coefficient (CC)	0.18		
Adjusted contingency coefficient (Adj. CC)	0.26		

Tab. 9 – Contingency: Foreign ownership x Use of ROI indicator – Frequencies. Source: own work.

Use of ROI indicator	Domestic ownership	Foreign ownership	Row Totals
<b>Observed Frequencies</b>			
Without ROI indicator	100	29	129
Use of ROI indicator	20	15	35
Totals	120	44	164
<b>Expected Frequencies</b>			
Without ROI indicator	94.3902	34.60976	129.0000
Use of ROI indicator	25.6098	9.39024	35.0000
Totals	120.0000	44.00000	164.0000
<b>Residual Frequencies</b>			
Without ROI indicator	<b>5.60976</b>	-5.60976	0.00
Use of ROI indicator	-5.60976	<b>5.60976</b>	0.00
Totals	0.00000	0.00000	0.00

Tab. 10 – Contingency: Foreign ownership x Use of Discounted cash flow valuation – Statistics. Source: authors.

Foreign investment x Use of Discounted cash flow valuation (Statistics)	Chi-square	df	p
Pearson's Chi-square	9.508447	df=1	p=0.00205
M-L Chi-square	9.506910	df=1	p=0.00205
Contingency coefficient (CC)	0.23		
Adjusted contingency coefficient (Adj. CC)	0.33		

Tab. 11 – Contingency: Foreign ownership x Use of Discounted cash flow valuation – Frequencies. Source: own work.

Use of Discounted cash flow valuation	Domestic ownership	Foreign ownership	Row Totals
<b>Observed Frequencies</b>			
Without Discounted cash flow valuation	76	16	92



Use of Discounted cash flow valuation	44	28	72
Totals	120	44	164
<b>Expected Frequencies</b>			
Without Discounted cash flow valuation	67.3171	24.68293	92.0000
Use of Discounted cash flow valuation	52.6829	19.31707	72.0000
Totals	120.0000	44.00000	164.0000
<b>Residual Frequencies</b>			
Without Discounted cash flow valuation	<b>8.68293</b>	-8.68293	0.00
Use of Discounted cash flow valuation	-8.68293	<b>8.68293</b>	0.00
Totals	0.00000	0.00000	0.00

Tab. 12 – Contingency: Foreign ownership x Use of investment controlling – Statistics.

Source: own work.

Foreign investment x Use of investment controlling (Statistic)	Chi-square	df	p
Pearson's Chi-square	7.698221	df=1	p=0.00553
M-L Chi-square	6.635690	df=1	p=0.01000
Contingency coefficient (CC)	0.21		
Adjusted contingency coefficient (Adj. CC)	0.30		

Tab. 13 – Contingency: Foreign ownership x Use of investment controlling – Frequencies.

Source: own work.

Use of investment controlling	Domestic ownership	Foreign ownership	Row Totals
<b>Observed Frequencies</b>			
Without investment controlling	117	38	155
Use of investment controlling	3	6	9
Totals	120	44	164
<b>Expected Frequencies</b>			
Without investment controlling	113.4146	41.58537	155.0000
Use of investment controlling	6.5854	2.41463	9.0000
Totals	120.0000	44.00000	164.0000
<b>Residual Frequencies</b>			
Without investment controlling	<b>3.58537</b>	-3.58537	0.00
Use of investment controlling	-3.58537	<b>3.58537</b>	0.00
Totals	0.00000	0.00000	0.00

#### 4.4 Investment project preparation

Theory fundamentals for an importance of investment project preparation, their content, structure, range or quality describes for example Bangs (1995) or Blackwell (1989). In evaluation of particular investment project we evaluate their suitability, efficiency and feasibility (Rajnoha, Jankovský, & Merková, 2014). Preparation of investment projects is the main assumption for successful realization and use of an investment, according Drábek & Polách (2008) we evaluate the impact of the investment project on total effectiveness, prosperity and financial stability of the company. Due to appropriate and precise investment

project can companies react quickly and adequately to changes in surrounding conditions, increase the hope to succeed in given entrepreneurial activities and gives presumptions for improving long-term economic results of the enterprise. If local firms do not make any investment projects, or they make them in non-adequate way, it can be the factor of failure.

Preparation of investment projects considering local or foreign firms is typical for the second mentioned group, against the local firms without extensive making of business or investment projects (Tab. 14 and 15). Although most domestic enterprises prepare investment projects, it is not sufficient in relation to foreign companies and the relationship between investment projects and foreign capital is statistically significant.

Tab. 14 – Contingency: Foreign ownership x Investment project preparation – Statistics.

Source: own work.

Foreign investment x Investment project preparation (Statistics)	Chi-square	df	p
Pearson's Chi-square	5.804882	df=1	p=0.01598
M-L Chi-square	6.635459	df=1	p=0.01000
Contingency coefficient (CC)	0.18		
Adjusted contingency coefficient (Adj. CC)	0.26		

Tab. 15 – Contingency: Foreign ownership x Investment project preparation – Frequencies.

Source: own work.

Investment project preparation	Domestic ownership	Foreign ownership	Row Totals
<b>Observed Frequencies</b>			
Without investment projects	32	4	36
Preparation of investment projects	88	40	128
Totals	120	44	164
<b>Expected Frequencies</b>			
Without investment projects	26.3415	9.65854	36.0000
Preparation of investment projects	93.6585	34.34146	128.0000
Totals	120.0000	44.00000	164.0000
<b>Residual Frequencies</b>			
Without investment projects	<b>5.65854</b>	-5.65854	0.00
Preparation of investment projects	-5.65854	<b>5.65854</b>	0.00
Totals	0.00000	0.00000	0.00

#### 4.5 Emphasis on investment risk analysis

The last presented result demonstrates statistically significant dependence between use of risk analysis and foreign firms (Tab. 16). Although from observed frequencies is evident, that most enterprises (local and foreign) do not use any methods for risk analysis, share of use in foreign companies is in greater extent; or on the other side, only few local companies emphasis on investment risk analysis (Tab. 17).

The research in this part contained also individual risk analysis methods (statistical, simulation Monte Carlo, Hertz model, sensitivity analysis, cost of capital rate correction, decision tree, etc.), but there was not any significant relationship considering each one. So, firms use the risk analysis, but they do not know or want to specify any method.

Tab. 16 – Contingency: Foreign ownership x Risk analysis – Statistics. Source: own work.

Foreign investment x Risk analysis (Statistics)	Chi-square	df	p
Pearson's Chi-square	5.094434	df=1	p=0.02400
M-L Chi-square	4.735888	df=1	p=0.02954
Contingency coefficient (CC)	0.17		
Adjusted contingency coefficient (Adj. CC)	0.24		

Tab. 17 – Contingency: Foreign ownership x Risk analysis – Frequencies. Source: own work.

Risk analysis	Domestic ownership	Foreign ownership	Row Totals
<b>Observed Frequencies</b>			
Without risk analysis	103	31	134
Use of risk analysis	17	13	30
Totals	120	44	164
<b>Expected Frequencies</b>			
Without risk analysis	98.0488	35.95122	134.0000
Use of risk analysis	21.9512	8.04878	30.0000
Totals	120.0000	44.00000	164.0000
<b>Residual Frequencies</b>			
Without risk analysis	<b>4.95122</b>	-4.95122	0.00
Use of risk analysis	-4.95122	<b>4.95122</b>	0.00
Totals	0.00000	0.00000	0.00

## 5 DISCUSSION

Results of the research highlight several facts. At first, local firms don't use or use in low level some sophisticated practices, techniques, concepts or methods in investment management and they achieve worse performance. There are several reasons for absence of some modern and useful knowledge fundamentals in local firms. The most important is lack of capital to buy or form own know-how. But it is possible to mention the typical sign of local firms - indifference and aversion to use new and unfamiliar tools, they do not understand those. If company doesn't trust them, it doesn't expect possible future effects and performance improve.

Second, just foreign investors bring and implement tools using in investment decision-making, measurement and management, what cause better business performance. Local firms benefit from entry of MNEs and improve own knowledge base. Investments focused in intangibles and R&D are connected with sophisticated production, higher added value and economic growth. Foreign firms benefit from advantages, which the host country provides, uses inexpensive raw material resources and particularly the cheap labor force, which is the main comparative advantage of Slovakia. This reality is often criticized as exploitation of workers and natural resources without the positive impact in the economic growth of country. However, it is important to perceive proved positives, advanced technology in transition country of Slovakia is precisely because foreign-owned firms. Supported result refutes

skeptical views of the FDI opponents, who argue that foreign firms in Slovakia only use outdated tools and procedures without requirements to develop and improve their knowledge base.

## **6 CONCLUSION**

Based on the scientific conclusions and the results of previous research, in which we have shown the positive effects of the FDI at the level of macro environment, we then hypothesized certain influence of foreign firms in microeconomics and we tested if companies with foreign capital are performing better. Current research has statistically confirmed that better business performance is significantly dependent on financing from foreign capital. The best performing companies (the most typically reaching of ROE above 10%) are mainly or wholly financed from abroad, and vice versa, for purely domestic firms are characteristic lower performance with a value of ROE in the range of 0-2%.

Consequently, we analyzed benefits, development and knowledge improvement comparing local and foreign firms. The research of various parameters in the particular area found out, that for the companies with foreign participation are typical certain elements of investment management:

- Focus in certain type of investments (intangible assets, research and development) providing knowledge flows towards local firms,
- Comprehensive approach to investment effectiveness valuation covered the ROI indicator, long-term indicators based on discounted cash flows and methods used in investment controlling,
- Preparation of investment projects,
- Emphasis on investment risk analysis.

Of course, we reflect the foreign knowledge flows in field of investment measurement and management is only part of business development. We simultaneously realize the research aimed at other strategic parameters, modern tools, concepts and methods as an asset of FDI in local firms.

### **Acknowledgements**

This paper is the result of a partial solution of the Ministry of Education grant project VEGA VEGA project no. 1/0513/14 – Theoretical analysis of the practice of human resources.

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## **STATISTICAL COMPARISON OF OECD MEMBER COUNTRIES HEALTHCARE EFFICIENCY BASED ON CHOSEN MACROECONOMICS INDICATORS**

*Martin Mikeska, Petr Klímek, Pavla Staňková*

### **Abstract**

The paper presents a statistical comparison of OECD member countries healthcare efficiency based on chosen macroeconomics indicators. Such comparison is perceived as problematic due to numerous economic specifications of the countries under comparison. These countries historically consume a significant proportion of their GDP to ensure public health of their citizens. All present-day healthcare systems are based on the prerequisite of future prosperity, sustainable wages and demographic growth. These systems are efficient in the times of industrial development where long-term employment with high wages is reached. However, all OECD countries have recently found themselves in the economic stagnation, real wage slump and the demographic decline. Dropping income into healthcare systems along with the growing expenditures create high deficits of public and private finances. Such changes have raised a question of which of the present-day healthcare systems is economically the most efficient and sustainable in the long run. To compare chosen economic parameters statistical testing of the significance of differences among healthcare systems with one-way analysis of variance (one factor ANOVA) is used. When conditions for its use are not fulfilled (especially the homogeneity of variance), which is tested by Hartley test, an adequate non-parametric Kruskal-Wallis test is applied. The paper suggests a conclusion that no major statistical dependence of the chosen macroeconomic aspects of various healthcare systems in the OECD countries exists.

*Keywords: Statistical Comparison, Macroeconomic Aspects, Healthcare Systems, Health Expenditure*

JEL Classification: E6, H51, I13

### **1 INTRODUCTION**

Present-day OECD countries feature four basic healthcare systems comparison of which is highly problematic. In the majority of cases the compared expenditures of public budgets and private expenditures covering the overall healthcare are compared from the view of macroeconomic factors. From the view of the economic principles of each healthcare system a pressure is obvious for the responsibility of an individual to sustain one's own health but also for the population health. Population health is placed higher than the health of an individual from the point of view of the economic importance of healthy workforce. A person's health is an indivisible part of population health, as is suggested by Arah (2009, p. 235). He claims that health of an individual must be seen in the context of "socioeconomic circumstances and other health determinants of where they were conceived, born, bred, and how they shaped and were shaped by their environment and communities, especially given the prevailing population health exposures over their lifetime."

The first healthcare system ensuring the collective health originated in the 19<sup>th</sup> century industrially developing Germany and it is known as Bismarck system until today (Němec, 2008; Jarošová, 2007). It was Chancellor Bismarck who linked health of citizens (thus employees) to the work productivity. He supposed the public system of health insurance



would realize economies of scale and the healthy workforce would offer higher work efficiency. Employees pay a part of their wages and employers pay healthcare system contributions from which healthcare is provided for everybody. Employees pay more from their higher wages thus creating favorable conditions for higher standards of healthcare.

Presently the OECD countries are considered to be industrial or postindustrial. They consume a significant proportion of their GDP to ensure public health of their citizens. Majority of the healthcare systems of the industrialized societies has been financed from the taxes and wages of the employed citizens. After the deindustrialization trend and the shift towards the economy of services started developing after 1970 in the OECD countries, the principle of employment and wages changed. Shift work changed to work on demand with many employers. Deep structural changes of OECD economies together with the growth of unemployment caused the shortfall of healthcare systems revenues. Based on the lower income into healthcare systems, a requirement for higher efficiency of healthcare systems and search for new sources of income has originated.

Some authors state that an important source of income into healthcare systems was found in direct patient fees (Tučková, Fialová, Popesko, 2011). In the Czech Republic, for example, these so called regulatory fees were supposed to bring shortening of waiting time for intervention, shortening of the hospitalization period, bring more money into treatment of serious diseases, increase the availability of healthcare and improve the patients' comfort by eliminating the possible overuse of medical services.

Based on such economic situation the specialized and lay public has been conducting debates about which of the basic healthcare systems is the most competitive. The aim of these debates is clear: to find the cheapest and the most effective healthcare system for the wide masses of citizens.

## **2 THEORETICAL BACKGROUND**

According to WHO (2013), the healthcare system can be defined as all the activities the aim of which is to support, renew or sustain health of a man. Four basic healthcare systems and several mixed systems (not classified in any of the basic categories) are identified in the 39 OECD countries. Chile and Ireland are considered to have mixed systems. Healthcare systems of the other OECD countries can be divided by the way of healthcare payment into:

- a) The Universal Health Insurance Model – healthcare systems based on universal health insurance, such as the Bismarck healthcare insurance system;
- b) The National Health Insurance Model – based on the principle of national healthcare service financed from the taxes, thus from the state budget – the Semashko and the Beveridge healthcare insurance systems. Contrary to the Semashko model the Beveridge model comprises a share of private healthcare service;
- c) The Out-of-Pocket Model – healthcare systems based on the market healthcare and individual responsibility of the citizens – Liberal and Mixed Models.

### **2.1 The Bismarck healthcare system**

The Bismarck model, based on the obligatory social insurance, was created and realized in industrial Prussia. Until the WWII it worked basically in all developed European countries. The basis of its functioning is to create within legally set limits the so called public funds, into which special purpose fees for social care and healthcare are paid. These funds are managed by healthcare insurance companies via elected management. The health care is paid for from the obligatory payments for health insurance, which consists of payments by the employees, employers and the state. The insurance sum is set with regard to the insured person's income. The provided healthcare is contracted through health insurance companies. The residents

register and become insured with one of the insurance companies. In some countries the insurance policy covers the family members who are currently unemployed. The insurance companies are non-government organizations managing the insurance funds. This system works (with slight differences) in Germany, France, Austria, Switzerland and Benelux (Lameire et al., 1999) and some other countries (see Tab. 2).

## **2.2 Semashko healthcare system**

According to Dragoi et al. (2008, p. 331) Semashko centralized healthcare system was typical for the former socialist countries of the Central and Eastern Europe. Gladkij et al. (2003, p. 36) claim that in such a system all healthcare units are owned by the state, there are no private healthcare organizations, healthcare is paid for from the state income directly via state budget, healthcare is considered to be a national economy sector, it is planned centrally and is provided “free of charge”. Healthcare workers are state employees and are remunerated with a wage. From the macroeconomic perspective healthcare in this system is considered to be a non-productive sector which results in low economic priority. Such healthcare type was terminated together with the transformations of centrally planned economies into market economies after 1990. Countries using the Semashko model typically transformed into using the Bismarck system. Cuba and North Korea are the only two countries currently using the Semashko model.

## **2.3 Beveridge healthcare system**

The Beveridge model is based on a single payer and is financed by national taxation. It is a model traditionally used in the United Kingdom, where a National Health Service provides publicly financed services. It also provides access to hospital specialists for which one must usually have a referral from a general practitioner (Bevan, Helderman and Wilsford, 2010, p. 252). The Beveridge Model of National healthcare service was elaborated on in Great Britain in 1948 according to the Beveridge Report from 1942, which reflected the changes of Swedish healthcare system in the 1930s. It departs from the principle of ensuring the healthcare for all citizens regardless their payment possibilities. As a part of their taxation citizens pay a proportion of their income into the state budget from which healthcare is paid for – with a significant influence of the state. In this system the majority of the specialized inpatient care facilities, laboratories and X-ray facilities are a part of hospitals which in turn are a part of national healthcare service. Private beds are rather rare. General practitioners’ offices, dentists’ offices, pharmacies, specialized surgeries, a large proportion of nursing homes and nursing care are in private ownership. This system is used in various modifications in Italy, Spain, Sweden, Denmark, Norway, Finland (Lameire et al., 1999) and some other countries (see Tab. 2).

## **2.4 Liberal: Market-driven healthcare system**

The Liberal Model of healthcare is based on the presumption that healthcare is an individual’s issue. Healthcare services are understood as a type of service running according to the market rules. Patient is taken as a client and doctor as an entrepreneur. Private healthcare insurance operates in this system. Employer partly contributes towards the health insurance of its employees. State here is a coordinating and regulatory body. Apart from this, non-profit charity facilities exist in the system as well as state hospitals offering the basic healthcare for poor citizens without healthcare insurance. According to Paterick, Z., Paterick, T. and Waterhouse (2009, p. 11), the Liberal Model is a comprehensive healthcare system that comprises some competitive elements regarding prices and the quality of services, but also makes available “accurate, transparent, data-supported information”. This system operates in the USA, some South American countries and other countries (see Tab. 2).

## 2.5 Comparisons of healthcare systems

The four major healthcare systems differ mainly due to their historical and economic background which in each case required different needs to ensure public healthcare. The following table (Tab. 1) shows the main advantages and disadvantages of the four systems as concluded by Gladkij (2003, p. 28).

Tab. 1 – Comparison of advantages and disadvantages of healthcare systems. Source: Gladkij (2003, p. 28)

	Advantages	Disadvantages
The Bismarck model	Wide availability of healthcare Satisfactory network of healthcare facilities Rich offer of healthcare services Continuity of healthcare services Support of primary care Adequate costs	Emphasis on basic care Administrative ponderousness Financial situation of some insurance institutions and the influence of their management on providing the offered healthcare Rising costs for healthcare through the activities of insurance institutions
The Semashko model	Wide availability of healthcare Rich offer of healthcare services Network of healthcare facilities Continuity of healthcare services Support of primary care Adequate costs for healthcare	Rising costs for healthcare through the activities of insurance institutions Emphasis on basic care Financial situation of some insurance institutions and the influence of their management on providing the offered healthcare Administrative inflexibility
The Beveridge model	General availability of services Sufficient offer of services Adequate importance of preventive care Interconnectedness of healthcare services Lower costs of healthcare services Good coordination of healthcare subjects' interests	Lack of financial resources for investments Problems with financing the care during recession Long waiting periods for non-urgent interventions Insufficient motivation of citizens for their own healthcare Limiting of competitive environment
The Liberal model	Wide range of high-quality services Support and development of medical technologies Support of competitiveness of healthcare facilities	Insufficient preventive care High administrative costs Low availability of high-quality care for low-income groups of citizens Nonexistent interconnections in healthcare services High healthcare costs

Present situation in OECD countries is represented by only three main healthcare systems: Bismarck, Beveridge and Liberal model. Since 1990s, the Semashko model is no longer in use in European countries.

The following table (Tab. 2) shows economic and noneconomic factors which can illustrate the differences of the three chosen healthcare systems. The factors are divided into two main areas. The first area comprises quantitative factors - healthcare resources; the second area comprises qualitative factors - health status. Both of them are measured in all OECD member states thus enabling comparison across all healthcare systems. Affordability of healthcare system can be discussed by comparing the numbers of physicians, nurses and hospital beds per 1000 citizens. Quality of healthcare and health services provided by state or private institutions can be compared by evaluating of life expectancy and infant mortality data.

Tab. 2 – Health expenditure according to healthcare system by OECD countries; 2010 (or nearest year). Source: OECD Health Statistics, 2010.

HEALTH EXPENDITURE	HEALTHCARE RESOURCES	HEALTH STATUS (MORTALITY)	MODEL*
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Finance and Performance of Firms in Science, Education and Practice*

OECD Country	Total expenditure on health, % gross domestic product	Annual growth rate of total expenditure on health, in real terms	Annual growth rate of public expenditure on health, in real terms	Public expenditure on health, % total expenditure on health, THE	Health expenditure by financing agent/scheme, Out-of-pocket payments (households), % total expenditure on health, THE	Physicians, Density per 1 000 population (head counts)	Nurses, Density per 1 000 population (head counts)	Total hospital beds, Per 1 000 population	Life expectancy, Total population at birth, Years	Infant mortality, Deaths per 1 000 live births	Bismarck, Beveridge, Liberal, Mixed
Australia	9,1	4,6	4,9	68,5	3670,20	3,08	10,06	3,73	81,80	4,10	LIB
Austria	11,0	2,5	2,6	76,2	4394,80	4,78	7,67	7,63	80,70	3,90	BIS
Belgium	10,5	4,1	4,2	75,6	3968,80	2,92	15,06	6,44	80,30	3,50	BIS
Canada	11,4	4,5	4,6	71,1	4444,90	2,37	9,34	3,19	80,80	5,10	BEV
Chile	8,0	8,5	7,7	48,2	1202,20	1,43	1,51	2,04	79,00	7,90	MIX
Czech Republic	7,5	5,1	4,3	83,8	1883,50	3,58	8,06	7,01	77,70	2,70	BIS
Denmark	11,1	3,1	3,2	85,1	4463,90	3,48	15,44	3,50	79,30	3,40	BEV
Estonia	6,3	5,4	5,6	78,9	1293,80	3,24	6,13	5,33	75,60	3,30	BIS
Finland	8,9	4,0	4,4	74,5	3250,90	3,27	9,58	5,85	80,20	2,30	BEV
France	11,6	2,6	2,3	77,0	3974,00	3,27	8,45	6,42	81,30	3,60	BIS
Germany	11,6	2,0	1,7	76,8	4338,40	3,73	11,27	8,25	80,50	3,40	BIS
Greece	10,2	4,8	4,7	59,4	2913,70	6,13	3,31	4,85	80,60	3,80	BEV
Hungary	7,8	2,8	1,9	64,8	1600,50	2,87	6,22	7,18	74,30	5,30	BIS
Iceland	9,3	2,0	1,9	80,4	3309,30	3,60	14,54	5,79	81,50	2,20	BEV
Ireland	9,2	6,7	5,9	69,5	3718,20	3,13	13,07	3,14	81,00	3,80	MIX
Israel	7,5	3,0	2,6	60,5	2071,10	3,50	4,76	3,31	81,70	3,70	BEV
Italy	9,3	1,9	2,8	79,6	2963,70	3,68	6,30	3,52	82,00	3,40	BEV
Japan	9,5	2,7	2,6	80,5	3034,60	2,23	10,11	13,62	83,00	2,30	LIB
Korea	7,1	9,0	11,0	58,2	2035,40	1,99	4,63	8,76	80,70	3,20	LIB
Luxembourg	7,9	3,4	3,2	84,0	4786,00	2,77	11,10	5,37	80,70	3,40	BIS
Mexico	6,2	3,8	4,0	47,3	915,70	2,03	2,48	1,64	75,50	14,10	LIB
Netherlands	12,0	5,4	8,2	85,7	5056,20	2,92	8,40	4,66	80,80	3,80	BIS
New Zealand	10,1	5,5	6,2	83,2	3022,10	2,61	10,03	2,74	81,00	5,20	BEV
Norway	9,4	3,2	3,6	85,5	5387,60	4,07	14,39	3,30	81,20	2,80	BEV
Poland	7,0	6,4	6,6	71,7	1388,70	2,18	5,26	6,59	76,30	5,00	BIS
Portugal	10,7	2,1	2,0	65,8	2727,70	3,82	5,65	3,35	79,80	2,50	BEV
Slovak Republic	9,0	10,1	6,5	64,5	2095,50	3,34	6,03	6,42	75,20	5,70	BIS
Slovenia	9,0	3,6	3,4	72,8	2428,50	2,43	8,19	4,57	79,50	2,50	BIS
Spain	9,6	5,0	5,4	74,2	3055,70	3,78	4,88	3,16	82,20	3,20	BEV
Sweden	9,6	3,7	3,2	81,0	3757,70	3,80	11,00	2,73	81,50	2,50	BEV
Switzerland	11,4	2,8	4,5	65,2	5269,60	3,81	16,03	4,97	82,60	3,80	LIB
Turkey	6,1	7,1	9,1	73,0	913,00	1,69	1,60	2,52	74,30	10,10	BIS
United Kingdom	9,6	4,9	5,5	83,2	3433,20	2,71	9,60	2,96	80,60	4,20	BEV
United States	17,6	4,2	5,4	48,2	8232,90	2,44	10,95	3,08	78,70	6,10	LIB
OECD Average	9,47	4,43	4,58	72,18	3264,76	3,14	8,56	4,93	79,76	4,29	
* own processing											
BIS Average	9,02	4,65	4,58	75,74	2932,44	3,06	7,96	6,03	78,25	4,32	BIS
BEV Average	9,75	3,67	3,85	75,67	3446,27	3,60	9,14	3,71	80,95	3,41	BEV
LIB Average	10,15	4,52	5,40	61,33	3859,73	2,60	9,04	5,97	80,38	5,60	LIB
MIX Average	8,60	7,60	6,80	58,85	2460,20	2,28	7,29	2,59	80,00	5,85	MIX

### 3 METHODOLOGY

Primary economic indicators comprise indicators regarding health expenditures. Statistical links are searched for between these indicators to prove differences between individual healthcare systems. In order to compare the healthcare systems as such it is also important to compare non-economic factors such as healthcare resources and health status.

The stated research question asks if various models of health systems differ from each other. Following main indicators were selected from OECD data to answer this question:

- I. Total expenditure, % GDP
- II. Annual growth rate of total expenditure on health, in real terms
- III. Annual growth rate of public expenditure on health, in real terms
- IV. Public expenditure on health, % total expenditure on health (TEH)

- V. Health expenditure by financing agent/scheme, Out-of-pocket payments (households), % total expenditure on health (TEH)

The following main statistical hypotheses (null and alternative) were set:

H<sub>0</sub>: There is no difference among healthcare systems in the selected indicator.

H<sub>1</sub>: There is a difference among healthcare systems in the selected indicator.

Upon having chosen the five indicators the null hypothesis is tested five times on XLStatistics software. One-way analysis of variance (one factor ANOVA) is used to test the significance of differences among healthcare systems. Condition for its use (in particular the homogeneity of variances) is tested by the Hartley's test. If this condition is not fulfilled, the Kruskal-Wallis test is applied to test the null hypothesis. The post-hoc multiple comparison test is applied in the case of rejection of the null hypothesis, thus demonstrating the difference between the models of healthcare systems (Scheffé test for one-way analysis of variance or Néményi test for Kruskal-Wallis test).

### 3.1 One factor ANOVA

Suppose experiment where only one factor is treated. This factor can be either numerical or categorical. It is used at  $I \geq 2$  levels  $A_1, A_2, \dots, A_I$ . The total number of observations in the whole experiment is  $n$ . The analysis of variance (ANOVA) is a technique designed to divide the total variation in a set of data into its component parts, each of which can be ascribed to a particular source. We test the null hypothesis  $H_0$  that the effects on all levels of A-factor are the same. The test statistic for ANOVA is  $F = \frac{S_A / (I - 1)}{S_e / (n - I)}$ . If  $F \geq F_{1-\alpha}(I - 1, n - I)$ , the null

hypothesis is rejected; otherwise it is not rejected. It means that factor A is significant (effects are different, for  $\alpha$ -level). The use of ANOVA assumes equal variances. This equality can be tested by Hartley's test. The null hypothesis is set as variances are equal. The test is based on the ratio of the largest group and of the smallest group variance. The calculated ratio is then compared to a critical value from a special table. If the calculated ratio is less than the critical value, the groups are treated as they have similar or equal variances. In case of the variances in groups are not equal the nonparametric Kruskal-Wallis test should be used instead of one factor ANOVA (Klímek, 2010).

### 3.2 Kruskal-Wallis Test (KW ANOVA)

The total number of observations is  $n = n_1 + n_2 + \dots + n_k$  in the  $k$  independent samples. The null hypothesis that all samples are the same (or there is no significant difference among them) is tested. All elements (units) are sorted into the growing row with rank. Then  $T_i$  is sum of rank of units from the  $i^{\text{th}}$  selection/group ( $i = 1, 2, \dots, k$ ). Finally, the test statistic

$Q = \frac{12}{n(n+1)} \sum_{i=1}^k \frac{T_i^2}{n_i} - 3(n+1)$  is calculated. If  $Q \geq \chi_{1-\alpha}^2(k-1)$ , we reject the null hypothesis;

otherwise we do not reject it (Klímek, 2008).

### 3.3 Post-hoc comparison

Post-hoc comparison is used after rejecting the null hypothesis. The equality of means  $\mu_i = \mu_j$  for all pairs  $i, j = 1, 2, \dots, I; i \neq j$  is tested. The methods of multiple comparisons (e.g. Scheffé method, LSD test, Neuman-Keul test, etc.) can be used. The null hypothesis that  $\mu_i = \mu_j$  for all

pairs (i, j) is rejected if  $|\bar{x}_i - \bar{x}_j| \geq \sqrt{(I-1) s^2 F_{1-\alpha}(I-1, n-I) \left(\frac{1}{n_i} + \frac{1}{n_j}\right)}$ ;  $i \neq j$ ; otherwise we do not reject it (Klímek and Kovářik, 2011).

## 4 STATISTICAL COMPARISON OF MACROECONOMIC EFFICIENCY ASPECTS

The chosen data have been confronted with null hypotheses. In case the null hypothesis is confirmed, the individual healthcare systems do not differ. In case the null hypothesis is rejected, statistically significant difference exists among the healthcare systems.

### 4.1 Trends in Total Expenditure, % GDP

To compare the models of healthcare systems the following null hypothesis is proposed:

$H_0$ : Individual models do not differ with regard to the Total expenditure, % GDP.

Tab. 3 – Analysis of Variance, Hartley’s Test, Kruskal-Wallis Test of Total expenditure, % GDP; healthcare systems by OECD countries. Source: Own processing.

CATEGORY LABELS AND NUMERICAL SUMMARIES FOR  
TOTAL EXPENDITURE, % GDP

MODEL	ALL	BISMARCK	BEVERIDGE	LIBERAL	MIXED
Number	34	13	13	6	2
Mean	9.47353	9.02308	9.74615	10.15	8.6
St Dev	2.18539	2.10877	1.00633	4.08644	0.84853
Skew	1.34549	0.11895	-0.4016	1.42445	###
Min	6.1	6.1	7.5	6.2	8
Q <sub>1</sub>	7.925	7.5	9.3	7.6	8.3
Median	9.35	9	9.6	9.3	8.6
Q <sub>3</sub>	10.65	11	10.2	10.925	8.9
Max	17.6	12	11.4	17.6	9.2

ANALYSIS OF VARIANCE  
(COMPARISON OF MEANS OF TOTAL EXPENDITURE, % GDP)

Independent variable (Model) is a

X Fixed effect

Random effect

$H_0$ : All population means (of Total expenditure, % GDP) are equal

$H_1$ : Not all population means (of Total expenditure, % GDP) are equal

p-value = 0.66779

ANOVA Table

Source	DF	SS	MS	F
Model	3	7.87579	2.62526	0.526
Error	30	149.73	4.99101	
Total	33	157.606		

Hartley’s  $F_{\max}$  Test

Data

Number of Groups	4
Total Sample Size	34
$S_{\max}^2$	16.699
$S_{\min}^2$	0.72

$H_0$ : Population variances of all categories equal



Total Sample Size	34
$S_{\max}^2$	5.3937
$S_{\min}^2$	1.5073

$H_0$ : Population variances of all categories equal  
 $H_1$ : Population variances of all categories not equal

$F_{\max}$	3.578344816
$DF_1$	4
$DF_2$	8
p-value =	0.058920392

Because the p-value (0.07) is higher than 0.05 (the standard value) the difference among the healthcare systems cannot be proven.

### 4.3 Trends in Annual growth rate of public expenditure on health, in real terms

To compare the models of healthcare systems the following null hypothesis is proposed:

$H_0$ : Individual models do not differ with regard to the Annual growth rate of public expenditure on health, in real terms.

Tab. 5 – Analysis of Variance, Hartley’s Test, Kruskal-Wallis Test of Annual growth rate of public expenditure on health, in real terms healthcare system by OECD countries. Source: Own processing

MODEL	ALL	BISMARCK	BEVERIDGE	LIBERAL	MIXED
Number	34	13	13	6	2
Mean	4.57941	4.58462	3.85385	5.4	6.8
St Dev	2.18865	2.4231	1.38541	2.90586	1.27279
Skew	1.00979	0.60979	0.17438	1.83477	###
Min	1.7	1.7	1.9	2.6	5.9
$Q_1$	2.9	2.6	2.8	4.125	6.35
Median	4.35	4.2	3.6	4.7	6.8
$Q_3$	5.575	6.5	4.7	5.275	7.25
Max	11	9.1	6.2	11	7.7

ANALYSIS OF VARIANCE  
 (COMPARISON OF MEANS OF ANNUAL GROWTH RATE OF PUBLIC EXPENDITURE ON HEALTH)

Independent variable (Model) is a

X Fixed effect Random effect

$H_0$ : All population means (of Annual Growth Rate of PEH) are equal

$H_1$ : Not all population means (of Annual Growth Rate of PEH) are equal

p-value = 0.23187

ANOVA Table

Source	DF	SS	MS	F
Model	3	20.7464	6.91545	1.5107
Error	30	137.329	4.57764	
Total	33	158.076		

Hartley’s  $F_{\max}$  Test

Data	
Number of Groups	4
Total Sample Size	34



$S_{\max}^2$	8.444
$S_{\min}^2$	1.62
<hr/>	
H <sub>0</sub> : Population variances of all categories equal	
H <sub>1</sub> : Population variances of all categories not equal	
<hr/>	
F <sub>max</sub>	5.212345679
DF <sub>1</sub>	4
DF <sub>2</sub>	8
p-value =	0.023006562
<hr/>	
Kruskal-Wallis Test	
H <sub>0</sub> : All population medians equal	
H <sub>1</sub> : Not all populations medians equal	
<hr/>	
H	3.96092437
p-value =	0.265714624
<hr/>	

Since the variance in the individual categories is not the same, the non-parametric Kruskal-Wallis test must be used. Because the p-value is again higher than 0.05 the null hypothesis is not rejected. The individual systems do not differ from one another.

#### 4.4 Trends in Public expenditure on health, % total expenditure on health (TEH)

To compare the models of healthcare systems the following null hypothesis is proposed:

H<sub>0</sub>: Individual models do not differ with regard to the Public expenditure on health, % total expenditure on health (TEH).

Tab. 6 – Analysis of Variance, Hartley’s Test, Kruskal-Wallis Test of Public expenditure on health, % total expenditure on health (TEH); healthcare system by OECD countries. Source: Own processing.

CATEGORY LABELS AND NUMERICAL SUMMARIES FOR  
PUBLIC EXPENDITURE ON HEALTH IN TOTAL EXPENDITURE ON HEALTH

MODEL	ALL	BISMARCK	BEVERIDGE	LIBERAL	MIXED
Number	34	13	13	6	2
Mean	72.1767	75.744	75.6658	61.329	58.8537
St Dev	10.9169	6.6083	9.05196	12.7557	15.0785
Skew	-0.8679	-0.2616	-0.7744	0.35184	###
Min	47.3153	64.4756	59.3986	47.3153	48.1916
Q <sub>1</sub>	65.3617	72.8194	71.0526	50.6947	53.5227
Median	74.3469	76.202	79.5951	61.7259	58.8537
Q <sub>3</sub>	80.4909	78.8529	83.221	67.6896	64.1848
Max	85.6822	85.6822	85.5197	80.8119	69.5158

ANALYSIS OF VARIANCE  
(COMPARISON OF MEANS OF PUBLIC EXPENDITURE ON HEALTH IN TOTAL EXPENDITURE ON HEALTH)

Independent variable (Model) is a

X Fixed effect

Random effect

H<sub>0</sub>: All population means (of PEH (in % of TEH)) are equal

H<sub>1</sub>: Not all population means (of PEH (in % of TEH)) are equal

p-value = 0.00417

ANOVA Table

Source	DF	SS	MS	F
Model	3	1384.73	461.578	5.43418
Error	30	2548.19	84.9397	

Total	33	3932.93			
Hartley's $F_{\max}$ Test					
Data					
Number of Groups	4				
Total Sample Size	34				
$S_{\max}^2$	227.36				
$S_{\min}^2$	43.67				
H <sub>0</sub> : Population variances of all categories equal					
H <sub>1</sub> : Population variances of all categories not equal					
$F_{\max}$	5.206377926				
DF <sub>1</sub>	4				
DF <sub>2</sub>	8				
p-value =	0.023077416				
Kruskal-Wallis Test					
H <sub>0</sub> : All population medians equal					
H <sub>1</sub> : Not all populations medians equal					
H	8.590950226				
p-value =	0.035254062				
POST-HOC TEST					
PUBLIC EXPENDITURE ON HEALTH IN TOTAL EXPENDITURE ON HEALTH					
CELL	MODEL	{1}	{2}	{3}	{4}
1	Liberal	61.329	75.744	75.666	58.854
2	Bismarck	0.032048	0.32048	0.033274	0.990638
3	Beveridge	0.033274	0.999997	0.999997	0.144319
4	Mixed	0.990638	0.144319	0.147193	

Because the p-value is lower than 0.05 the null hypothesis is rejected. The individual systems differ significantly. The follow-up is the post-hoc test which identifies pairs of models that differ significantly. A significant difference is proven between the Bismarck and the Liberal system and again between the Beveridge and the Liberal system.

#### 4.5 Trends in Public expenditure Health expenditure by financing agent/scheme, Out-of-pocket payments (households), % total expenditure on health (TEH)

To compare the models of healthcare systems the following null hypothesis is proposed:

H<sub>0</sub>: Individual models do not differ with regard to the Health expenditure by financing agent/scheme, Out-of-pocket payments (households), % total expenditure on health (TEH).

Tab. 7 – Analysis of Variance, Hartley's Test, Kruskal-Wallis Test of Public expenditure Health expenditure by financing agent/scheme, Out-of-pocket payments (households), % total expenditure on health (TEH); healthcare systems by OECD countries. Source: Own processing.

CATEGORY LABELS AND NUMERICAL SUMMARIES FOR OUT-OF-POCKET PAYMENTS, % TOTAL EXPENDITURE ON HEALTH					
MODEL	ALL	BISMARCK	BEVERIDGE	LIBERAL	MIXED
Number	34	13	13	6	2
Mean	19.5088	16.5385	18.8462	25.4333	25.35
St Dev	9.06209	6.56893	7.87957	13.5757	11.243
Skew	1.28065	-0.1336	1.30711	1.16217	###
Min	5.2	5.2	8.9	11.8	17.4

Q <sub>1</sub>	13.45	12.9	14.2	16.65	21.375
Median	18	15.9	17.8	21.85	25.35
Q <sub>3</sub>	24.35	21.8	19.7	30.35	29.325
Max	49	26.2	38.4	49	33.3

ANALYSIS OF VARIANCE  
(COMPARISON OF MEANS OF OUT-OF-POCKET PAYMENTS, % TOTAL EXPENDITURE ON HEALTH)

Independent variable (Model) is a

X Fixed effect

Random effect

H<sub>0</sub>: All population means (of OOP, % total expenditure on health) are equal

H<sub>1</sub>: Not all population means (of OOP, % total expenditure on health) are equal

p-value = 0.18244

ANOVA Table

Source	DF	SS	MS	F
Model	3	399.246	133.082	1.72777
Error	30	2310.76	77.0254	
Total	33	2710.01		

Hartley's F<sub>max</sub> Test

Data

Number of Groups	4
Total Sample Size	34
S <sub>max</sub> <sup>2</sup>	184.3
S <sub>min</sub> <sup>2</sup>	43.151

H<sub>0</sub>: Population variances of all categories equal

H<sub>1</sub>: Population variances of all categories not equal

F <sub>max</sub>	4.271027432
DF <sub>1</sub>	4
DF <sub>2</sub>	8
p-value =	0.038530878

Kruskal-Wallis Test

H<sub>0</sub>: All population medians equal

H<sub>1</sub>: Not all populations medians equal

H	2.83487395
p-value =	0.417791173

Because the p-value is higher than 0.05 the null hypothesis is not rejected. The adequacy of using the analysis of variance is tested by Hartley test. Since the variance in the individual categories is not the same, the non-parametric Kruskal-Wallis test must be used. Because the p-value is again higher than 0.05 the null hypothesis is not rejected. The individual systems do not differ from one another.

## 5 CONCLUSIONS

The statistically significant difference (significance level of 0.05 or lower) among healthcare systems (BIS, BEV, LIB, and MIXED) was proved (H<sub>0</sub> was rejected) only for the indicator of **Public expenditure on health, % total expenditure on health (TEH)**. Differences between healthcare systems in other indicators were not proved.

Tab. 8 – Table of results. Source: Own processing.

Indicator	ANOVA	Hartley's test	Kruskal-Wallis	Post-hoc Test	H <sub>0</sub>
Total expenditure, % GDP	0,66779	0,000185	0,6059	–	Not rejected
Annual growth rate of total expenditure on health, in real terms	0,07064	0,0589	–	–	Not rejected
Annual growth rate of public expenditure on health, in real terms	0,23187	0,0230	0,265714	–	Not rejected
Public expenditure on health, % total expenditure on health (TEH)	0,00417	0,02307	0,03525	Significant differences: (LIB, BIS) and (LIB, BEV)	<b>Rejected</b>
Health expenditure by financing agent/scheme, Out-of-pocket payments (households), % total expenditure on health (TEH)	0,18244	0,03853	0,41779	–	Not rejected

The proven difference between the Liberal and Bismarck system and the Liberal and Beveridge system is in the essence of financing the healthcare systems under investigation. While the Bismarck and Beveridge systems are financed from the public sources, the Liberal system is financed mainly from the private sources. The Liberal systems focus on individual's responsibility for their own health and majority of the healthcare costs are required from the individuals. The Bismarck and Beveridge systems focus on public health and supply the majority of needed funds from the public sources. That is the major reason for the disclosed statistical difference. This difference, however, cannot answer the question of which healthcare system is the most efficient from the point of view of the macroeconomic aspects.

Tab. 9 – Average health expenditure according to the healthcare systems by OECD countries. 2010 (or nearest year). Source: OECD Health Statistics, 2010.

OECD Country	HEALTH EXPENDITURE					HEALTHCARE RESOURCES			HEALTH STATUS (MORTALITY)		MODEL*
	Total expenditure on health, % gross domestic product	Annual growth rate of total expenditure on health, in real terms	Annual growth rate of public expenditure on health, in real terms	Public expenditure on health, % total expenditure on health (TEH)	Health expenditure by financing agent/scheme, Out-of-pocket payments (households), % total expenditure on health (TEH)	Physicians, Density per 1 000 population (head counts)	Nurses, Density per 1 000 population (head counts)	Total hospital beds, Per 1 000 population	Life expectancy, Total population at birth, Years	Infant mortality, Deaths per 1 000 live births	
BIS Average	9,02	4,65	4,58	75,74	2932,44	3,06	7,96	6,03	78,25	4,32	BIS
BEV Average	9,75	3,67	3,85	75,67	3446,27	3,60	9,14	3,71	80,95	3,41	BEV
LIB Average	10,15	4,52	5,40	61,33	3859,73	2,60	9,04	5,97	80,38	5,60	LIB
MIX Average	8,60	7,60	6,80	58,85	2460,20	2,28	7,29	2,59	80,00	5,85	MIX

\* own processing

According to Tučková, Fialová and Strouhal (2011), the evaluation of the quantitative factors of the healthcare systems are more complex than is usually considered. From their point of view, for people to get what they want from the system, exchanges between patients and providers must be made (Tučková, Fialová and Strouhal, 2011). The overall comparison of the average parameters of the OECD counties healthcare systems (see Tab. 9) shows that Liberal systems are the most expensive from the point of view of Total expenditure on health, as a percentage of gross domestic product. The cheapest ones are the Mixed systems but these have the fastest Annual growth rate of total expenditure on health, in real terms, which suggests that the expenditures equalize in the medium run. Similar growth is recorded with

the Liberal and Mixed systems in the Annual growth rate of public expenditure on health, in real terms. On the other hand, the Bismarck and Beveridge systems show stable (even if lower) share of the Annual growth rate of total and public expenditure on health, in real terms.

The highest Health expenditure by financing agent/scheme, Out-of-pocket payments (households), as a percentage of total expenditure on health (TEH) are seen with the Liberal healthcare systems. They also feature a lower number of physicians and a comparable number of nurses at a high number of the offered hospital beds. Together with the Mixed systems the liberal systems have the highest infant mortality at a relatively comparable life expectancy. The Bismarck system is the second cheapest from the point of view of GDP expenditures with the lowest participation of private funds. It offers the highest number of hospital beds with a high number of physicians and nurses. Nevertheless, the life expectancy of citizens is almost two years lower than the average of the other healthcare systems. The infant mortality is the second best. The Beveridge system is comparable with the Liberal system in terms of overall expenditures. It sets up a different ratio between public and private funds where the majority of payments for healthcare is covered by the government sector. The Beveridge system offers the highest number of physicians and nurses at a low number of hospital beds. The infant mortality is the lowest and the life expectancy is the highest from all the compared systems. Mixed systems appear to be specific in their evaluation. They do not reach lower costs for healthcare but they have fewer physicians, nurses and hospital beds. They also have the highest infant mortality and only a standard life expectancy. This system thus seems to be the least advantageous. From the point of view of economic efficiency the most efficient systems are the Bismarck and the Beveridge healthcare systems, which in the long term concentrate on building public health. However, there were no statistically significant differences disclosed in the comparison of OECD member countries healthcare efficiency based on chosen macroeconomics indicators.

For the future extension of the research it would be appropriate to compare healthcare systems of specific countries by detailed econometric analyses of macroeconomic indicators. These macroeconomic variables could be expanded, for example, onto purchasing power parity. Such explained variables would be one of the proxies for the efficiency of healthcare in the given country or of chosen healthcare system itself across OECD member countries.

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## **ETHNIC NETWORKS EFFECT ON INTERNATIONAL TRADE BETWEEN VIETNAM AND CZECH REPUBLIC**

*Minh Ly Pham, Hong Nga Do, Minh Tuan Phung*

### **Abstract**

Ethnic networks have been found to have a heterogeneous effect on economic outcomes. Vietnam is a developing, non-English speaking country and has a diversity of ethnic networks. In addition, Vietnamese ranked the third largest ethnic minority in Czech Republic at all since both countries established relationship. However, there is a shortage of research studying whether culture structure has an effect on international trade among two countries mentioned above or not. Using data from 1993 to 2013 on export and import value between these nations, we found that the number of Vietnamese living and working in Czech and GDP of Vietnam do have a positive impact on export activities among two countries.

*Keywords: ethnic networks, international trade*

### **1 INTRODUCTION**

In recent years, sociologists and anthropologists have begun to apply their analytical frameworks and empirical tools to role of culture and social networks on economic outcomes. In their influential research, Guiso, Sapienza and Zingales (2006) have found that culture as defined by religion and ethnicity does have a positive impact on economic behavior such as international trade, direct investment, national savings rates and government's redistributive policies as well. In addition, a number of scholars have accumulated a wealth of field evidence on the effect of ethnic networks in promoting macroeconomic outcomes, namely international trade and investment (Hiller, 2011; Chung & Tung, 2013; Freeman & Lindsay, 2012; Sanderson, 2013). Some recent papers include Rauch and Trindade (2002), Huang and Qian (2008) study how ethnic ties facilitate cross-country trade and investment flows. This study has been extended by Duanmu and Guney (2013) to cover multiple ethnic networks. Here, social and culture factors such as family ties and ethnic network can affect trade between Thailand and their countries of origin.

Vietnam is a developing, non-English speaking country and has a diversity of ethnic networks. Therefore, using Vietnam as a sample can provide an interesting case because it is not major immigration nations such as the United States, Canada and the United Kingdom (Girma and Yu, 2002; Mundra, 2005; Wagner, Head and Ries, 2002). On the other hand, the Czech Republic is, due to its advantageous geographic location at the heart of Europe, a very essential nation for migrants either as a final destination or transit point (Strielkowski and Weyskrabova, 2014). According to the 2001 census, there were 17,462 ethnic Vietnamese in the Czech Republic. The Vietnamese population has grown very rapidly since then, with the Czech Statistics Office estimating that there were 61,012 Vietnamese residing in the Czech Republic in October 2009. Vietnamese people in the Czech Republic, including residents and citizens, form the largest immigrant community in the country (and 3rd largest ethnic minority at all, after Slovaks and Romanies), numbering more than 83,000 people according to 2011 census.

However, there is a shortage of research studying whether culture structure has an effect on international trade among two countries mentioned above or not. To address this gap, the aim of this study is to explore the impact of ethnic networks on cross-border trade between Vietnam and Czech Republic.



This paper has the following structure. Section 2 reviews the existing literature and develops our hypotheses. Section 3 presents a general background of ethnic minorities in Vietnam. Our models and empirical data are shown in Section 4. Then these results and conclusions are reported and discussed in Section 5.

## **2 LITERATURE REVIEW**

The theoretical claim that ethnic networks encourage trade has found broad empirical support in the literature on migration business networks and international trade (Hiller, 2011). People have a tendency to cooperate with others who have some same aspects such as ethnicity, religion and race (Duanmu & Guney, 2013). Networks have properties that allow them to persist in spite of the dramatic development of market economy (Bowles & Gintis, 2004; Guiso, Sapienza & Zingales, 2009). Sociologists hold a believe that within-group cultural affinity supports association by means of positive sentiments, namely ethnic purity and personal loyalty among group members (Loury, 2001), while economists claim that consistent network effect is explained at least in part by their problem-solving capacities such as altering the information structure among members and powerful contractual enforcement (Bowles & Gintis, 2004).

Prior research on ethnic networks as an essential intermediary has shown that ethnic networks can reduce unofficial barriers in foreign markets by supporting information about laws, languages, and business culture (Bandyopadhyay et al., 2008). For instance, Rauch and Trindade (2002) developed a test for this information function of co-ethnic networks. They have found that an ethnic-Chinese network has a significant strong effect on trade in differentiated product space. Because homogeneous products do not have a ready reference price point, information requirements are particularly important in this product segment. And the fact that the ethnic effects are large in this product space is evidence of the informational advantage of ethnic ties. In addition, Fisman and Love (2003) have found that common ethnic ties also facilitates trade credit extensions in developing countries, as well as the more productive forms of financial transactions such as the use of longer-term contracts over the short-term ones – checks rather than cash (Guiso, Sapienza & Zingales, 2004). However, one of the gaps of prior research is that it has either concentrated on a single network or supposed that all ethnic networks have an equal effect on trade (Duanmu & Guney, 2013).

This lacuna has been elaborately described by Bandyopadhyay et al. (2008) in his empirical research. They figured out that positive heterogeneous effect of ethnic networks on cross-broad trade between US and five countries namely Brazil, Columbia, Spain, Thailand and Turkey. Nevertheless, there is no explanation for why the impact only exists for five nations out of twenty-nine countries in their investigation. On the other hand, one of the attempts to clarify the complicated effect of ethnic network is presented by Dunlevy (2006). In his paper, he gathered the export data of fifty states of US with eighty-seven other countries during the period 1990-1992. Dunlevy (2006) found that the higher corruption level of the origin country's political system leads to the stronger effect of diverse ethnicities, and less significant when Spanish or English is the language of the country of origin.

We carry on this line of investigation by concentrating on several notable points of the original country that may make up the complex impact of ethnic networks. There is an increasing number of paper studying on the remarkable effect of social and cultural aspects on economic outcomes in various avenues. For instance, Giuliano (2007) indicated that the US family structure are affected by economic conditions and culture heritage. In addition, Fernandez and Fogli (2009) found that culture is likely to play an essential role in explaining the large variation across time and countries in women's work and fertility. Moreover, culture

is also the explanation for cross-country variation in other individual economic outcomes such as entrepreneurial activity, creativity, and physical and human capital accumulation. Therefore, culture is an important area for economists and sociologists to study. Therefore, we hypothesize that:

*H1: Ethnic networks have a positive effect on export (import) between Vietnam and Czech.*

*H2: GDP of Vietnam has a positive effect on export (import) between Vietnam and Czech.*

*H3: GDP of Czech has a positive effect on export (import) between Vietnam and Czech.*

*H4: Population of Vietnam has a positive effect on export (import) between Vietnam and Czech.*

*H5: Population of Czech has a positive effect on export (import) between Vietnam and Czech.*

Based on our hypotheses, we provide the country background of Vietnam in Section 3, then present our empirical study in Section 4.

### **3 RESEARCH BACKGROUND: VIETNAM**

Vietnam is a multi-ethnic and multi-cultural country in South east Asia, and become a member of ASEAN in 1995. The Vietnamese people are the majority ethnic group of Vietnam, comprising 86% of the population. The Kinh population is concentrated mainly in the alluvial deltas and coastal plains of the country. However, Vietnam is also home to 54 ethnic minority groups, including the Hmong, Dao, Tay, Thai, and Nùng. Many ethnic minorities – such as the Muong, who are closely related to the Kinh – dwell in the highlands, which cover two-thirds of Vietnam's territory. The Hoa - ethnic Chinese and Khmer Krom people are mainly lowlanders.

The official national language of Vietnam is Vietnamese, which is spoken by the majority of the population. Vietnam's minority groups speak a variety of languages, including Tày, Mường, Cham, Khmer, Chinese, Nùng, and H'Mông. The Montagnard peoples of the Central Highlands also speak a number of distinct languages.

The French language, a legacy of colonial rule, is spoken by many educated Vietnamese as a second language, especially among the older generation and those educated in the former South Vietnam. Russian – and to a much lesser extent German, Czech and Polish – are known among some Vietnamese whose families had ties with the Soviet bloc during the Cold War. In recent years, as Vietnam's contacts with Western nations have increased, English has become more popular as a second language. Japanese, Chinese and Korean have also grown in popularity as Vietnam's links with other East Asian nations have strengthened.

Vietnam has become a major tourist destination since the 1990s. In 2012, Vietnam has 6.84 million tourists visiting. This was a 13% increase from 2011 figure of 6 million international visitors, which was itself a rise of 2 million visitors relative to 2010 arrivals. Vietnam has become increasingly popular as an expat destination in recent years and it is now recognized as a safe place for foreigners to live and work. Expats are attracted by the nice weather, low cost of living, lively culture and the steady improvements in Vietnam's infrastructure. According to the Ministry of Labour, Invalids and Social Affairs, by May 2012, the total number of foreign workers in Viet Nam has now reached over 71,000 people. Of which, over 41,500 (more than 63 per cent) were granted work permits, nearly 24,000 people (nearly 37 per cent) were not granted work permits and 5,500 are not required to hold such a permit. The

Ministry also announced a breakdown of the figures on foreign workers, from over 60 countries, of which roughly 58 per cent are from Asia (mostly China, Japan, South Korea, Malaysia and Taiwan) and 28.5 per cent from Europe. Men make up nearly 90 per cent of all foreign workers and 86 per cent of workers are over 30 years old. In conclusion, Vietnam is not a major immigration country. This country is small, developing, South East Asian country with diverse cultural and religious attributes from Western nations. Findings from this research will help us extend theoretical and empirical previous studies.

## **4 EMPIRICAL MODEL AND DATA**

### **4.1 Gravity model specification**

We examine the effects of ethnic networks using a standard gravity model of bilateral. We analyze it in two ways. Firstly, we use ethnic networks as a dummy variable to estimate the overall effect of ethnic networks. This is to examine whether the presence of ethnic networks generates positive effects on international trade between Vietnam and Czech Republic. Secondly, we measure it as the natural logarithm of number of citizens of a foreign origin plus 1, so that it is a continuous variable which will allow us to examine the complicated impacts of ethnic networks on cross-border trade by incorporating into the model their two salient social features, namely family ties and ethnic diversity. This will enable us to test our hypotheses and establish whether or not these social features magnify or deflate the effect of ethnic networks on trade (Duanmu & Guney, 2013). The common gravity model that we are going to use is specified as follows:

$$\text{Ln Exports}_t \text{ or Ln Imports}_t = \beta + \delta_1 \text{Ethnic networks}_t + \delta_2 \text{GDP\_VN}_t + \delta_3 \text{GDP\_CZ}_t + \delta_4 \text{Population\_VN}_t + \delta_5 \text{Population\_CZ}_t + \varepsilon_t$$

Where  $j$  denotes a country and  $t$  denotes time.  $\beta$  is the constant term common to all countries;  $\varepsilon_t$  is the general disturbance term for the model. The dependent variable is either Ln Exports or Ln Imports.  $\text{Ln Exports}_t$  denotes the dollar value of exports from Vietnam to Czech Republic in year  $t$ . Similarly,  $\text{Ln Imports}_t$  defines the total value of goods imported from Czech to Vietnam in year  $t$ .  $\text{Ethnic networks}_t$  denotes the number of Vietnamese people in Czech in year  $t$ .  $\text{GDP\_VN}_t$  denotes GDP of Vietnam in year  $t$ .  $\text{GDP\_CZ}_t$  denotes GDP of Czech Republic in year  $t$ .  $\text{Population\_VN}_t$  denotes the population of Vietnam in year  $t$ .  $\text{Population\_CZ}_t$  denotes population of Czech Republic in year  $t$ .

### **4.2 Data and measurement**

Our empirical research has collected data from various sources. First, we gather data on exports and imports between Vietnam and Czech Republic through the UN Comtrade database. We use exports as our primary dependent variable; and imports are used as an alternative to check the robustness of our findings. Exports and imports data are collected during the period of 21 years (from 1993 to 2013). Second, data on ethnic networks, we collect the number of Vietnamese people in Czech Republic from 1993 to 2013, which is gathered from Czech Statistical Office. According to this figure, when two countries had established diplomatic relationship in 1954 until now, the number of Vietnamese people in Czech Republic has increased steadily. Data on GDP, population of Vietnam and Czech Republic from 1993 to 2013 are drawn from the World Bank.

## 5 RESULTS AND CONCLUSIONS

Firstly, Table 1 has showed the definition and descriptive statistics of all variables. As can be seen, we use the natural logarithm for both independent and dependent variables.

Tab. 1 - Descriptive statistics for the main variables and their definition

<b>Variable</b>	<b>Definition</b>	<b>Mean</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>
Ln Exports	The natural logarithm of the dollar value of exports	17.6776	1.01817	15.43	19.03
Ln Imports	The natural logarithm of the dollar value of imports	16.6577	.82156	15.58	18.07
Ethnic networks	The natural logarithm of the number of Vietnamese people in Czech	12.6486	.65983	11.55	13.63
GDP_VN	The natural logarithm of GDP of Vietnam	24.6109	.76089	23.30	25.87
GDP_CZ	The natural logarithm of GDP of Czech	25.3422	.58726	24.39	26.14
Population_VN	The natural logarithm of Vietnam's population	18.1971	.07726	18.06	18.31
Population_CZ	The natural logarithm of Czech's population	16.1500	.01043	16.14	16.17

Before discussing the multiple regression analysis, table 2 provides the correlation matrix among the dependent and explanatory variables.

Tab. 2 - Correlation matrix for the main variables

		EX	IM	Ethnic networks	VN_GDP	CZ_GDP	VN_PO	CZ_PO
EX	Pearson Correlation							

IM	Pearson Correlation	.791**						
Ethnic networks	Pearson Correlation	.958**	.760**					
VN_GDP	Pearson Correlation	.960**	.798**	.990**				
CZ_GDP	Pearson Correlation	.922**	.792**	.958**	.967**			
VN_PO	Pearson Correlation	.960**	.748**	.999**	.986**	.953**		
CZ_PO	Pearson Correlation	.508**	.681**	.511**	.602**	.539**	.477*	

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

We report our regression results as follow. Table 3 and 4 report our main results where Vietnam's export is the dependent variable. As can be seen from these tables, there is no independent variable having a positive effect on international trade between Vietnam and Czech when we run all the explanatory variables together in one model as mentioned in Section 4.

Tab. 3 - Regression model with all independent variables and export value

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	-2167.918	1662.215		-1.304	.212
ln_ethnicnetwork	-9.302	6.273	-6.028	-1.483	.159
ln_vngdp	-.646	2.122	-.483	-.304	.765
ln_czgdg	.404	.681	.233	.593	.562
ln_vnpp	92.888	64.135	7.049	1.448	.168
ln_czpp	38.306	38.764	.392	.988	.339

a. Dependent Variable: ln\_export

Tab. 4 - Regression model with all independent variables and import value

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-4312.368	2721.009		-1.585	.134
	ln_ethnicnetwork	-14.404	10.268	-11.568	-1.403	.181
	ln_vngdp	-4.168	3.474	-3.860	-1.200	.249
	ln_czgdg	1.960	1.115	1.401	1.757	.099
	ln_vnpop	149.761	104.988	14.084	1.426	.174
	ln_czpop	113.864	63.455	1.446	1.794	.093

a. Dependent Variable: ln\_import

Therefore, we have adjusted our model and finally find out that only ethnic networks and GDP of Vietnam have positive impact on export value between Vietnam and Czech as shown in Table 5 & 6. Adjusted R<sup>2</sup> is 91.4% and 55.6% respectively, indicating a satisfactory model fit.

Tab. 5 - Regression model with export value and ethnic networks variables

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.030	1.278		-.806	.430
	ln_ethnicnetwork	1.479	.101	.958	14.652	.000

a. Dependent Variable: ln\_export

### Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.958 <sup>a</sup>	.919	.914	.29787

a. Predictors: (Constant), ln\_ethnicnetwork

Tab. 6 - Regression model with import value and ethnic networks variables

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.683	2.350		1.993	.061
	ln_ethnicnetwork	.947	.186	.760	5.103	.000

a. Dependent Variable: ln\_import

### Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.760 <sup>a</sup>	.578	.556	.54747

a. Predictors: (Constant), ln\_ethnicnetwork

From these tables above, we have some conclusions about our hypotheses. Based on the results from the regression, we reject the H2, H3, H4 and H5; whereas only H1 can not be rejected. In conclusion, export and import value between Vietnam and Czech Republic are affected by the number of Vietnamese living and working in Czech, whereas GDP and population of both countries do not have an impact on international trade between these nations. This results point out the importance of ethnic networks representing by Vietnamese people in Czech on the total amount of goods exported and imported between both countries. Government can base on these results to make some policies to encourage people to move between Vietnam and Czech to have the positive effect on international trade. The Government of Czech and Vietnam should create more opportunities for citizens to live, work, study abroad and do business in Czech Republic and vice versa, which can produce a positive impact on trade.

Our research also has some limitations in methodology and data. Firstly, we just carry two models by one method which is linear regression. Therefore, there are several areas for further research, which can apply multiple models to have a comparison between these models for the best one. Secondly, our model contains only five variables, so next study can add some variables relating ethnic networks or culture such as ethnic diversity, religion, family ties and so on to get more results and practical implications. We can also investigate ethnic networks effect on international financial flows such as FDI. Finally, our data just covers about two decades, in the future research, we may expand data for the longer time span.

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## **EFFECTS OF EXCHANGE RATE SHOCKS ON SHORT-TERM INTEREST RATES IN NEW EU MEMBER COUNTRIES**

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### **Abstract**

New EU member countries are still suffering from negative implications of economic crisis. Low interest rate environment and associated liquidity trap risk motivated economists to investigate sources of interest rates volatility. We suggest that interest rates responsiveness to the exchange rate shocks can reveal substantial implications of relative exchange rate diversity and its importance during the crisis period. As such, sources of interest rates volatility may help to reveal side effects of the exchange rate regime choice affecting monetary policy decision making. In the paper we examine responsiveness of short-term nominal interest rates to the exchange rate shocks in ten new EU member countries by employing SVAR methodology. We observed unique patterns of the short-term interest rates responsiveness in countries with different exchange rate arrangements that contributes to the fixed versus flexible exchange rate dilemma.

*Keywords: interest rates, structural shocks, exchange rate arrangements, economic crisis, VAR, impulse-response function*

JEL Classification: C32, E43, F41

### **1 INTRODUCTION**

Crisis period with a large complex of key and side effects affected not only the overall performance of the new EU member countries but also maneuverability of authorities in fighting the economic crisis. Increased uncertainty on the financial markets resulted in higher volatility of market prices/rates reduces predictability of market trends, even in the short period. As a result, increased instability of exchange rates seems to be inevitable but painful implication (Stavarek, 2012).

Low interest rate environment clearly reduced effects of monetary policy on the business cycle. At the same time, spurious effects of quantitative easing induced economists to examine sources of interest rates volatility. Responsiveness of short-term interest rates to the structural shocks provides unique platform to investigate sources of their unexpected volatility and associated effects on monetary policy decision making. Moreover, sources of interest rates volatility may help to reveal side effects of the exchange rate regime choice.

In the paper we analyze effects of exchange rate shocks on interest rates in ten new EU member countries. From estimated SVAR model we compute impulse-response functions to analyze responses of short-term nominal interest rates to the unexpected positive one s.d. exchange rate shock. Results of estimated model are discussed from the perspective of fixed versus flexible exchange rate dilemma (Calvo and Reinhart, 2002). To provide more rigorous insight into the problem of the exchange rate regime suitability we estimate the model for each particular country employing data for two subsequent periods 2000-2007 (pre-crisis period) and 2000-2013 (extended period). Comparison of the results for both models is crucial to investigate the origins and key implications of current economic crisis on the volatility of short-term interest rates.

## **2 OVERVIEW OF THE LITERATURE**

Gerlach-Kristen and Rudolf (2010) compared three monetary operating procedures by examining optimal policy reaction functions, impulse responses and simulated volatilities of inflation, the output gap and the yield curve to examine volatility of interest rates and other main macroeconomic variables. Their results suggest that volatilities in key variables under different monetary-policy framework (commitment vs. discretion) are strongly dependent on general preconditions (normal times vs. financial distress). Eiffinger, Schaling and Vehagen (2000) analyzed the relevancy of the term structure of interest rates for the transmission process of the monetary policy. Authors identified and empirically tested the long-term interest rates as a crucial indicator for monetary policy discretionary changes. Emiris (2006) decomposed long-term interest rates into term premium and inflation premium to investigate the sources of average premium on ten years bonds variability. Author also examined responses of the term premia to the different shocks. Fendel (2009) intended to support the empirical findings on the information content of the term structure of interest rates for monetary policy. Kulish (2007) analyzed two roles (first, as a key determinant in the reaction function of the monetary authority; second, as instruments of policies) that long-term nominal interest rates can play in the conduct of the monetary policy. McGough, Rudebusch and Williams (2005) investigated the problem of short-term versus long-term interest rates suitability to operate as a monetary policy instrument. Authors highlight and discuss a crucial role of inflation expectations and real interest rate for selecting the most appropriate interest rate as a key pillar of a monetary policy framework. Michaud and Upper (2008) identified the origins of interbank interest rates volatility by examining the possible determinants of the risk premium contained in the money market interest rates. Rudebusch, Sack and Swanson (2007) examined the origins and implications of changes in bond term premiums for economic activity to analyze the stability of long-term interest rates. Authors also analyzed empirical relationship between short-term and long-term interest rates.

## **3 OVERVIEW OF EXCHANGE RATE REGIME EVOLUTION IN THE NEW EU MEMBER COUNTRIES**

Macroeconomic stability, fast recovery from deep and sudden transition shock and real output growth stimulation represents one of the most challenging objectives for the European transition economies in the early 1990s. Consistent choice as well as flexible adjustments of monetary policy framework and exchange rate regime accompanied key crucial economic policy decisions in this process. Associated changes in monetary-policy strategy reflected wide range of macroeconomic aspects underlying sustainability of appropriate exchange rate regime choice.

Among key determinants of the exchange rate regime choice in the European transition economies at the beginning of the 1990s we may consider an effort to regain macroeconomic stability, foreign exchange reserves requirements and availability, overall external economic (trade and financial) openness, etc. At the later stages of transition process we emphasize the role of massive foreign capital inflows, sustainability of real economic growth, institutional adjustments according to perspectives of ERM2 entry.

Initial transition shock followed by the sharp real output decline associated with intensive inflation pressures (caused by rapid exchange rate devaluations, price liberalization and deregulation, tax reforms, fiscal imbalances, etc.) emphasized a crucial importance of strong nominal anchor for monetary authorities in restoring a macroeconomic stability and confidence as well as positive expectations of economic agents. However immediate exchange rate based stabilization became an appropriate strategy only for countries with

adequate foreign exchange reserves while being able to significantly reduce inflation pressures in adequate (short) time period to prevent undesired rapid overvaluation. As a result it seems to be convenient to divide the new EU member countries in two groups (so called “peggers” and “floaters”) considering initial exchange rate regime framework.

Relative diversity in exchange rate regimes in the new EU member countries revealed uncertain and spurious conclusions about the exchange rate regime choice during last two decades. Moreover, Eurozone membership perspective (de jure pegging to euro) realizes uncertain consequences of exchange rate regime switching especially in the group of large “floaters”.

Tab. 1 - Exchange Rate Regimes in the new EU member countries. Source: IMF AREAER 1990-2011, author’s processing.

	Exchange rate regime																							
<b>Bulgaria</b>		managed floating								currency board														
<b>Czech Republic</b>	peg with horizontal bands								managed floating															
<b>Estonia</b>		currency board												ERM2				eurozone						
<b>Hungary</b>	adjustable peg				crawling peg				peg with horizontal bands						managed floating									
<b>Latvia</b>		floating		conventional fixed peg										ERM2										
<b>Lithuania</b>		floating		currency board										ERM2										
<b>Poland</b>		crawling peg								free floating														
<b>Romania</b>	free floating								managed floating															
<b>Slovak Republic</b>	peg with horizontal bands								managed floating						ERM2				eurozone					
<b>Slovenia</b>		managed floating										crawling band		ERM2			eurozone							
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013

**Note:** Exchange rate regime evolution in the New EU member countries (Information in the table are based on the condition from the end of 2013. See following per country description for up-to-date information): *Bulgaria* - since 1991 floating (pegged exchange rate regime undesirable due to possible low credibility), currency board since 1997 (after 1996-1997 financial crisis (public debt, bad commercial banks loans)). *Czech Republic* - exchange rate pegged to currency basket with narrow but continuously widen horizontal bands, since May 1997 after currency attacks switch to managed floating with no predetermined path for the exchange rate with DEM (EUR) as reference currency. *Estonia* - currency board since 1992 till 2011 (euro adoption), plan to adopt in 2008 but delayed due high inflation, since 2011 eurozone membership. *Hungary* - managed floating till February 1995, since March 1995 till the end of 1999 crawling peg with continuously decreased rate of periodical devaluation and widen horizontal bands, since January 2000 exchange rate pegged to euro combined with wide horizontal bands (since May 2001), since May 2008 managed floating with EUR as reference currency. *Latvia* - since February 1994 exchange rate pegged to SDR (fixing the exchange rate to a basket of currencies (SDR) instead of a single currency serves

to promote long-term stability) (since January 2005 pegged to EUR), since 2014 eurozone membership. *Lithuania* - since April 1994 currency board (exchange rate pegged to USD, in February 2002 pegging switched to EUR), since 2015 eurozone membership. *Poland* - since the end of 1991 crawling peg with continuously decreased rate of periodical devaluation and widen horizontal bands, since April 2000 free floating. *Romania* - free floating, since 1998 exchange rate arrangement reclassified as managed floating. *Slovak Republic* - exchange rate pegged to currency basket with narrow but continuously widen horizontal bands, since October 1998 after currency attacks switch to managed floating with no predetermined path for the exchange rate with DEM (EUR) as reference currency, since 2009 eurozone membership. *Slovenia* - managed floating with no predetermined path for the exchange rate (since February 2002 crawling band - the monetary authority manages the float of the domestic currency within certain fluctuating margins around a depreciating path - a heavily-managed crawling band with pragmatic monetary, real, external and financial indicators).  
ERM2 - June 2004 - Estonia (left in January 2011 after euro adoption), Lithuania (left in January 2015 after euro adoption), Slovenia (left in January 2007 after euro adoption)  
- May 2005 - Latvia (left in January 2014 after euro adoption)  
- November 2005 - Slovak Republic (left in January 2009 after euro adoption)

Successful anti-inflationary policy associated with stabilization of inflation expectations in the European transition economies at the end of 1990s significantly increased the role of short-term interest rates in the monetary policy strategies. At the same time, so called qualitative approach to the monetary policy decision-making performed in the low inflation environment, gradually enhanced the role of real interest rates expectations in the process of nominal interest rates determination. However, economic crisis increased uncertainty on the markets and thus worsen expectations (inflation expectations including) of agents.

Eurozone member countries as well as global economy are currently exposed to the negative effects of the economic and debt crisis. To alleviate recession and support economic recovery, monetary authorities dramatically reduced key interest rates. Low interest rates together with quantitative easing, however, should not necessarily increase supply of loans due to prudential credit policy of commercial banks reflecting increased uncertainty on the markets. As a result, policy of low interest rates seems to be inefficient.

Exchange rate policy evolution represents one of the key parts of crucial economic policy decisions at the beginning of the transition process in countries from the region of Central and Eastern Europe in the early 1990s. Despite its complexity and particularity there seems to be some similar features at the starting point of transition process in all European transition economies such as recession followed by initial transition shock and common vision of European union and Economic and Monetary union membership.

Macroeconomic stability as one of the primary objectives in the initial phase of the transition process affected exchange rate regime choice in the later new EU member countries. However, low credibility of monetary institutions, lack of foreign exchange reserves and high inflation differentials represented real constraints and difficulties related to the sustainability of pegged exchange rate regimes. Brief overview of the exchange rate regimes evolution in new EU member countries provides table 1.

It seems to be clear that new EU member countries did not follow common practice in the process of the exchange rate regime choice at the beginning of the 1990s. Small Baltic countries adopted currency board regime (Estonia and Lithuania) eventually conventional fixed peg regime (Latvia). Hungary adopted crawling peg regime (after few years of adjustable peg in place) together with Poland. Czech Republic and Slovak Republic adopted

pegged regime with horizontal bands. Despite high inflation rates Bulgaria, Romania and Slovenia adopted floating exchange rate regime due to low level of reserves and lack of credibility though Bulgaria switched to currency board after 1996-97 financial crisis. It seems to be clear that most of new EU member countries enjoyed disinflationary and credibility benefits of so called hard or soft exchange rate regimes. Fixed exchange rates as the nominal anchor significantly contributed to the successful disinflationary process at the end of the 1990s.

Till the end of the decade many countries from the group switched to more flexible exchange rate regimes (Czech Republic in 1997, Slovak Republic in 1998 and Poland in 2000). Similarly Hungary switched to intermediate regime by widening horizontal bands. Although Hungary stacked to exchange rate pegged to euro, by employing wide horizontal bands de facto followed the same trend as previous group of countries.

Exchange rate regime choice also affected corresponding monetary policy strategy framework. Countries with exchange rate as nominal anchor (hard pegs or soft pegs with narrow horizontal bands) successfully implemented exchange rate targeting. Countries with soft pegs (pegs with wide horizontal bands or crawling pegs) and floating regimes employed monetary targets as intermediate criteria of monetary policy (monetary targeting).

Overall success of disinflationary process represents one of the key milestones on the road to stable macroeconomic environment with crucial role of low and stable inflation expectations. Low inflation combined with stable inflation expectations is considered to be a substantial condition for switching from quantitative (money supply) to qualitative (interest rates) approach in monetary policy decision-making. This adjustment in monetary policy strategies seems to be obvious in new EU member countries since the end of 1990s as a part of prevailing trend in weakening of relationship between money and inflation. Increased role of inflation expectations together with raising credibility of monetary authorities resulted in adoption of direct (explicit) inflation targeting strategy in many new EU member countries - Czech Republic (1998), Poland (1999), Hungary (2001), Slovenia (2002), Romania (2005) and Slovak Republic (2005).

New EU member countries challenged a decision of a euro adoption and Eurozone membership several years before the economic crisis arises. Disputable policy implications of sacrificing monetary sovereignty rose as a crucial assumption affecting main features as well as durability of preparation phase timetable in countries with flexible exchange rate regimes (Czech Republic, Poland, Romania, Slovak Republic and Slovenia). Among a variety of determinants and aspects we emphasize the role of decisions inevitably associated with "right" scheduling of the Eurozone entry. Some countries from the group of new EU member countries already joined the Eurozone (Slovenia (2007), Slovak Republic (2009), Estonia (2011), Latvia (2014), Lithuania (2015)) followed by participation of their currencies in ERM2 (Estonia (June 2004), Lithuania (June 2004), Slovenia (June 2004), Latvia (May 2005), Slovak Republic (November 2005)).

The loss from sacrificing exchange rates flexibility in the Eurozone candidate countries became directly confronted with benefits related to exchange rate stability associated with sacrificing monetary autonomy. Despite plausible advantages of pegging exchange rates of candidate countries to euro followed by the euro adoption it seems to be clear that risks associated with potential effects of breakdown in mutual interconnections between macroeconomic development and flexible exchange rates leading path seem to be of a minor interest in current empirical literature.

Economic theory provides clear suggestions in fixed versus flexible exchange rates dilemma in fighting high inflation pressures. At the same time exchange rate based enhancement of

external competitiveness may provide a convenient framework to foster economic growth even when domestic economy is cooling down. On the other hand, incentives to increase external demand during the crisis period may start unfavorable spiral of competitive devaluations. Central banks and governments may tend to devalue currencies (internal devaluation) especially in times when low interest rates policy associated with quantitative easing doesn't provide correct and sufficient incentives to foster domestic demand. Internal devaluation causing real exchange rate to depreciate became highly discussed nowadays, in the time of economic and debt crisis in Eurozone, when inability of low performing economies to increase foreign competitiveness of their production forces authorities to experiment with internal devaluation considering all adjustments are made by prices, wages (and associated costs of production) and assets values falling.

#### 4 ECONOMETRIC MODEL

We implement a VAR methodology to analyze effects of positive exchange rate shock on short-term nominal interest rates in new EU member countries. Identification scheme based on imposing long-run restrictions on the variance-covariance matrix of the reduced-form VAR residuals is employed to identify structural shocks hitting the model.

True model is represented by the following infinite moving average representation:

$$X_t = A_0\varepsilon_t + A_1\varepsilon_{t-1} + A_2\varepsilon_{t-2} + \dots = \sum_{i=0}^{\infty} A_i\varepsilon_{t-i} = \sum_{i=0}^{\infty} A_iL^i\varepsilon_t = A(L)\varepsilon_t \quad (1)$$

where  $X_t$  represents  $n \times 1$  a vector including endogenous variables of the model,  $A(L)$  is a  $n \times n$  polynomial consisting of the matrices of coefficients to be estimated in the lag operator  $L$  representing the relationship among variables on the lagged values,  $\varepsilon_t$  is  $n \times 1$  vector of identically normally distributed, serially uncorrelated and mutually orthogonal errors (white noise disturbances that represent the unexplained movements in the variables, reflecting the influence of exogenous shocks):

$$E(\varepsilon_t) = 0, \quad E(\varepsilon_t\varepsilon_t') = \Sigma_\varepsilon = I, \quad E(\varepsilon_t\varepsilon_s') = [0] \quad \forall t \neq s \quad (2)$$

Vector  $X_t$  consists of six endogenous variables - industrial production ( $y_{r,t}$ ), money supply ( $m_t$ ), core inflation ( $p_t$ ), short-term nominal interest rates ( $ir_{n,t}$ ) and real exchange rate ( $er_{r,t}$ ). In the five-variable VAR model ( $X_t = [ip_{r,t}, m_t, p_t, ir_{n,t}, er_{r,t}]$ ) we assume five exogenous shocks that contemporaneously affects endogenous variables - demand shock ( $\varepsilon_{ip_{r,t}}$ ), nominal shock ( $\varepsilon_{m,t}$ ), inflation shock ( $\varepsilon_{p,t}$ ), monetary policy shock ( $\varepsilon_{ir_{n,t}}$ ) and exchange rate shock ( $\varepsilon_{er_{r,t}}$ ).

Structural exogenous shocks from equation (1) are not directly observable due to the complexity of information included in true form VAR residuals. At the same time, the shocks in the reduced form are likely to be correlated so they cannot be considered as true structural shocks. As a result, structural shocks cannot be correctly identified. It is then necessary to transform true model into following reduced form

$$X_t = C(L)Y_{t-1} + e_t \quad (3)$$



where  $C(L)$  is the polynomial of matrices with coefficients representing the relationship among variables on the lagged values and  $e_t$  is a  $n \times 1$  vector of normally distributed errors (shocks in reduced form) that are serially uncorrelated but not necessarily orthogonal:

$$E(e_t) = 0, \quad \Sigma_u = E(e_t e_t') = A_0 E(\varepsilon_t \varepsilon_t') A_0' = A_0 A_0', \quad E(e_t e_s') = [0] \quad \forall t \neq s \quad (4)$$

Relationship between reduced-form VAR residuals ( $e_t$ ) and structural shocks ( $\varepsilon_t$ ) can be expressed as follows:

$$e_t = A_0 \varepsilon_t \quad (5)$$

As we have already noted at the beginning of this section structural VAR (SVAR) approach, is based on decomposing a series into its permanent and temporary components. It imposes long-run restrictions to the reduced-form VAR model. Identification scheme in the SVAR models reflects a long-run neutrality assumption so that we expect the cumulative effect of a certain shock on the certain endogenous variable development is zero.

The equation (6) we can now rewrite to the following form:

$$\begin{bmatrix} 1 & 0 & 0 & a_{14} & a_{15} \\ 0 & 1 & 0 & 0 & a_{25} \\ 0 & a_{32} & 1 & a_{34} & a_{35} \\ a_{41} & a_{42} & a_{43} & 1 & a_{45} \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} u_{y,t} \\ u_{m,t} \\ u_{p,t} \\ u_{in,t} \\ u_{er,t} \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} \varepsilon_{y,t} \\ \varepsilon_{m,t} \\ \varepsilon_{p,t} \\ \varepsilon_{in,t} \\ \varepsilon_{er,t} \end{bmatrix} \quad (6)$$

In order to correctly identify the VAR model we have to impose fifteen restrictions. The number of long-run identifying restrictions is given by the simple equation  $n(n+1)/2$ , where  $n$  denotes the number of endogenous variables of the model. Five restrictions we obtain by normalizing the original matrix. Ten remaining long-run restrictions are identified as follows:

- demand shock does not have permanent effect on money supply (1), inflation (2), real exchange rate (3),
- liquidity shock does not have permanent effect on real output (4), real exchange rate (5),
- inflation shock does not have permanent effect on real output (6), money supply (7), real exchange rate (8),
- monetary policy shock does not have permanent effect on money supply (9), real exchange rate (10).

Estimated SVAR model is used to compute impulse response functions to analyze responses of short-term nominal interest rates to the one standard deviation exchange rate shock in new EU member countries.

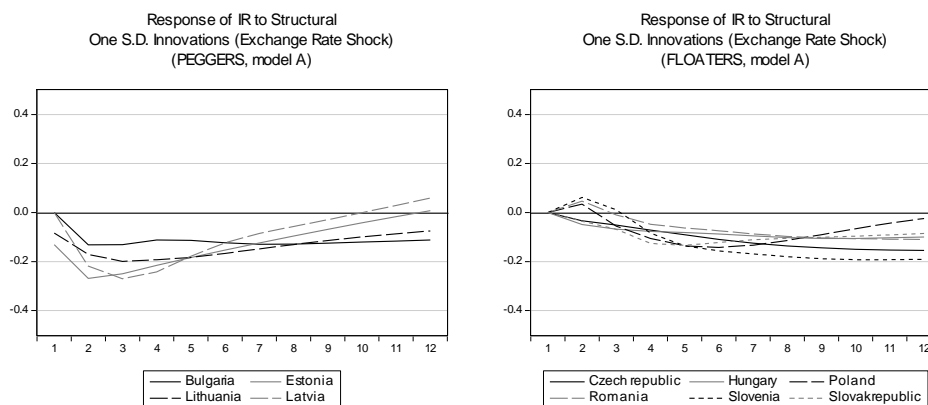
## 5 DATA AND RESULTS

We employed monthly data for period 2000M1-2007M12 (model A) consisting of 96 observations and period 2000M1-2013M12 (model B) consisting of 168 observations for the following endogenous variables - industrial production (nominal volume of the industrial product deflated by averaged PPI), money supply (monetary aggregate M2), inflation (core inflation), short-term nominal interest rates (interbank offered rates with 3 months maturity) and real exchange rate (real effective exchange rate). Time series for monthly industrial

production were employed due to absence of data on the same basis for real output (GDP). Short-term interest rates in Estonia, Slovak Republic and Slovenia we replaced by EURIBOR after euro adoption in each particular country (2007, 2009 and 2011).

Estimation of two models is in line with the primary objective of the paper to estimate the responses of the short-term nominal interest rates to the exchange rate shocks considering possible implications of the crisis period on presented results. Time series for all endogenous variables were drawn from IMF database (International Financial Statistics, October 2014). Time series for industrial production, money supply and inflation were seasonally adjusted.

### Model A



### Model B

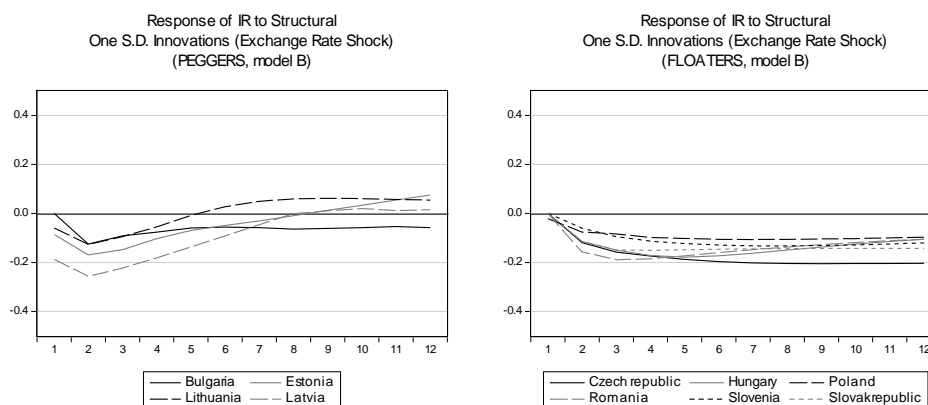


Fig. 1- Responses of Interest Rates to Exchange Rate Shock. Source: Author's calculation.

**Note:** Curves represent responses of interest rates (IR) to the positive one standard deviation exchange rate shock in each country from the group of new EU member countries.

Exchange rate shock was followed by an immediate interest rates decrease in all ten countries from both groups. However, we observed some differences in short-term and long-term response patterns according to the relative diversity in the adopted exchange rate regime in individual countries.

In countries with the nominal exchange rate anchoring we investigated that positive exchange rate shock (exchange rate appreciation) was followed by the interest rate drop with around one month lag. However, we observed some different patterns with regard to the intensity of the interest rate decrease even among countries from the same group ("peggers"). Regardless of this it seems that the short-term interest rates are likely to be responsive to the unexpected exchange rate shocks in countries with the nominal exchange rate targeting.

Initial dynamic decrease in interest rates followed by the exchange rate shock culminated during the second month since the shock. After reaching the peak, interest rates tend to converge to their pre-shock levels following the path of steady and continuous though slight increase. However, the speed of interest rates adjustment in the medium term differs. As a result, the overall effect of the positive exchange rate shock was neutralized between tenth (Estonia and Latvia), eighteenth (Lithuania) and twenty-fourth (Bulgaria) month since the shock in group of countries with pegged exchange rate regime.

Following our results we suggest that high short-term (or even immediate) responsiveness of interest rates to the unexpected exchange rate shocks in countries with exchange rate targeting is associated with an increased stabilization role of interest rates to maintain exchange rate stability affected by the exchange rate volatility (i.e. due to exchange rate shocks). Immediate higher responses of short-term interest rates in these countries should operate as a convenient vehicle to support the exchange rate on its way back to per-shock equilibrium levels.

Quite different response patterns of the short-term interest rates to the positive exchange rate shock were observed in the group of countries with flexible exchange rate arrangement. In comparison with the previous group of countries it seems that the immediate responsiveness of interest rates is lagged (by one to three months). Initial load of the exchange rate effect to the short-term interest rates is quite moderate. Interest rates reacted to the unexpected exchange rate shock by a moderate decrease. Effect of the shock intensified during next months. Despite relatively similar features in immediate responses of the short-term interest rates to the positive exchange rate shock in countries with flexible exchange rate arrangement we observed some differences in medium-term responsiveness patterns among individual countries.

Negative effect of the exchange rate shock to the short-term interest rates leading path completely died out within one year after the shock only in Poland. In remaining countries we observed longer response path on the way to the pre-shock equilibrium. As a result, interest rates returned back to their pre-shock levels till end of the second year since the shock hit the model in Hungary, Romania and Slovak Republic. However, negative effect of the exchange rate shock to the short-term interest rates seems to be permanent even in the long run in the Czech Republic and Slovenia.

We suggest that lower immediate responsiveness of interest rates to the unexpected exchange rate shock in countries with flexible exchange rate arrangement results from generally expected interest rates response patterns under interest rate parity conditions. As a result, interest rate differentials affect associated exchange rate adjustments in the medium-term horizons that is why the overall effects of exchange rate shock on interest rates are more durable under flexible exchange rates.

Crisis period affected substantial features in short-term interest rates responsiveness to the unexpected positive exchange rate shock in countries with nominal exchange rate anchoring. Differences in the immediate effects of the shock seem to be biased (in comparison with model A) according to the intensity of the response patterns within first three months. Immediate response path reflects slightly higher vulnerability of interest rates to the shock in some countries, though in some cases it does not change. However, we observed clear reduction in the overall durability of the immediate effect of the shock. As a result, interest rates converged to their pre-shock levels within reduced time period in all countries from the group but Bulgaria (though medium-term interest rate response trajectory reveals slightly reduced vulnerability). At the same time, we investigated increased volatility of interest rates on their medium-term converging path toward long-run equilibrium. Finally, effects of the

exchange rate shock died out in the long run and thus short-term interest rates are neutral to the distorting effect of the shock.

Different patterns in the short-term interest rates responsiveness to the exchange rate shock during the crisis period was also recognized in the group of countries with flexible exchange rate regime. Following our results we realize that in comparison with the pre-crisis period there is slightly reduced lag in the immediate response (within first three months) of interest rates during the initial loading phase. At the same time, short-term responsiveness of interest rate clearly increased in all countries from the group of “floaters” emphasizing increased role of the short-term interest rate differentials for exchange rate determination under expectation of higher uncertainty.

The overall durability of the exchange rate shock related interest rate effects slightly increased in all countries. However, similarly to our results for the model with a pre-crisis time series, we received mixed results about the overall durability of the exchange rate shock. The negative effect of the shock seems to be permanent in the Czech Republic, Poland, Slovenia and Slovak Republic while it is just a temporary in Hungary and Romania.

## **6 CONCLUSION**

Estimated results of the interest rates impulse-response functions revealed quite distorting effects of the unexpected exchange rate shock to the responsiveness and durability of short-term interest rates according to the employed exchange rate regime as well as baseline period. We suggest that a relative diversity in results according to the exchange rate arrangement provides important evidence about crucial patterns of adjustment processes under fixed and flexible exchange rates. Our results thus may be contributive to the discussion about side effects associated with the process of monetary integration of new EU member countries. On the other hand, comparison of results for pre-crisis and extended periods revealed unique crisis related effects. However, origins of examined crisis related effects in the area of the interest rates determination and distortions in particular contribution of exchange rate shocks to the interest rates leading path may be a subject of further investigation and academic discussion.

Crisis period affected responses of nominal interest rates to exchange rate shocks in both groups of countries. In general, we observed some different short-term interest rates responsiveness patterns in both groups of countries. It seems that responses of interest rates to structural shocks during the crisis period follow different path according to their initial change as well as following adjustment on the way to their long-run equilibrium. Observed changes in the interest rates responsiveness patterns differ not only according to the baseline period but also from the exchange rate arrangement perspective. Our investigation and estimated results thus highlight both crisis related implications in the area of the short-term interest rates determination as well as exchange rate arrangement bias (i.e. fixed versus flexible exchange rates dilemma) particularly in new EU member countries.

### **Acknowledgement**

This paper was written in connection with scientific projects VEGA no. 1/0892/13 and VEGA no. 1/0994/15. Financial support from this Ministry of Education’s scheme is also gratefully acknowledged.

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## **RECOGNITION OF DEFERRED TAX IN SMALL AND MEDIUM-SIZED ENTERPRISES: A CASE STUDY FOR THE CZECH REPUBLIC**

*Libuše Müllerová, Marie Paseková, Zuzana Crhová*

### **Abstract**

The article concerns deferred tax and its significance for the information capability of the financial statement. Temporary differences between accounting and tax rules are the cause of the formation of deferred tax. The accounting and recognition thereof stems from generally accepted accounting principles. The accrual principle, the principle of caution and that of the functioning of the accounting entity in the foreseeable future are at issue. The majority of small and medium-sized enterprises are not obliged to account for and recognize deferred tax, although they may do so, and it is desirable from the perspective of faithful representation of the financial situation of the accounting entity. The conducted investigation in the form of a questionnaire survey ascertained whether accounting entities recognize deferred tax. If not, for what reasons; and if so, from which temporary differences they ascertain it.

*Keywords: Accounting legislation, deferred tax, financial statement, small and medium-sized enterprises*

JEL Classification: M41

### **1 INTRODUCTION**

Accounting entities listed in the commercial register are obliged to release their financial statements, which are a fundamental source of information for the decision-making of all their users. For this reason, the financial statement should provide reliable and truthful data on the activity of the accounting entity so that users can, on the basis thereof, form a realistic concept of its financial situation and efficiency. At the same time, it is necessary to adhere to certain standard procedures in order to achieve reciprocal comparability of the accounting entity's financial statements with, for instance, those of competitors. The accounting act imposes many obligations for accounting entities, which they have to fulfil in order for their accounting and, subsequently, their financial statements to present a fair and true image on the state and flow of property and sources of its financing, but also on expenses, revenues, and the results of business activity. Accounting has to be internally consistent and should stem from the rules and generally accepted accounting principles imposed by the law and the connected accompanying regulations thereof.

Certain transactions recorded in accounting are influenced by other legal regulations, especially tax laws, with which Czech accounting is historically closely connected. Notwithstanding the fact that the accounting profit/loss is used as a departure point when ascertaining the base of current income tax, it is necessary to implement numerous modifications and eliminate from the tax base accounted expense or revenue items which, according to the income tax act, are not a part of the tax base, or, as the case may be, allocate others to it which are contrariwise not in the accounting. The tax base varies to a greater or lesser extent from the economic result ascertained from the accounting.

Deferred tax is the result of generally accepted accounting principles, which are historically the province of double-entry bookkeeping. The **accrual concept** imposes on an accounting entity the obligation to report expenses and revenues in the period with which they are connected objectively and in terms of time. The accounting entity's obligation to report also potential liabilities stems from the **principle of caution**; on the other hand, profits must not be over-estimated. **Preserving property**, or more precisely, the principle of the business's continuance in the future (the going concern concept) assumes that if a business divides the entire disposable profit during the period when a deferred tax liability (for which it did not account) arises, it does so at the expense of its property and it could thereby threaten its future existence. A **fair and true image** of the financial situation and the business activity of the accounting entity is fundamental, and it is the most important requirement of the accounting act. Accounting for deferred tax is thus among the accounting instruments that contribute to the achievement of this umbrella accounting principle. Last but not least, **objectification of financial analyses** is at issue; disposable profit is among the data used for the calculation of numerous financial indicators, especially for the calculation of viability indicators. By correct accounting for deferred tax, the accounting entity can acquire more realistic values of this financial indicator and avoid the distortion thereof caused by overestimation of disposable profit.

The presented contribution focuses on the problem of recognition of deferred tax in small and medium-sized enterprises and their influence on the information capability of the financial statement. It is precisely these businesses that are not obliged to account for deferred tax. The aim of the implemented survey was thus to ascertain whether small and medium-sized enterprises reflect deferred tax and to verify the hypothesis that if businesses are not obliged to account for deferred tax and recognize it, they do not do so, or only in very limited numbers and range. Furthermore, the aim is then to ascertain the reasons why this so.

The questionnaire survey method was used for data collection. The acquired data were further analysed. The text that follows is divided into five chapters. Firstly, attention is devoted to a conducted literary search, which is focused on the formation of deferred tax, the calculation method, usage of deferred tax for earnings management and also the obligation of small and medium-sized enterprises to account for deferred tax. This is followed by a chapter devoted to methodology. The chapter concerned with the acquired results is followed by a summary of the fundamental insights and the close.

## **2 LITERATURE REVIEW**

Hanlon and Heitzman (2010) state that there are numerous differences between the calculation of the accounting profit/loss (prior to taxation) and the taxable income. These could be classified as permanent or temporary. Typical examples of temporary difference is depreciation or adjusting items of receivables. If a tax write-off occurs prior to an accounting expense, recognition of a deferred tax liability and, at the same time, a deferred tax expense occurs.

The pilot version of IAS 12 enabled accounting entities to choose whether they would use, whilst calculating deferred tax, the deferral method or the liability method with the revenue procedure. Time differences between the accounting profit/loss and the tax base thus formed the departure point. At the time, emphasis was placed especially on information presented in the profit and loss statement, and standards therefore preferred the deferral method to the liability method. According to Janoušková (2007), the deferral method ensured better adherence to the principle of assigning expenses to revenues with which they are connected

objectively and in time, and thereby led to a more precise enumeration of the economic result than was the case with the liability method.

In certain cases, transactions connected with the formation of deferred taxes are accounted against equity capital. According to Müllerová (2006) deferred tax is in this case also accounted for in this manner, for the rule applies that deferred tax is accounted for in the same way as the transaction which elicited it.

Poterba et al. (2011) further states that the majority of companies recognize a deferred tax liability rather than a deferred tax asset. Depreciation, then, is indeed the greatest source of temporary differences. According to Dhaliwal (2012), it is possible on the basis of the release of deferred tax assets to assess whether a given business will make adequate profits in the future.

Financial Accounting Standard Board (FASB) indicates that supplementary information on a deferred tax asset or liability should be stated in an appendix to the financial statement (Philips et al., 2003). Graham et al. (2012) add that it is precisely notes on deferred tax in the appendix and the harmonization of the tax and accounting profit/loss that can provide users of the financial statement with information on the viability of a given company.

Lev and Nissim (2004) further document the positive relationship between the future growth of the economic result and the proportion of the taxable economic result and the accounting profit/loss.

A change from accelerated to linear depreciation increases deferred tax and increases the economic result (Lev and Nissim., 2002). According to Lev and Nissim (2002), similar accounting choices which have an impact on deferred tax are thoroughly standard and reduce the ability of deferred tax to provide information on the quality of business activity.

Philips et al. (2003) state that a deferred tax expense provides information on earnings management prior to taxation.

Profit is an important foundation for various indicators of financial analysis. According to Müllerová (2005), by correct accounting for deferred tax, the accounting entity can acquire more realistic values of these financial indicators and avoid the distortion thereof caused by overestimation of disposable profit. In addition, improved comparability with sectorial indicator values or values acquired from the data of competing businesses is achieved.

### ***Deferred tax in small and medium-sized enterprises***

The small and medium-sized enterprise sector plays an irreplaceable role in the Czech national economy. According to data from the Ministry of Industry and Trade CR, small and medium-sized enterprises represent more than 1 million economic subjects; they account for 61.52 % of employment and 54.57 % of accounting added value. The proportion of these businesses in the total number of active entrepreneurial subjects is 99.83 %. Support of small and medium-sized entrepreneurship is currently connected with the requirement of reducing the administrative burden for these businesses, which has an impact also on the area of accounting and financial reporting. One of these reliefs is the possibility to compile a simplified financial statement, which entails a condensed financial statement and a simpler appendix. In contrast to this, there is no doubt that there is the unified European Union market, which requires uniform legal norms and standardization also in the area of financial reporting for small and medium-sized enterprises. (Ministry of Industry and Trade)

Decree No. 500/2002 Coll. states in Section 59 which accounting entities are obliged to account for deferred tax. Those which form a consolidated whole due to unified accounting rules for compilation of a consolidated financial statement are at issue. Then there are



accounting entities which compile a full financial statement: These include all joint-stock companies; then from the remainder of trade corporations, those which are obliged by law to have their financial statements verified by an auditor (see Section 20 Act No. 563/1991 Coll. on accounting). Other accounting entities can (but do not have to) account for deferred tax and recognize it voluntarily. The extent to which they do so was the subject of the presented survey to follow.

### **3 METHODOLOGY DESIGN**

The data for the survey was acquired by a questionnaire survey. Students who visited small and medium-sized enterprises in the Czech Republic participated in the collection of data for the study. Students were selected based on pseudo-random selection. A total of 418 questionnaires were acquired. In each completed survey, the students stated the name of the business and the contact person. The origin of data was randomly verified in roughly thirty businesses by a question posed to the contact person via telephone.

The questionnaire contained six questions. The first question ascertained whether deferred tax was recognized in the business. If the reply was negative, the respondents stated the reason for non-recognition. Other questions were aimed only at those respondents who answered positively to the first question. Replies to the questions provided information as to whether they recognize deferred tax as a deferred tax asset or a deferred tax liability. In the case of recognition of a deferred tax asset, the respondents stated why they chose this method of recognizing deferred tax. Other questions then ascertained the reasons for recognizing deferred tax, what titles enter into the calculation of deferred tax and whether they elaborate the information on deferred tax in an appendix.

The first two questions divided the respondents into three groups. The first group included respondents which do not recognize deferred tax; in the other group there are respondents which recognize deferred tax as a deferred tax liability (DTL); and finally, the third group comprises of respondents which recognize deferred tax as a deferred tax asset (DTA).

### **4 RESULTS**

Figure 1 shows that deferred tax is not recognized in approximately half of businesses; and among the other half of businesses which recognize deferred tax, approximately two thirds are those which recognize it as a deferred tax liability.

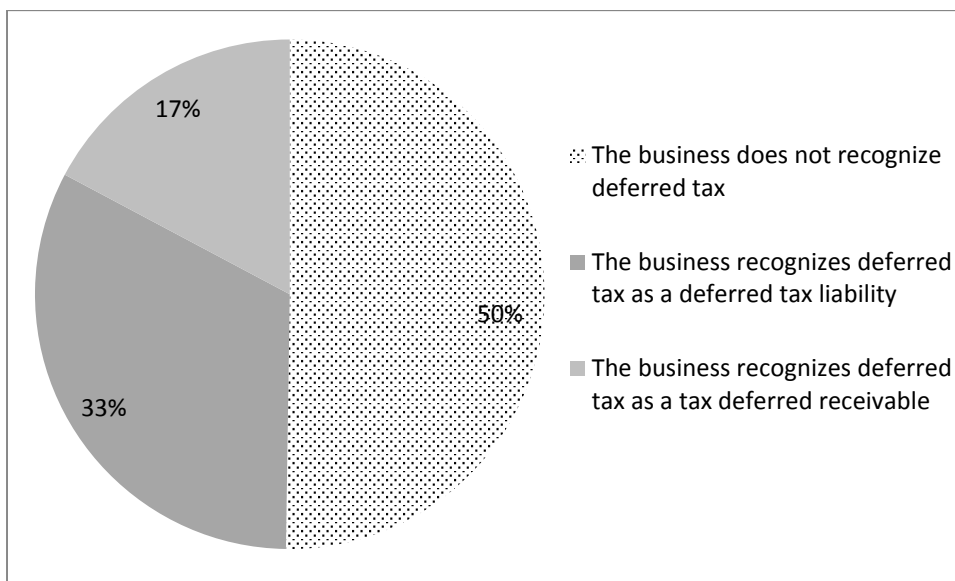


Fig. 1 - The relative number of respondents according to recognition of deferred tax. Source: own survey

Accounting entities which did not recognize deferred tax were asked questions which were intended to justify this fact, which is shown by the following figure:

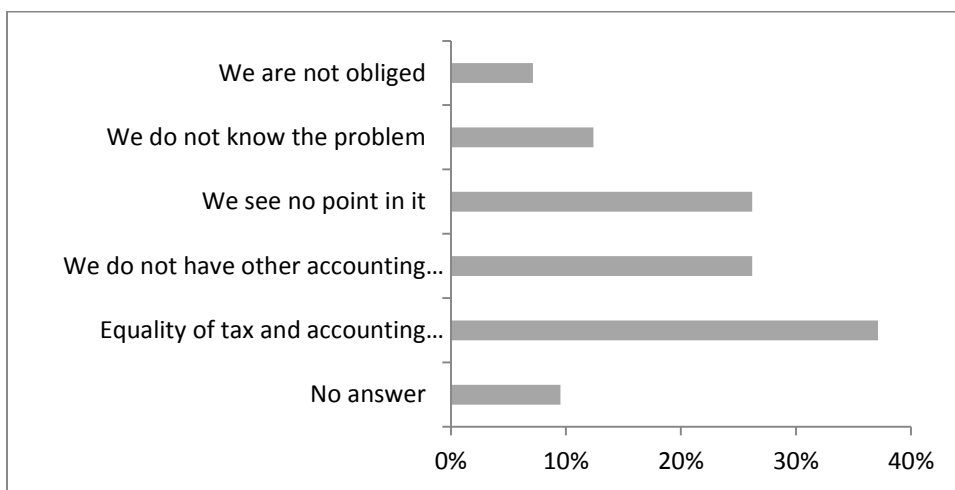


Fig. 2 - Relative representation of reasons for not recognizing deferred tax. Source: own survey

Most respondents give objective reasons to justify non-recognition of deferred tax. Most frequently, it is the non-existence of temporary and accounting differences (in small businesses, accounting and tax depreciation are equal; as a rule, neither adjusting items nor reserves are accounted). Another reason is the non-comprehension of the significance of deferred tax and the conviction stemming therefrom that its recognition makes no sense. Ignorance of the problem is a markedly less frequent substantiation, and a relatively small part of the respondents refer to the fact that they are not obliged to recognize deferred tax.

Furthermore, reasons for possible recognition of deferred tax in the event of deferred tax assets were surveyed.

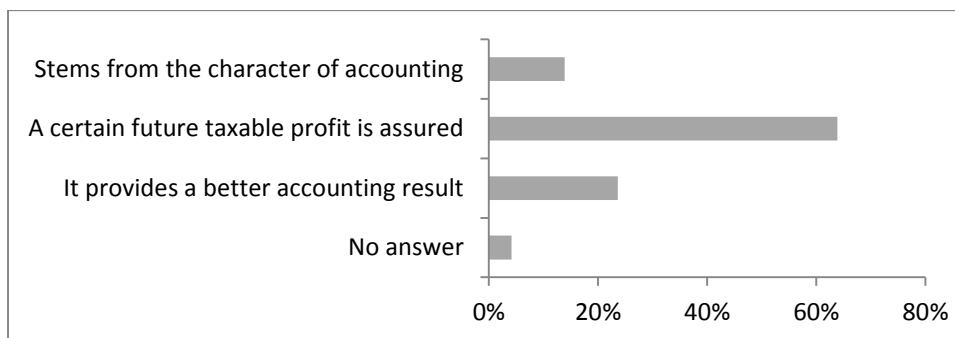


Fig. 3 - Relative representation of reasons for recognizing deferred tax as deferred tax assets. Source: own survey

For a dominant number of respondents, the reason for recognition of deferred taxes as deferred tax assets is the guarantee of the generation of future taxable profit. Only less than a quarter of monitored respondents substantiate this accounting method as a guarantee of a better future accounting profit/loss, or as the case may be, they consider this accounting procedure as the natural consequence of the reporting system. Less than a twentieth of monitored respondents did not justify the given choice.

The relative representation of titles entering into calculation of deferred tax is illustrated in Figure 4. The difference between accounting and tax depreciation enter the calculation of deferred tax in more than 80% of businesses. Similarly to the formation of accounting reserves, the formation of accounting adjusting items is utilized by approximately 40 % of businesses. Approximately one fifth of businesses state the title of transferred tax losses. Overestimation, fines and penalties, unsettled social and health insurance and retrospective tax assessment of liabilities is stated by less than 3% of businesses.

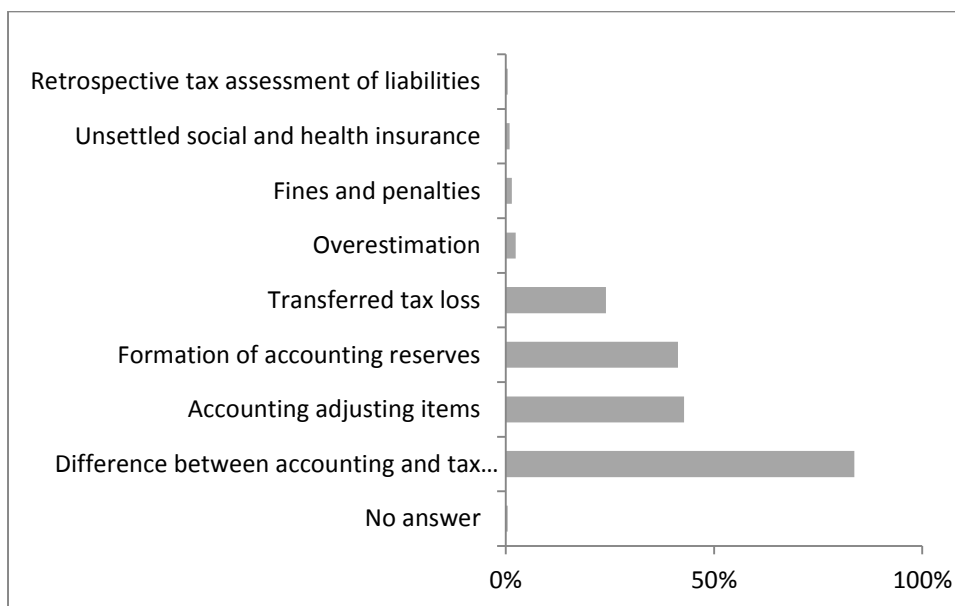


Fig. 4 - The relative representation of titles entering into the calculation of deferred tax. Source: own survey

It stemmed from the questionnaire that approximately half of the businesses which recognize deferred tax provide information on this tax and, as the case may be, on its structure in an appendix, and half do not.

## **5 DISCUSSION**

The actual recording and reporting of deferred tax assets or liabilities is preceded by several steps. The first is the ascertainment as to whether the accounting entity is obliged to account for deferred tax. If the law does not directly impose this obligation on the accounting entity, it has to decide whether this will improve the information capability of its financial statements, compile them fully with the connected recognition of deferred tax or not. The results of the questionnaire survey clearly show the unwillingness of accounting entities to recognize deferred tax voluntarily.

The second step is the identification of temporary differences, from which title deferred tax arises. According to effective accounting regulations, deferred tax is calculated from all temporary differences. Besides the difference between the accounting and tax net book value of depreciated property caused by varying accounting and tax depreciation, other temporary differences also have to be taken into consideration. Adjusting items, reserves, contractual interests from delays and other titles are examples. In view of the fact that deferred tax is not a novelty in Czech accounting, accounting entities have, as a rule, been adequately acquainted with the main titles leading to the formation of deferred tax. However, the majority of them generate a deferred tax asset, so they prefer not to include it into the calculation due to caution. Different accounting and tax depreciation of property are thus the dominant cause of the formation of deferred tax.

It is clear from the results of the questionnaire survey that the number of accounting entities that recognized a deferred tax liability dominates. This is given both by caution in the case of deferred tax assets and the fact that a deferred tax liability usually arises from the title of dissimilar tax and accounting depreciation, which is the most frequent and most significant title, and its influence often dominates over titles leading to the formation of deferred tax liabilities.

Accounting units are obliged to provide details on deferred tax (both as a liability and as an asset) in an appendix to the financial statement. In the event of non-recognition of deferred tax assets due to caution, the accounting entity must not forget to substantiate this fact. It should, among others, state the amount of non-recognized deferred tax assets and a breakdown of the titles which caused the formation of partial deferred tax assets and liabilities. It stemmed from the questionnaire survey that half of the interviewed accounting entities do not state any information on deferred tax in an appendix.

The aim of the survey was to verify the hypothesis that if businesses are not obliged to account for deferred tax and recognize it, they do not do so, or only in very limited numbers and range. The results of the survey confirmed this hypothesis, and also pointed towards the reasons why this is so.

## **6 CONCLUSION**

The accounting act obliges accounting entities to keep accounts so that the financial statement compiled on the basis thereof may provide a fair and true image of the subject of the accounting of the accounting entity's financial situation (see Section 7 Para. 1 Act No. 563/1991 Coll.). Accounting for deferred tax is among the tools which enable the fulfilment of this required accounting principle. The fact that Decree No. 500/2002 Coll., as an accompanying regulation to this act, enables the majority of small and medium-sized enterprises not to account for deferred tax and not to recognize it is indeed a certain reduction of administrative burden for these businesses, although it is a contravention of the above-mentioned principles laid down by the law.

Increasing harmonization in an increasingly connected world cannot be halted. Discussion as to whether small and medium-sized businesses require thorough harmonization has been underway since the beginning of the new millennium. Objections from the sides of opponents of harmonization of financial reporting for these businesses (with the reason they are not businesses of international scale) are gradually weakening in the connected and globalizing world. Foreign investors, for whom the ability to orient themselves in business financial statements is fundamental, operate also in small and medium-sized businesses.

In 2009, the International Accounting Standards Board (IASB) published the Standard for Small and Medium-sized Enterprises, which stems from full IFRS, although it was modified for the needs of smaller entrepreneurial subjects. Many principles from full IFRS for recognition and valuation of assets, liabilities, revenues and expenses have been simplified; certain themes which did not concern small and medium-sized businesses were omitted, and the number of requirements for publication was fundamentally simplified. Although the Czech Republic has not yet implemented it (which cannot be ruled out in the future), it is an important fact that the standard does not take into consideration that small and medium-sized enterprises would not have to account for deferred tax.

### **Acknowledgments**

The authors are thankful to the Operational Programme Education for Competitiveness co-funded by the European Social Fund (ESF) and national budget of the Czech Republic for the grant No. CZ.1.07/2.3.00/20.0147 - "Human Resources Development in the field of Measurement and Management of Companies, Clusters and Regions Performance", which provided financial support for this research.

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## **DETERMINANTS OF NEW ENTERPRISE FORMATION: THE CZECH REPUBLIC (2011-2012)**

*Jana Nekolová, Jiří Novosák, Oldřich Hájek*

### **Abstract**

This paper deals with determinants of new enterprise formation in the Czech Republic in the time period 2011-2012. The determinants are analyzed for 227 functional areas delimited according to labor commuting flows. Regression models are computed to reveal the relationship between new enterprise formation and explanatory variables. Final results point out positive impact of spatial concentration of entrepreneurs, high share of foreign firms, the quality of human capital and industrial diversity on new enterprise formation. On the contrary, the presence of large firms is negatively associated with new enterprise formation. The relationship between new enterprise formation on one hand and population density and unemployment on the other is ambivalent.

*Keywords: entrepreneurship, determinants of new enterprise formation, the Czech Republic, regression models*

JEL Classification: R12, M13, R15

## **1 INTRODUCTION**

Thinking about the relationship between the size of enterprises and economic growth went through important changes after the Second World War. First, large firms were regarded as the main engine of economic growth. This assertion was explained by the higher efficiency of large firms compared with their small and medium counterparts due to economies of scale and innovativeness (see, e.g., Verheul et al., 2001). However, this view was reformulated in the 1970s, emphasizing the crucial contribution of small and medium-sized enterprises (SMEs) to economic growth. Concerning reasons for this change, the scholar literature traditionally mentions the increasing importance of knowledge, economies of scope, and flexibility in the decision-making process - the main sources of SME competitiveness in increasingly uncertain global markets (e.g., Audretsch, 2001; Raposo, 2009).

New enterprise formation and entrepreneurial activity are perceived to be the conditions of long-term economic development and growth (see, e.g., Andersson and Koster, 2011; Fritsch and Mueller, 2007; Lee, Florida and Acs, 2004). Scholars have attempted to empirically verify the relationship between enterprise activities and economic growth. The positive impact of enterprise density on economic growth is mentioned by, e.g., Carree et al. (2007), Sternberg (2012), Romero (2012), and Huggins and Williams (2011). Similarly, Fotopoulos (2013), Andersson and Koster (2011), and Fritsch and Mueller (2007) note the importance of new enterprise formation for economic growth. Consequently, the support to SME development is positioned high on the political agenda of developed countries. Generally, two closely interlinked strands of such policies may be distinguished (e.g., Raposo, 2009). The first strand is focused on the competitiveness of existing SMEs while the second strand is on the creation of new enterprises (entrepreneurship). The formation of new enterprises is the main research theme of this paper, embedding it into the spatial dimension of entrepreneurship.



Despite the widely accepted positive relationship between entrepreneurship and economic growth, a consensus on the importance of particular determinants of new enterprise formation is missing. Thus, for example, some studies point out the positive impact of high unemployment on entrepreneurship while other studies speak about the inverse relationship (compare, e.g., with Fotopoulos, 2013). Moreover, research on the determinants of new enterprise formation in post-communist countries is rather scarce. This paper contributes in filling this research gap. Using tools of regression analysis, it reveals determinants that influenced the formation of new enterprises in the Czech Republic in the time period 2011-2012. The paper is structured as follows: the following part introduces the theoretical framework of the research; the third part describes the methodology used in this paper; the fourth part summarizes the findings from the analysis. The final part draws conclusions.

## **2 THEORETICAL BACKGROUND**

The importance of new enterprise formation for employment, productivity growth, innovation and wealth (see, e.g., Fotopoulos, 2013) substantiates the political interest in determinants of new enterprise formation (see also Fritsch and Mueller, 2007; Schutjens and Wever, 2000). The relevance of particular determinants influences decisions about the form of public interventions. These decisions are of increasing importance in global competition of locations (see, e.g., Brühlhart et al., 2012; Devereux et al., 2007). Moreover, uneven distribution of entrepreneurial activities plays its part (see, e.g., Audretsch and Fritsch, 1994; Wang, 2006). In this regard, Fotopoulos (2013) and Andersson and Koster (2011) pointed out persistence of this distribution in time. They state that the determinants of new enterprise formation are changed slowly. Consequently, focus of public interventions on the most influential determinants of new enterprise formation may be crucial to break the path dependency.

Despite its importance, the knowledge about the relevance of particular determinants of new enterprise formation is not straightforward (see, e.g., Sutaria and Hicks, 2004). Theoretical background offers various views on the issue. The theory of entrepreneurial choice emphasizes the entrepreneur's personality and experience (see, e.g., Evans and Jovanovic, 1989). Armington and Acs (2002) describe three life strategies of potential entrepreneurs in this regard. Self-employment is the strategy preferred mostly in rural areas and territories with limited employment opportunities. The wage-work strategy is typical for a territory whose economy is characterized by the presence of large firms (see also Fritsch and Mueller, 2007). The career strategy is followed by ambitious, well-educated people in knowledge intensive sectors (see also Armington and Acs, 2002; Acs, Armington and Zhang, 2007; Bishop, 2012; Lee, Florida and Acs, 2004 for the positive relationship between quality of human capital and new enterprise formation). Consequently, new enterprise formation may be positively associated with unemployment, absence of large firms, quality of human capital, and knowledge concentration. Note that unemployment may have also negative impact on new enterprise formation due to structural problems of economy (see, e.g., Bishop, 2012; Cieřlik, 2005). However, the scope of determinants that influence entrepreneur's decision is much wider. Wang (2006) and Bishop (2012) note conditions on labor market, state of national economy and risk of firm failure. Belás et al. (2015) mention several motivational factors, including access to financing or administrative burden (compare also with Jurcik, 2013). Lee, Florida and Acs (2004) and Bilan (2014) point out higher propensity of foreigners to become employer compared to natives.

Besides entrepreneur's personality, another research approach is concerned with determinants of new enterprise formation. Spatial perspective is the cornerstone of this approach. Its essence rests on the variance in new enterprise formation rates amongst territories.

Subsequently, various characteristics of these territories - determinants - are used to explain the variance. What are the determinants of new enterprise formation from the spatial perspective?

Several spatial development theories emphasize the importance of agglomeration economies. These theories point out positive relationship between agglomeration economies and new enterprise formation. Thus, concentration of people and entrepreneurial activity stimulates new enterprise formation (see, e.g., Audretsch and Fritsch, 1994; Acs, Armington and Zhang, 2007; Brühlhart et al., 2012; Devereux et al., 2007). Specialized business services, pooled labour market, innovation and knowledge spillovers and entrepreneurial infrastructure are the sources of agglomeration economies. However, agglomeration diseconomies from competition may counteract the positive effects (see, e.g., Sutaria and Hicks, 2004). Two types of agglomeration economies are distinguished in literature. Marshall-Arrow-Romer (MAR) externalities are connected with economies from specialization. It is claimed that innovation and knowledge spillovers can be easily realized in related industries (see, e.g., Beaudry and Schiffauerova, 2009; Acs, Armington and Zhang, 2007). On the contrary, Jacobian externalities emphasize the advantages from diversity and diversified skills in identifying market opportunities. Thus, diversity allows utilization of processes and methods from one sector in the others – innovations (see, e.g., Beaudry and Schiffauerova, 2009; Bishop, 2012; Delfmann et al., 2014). There is not a consensus which type of externalities is more important for new enterprise formation.

### **3 METHODOLOGY**

The methodology of this study is based on the broadly used spatial approach to new enterprise formation research (see, e.g., Audretsch and Fritsch, 1994; Armington and Acs, 2002; Bishop, 2012), using the Czech Republic in the time period 2011-2012 as the case study. The further analysis is related to the so called functional areas (FUAs) as defined by the Czech Statistical Office on the basis of the 2011 Census data for municipalities (see CSO, 2013). The FUAs delimitation is based on labour commuting flows between core municipality and its hinterland (see, e.g., Armington and Acs, 2002 for such an approach). In this regard, we slightly adapted the CSO methodology through inclusion of all Czech municipalities to a FUA. Thus, we dissolved the set of uncategorized municipalities. Overall, 227 FUAs were delimited.

Linear regression was used to examine determinants that influence new enterprise formation in the Czech Republic in the time period 2011-2012. Variables were chosen with respect to the theoretical background. The number of new enterprises in each FUA was taken from the Business Register of the Czech Republic. An enterprise was counted as a new enterprise if it was registered in the Business Register of the Czech Republic in 2011 or 2012. Note that both legal entities and natural persons with the status of an entrepreneur were included into the analysis. However, the absolute number of new enterprises is influenced by different size of FUAs. There are two broadly accepted approaches to cope with this problem (see, e.g., Bishop, 2012; Armington and Acs, 2002; Fritsch and Mueller, 2007). The ecological approach divides the number of new enterprises by the total number of entrepreneurial entities in the territory. The labor force approach uses total labor force as the denominator. The second approach was used in this study. Thus, the number of new enterprises was divided by the number of economically active people (NEW). Logarithmic transformation (LNNEW) was applied to reduce the influence of outliers. The data for economically active people were taken from the 2011 Census.

Explanatory variables for this study were defined as follows. Population density (DENSITY) was included into the analysis to explore the impact of agglomeration economies on new

enterprise formation. Positive impact of spatial concentration of people is expected in this regard (see, e.g., Audretsch and Fritsch, 1994; Acs, Armington and Zhang, 2007; Brühlhart et al., 2012; Devereux et al., 2007). Moreover, agglomeration economies are connected with the distinction between MAR and Jacobian externalities (see, e.g., Beaudry and Schiffauerova, 2009). Therefore, the entropy measure of diversity (ENTROPY) was added into the analysis to explore the impact of industrial diversity on new enterprise formation. This measure was defined as

$$ENTROPY = \sum_{i=1}^n I_i * \ln \frac{1}{I_i}$$

where  $I_i$  is the share of the  $i$ th 2-digit NACE code in SO ORP's employment and  $n$  is the number of 2-digit NACE codes (see, e.g., Shannon and Weaver, 1949 for theoretical aspects of the measure). Scholars did not find a consensus which type of externalities is more important for new enterprise formation (see, e.g., Fotopoulos, 2014; Delfmann et al., 2012). The data for the both variables were taken from the 2011 Census.

Two explanatory variables were included into the analysis to explore the impact of the quality of entrepreneurial climate on new enterprise formation. The first variable is the ratio between the number of entrepreneurs and economically active people (ENTREP). Positive impact of spatial concentration of entrepreneurs is expected because of, e.g., information and knowledge spillovers, and positive attitudes to entrepreneurship (see, e.g., Audretsch, 2001; Verheul et al., 2001). The data for this variable were taken from the 2011 Census. The second variable is the share of foreign enterprises in the total population of enterprises (FOREIGN). Foreigners may substantially contribute to new enterprise formation. Their lower risk aversion plays positive role in this regard (see, e.g., Bilan, 2014; Lee, Florida and Acs, 2004). The data for the variable were taken from the Business Register of the Czech Republic (2010).

Two alternative variables were included into the analysis to explore the impact of human capital on new enterprise formation. The first variable is the share of university-graduates in the population older than 15 years of age (UNIGRAD). The second variable is defined as the ratio between the number of workers in knowledge-intensive business industries and the number of economically active people (KIABI). The Eurostat's definition of knowledge intensive business industries as the 2-digit NACE codes was used. Positive relationship between the quality of human capital and new enterprise formation is expected. The ability to grasp entrepreneurial opportunities and ambitions of well-educated people are mentioned in literature (see, e.g., Armington and Acs, 2002; Acs, Armington and Zhang, 2007; Bishop, 2012; Lee, Florida and Acs, 2004). The data for the both variables were taken from the 2011 Census.

Unemployment rate (UNEMPLOY) was included into the analysis to explore the relationship between labor market conditions and new enterprise formation. Scholars did not find a consensus on the impact of unemployment on new enterprise formation. Unemployed people may be an important source of entrepreneurs. However, unemployment may discourage new enterprise formation because of economic problems of the territory (see, e.g., Audretsch and Fritsch, 1994; Armington and Acs, 2002; Lee, Florida and Acs, 2004). The data for the variable were taken from the Business Register of the Czech Republic (2010). Finally, the share of large firms understood as legal entities with more than 249 employees in the population of all firms (LARGE) was included into the analysis to explore the impact of the presence of large firms on new enterprise formation. Several scholars pointed out negative relationship between the presence of large firms and new enterprise formation. In this regard, large firms are perceived as a source of stable employment with high income (see, e.g., Lee,

Florida and Acs, 2004; Armington and Acs, 2002). The data for the variable were taken from the Business Register of the Czech Republic (2010).

Five multiple ordinary least square (OLS) regression models were computed to reveal the determinants of new enterprise formation with LNNEW as the dependent variable, and DENSITY, ENTREP, ENTROPY, FOREIGN, KIABI, LARGE F, UNIGRAD and UNEMPLOY as explanatory variables. Tab. 1 shows expected signs of particular explanatory variables in accord with the theoretical background. Tab. 2 summarizes descriptive statistics. Standard tests were applied to check for the OLS multi-collinearity, non-normality, and heteroscedasticity assumptions in all models.

Tab. 1 – Explanatory variables: expected signs

Variable	Expected signs
DENSITY	Positive
ENTREP	Positive
ENTROPY	Positive/negative
FOREIGN	Positive
KIABI	Positive
LARGE F	Negative
UNEMPLOY	Positive/negative
UNIGRAD	Positive

Tab. 2: Summary statistics

Variable	Mean	St. Deviation	Minimum	Maximum
LNNEW (per 1000 people)	3.48	0.15	2.99	4.28
DENSITY (inh./km <sup>2</sup> )	111.41	81.10	20.90	580.00
ENTREP (per 1000 people)	144.28	20.51	63.50	211.50
ENTROPY	0.89	0.02	0.77	0.92
FOREIGN (%)	4.67	3.57	0.40	27.00
KIABI (%)	6.79	2.45	3.00	22.50
LARGE F (%)	7.74	6.37	0.00	45.45
UNEMPLOY (%)	11.47	3.71	4.40	26.50
UNIGRAD (%)	8.54	2.43	4.00	21.00

## 4 EMPIRICAL RESULTS AND DISCUSSION

Tab. 3 contains results of the five multiple OLS regressions computed for this study. Note that variance inflation factors, Kolmogorov-Smirnov and Shapiro-Wilk tests, and Breusch-Pagan test do not indicate problems of multi-collinearity, non-normality, and heteroscedasticity, respectively. However, regression results may be influenced by the Kadaň FUA outlier. Therefore, we computed OLS regressions for both situations – for all 227 FUAs and for 226 FUAs without the Kadaň FUA. Because regression results are stable in the both situations we decided to retain the Kadaň FUA in the model.

All the five OLS regression models explain almost half of the variance in the data. The first model contains results of stepwise regression that retains only statistically significant variables. Four variables are included in the model. First, ENTREP is statistically significant at the 1% level with expected sign. Therefore, the share of entrepreneurs in economically active population is positively associated with new enterprise formation. Second, FOREIGN is statistically significant at the 1% level with expected sign. Therefore, the share of foreign enterprises in the total population of enterprises is positively associated with new enterprise formation. Third, LARGE F is statistically significant at the 1% level with expected sign. Therefore, the share of large firms in the total population of firms is negatively associated with new enterprise formation. Finally, UNIGRAD is statistically significant at the 1% level with expected sign. Therefore, the share of university-graduates in the population older than 15 years of age is positively associated with new enterprise formation.

UNIGRAD is replaced by the alternative variable of human capital – KIABI – in the second model. KIABI is statistically significant at the 1% level with expected sign. Therefore, the share of people employed in knowledge intensive business industries in economically active population is positively associated with new enterprise formation. ENTREP, FOREIGN and LARGE F remain statistically significant with expected signs. However, LARGE F is statistically significant only at the 5% level. Thus, KIABI reduces somewhat the impact of LARGE F on the variance of new enterprise formation.

Model 3, Model 4 and Model 5 are extensions of the first model by DENSITY, UNEMPLOY and ENTROPY respectively. First, population density is not statistically significant when explaining the variance of new enterprise formation (see Model 3). Therefore, population density alone is not sufficient source of agglomeration economies propulsive for new enterprise formation. This is the case of the Ostrava FUA. The quality of entrepreneurial environment of the Ostrava FUA characterized by relatively low shares of entrepreneurs and foreign firms does not enable to use the full potential of agglomeration economies created by spatial concentration of people. Second, also unemployment is not statistically significant when explaining the variance of new enterprise formation (see Model 4). This is in accord with a number of studies pointing out ambivalent relationship between unemployment and new enterprise formation. Unemployment may be an important source of entrepreneurs but also a symbol of declining economy. Third, ENTROPY is positively associated with new enterprise formation. Therefore, industrial diversity contributes to new enterprise formation. However, this relationship is not statistically significant either at the 1% level or at the 5% level.

Altogether, the findings contribute to the theory of new enterprise formation as follows. The statistical significance of ENTREP and FOREIGN indicates positive impact of various spillovers (e.g. information, knowledge, motivations) in the FUAs characterized by entrepreneurial climate of high quality. Moreover, the statistical significance of ENTREP and FOREIGN supports the path dependency nature of new enterprise formation. Thus, the existing enterprise stock as the result of previous development positively influences new enterprise formation. Consequently, it is long-term process to change new enterprise formation tendencies (see, e.g., Fotopoulos, 2014; Anderson and Koster, 2011; Fritsch and Mueller, 2007). The statistical significance of FOREIGN supports also the idea that foreigners are more likely to establish their business compared to natives (see, e.g. Lee, Florida and Acs, 2004).

The statistical significance of UNIGRAD and KIABI highlights the importance of human capital for new enterprise formation. This is in accord with the theoretical strand that emphasizes the changing nature of current economy towards increasing importance of

knowledge (see, e.g., Bishop, 2012). Consequently, the quality of human capital and knowledge stock is decisive to benefit from unused market opportunities. Industrial restructuring creates theoretical background also for the statistical significance of LARGE F. Increasing importance of knowledge, services and flexibility upholds the role of small and medium enterprises (see, e.g., Armington and Acs, 2002). The presence of large firms is not desirable in this framework. Finally, the positive sign of ENTROPY favors the Jacobian externalities. This finding contrasts several other studies that prefer MAR externalities (see, e.g., Fotopoulos, 2014; Delfmann et al., 2014).

Tab. 3: Regression results – standardized coefficients

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
ENTREP	0.412** (0.000)	0.426** (0.000)	0.420** (0.000)	0.423** (0.000)	0.387** (0.000)
FOREIGN	0.327** (0.002)	0.260** (0.002)	0.325** (0.002)	0.337** (0.002)	0.327** (0.002)
LARGE F	-0.142** (0.001)	-0.122* (0.001)	-0.140** (0.001)	-0.135** (0.001)	-0.125** (0.001)
UNIGRAD	0.303** (0.003)		0.289** (0.004)	0.327** (0.003)	0.272** (0.003)
KIABI		0.308** (0.003)			
DENSITY			0.025 (0.000)		
UNEMPLOY				0.063 (0.002)	
ENTROPY					0.104 (0.372)
Adjusted $R^2$	0.459	0.464	0.457	0.459	0.464
Observations	227	227	227	227	227

\* 5% level of statistical significance

\*\* 1% level of statistical significance

Note: standard errors in parentheses

## 5 CONCLUSION

Entrepreneurship is regarded as an important source of economic growth and development. This relationship substantiates the research on determinants of new enterprise formation. This paper dealt with this issue. Its goal was to reveal determinants that influenced the formation of new enterprises in the Czech Republic in the time period 2011-2012. Multiple OLS regression was used from the methodological point of view. In this regard, regression models were built on the spatial basis for 227 FUAs.

The study points out several statistically significant associations between explanatory variables and new enterprise formation. Spatial concentration of entrepreneurs, high share of foreign firms, human capital of high quality and industrial diversity contribute to higher new enterprise formation. On the contrary, the presence of large firms is negatively associated with new enterprise formation. The impact of population density and unemployment on new enterprise formation is ambivalent.

### Acknowledgement:

The authors are thankful to the Operational Programme Education for Competitiveness co-funded by the European Social Fund (ESF) and national budget of the Czech Republic for the grant No. CZ.1.07.2.3.00/20.0147 – “Human Resources Development in the Field of Measurement and Management of Companies, Clusters and Regions Performance”, and to the grant No. IGA/FaME/2014/003 which provided financial support for this research.

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## **OPTIONAL CCCTB IMPLEMENTATION AND ITS IMPACT ON THE CORPORATE TAX REVENUES IN THE CZECH REPUBLIC**

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### **Abstract**

The aim of the paper is to research the impact of the optional CCCTB implementation (i.e. implementation in all the EU Member States except the Czech Republic) on the tax bases in the Czech Republic, and to identify whether the outflow/inflow or inflow will occur. The empirical analysis is based on the data available from the Amadeus databases and covered 2403 parent companies with 3562 Czech subsidiaries. The research performed in the paper revealed that the implementation of CCCTB system in EU27 would negatively change the tax base generated in the Czech Republic, as the country would lose more than 8% of the current tax base. Based on the results of the research, we can conclude, that the implementation of CCCTB in EU27 without the participation of the Czech Republic might have very strong negative impact on the overall tax base generated by the Czech subsidiaries in the Czech Republic and therefore also on the tax revenue.

*Keywords: CCCTB, group, tax base, tax revenue, Czech Republic*

JEL Classification: H25, K22

### **1 INTRODUCTION**

There have been many attempts to coordinate corporate taxation systems of EU Member States. Firstly, in 1962, European Commission suggested to split the corporate tax rates and to apply different tax rate for retained and distributed profits. Further, eight years later, Temple report suggested implementation of classical system of corporate taxation in the EU Member States. Consequently, the European Commission tried to approximate the corporate tax rates – it elaborated the proposal on common level of corporate taxation between 45% and 55%, lately on minimum corporate tax rate of 30%. As those harmonization efforts were not successful, European Commission decided to try to harmonize only the provisions affecting smooth functioning of the Internal Market. Moreover, as add Nerudová and David (2008), the long-term aim of the European Commission is to reduce the individual differences in the tax systems of the Member States, whether through tax harmonization or through tax coordination, in order to not cause the obstacles to the smooth functioning of internal market and not to cause inefficient allocation of production factors or production caused by the obstacles of tax character.

The background of the CCCTB draft directive goes back into 2001, when the European Commission suggested four alternative proposals on corporate income tax harmonization – Home State Taxation System, European Union Company Tax, Compulsory Harmonized Corporate Tax Base and Common Consolidated Corporate Tax Base. After the discussion of all four models, the European Commission decided to set the implementation of Common Consolidated Corporate Tax Base as its long-term. It represents one of the most ambitious projects in the history of the harmonization efforts. After more than ten years of the work Commission has published the text of CCCTB Directive proposal on 16th March, 2011.

With respect to the current situation, it is quite obvious that based on the experience with financial transaction tax, CCCTB will probably be introduced through enhanced cooperation as well. This solution is connected with one disadvantage. The existence of two systems

(CCCTB and national system) leaves the space for speculations, tax arbitrations, tax evasion and fraud. Moreover, if introduced under enhanced cooperation or as optional, countries not implementing the system can face the outflow of tax bases into the jurisdictions applying CCCTB system.

The implementation of CCCTB is connected also with the problem of tax sharing mechanism. Based on several discussions, finally, the directive proposal suggests the allocation formula. In that system the consolidated tax base will be shared among the members of the group based on micro factors. This new allocation ruled will have the impact on EU Member States budgets.

The aim of the paper is to research the impact of the optional CCCTB implementation (i.e. implementation in all the EU Member States except the Czech Republic) on the tax bases in the Czech Republic, and to identify whether the outflow/inflow or inflow will occur. The empirical analysis is based on the data available from the Amadeus database. The paper presents the results of the research within the project GA CR No. 13-21683S “The quantification of the impact of the introduction of Common Consolidated Corporate Tax Base on the budget revenues in the Czech Republic”.

## **2 THEORETICAL BACKGROUND**

At present, MNEs are facing two systems of income determination (i.e. also the determination of tax base) in the European Union – formulary apportionment and separate entity accounting. Under separate accounting approach the parent company has to calculate its financial account as each of its enterprise would be independent entity – i.e. all the transactions between the members of the group have to be at arm’s length. Oestreicher (2000) adds that conceptual core of separate accounting is to provide a level tax playing field among integrated and stand-alone firms by treating each subsidiary and branch of an MNE as a lawfully distinct party that deals at arm’s length with its parent and other members of the same overall entity. Bakker (2009) mentions that under arm’s length principle, affiliated businesses should set transfer prices at levels that would have prevailed that the transaction occurred between unrelated parties. On the contrary Gresik (2001) or Desai, Foley and Hines (2003) mention that current international practice using separate accounting is heavily criticised for there is direct and indirect evidence that MNEs are relocating their taxable incomes from high-tax jurisdictions to low-tax jurisdictions. Celestin (2000) mentions that separate accounting system failed to pass the test of simplicity, equity, efficiency and administrative ease. Hamaekers (2001) for example mentions that nowadays intra-group transactions occur in components and intangibles and in that situation separate accounting outlasted its usefulness.

There can be found only four empirical studies researching the impact of CCCTB introduction on the budget revenues of the EU Member States. Unfortunately, none of them is specifically aimed specifically at the impacts on the Czech Republic or solely on the scenario that CCCTB will be implemented by enhanced cooperation (i.e. by not all EU Member States).

The first paper by Fuest, Hemmelgarn and Ramb (2007) builds on the scenario of mandatory CCCTB. To predict the possible impact on budget revenues of EU Member states, they are using the data on German company-level foreign direct investment and data from balance sheets. The sample is limited on 2000 German parent companies and 6000 foreign subsidiaries in other EU Member States between the years 1996-2000. The authors estimate that national tax bases would decline by 20% on average.

The second paper by Van der Horst, Bettendorf and Rojas-Romagosa (2007) builds also on the scenario of mandatory CCCTB, this time in 17 EU Member states. It is not aimed directly on the changes in budget revenues, but on the welfare effects connected with the introduction

of the system. Not only the study comprise mandatory scenario, it also assumes that all companies have to opt for CCCTB. The research is based on the equilibrium model, which expects, that each from 17 EU Member states has MNE parent company having subsidiaries in each of the remaining Member States.

Third paper written by Deveraux and Loretz (2008) is more complex. The study researches two scenarios – voluntary and mandatory CCCTB. It analyzes the sample of 50,000 companies during the period of the years 2000-2004. The authors estimate, that under voluntary system, the tax revenues could decrease by 2.5%, while under mandatory system, the revenues could increase by 2 %. Also as in case of the previous mentioned studies, the results shows unequal effects in individual Member States on budget revenues. The impact varies from -18% to +60%.

Cline, Neubig, Philips, Sanger and Walsh (2010) have researched three possible scenarios – mandatory CCCTB in all EU Member States, voluntary CCCTB in all EU Member States and mandatory CCCTB in 9 EU Member States. The study is built on the model of 200,000 companies in the year 2005. The scenario of mandatory CCCTB system in 27 Member States has revealed that there would be winners and losers. The corporate tax collection varied from -8.3% in Denmark to +6.0% in France. In that model, the Czech Republic would lose 3.0% of corporate tax collection. In case, that the system would be voluntary in 27 Member States, the range of changes would be narrower – from -7.7% in Germany to +2.6% in United Kingdom. The Czech Republic would lose roughly the same – i.e. -3.1% of corporate tax collection. The scenario of mandatory CCCTB in nine Member States has revealed that the change in corporate tax collection would vary from -8.5% in Netherlands to +5.7% in France.

### **3 DATA AND METHODOLOGY**

With respect to the methodology, the paper follows the approach of Devereux and Loretz (2008), Fuest, Hemmelgarn and Ramb (2006) or Clien, Neubig, Phillips, Sanger and Walsh (2010). The research in the paper is based on the data from the Amadeus database (update 227). The database offer standardized financial information on public companies, private companies, financial institutions and insurance undertakings in 43 European countries.

As the paper is aimed on the identification of inflows and outflows of the tax bases in the Czech Republic, it was necessary to create the group of the Czech companies and other EU companies, which would qualify under CCCTB system for consolidation regime and group treatment. As is stated in the CCCTB directive proposal, two-tier test was performed. This test is based on two layers – control and ownership. First layer (i.e. control), is fulfilled when the controlling company holds at least 50.01% in the controlled company. The condition of ownership is fulfilled when the ownership rights amount to more than 75% of the company's capital.

Based on the two-tier test it was identified 1587 Czech parent companies with 2427 subsidiaries in the Czech Republic and other EU member states and 816 other EU parent companies with 1135 subsidiaries in the Czech Republic. The overall amount of companies represents final group with all necessary data. Missing data in financial statements of companies was supplemented based on method of imputation as the most suitable method for missing data as was proved in previous research by Nerudová (2012) and Nerudová and Solilová (2014).

In the next step, the assumptions of potential outflow/inflow of tax bases from/in to the Czech Republic were set up as a consequence of the implementation of the CCCTB system in EU27 (i.e. all the EU Member States except the Czech Republic). According to the report of the Committee of Independent experts on Company Taxation (1992) was proved that both -

differences in business taxation, the burden of business taxes and differences in the level of effective tax rates among EU Member States - have the impact on the decision of corporations on the location of their economic activity and investment in other EU Member States. Taking into account this permission, based on the analysis of the level of the effective tax rate among the EU Member States we have identified the potential outflow/inflow of tax bases from/in to the Czech Republic.

The table 1 below shows the effective average tax rate in EU member states in 2014. Its calculation is based on the methodology developed by Devereux and Griffith (1998). As can be seen from the table, lower effective tax rate than the effective tax rate in the Czech Republic were identified in Bulgaria, Croatia, Cyprus, Estonia, Ireland, Latvia, Lithuania, Romania and Slovenia.

Tab. 1- Effective average tax rate by EU member states in 2014. Source: Spengel, Endres, Finke and Heckemeyer (2014).

<b>Country</b>	<b>Corporate tax rates in %</b>	<b>Effective average tax rate in %</b>	<b>Country</b>	<b>Corporate tax rates in %</b>	<b>Effective average tax rate in %</b>
AT	25.0	23.0	IT	30.9	24.0
BE	34.0	26.7	LV	15.0	14.3
BG	10.0	9.0	LT	15.0	13.6
HR	20.0	16.5	LU	29.2	25.5
CY	12.5	15.2	MT	35.0	32.2
CZ	19.0	16.7	NL	25.0	22.6
DK	24.5	22.2	PL	19.0	17.5
EE	21.0	16.5	PT	30.0	27.1
FI	20.0	18.4	RO	16.0	14.8
FR	38.9	39.4	SK	22.0	19.4
DE	31.0	28.2	SI	17.0	15.5
EL	26.0	24.1	ES	35.3	32.6
HU	20.9	19.3	SE	22.0	19.4
IE	12.5	14.4	UK	21.0	22.4

Our model is based on the assumption that CCCTB would be introduced in neighboring countries and not in the Czech Republic. Therefore companies would tend to relocate their taxable presence into the EU Member States with lower effective tax rate than in the Czech Republic. Such an assumption can be done due to the fact, that under CCCTB system (i.e. under the system with unified rules for tax base construction), the nominal tax rate is equal to the effective one, as was already explained above.

Moreover, in the model we can have defined two scenarios. Firstly, we are researching the group of EU parent company (in the jurisdictions with lower effective tax rate than in the Czech Republic) having subsidiaries in the Czech Republic. As a result of CCCTB introduction in those states we expect the relocation (outflow) of Czech subsidiaries into the above mentioned states. Secondly, we are researching the group of the Czech parent companies having subsidiaries in the Czech Republic and other EU member states. We expect outflow to occur in situation when the group includes at least one subsidiary situated in other EU member states (i.e. we do not expect group with only Czech subsidiaries to move its tax bases from the Czech Republic). The second scenario expects not only the outflow of tax bases of the Czech subsidiaries into the member states where other subsidiary is situated but

also the outflow of the tax base of the parent company. Only after that, the group can benefit from CCCTB system which will be implemented in EU27 except of the Czech Republic.

#### 4 RESULTS

The research of the selected group of companies (2,403 parent companies with 3,562 subsidiaries) enabled to identify the overall tax base. Based on the above mentioned two scenarios, we identified the outflow of tax bases of 108 Czech subsidiaries, its 81 Czech parent companies, and 35 Czech subsidiaries of other EU parent companies (for details see table 2 below). The research has not identified any inflow of the tax bases. As can be seen from the below stated table 2, the largest outflow represents the scenario of the Czech parent companies and its subsidiaries.

Tab. 2 - Summary of parent companies and its subsidiaries, tax bases and potential outflow.

Source: Amadeus database, own research.

Database	Czech parent companies				Other EU parent companies				Total companies	Total subsidiaries
	No. of companies		No. of its subsidiaries in EU		No. of companies		No. of its subsidiaries in CZ			
	total	out-flow	total	out-flow	total	out-flow	total	out-flow		
Amadeus	1,587	81	2,427	108	816	0	1,135	35	2,403	3,562

Furthermore, data set from Amadeus database including 2,403 parent companies with 3,562 subsidiaries was categorized based on NACE classification. As can be seen from the table 3 below stated table, the researched group of companies generates the tax base (i.e. without CCCTB implementation in EU 27) in the amount of EUR 5,226,378 th. in the Czech Republic. NACE sector M (Professional, scientific and technical activities) represents the sector with the largest portion of the tax base (37.88%). It is followed by NACE sector C (Manufacturing) in the amount of 25.59%. As can be seen from the table, the rest of NACE sectors generate only marginal portion of the tax base in the Czech Republic.

Tab. 3 - Czech tax base according to current conditions. Source: Amadeus database, own research.

NACE	Total tax bases in CZ	
	%	in th. EUR
<b>A</b> (agriculture, forestry and fishing)	0.10	<b>5,469</b>
<b>B</b> (mining and quarrying)	0.19	<b>10,015</b>
<b>C</b> (manufacturing)	25.59	<b>1,337,611</b>
<b>D</b> (electricity, gas, steam and air conditioning supply)	4.70	<b>245,509</b>
<b>E</b> (water supply; sewerage; waste management and	0.37	<b>19,246</b>

remediation activities)		
<b>F</b> (construction)	0.87	<b>45,505</b>
<b>G</b> (wholesale and retail trade; repair of motor vehicles and motorcycles)	7.51	<b>392,375</b>
<b>H</b> (transporting and storage)	0.91	<b>47,554</b>
<b>I</b> (accommodation and food service activities)	0.03	<b>1,854</b>
<b>J</b> (information and communication)	3.32	<b>173,547</b>
<b>K</b> (financial and insurance activities)	15.29	<b>799,308</b>
<b>L</b> (real estate activities)	1.31	<b>68,420</b>
<b>M</b> (professional, scientific and technical activities)	37.88	<b>1,980,007</b>
<b>N</b> (administrative and support service activities)	0.23	<b>12,179</b>
<b>O</b> (public administration and defence; compulsory social security)	1.42	<b>74,474</b>
<b>P</b> (education)	0.01	<b>557</b>
<b>Q</b> (human health and social work activities)	0.03	<b>2,376</b>
<b>R</b> (arts, entertainment and recreation)	0.04	<b>10,347</b>
<b>S</b> (other services activities)	0.00	<b>25</b>
<b>Sum</b>	<b>100</b>	<b>5,226,378</b>
		<b>100%</b>

Therefore, based on the above presented analysis, we have researched that currently (i.e. without the implementation of CCCTB), Czech Republic receives the tax base in the amount of EUR 5,226,378 th. As was already indicated above, the model is based on the research of the two scenarios. The following table 4 summarizes the results of the research of the first scenario – i.e. the potential outflow of tax bases in the group of Czech subsidiaries of parent companies from other EU member states, where we assume that the outflow of tax bases would occur when the parent company of Czech subsidiary would be situated in Bulgaria, Croatia, Cyprus, Estonia, Ireland, Latvia, Lithuania, Romania or Slovenia (i.e. in countries with lower effective tax rate than in the Czech Republic) .

Tab. 4 - Overall Czech tax base after implementation of CCCTB in other EU member states- part I. Source: Amadeus database, own research.

NACE	Tax bases of the Czech subsidiaries of the parent companies from the EU Member States except of the Czech Republic	
	current situation	expected outflow

	%	in th. EUR	%	in th. EUR
<b>A</b>	0.09	3,806	7.41	3,640
<b>B</b>	0.05	2,179	-	-
<b>C</b>	30.78	1,227,361	15.76	7,730
<b>D</b>	0.00	142	-	-
<b>E</b>	0.15	6,291	0.04	19
<b>F</b>	0.93	36,940	-	-
<b>G</b>	1.28	50,989	0.57	283
<b>H</b>	0.66	26,470	-	-
<b>I</b>	0.00	41	-	-
<b>J</b>	3.24	129,007	0.03	14
<b>K</b>	14.90	594 105	1.77	871
<b>L</b>	0.36	14,523	-	-
<b>M</b>	47.31	1,886,336	72.33	35,503
<b>N</b>	0.20	8,183	2.09	1,024
<b>O</b>	0.02	706	-	-
<b>P</b>	-	-	-	-
<b>Q</b>	-	-	-	-
<b>R</b>	-	-	-	-
<b>S</b>	-	-	-	-
<b>Sum</b>	<b>100</b>	<b>3,987,079</b>	<b>100</b>	<b>49,084</b>
		<b>100%</b>		<b>1.23%</b>

As can be seen in the table, the research indicated only 1.23% (EUR 49,084 th.) outflow of tax bases in case of the group of Czech subsidiaries of parent companies in other EU member states. NACE sector M (Professional, scientific and technical activities) represents the sector in which the largest portion of outflow (72.33%) was identified, followed by NACE sector C (Manufacturing) with 15.76% and by NACE sector A (Agriculture, forestry and fishing) with 7.41%. In NACE sectors B, D, F, H, I, L and O to S any outflow of tax base was identified.

Following table 5 summarizes the potential outflow of the tax bases in the group of Czech subsidiaries of Czech parent companies, when CCCTB would be implemented in EU27 and not in the Czech Republic (i.e. second scenario). As was already mentioned above, we assume that the outflow of the tax base would occur when the group would include at least one subsidiary situated in other EU member states.

Tab. 5 - Overall Czech tax base after implementation of CCCTB in other EU member states- part II. Source: Amadeus database, own research.

NACE <sup>1</sup>	Tax bases of Czech subsidiaries of the Czech parent companies				expected outflow of Tax bases of parent companies
	current situation		expected outflow		
	%	in th. EUR	%	in th. EUR	in th. EUR
<b>A</b>	0.13	1,663	0.00	-	-
<b>B</b>	0.63	7,836	0.00	-	1,918
<b>C</b>	8.90	110,250	3.79	14,873	55,993
<b>D</b>	19.80	245,368	0.00	0	174,696



<b>E</b>	1.04	12,955	1.66	6,494	218
<b>F</b>	0.69	8,565	0.00	0	13,467
<b>G</b>	27.55	341,386	52.39	205,221	539,736
<b>H</b>	1.70	21,084	0.00	-	0
<b>I</b>	0.15	1,813	0.00	-	-
<b>J</b>	3.59	44,540	0.40	1,555	206
<b>K</b>	16.55	205,203	41.38	162,136	657
<b>L</b>	4.35	53,897	0.06	247	3,273
<b>M</b>	7.56	93,671	0.31	1,213	179,845
<b>N</b>	0.32	3,996	0.00	-	10
<b>O</b>	5.95	73,767	0.00	-	-
<b>P</b>	0.04	557	0.00	-	-
<b>Q</b>	0.19	2,376	0.00	-	-
<b>R</b>	0.83	10,347	0.00	-	-
<b>S</b>	0.00	25	0.00	-	-
<b>Sum</b>	<b>100</b>	<b>1,239,299</b>	<b>100</b>	<b>391,739</b>	<b>970,019</b>
		<b>100%</b>		<b>31.61%</b>	<b>-</b>

1 - see explanation in table 3 above

As can be seen from the above stated table, the research indicated the outflow of 31.61% of the tax bases of the defined group of companies (i.e. EUR 391,739 th.). NACE sector G (Wholesale and retail trade; repair of motor vehicles and motorcycles) represent the sector with the largest portion of outflow (52.39%), followed by NACE sector K (financial institutions and insurance undertaking) with 41.38%. It is necessary to highlight that those two sectors represent nearly 94% of total outflow from the Czech Republic. Moreover, taking into account the possibility of relocation of also parent companies into the other EU member states, in order to access the advantages of CCCTB system, the Czech Republic would lose at least EUR 970,019 th. It is necessary to point out, that the research did not identify any inflow (for details see table 5 above).

Based on the performed research, we can conclude, that in case that the CCCTB would be implemented and the Czech Republic would not be joining the club, there could arise very large differences between the outflows of tax bases in the group of Czech subsidiaries of Czech parent companies (31.61 %) and in the group of Czech subsidiaries of other EU parent companies (1.23%). Only 1% outflow of tax bases may be caused by the fact that parent companies in other EU member states will consider whether entering into the CCCTB system will bring them more advantages than staying in the Czech tax jurisdiction. However, the total outflow of the tax bases in the amount of EUR 440,823 th. out of the total tax base in the amount of EUR 5,226,378 th. (currently present in the Czech Republic) presents 8.43%, which is nearly 3times more than calculated by Cline, Neubig, Philips, Sanger and Walsh (2010) in their last comparative study (for details see table 6 below).

Tab. 6 - Summary of results. Source: own research.

Amadeus data set	First and second scenario				Total tax base in th. EUR	Expected outflow in th. EUR	
	No. of companies		No. of its subsidiaries			Czech subsidiaries	Czech parent companies
	total	outflow w	total	outflow			

Total	2,403	81	3,562	143	5,226,378	440,823	970,019
%					100	8.43	-

## 5 CONCLUSION

The aim of the paper was to research the impact of the optional CCCTB implementation (i.e. implementation in all the EU Member States except the Czech Republic) on the tax bases in the Czech Republic, and to identify whether the outflow/inflow or inflow will occur. The empirical analysis was based on the data available from the Amadeus database and covered 2,403 parent companies with 3,562 Czech subsidiaries.

The defined model and the research of the two scenarios performed in the paper revealed that the implementation of CCCTB system in EU27 would negatively change the tax base generated in the Czech Republic, as the country would lose more than 8% (i.e. EUR 440,823 th.) of the current tax base. Specifically, the outflow of the tax base from the group of the Czech subsidiaries of the Czech parent companies was assumed in the amount of 31.61% (i.e. EUR 391,739 th.). The largest portion of outflow (52.39%) was identified from NACE sector G (Wholesale and retail trade; repair of motor vehicles and motorcycles) and from NACE sector K (financial institutions and insurance undertaking) with 41.38%, i.e. almost 94% for both of them. The employment of second scenario enabled us to identify the other outflow of the tax bases in the group of the Czech subsidiaries of other EU parent companies in the amount of 1.23% (49,084 th. EUR). The largest portion of outflow (72.33%) was identified from NACE sector M (Professional, scientific and technical activities), followed by NACE sector C (Manufacturing) with 15.76% and by NACE sector A (Agriculture, forestry and fishing) with 7.41%. Any inflow was identified.

Consequently, the research of the two scenarios revealed that implementation of CCCTB in EU27 without Czech Republic joining the club may result into the relocation of tax base from the Czech Republic in case of the Czech parent companies with at least one subsidiary situated in other EU member states. In this case it would be the amount of EUR 970,019 th.

Finally, based on the research of the two scenarios (i.e. researching the group of EU parent companies having subsidiaries in the Czech Republic and the group of the Czech parent companies having subsidiaries in the Czech Republic and other EU Member States) and taking into account the above mentioned assumptions, we can conclude, that the implementation of CCCTB in EU27 with the Czech Republic not joining the club might have very strong negative impact on the overall tax base generated by the Czech subsidiaries in the Czech Republic and therefore also on the tax revenue.

### Acknowledgements

The paper presents the results of the research within the project GA CR No. 13-21683S “The quantification of the impact of the introduction of Common Consolidated Corporate Tax Base on the budget revenues in the Czech Republic.

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## **THE ROLE OF BUSINESS ECONOMICS IN MEASURING AND MANAGING BUSINESS PERFORMANCE**

*Inka Neumaierová, Ivan Neumaier*

### **Abstract**

In order to understand the behaviour of businesses it is necessary to link the views of specialist scientific disciplines (management, marketing, finance, ...) into a holistic view of a business. The intersections of the individual specialised sciences are examined by business economics. The aim of this article is to consider the importance (role) of business economics in the development of measuring and managing business performance. The new conception is outlined, which meets requirements of the present time.

*Keywords: business economics, business performance, holistic view.*

JEL Classification: M200

### **1 INTRODUCTION**

The article was written for reason of deviation from business economics not at our university only, but abroad too. The reason is the generation exchange of lecturers, when the leaving generation simultaneously went away the business economics. We can consider that the rejection of business economics is mistake, because the business economics is probably the only scientific discipline on firm, which is able to absorb the comprehensive view on the business.

The redefinition of business economics, as a comprehensive business discipline with the compact view, is the contribution of authors to the discussion on business economics. The redefinition is based on the rich experience of authors in using of systematic dynamic simulators in tuition and practical applications.

The aim of this article is to consider the mission and role of business economics. To emphasise its importance for measuring and managing corporate performance and for the development of individual specialised disciplines.

### **2 HOLISTIC VIEW**

The standard of measuring and managing business performance is influenced by the development of business economics. In this article we want to draw attention to the fact that business economics (in German: *Betriebswirtschaft*) cannot be understood as a simple set of individual specialised economic disciplines (management, marketing, finance, etc.). It does not have the role of the plate on which a pile of peanuts lies. Business economics should be understood as a system and the individual specialist disciplines as subsystems of this system. The focal point of investigations by business economics are links between the individual specialist disciplines, their interfaces.

A comparison with medical science is instructive. Modern medicine has a large quantity of specialised scientific disciplines, which enables the perfection of knowledge about how the human body works. Holistic medicine, which deals with the context of images from individual specialists and the creation of a holistic view of the causes of problems in a

person's health, is starting to play a more and more irreplaceable role. The holistic view is not focused only on one physical medical problem, but looks for causes also in a sick soul.

Business economics principally plays a similar role when viewing a business to that played by holistic medicine when viewing a person. The thing compared to the soul in business economics is a business's vision and strategy. They are the basis of the business model.

At the centre of interest of business economics is the business, the same as the centre of medical science is the human body and the centre of infomatics is the computer.

A business can be viewed from various angles: as a coalition of stakeholders, as a portfolio of resources, from the viewpoint of its economic structure, organisational structure, procedural structure, ownership and capital structure. Business economics is a discipline of business science that links these views.

Understanding and managing the behaviour of a business requires a holistic approach from business economics. Holism (Petráčková & Kraus, 1995) emphasises the holistic nature and sees the whole as something more than the sum of its parts. This means that all the properties of a system cannot be explained only by examining its parts and the meaning of each part can be recognised by relating it to the other parts and to the whole.

The synergy effect is related to holism. When merging businesses, it is expected, for example, that the value of the business after the merger will be higher than the sum of the values of the individual businesses merged. Otherwise the merger would make no sense.

The meaning of business economics consists of the realisation of a synergy effect by linking knowledge from the individual specialised economic disciplines (management, marketing, finance, etc.). The problem, in our opinion (Neumaier & Neumaierová, 2006) is that this meaning is not fully appreciated. Many of the specialised disciplines aspire to a conducting role, although, given their specific focus, none of them can satisfactorily perform it. Instead of synergy there is a platform for conflict between them (Neumaierová, 2010).

The above, however, is also proof of the need for the existence of a holistic view of a business. A holistic view is emphasised, for example, by Porter or Kotler.

Porter (1994) emphasises that a competitive advantage cannot be understood unless we link disciplines that play a role in its establishment (marketing, production, management and control, finance...) in a holistic view of a business. It formulates methodological frameworks that are a set of basic logical relations showing competitive behaviour.

Kotler (2007) comes up with a definition of a holistic marketing concept: *"The concept of holistic marketing is based on the development, design and implementation of marketing programs, processes and activities that recognise their breadth and interdependencies. Holistic marketing recognises that 'everything matters' with marketing—and that a broad, integrated perspective is often needed."* (p.28).

Wehrich and Koontz (1993), in their book *Management*, talks about examining the relationship between basic managerial functions and their links to the corporate environment through a systemic approach.

Professor Koontz (1993) says that *"... you could say that the development of management science and theory has been a jungle until now."* (p. 52). It is not only a semantic jungle caused by the terminology used, which is not always clear. It is the concept of management and the approaches to it. The procedural (operational) concept tries to integrate the various "schools". It is based on an arrangement of management knowledge in accordance with managerial functions (planning, organising, personnel work, management and control). He

emphasises that this approach enables the “*differentiation of managerial knowledge from special knowledge and specialist abilities in non-managerial areas such as marketing and manufacturing.*” (p. 59).

Financial reporting is a significant example of integration efforts. There is an awareness of the need to create new corporate reporting (Beattie, 2000) that unifies the current approaches and better identifies a business as such and its outlook for the future. The aim is to create integrated reporting that would enable companies to create for stakeholders a single report with a faithful view of the business and its risks. The new principle-based standard is focused on facts that are related to the business’s ability to create value over time. It can capture the business strategy and the ability of a business to create value in the long term.

New corporate reporting is in accordance with the holistic approach to business economics and enables the search for a global optimum for a business.

### **3 GLOBAL OPTIMUM**

A business’s mission is the manufacture and distribution of goods and services. The vision is a milestone on the path to implementing the mission. The strategy realises the vision. It sets out long-term goals for the business, the focus of activities and the allocation of resources to achieve the goals foreseen by the vision.

The business model is important for a business’s life and the direction of its behaviour in accordance with the strategy. It is an expression of the business’s strategy. It has to ensure a business’s ability to generate profits. It represents a method of transforming input into output, including taking into account the feedback of output to input. The feedback of output to input usually occurs with a certain delay. There is a causal loop, which represents the structure generating a business’s behaviour.

The management system serves to implement the strategy. Each management system has its reporting model, which is its tool. Examples of a concept for a strategic management system are the Balanced Scorecard (Kaplan & Norton, 2010), Tableau de bord (Epstein & Manzoni, 1997) and Business Model Canvas (Osterwalder & Pigneur, 2012). It enables a business’s strategy to be expressed in a manageable way and to be operationalised. The strategy must express the route to the global optimum, i.e. to increase a business’s value. Increasing value can be achieved through a business’s competitive advantage.

The task of strategy is to attain a competitive advantage for a business. A competitive advantage can be both on the part of inputs, the method of their transformation, and on the part of outputs, the profiling of their usefulness and also in the management system.

A strategy should have two properties:

1. It should remain anchored by two anchors—economic and ethical (Neumaier & Neumaierová, 2006). The economic anchor is the basic criterion for assessing corporate performance, where a strategy leading to growth in the value of a business is regarded as acceptable (the net current value is positive). The ethical anchor of strategy provides an ethical dimension to doing business, compliance with which is the key to a business’s trustworthiness.
2. It should reflect the fact that the environment for business is changing, as is the method of achieving a competitive advantage. In the conditions of globalisation the world is more and more connected and is still more predisposed to unbalanced states. It is necessary to examine them and look for barriers to achieving balance.

The strategy profiles the ability of a business to interact with its environment. It is the guide for the operation of a business in the sense of usefulness and effectiveness.

For the correct formulation of a strategy leading to the achieving of the global optimum (growth in a business's value) it is necessary to understand the dynamic complexity of the environment.

#### **4 DYNAMIC COMPLEXITY**

Being oriented on detailed complexity is not enough. For example, accounts deal with detailed, but not dynamic complexity. Despite this, accounts also serve for an investigation of dynamic complexity, as the information that they provide enables an examination of the context in a business, in a maximally aggregated quantitative form. A financial manager must re-shape the detailed complexity of accounting data to the dynamic complexity of a view of the creation of a business's value (Brealey & Myers & Allen, 2014).

Financial accounting also shows the effect of intangible and intellectual assets that are regarded as decisive assets for a business's success. The effect of a great brand, know-how and specialists will certainly be reflected in a business's revenues. The building of a brand and the retention of experts obviously costs a business something.

Accounting is the showing of corporate reality that is already the past in a form that is an ideal starting point for a related statement about the business's future. Strategic plans have, in their most concentrated quantitative form, the form of expected financial statements.

The shift in thinking or the optics of viewing information produced by financial accounting consists of the non-monitoring of the current state and a linear chain of cause and effect, but attention will be paid to change processes and interrelations. It is focused on the image of deeper structures hidden behind events and details. This view enables an understanding of behaviour and forces able to cause a change.

It assumes systemic thinking (Senge, 2007), where the axiom that each influence is also a cause and an effect applies, and abandons the assumption of one-way influences. It significantly affects deeply-rooted ideas about causality.

Systemic thinking is beneficial for its ability to unify knowledge crossing the boundaries of individual specialised areas and disciplines. It is not possible to respond to the problem of complexity and change when a person sees only a detailed view—a wide view is necessary.

It is necessary to realise that in some cases it is possible to ignore dynamic complexity. There are situations where the linear approach is completely sufficient and it is not necessary to look for feedback, because it has minimal effects. It is important to be able to distinguish in accordance with what decision should be made, whether to use a linear or system dynamic approach. The answer lies in realising the essence of the problem.

A system dynamic approach should be used to solve problems for which there is not one best solution and where the cause and effect are remote from each other in terms of time and space. Most managerial problems are of this nature. An example is searching for the best satisfaction of individual stakeholders (Neumaierová et al., 2005).

The paradigm of business economics changes not in the sense of what is to be examined, but with what approaches, what methods, in accordance with what rules and conventions.

## 5 CONCLUSION

Business economics has, as every science does, its main current and its derivatives, as well as innovative directions that entail the development of the scientific discipline and a change to its quality.

What business economics deals with (the subject of its interest) remains valid, but it changes the method in which a business is viewed. As a consequence of the innovation in thought (application of system dynamics) it is possible to find strategies with a large leverage effect where a small change to the structure can have a huge influence on the system's behaviour.

The trends in business economics have consequences for the concept of measuring and managing the performance of businesses and for the development of individual specialised disciplines.

A suitable tool for realising a holistic view of business economics are simulators, in which it is possible to examine the interaction of explicitly expressed views of individual specialised economic sciences. The great benefit is also the fact that it enables an expression of the dynamism of strategy. The inability to turn back time is respected. It enables the verification of whether the business model that arises upon the expression of the business strategy is correctly set.

No specialised scientific discipline can substitute for the role of business economics. Business economics is not only a set of individual specialist disciplines standing next to each other. It has to deal with the relations between them. Its conducting role and non-substitutability consists of it being a system in the framework of which individual specialised disciplines have their irreplaceable positions (where if any discipline is excluded the system cannot function as a whole). So that it is better able to play this demanding role than it has been until now, it needs to be restored through an innovation in thinking, i.e. the thorough application of a holistic view of a business. Examining the connections and interfaces of the individual specialised economic scientific disciplines contributes to business economics and their development.

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# **IMPACT OF SOCIAL CAPITAL, HUMAN CAPITAL AND PSYCHOLOGICAL CAPITAL ON INDIVIDUAL JOB PERFORMANCE-A STUDY ON 100% FOREIGN CAPITAL COMPANY IN VIETNAM**

*Nguyen Duc Trung, Nguyen Thuy Vy, Trinh Phuong Dung*

## **Abstract**

This study examined empirical information to investigate the influence of non-physical sources which are social capital, human capital, and psychological capital on individual job performance. The results of this study aim to assist firms with entirely foreign capital identified major factors contributing to enhanced individual job performance. Thus, facilitating these organizations upper management determines resolutions for improving their overall performance. In addition, the results also provide support for domestic enterprises in training and developing their employees. The proposed model is tested and proven adequately with the collected data. Despite the fact that it consists of limitations, the article contributes to the study on individual job performance in Vietnam.

*Keywords: Social Capital, Human Capital, Psychological Capital, Individual Job Performance*

JEL Classification:

## **1 INTRODUCTION**

Individual job performance, which is also known as individual performance, is a very significant factor. It is essential not only for the individual working in organizations but also for the development of these organizations (Erhard et al, 2010). To some extent, organizations need their individual working with high job performance in the provision of product and service. This is in order to lean forward competitive advantage, and eventually to achieve the ultimate goal of the organization.

On the other hand, in the traditional economy, economic capital includes financial assets and tangible assets such as machinery, equipment, and infrastructure which are key resources in the developing requirements of any organizations. In the new knowledge economy, these resources are no longer the sole most important factor creating competitive advantages of modern enterprises (Luthans et al., 2004). Thus, Luthans et al. (2004) associated concepts of new capital of organization including knowledge of human capital, social capital, and psychological capital. Human capital includes experience, skills, knowledge and competency of employee working in organization. Social capital refers to resources of trust, relationships, and contact network. Positive psychological capital discusses four factors: self-improvement (trust in self-improvement result), hope, optimism, and resilience.

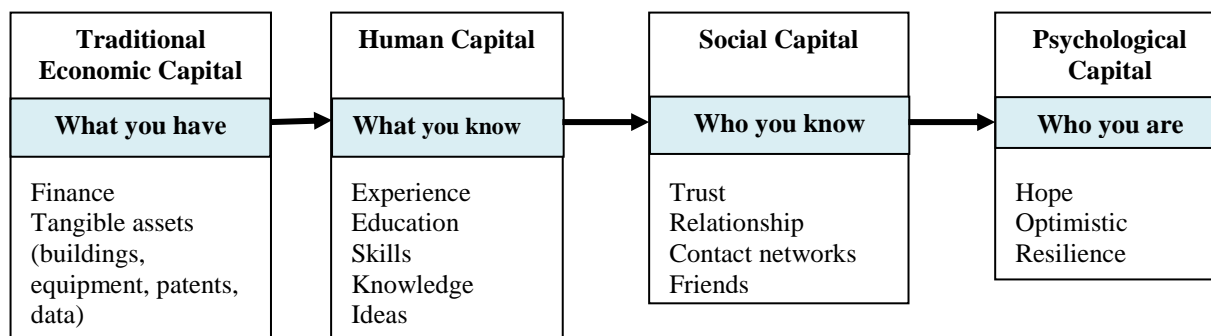


Figure 1 - Concepts of Capital. Source: (Luthans et al., 2004)

In this study, individual job performance of organizations at Vietnam is observed. It is known that individual performance at Vietnam is currently assessed at almost the lowest level in Southeast Asia. The labor is lack of experience and practical knowledge; have been undertrained and equipped with inconsistent skills with the labor market. That is the reason causes individual performance of Vietnamese is at the lowest level of Asia. It takes only 1/5 of Malaysian labor and 1/15 of Singaporean labor (laodong.com.vn).

Enterprises with 100% foreign investment in Vietnam are established in the form of Limited Liability Company with legal responsibility under the law of Vietnam. Although foreign investment is conducted in almost all provinces and cities of Vietnam, the largest proportion of investment is conducted at the key economic regions in the South include: Ho Chi Minh city, Dong Nai, Binh Duong, Ba Ria-Vung Tau; in the North include: Hanoi, Hai Duong, Hai Phong and Quang Ninh. However, the investment remain mostly in Hanoi and Ho Chi Minh city since these two have the most developed infrastructure, higher purchasing power and skilled labor force (www.hanoitie.com.vn).

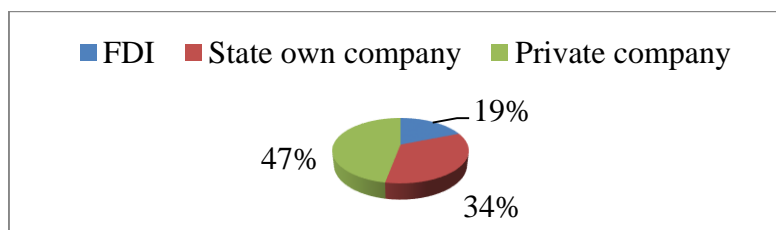


Figure 2 - Proportion of GDP by economic sectors. Source: Report yield Vietnam 2010

In recent years, the number of projects with 100% foreign capital begins to increase. Foreign investment in Vietnam has been a boom. It gradually asserts its position as a dynamic part of the economy and contributes significantly to support the capacity and competitiveness of the economy strength. Along with the trend of increasing investment, foreign investment sector accounts for a quarter of the total capital of the country, 43.6% of industrial output (2004), 57.2% of total exports (2005) and 15, 9% of Vietnam's GDP.

From the evidences that mentioned, the gaps of the research are: (i) the lack of understanding in which examine all three forms of capital in the diagram of Luthans et (2004) at the same time ( not including the traditional economic capital) in relate to individual performance; (ii) the lack of research survey the interaction between the three forms of modern capital; (iii) in the case of Vietnam, research on the impact of non-traditional sources of capital to individual performance has significant practical implications.

The objectives of this study are as following:

- Identify and define the interaction between the three elements of social capital, human capital and psychological capital in relate to individual job performance;
- Measure impact of social capital, human capital and psychological on individual performance.

This study aims to propose a number of recommendations to improve individual job performance for different organizations in Vietnam.

## **2 LITERATURE REVIEW**

### **2.1 Individual Job Performance**

According to Sonnentag & Frese (2001), there are three different views of job performance: individual differences perspective, situational perspective, and process perspective.

Individual differences perspective expresses the difference between the performances of individuals which are due to differences in ability, personality and motivation. Therefore, to ensure high individual performance, organizations need to select individuals based on their ability, experience and personality. This study fundamentally approaches to follow individuals as briefly above.

Individual job performance includes a separate set of activities to contribute to the organization in different ways (Campbell, 1990). It is divided into two aspects:

In-role behavior is defined as activities that are directly related to the completion of the core tasks of the job or the direct operational support to complete the task participate in the "technical core" of an organization (Borman & Motowidlo, 1993). These behaviors include performing assigned tasks and focus on certain jobs; there is consensus on the job and they are relatively fixed over time (Ilgen & Hollenbeck, 1991). According to the popular model on performance of Borman & Motowidlo (1997), it is conducted formally known as task performance. To avoid confusion with job performance, this study will use the term in-role behavior.

Extra-role behavior indicates job performance includes not only the official performed duties but also the unofficially emerging task. It contributes to the organization in a less direct way (Borman & Motowidlo, 1997). The behavior of this type includes helping, honesty, devotion, and good morals (Organ, 1988) which does not contribute directly to the core values of an organization, but instead, they contribute to the organization by promoting a social environment and psychological advantages for the completion of the work related to the core values of the organization (Borman & Motowidlo, 1997). Regarding terminology, performing informal work is contextual performance of Borman & Motowidlo (1997) or organizational citizenship behavior of William & Anderson (1991).

### **2.2 Social Capital**

The concept of social capital first mentioned in studies of Hanifan (1916). Hanifan (1916) particularly interested in cultivating goodwill, friendship, empathy and good social relationship. Subsequently, the newer concept of social capital is formed later then. According to Nahapiet & Ghoshal (1998), social capital consists of three aspects of structural, relational and cognitive social capital. Although every aspect of social capital represents a distinct characteristic, but all the three aspects are interrelated. The structural aspect affects the

cognitive aspect and related aspects (Nahapiet & Ghoshal 1998), or the cognitive aspect affect the relationship aspect (Tsai & Ghoshal 1998).

Primarily, in the study of Ariani (2012) on the relationship between social capital and job performance, the structural concept of social capital is inherited from the work of Nahapiet and Ghoshal (1998). However, the correlation between the three aspects components which are mentioned as: structural, relational and cognitive of social capital are ignored.

In the meantime, a recent study of Sun, Y. (2012) correspondingly confirmed the positive impact of social capital on service quality and customer satisfaction. Nonetheless, the structural aspect of social capital is completely chemical intermediated by cognitive aspect and relationship aspect of social capital.

To compare the two models studied by Ariani (2012) and Sun Y. et al (2012), the authors find that mutual relationships between the three dimensions of social capital components should be considered in order to closely reflect the inclusion of social capital in the classic theory of Adler & Kwon (2002). Accordingly, this study contributes the three theories of social capital in H1A and H1B denoted, H8a of the proposed research model (see figure 3).

Consequential, the result demonstrates social capital is an appropriate prefix to describe job performance (Ariani 2012), the authors decide on the hypothesis about the relationship between social capital and the two aspects: official duties and informal task performed. The performance of the work consists of these hypotheses: H2A, H2b, H3a and H3b (see figure 3).

### **2.3 Human Capital**

The theory of human capital indicates that the enterprise does not own knowledge, skills and capabilities that employee possess (Wright & CTG 2001). Accordingly, the relationship between human resources (knowledge, skills and capabilities) with specific behaviors of employees in enterprises and human resource management practices show significant meaning. About the concepts, human capital is defined as the repository (stock) skills and business knowledge of employee (Hunt 2000), or the knowledge and skills of professionals in the company can be used to create professional services firm (Backer 1964), or represented by two indices that are the professional qualifications and experience (Arrow 1973). Also note that most of the studies established that human capital vary according to the specific industry.

Many studies emphasize that social capital is an important resource to access, exploitation and use of personal knowledge, share and thus provide strategic value to the organization (Nahapiet & Ghoshal , 1998). In other words, social capital affect the creation of individual intellectual capital (Reiche, 2009). It is understood that the whole range of knowledge can be shared through the exchange of social capital. The impact of social capital on human capital and knowledge support the authors to the hypothesis H4a and H5a in figure 3.

On the other hand, human capital is the platform of education, experience and skills. This is the most fundamental factor contributing to improve the performance of individual. According to Goldsmith et al (1997), it also shows that human capital is one of the factors that impact on job performance. Thus, the authors come up with the hypothesis H6a and H6b in figure 3.

Additionally, in a study of Luthans et al (2004) "Positive psychological capital: human capital side and the social capital" also shows the content and the relationship between the non-physical capitals. Therefore, the hypothesis H8b is formed in figure 3.

## 2.4 Psychological Capital

Luthans (2002) stated positive psychology in the workplace is a positive organizational behavior. Accordingly, positive organizational behavior is an approach based primarily on positive psychological state. It is defined as: "the study and application of psychological capacity and strength of human resources in a positive way to measure, develop and manage an effective way to improve productivity"(Luthans, 2002).

At the individual level, psychological resources could enhance growth and efficiency. At the organizational level, similar to human capital and social capital, which can create psychological levers, it brings a return on investment, and competitive advantage through improved work performance (Luthans & CTG, 2005). According to Luthans et al (2007), the structure consists of positive psychology: hope, resilience, optimism and self-improvement.

Yip et al (2006) declared that social capital has a positive impact on general health and mental health (psychological capital) in particular, and as the satisfaction of human happiness. Subsequently, two hypotheses are designed as H4b and H5b in the model (figure 3).

Resulting, the study on 422 samples of Chinese workers, Luthans et al (2005) shown positive psychological state of employees strongly correlated with their job performance and best results consistent with the assessment from their supervisors. Luthans et al (2007) point out that not only the employee's psychological capital is positively correlated with performance and satisfaction of their work, but also a strong positive correlation with the integration of the four aspects of the capital which is interest with reasonable performance and job satisfaction rather than individually at each aspect of psychological capital.

Sun T. et al (2012) also concluded that psychological capital is positively correlated with job performance. Consequently, the hypotheses H7b and H7a are formed.

## 2.5 The conceptual Model

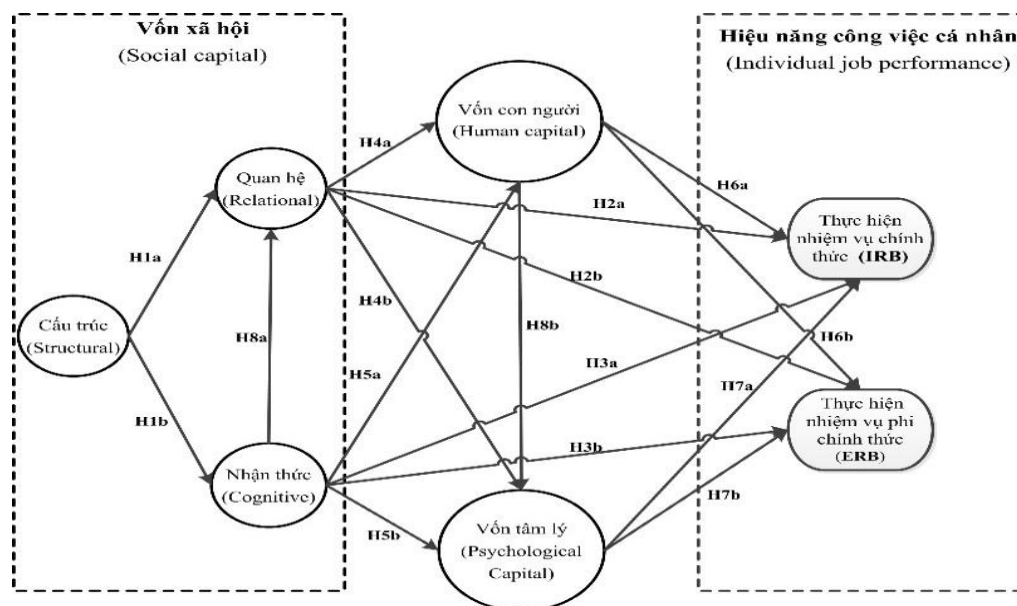


Figure 3: The suggested model. Source: Nguyen et al, 2015

The conceptual model used in this study is shown in Figure 3. To examine the relationship of human capital, social capital, psychological capital and individual job performance, eight hypotheses were developed:

*H1a: Structural (dimension of social capital) has a positive relationship with relational (dimension of social capital).*

*H1b: Structural (dimension of social capital) has a positive relationship with cognitive (dimension of social capital).*

*H2a: Relational (dimension of social capital) has a positive impact to in-role behavior.*

*H2b: Relational (dimension of social capital) has a positive impact to extra-role behavior.*

*H3a: Cognitive (dimension of social capital) has a positive impact to in-role behavior.*

*H3b: Cognitive (dimension of social capital) has a positive impact to extra-role behavior.*

*H4a: Relational (dimension of social capital) has a positive impact on human capital.*

*H4b: Relational (dimension of social capital) has a positive impact to psychological capital.*

*H5a: Cognitive (dimension of social capital) has a positive impact to human capital.*

*H5b: Cognitive (dimension of social capital) has a positive impact to psychological capital.*

*H6a: Human capital has a positive impact to in-role behavior.*

*H6b: Human capital has a positive impact to extra-role behavior.*

*H7a: Psychological capital has a positive impact to in-role behavior.*

*H7b: Psychological capital has a positive impact to extra-role behavior.*

*H8a: Cognitive (dimension of social capital) has a positive relationship with relational (dimension of social capital).*

*H8b: Human capital has a positive impact to psychological capital.*

### **3 METHODOLOGY**

The study was conducted in two main steps: a preliminary and main research. Preliminary studies are carried out through two methods: (i) qualitative research explored, adjusted and supplemented the observed variables using to measure the concept of study; (ii) qualitative research was conducted through discussions and interviews. Persons who participated in interviews and discussion are managers and employees in 100% foreign direct investment enterprises in Vietnam. Preliminary quantitative research primarily evaluated the reliability of the scale designed and adjusted to suit the context in Vietnam. Preliminary study of this study was done with a convenient sampling method with 119 observations which is suitable for EFA minimum sample size of 50 preliminary observations.

Main research was conducted with quantitative research methods. Through the review and analysis, the conceptual model consists of seven concepts with forty three observed variables. Based on this model, sixteen hypotheses will be tested through the primary collected data. The study based on original scale and adjusted to get the formal scales (Table 1). Data collection for this study was through a survey using questionnaires as the tool. A total of 439 respondents participated in this study. The persons who were survey in this study are employees and managers in 100% foreign direct investment companies at HCM City and Binh Duong Province in Vietnam. As for data analysis, confirmed factor analysis (CFA) and structure equation model (SEM) were used to test the model and hypotheses.

Table 1 - Details of items measuring variable. Source: Nguyen et al, 2015

Scale	Variable	Editor	Draft scales	Formal scales
Social capital – SC	Structural capital	Sun Y. et al (2012)	4 questions	10 questions
	Relational capital		4 questions	
	Cognitive capital		3 questions	
Psychological Capital – PC	Self-efficacy	Luthans et al (2007)	6 questions	17 questions
	Hope		6 questions	
	Resilience		6 questions	
	Optimism		6 questions	
Human capital – HC		Griffith and Lusch, 2007		4 questions
Human Performance	In role Behavior	Williams & Anderson, 1991	7 questions	12 questions
	Ex-tra Behavior	Lee và Allen, 2002	16 questions	

## 4 RESULTS

Descriptive statistics are presented in table below:

Table 2 - Demographic profiles. Source: Nguyen et al, 2015

Characteristic	Frequency	Percentage (%)
<b>Company</b>		
ScanCom	87	19.8
Unilever	72	16.4
Fujikura	69	15.7
Elca	49	11.2
P&G	58	13.2
Renasas	44	10.0
Standard Chartered	31	7.1
Kuehne & Nagel	29	6.6
<b>Division</b>		
Planning	90	20.5
Purchasing	42	9.6
IT	136	31
Manufacturing	41	9.3
warehouse	43	9.8
QA	25	5.7
sales	12	2.7
Human resource	2	0.5
R&D	23	5.2
Others	25	5.7



<b>Sex</b>		
Female	177	40.3
Male	262	59.7
<b>Age</b>		
< 26	98	22.3
≤ 26 to 35	329	74.9
≤ 36 to 45	10	2.3
≤ 46 to 55	2	0.5
≥ 55	0	0
<b>Income/month (VND)</b>		
<5 millions	21	4.8
≤ 5 to 10 millions	166	37.8
≤ 10 to 15 millions	137	31.2
≥ 15 millions	115	26.2
<b>Ranking</b>		
Employee	402	91.6
Associate	15	3.4
Manager	22	5.0
<b>Education</b>		
Vocational school	13	3.0
College	32	7.3
University	352	80.2
Post graduate	42	9.6
<b>Marital status</b>		
Single	269	61.3
Married	57	13.0
Married and had children	113	25.7

After testing by explore factor analysis (EFA), Cronbach's alpha was reviewed to test reliability of the scale after eliminating variable in earlier. The scales' reliability coefficients and Corrected Item-Total Correlation are satisfied, so these variables were used to confirm factor analysis (CFA). 39 observed variables were measured the 10 dimensions of model studies. Some variables which are strongly correlated with other variables were removed to enhance the compatibility of the scale with market data. 13 variables such as ST01, REL05, SE11, SE13, SE15, SE16, HO17, RE20, RE22, OP27, HU30, EX37, EX38, EX43 were eliminated because of strong correlation.

The result shows Chi-square/df = 1.801 (<2), GFI= 0.919 (>0.9), TLI=0.926, CFI = 0.936 (>0.9); RMSEA = 0.043 (<0.08) (Figure 4). ) The model was sufficiently compatible with market data. Similar testing scales, Maximum LikeHood method (ML) was estimated the parameters and modeling studies. Results showed that three hypotheses are not supported (P> 5%) (Table 3)

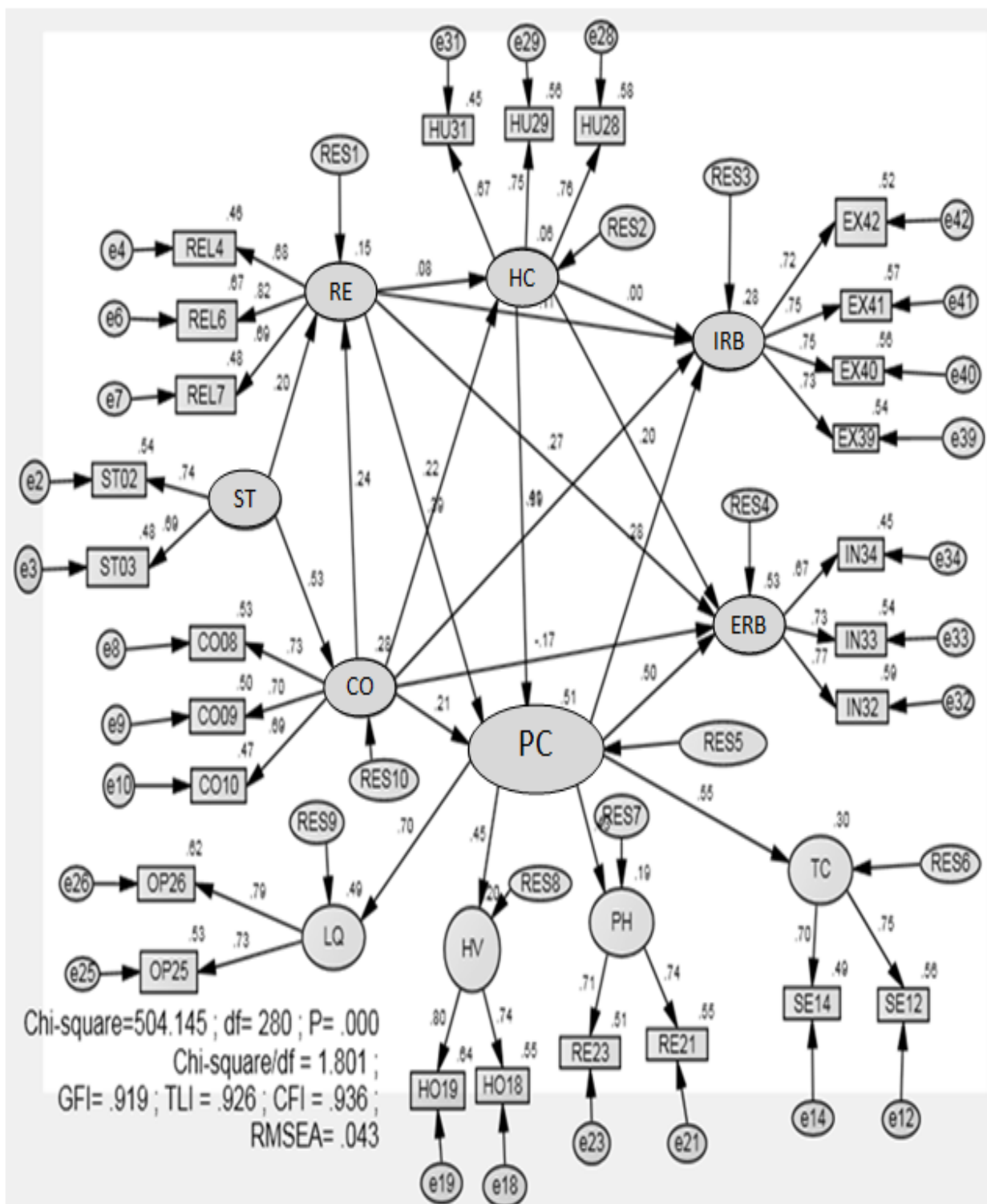


Figure 4 - Results of testing conceptual model. Source: Nguyen et al, 2015

Table 3 - Summary of hypothesis testing. Source: Nguyen et al, 2015

			ML	S.E.	C.R.	P-value	
Cognitive	<--->	Structural	0.533	0.09	6.72	***	Accepted
Relational	<--->	Structural	0.2	0.118	2.437	0.015	Accepted
Relational	<--->	Cognitive	0.239	0.1	3.014	0.003	Accepted
Human capital	<--->	Relational	0.077	0.049	1.177	0.239	Rejected
Human capital	<--->	Cognitive	0.216	0.064	3.176	0.001	Accepted
Psychological capital	<--->	Cognitive	0.209	0.053	2.707	0.007	Accepted
Psychological capital	<--->	Relational	0.391	0.043	4.945	***	Accepted
Psychological capital	<--->	Human capital	0.406	0.055	5.373	***	Accepted
In-role behavior	<--->	Psychological capital	0.497	0.189	3.6	***	Accepted
Extra-role behavior	<--->	Cognitive	0.393	0.094	5.406	***	Accepted
In-role behavior	<--->	Cognitive	-0.167	0.066	-2.368	0.018	Accepted
Extra-role behavior	<--->	Psychological capital	0.285	0.225	2.376	0.018	Accepted
Extra-role behavior	<--->	Relational	-0.11	0.081	-1.383	0.167	Rejected
In-role behavior	<--->	Relational	0.272	0.06	3.36	***	Accepted
In-role behavior	<--->	Human capital	0.197	0.08	2.453	0.014	Accepted
Extra-role behavior	<--->	Human capital	-0.002	0.107	-0.026	0.979	Rejected

## 5 DISCUSSION

The results showed that factors such as structural, cognitive, human capital and psychological capital have a positive impact to in-role behavior, and psychological capital is the most impact with  $\beta=0.497$ . However, relational and human capital does not affect extra-role behavior. The result can be explained that in-role behavior is attitude of each employee for their work, specific and obvious task. High social capital, human capital and psychological capital help employees to handle and complete their tasks quickly, easily with high performance. In the other hand, extra-role behavior refers the tasks not listed in the job description, which are made by the individual consciousness of each employee. Therefore, relational and human capital has no effect on extra-role behavior.

### **The relationship of social capital dimensions:**

As expected, the result shows that three hypotheses of social capital (H1a, H1b and H8a) are supported. Thus, the three dimensions formed by Ghoshal et al (1998) impact positively on each other. Structural dimension affects positively on relational and cognitive, and impact on

relational strongest. This confirms previous findings in the literature such as the studies of Nahapiet & Ghoshal (1998) and Tsai & Ghoshal (1998). In addition, the study of Sun Y. et al (2012) contributed to affirm that the relationship between social capital and structural is full mediated effected by cognitive and relational.

There was a significant positive correlation between relational and psychological capital. In the literature, human capital refers skills, experience, knowledge which employees accumulate to learn. Psychological capital refers the key concepts of consciousness, psychological which are difficult to quantify; including the ability to self-improvement, confidence, hope, optimism and self-recovery of each employee. Thus, psychological capital is influenced by stronger relationships, regular contact and shared terminology, general media understandable among employees together. This is consistent with finding of Yip et al (2006) that social capital (as a prefix) has a positive impact on general health, psychological health (or psychological capital) and satisfaction.

According to Coleman (1988) in "Social capital in the creation of human capital", social capital has an important influence in the creation of human capital in the next generation. Both social capitals in family level and in community level play main role in creating the human capital source of new generations. Many studies emphasize that social capital source is a key resource to access, exploitative and use personal and collective knowledge. Thus, it provides strategic value to the organization (Nahapiet & Ghoshal, 1998). In other words, social capital will affect the creation of individual human capital source (Reiche, 2009). This study confirmed cognitive positively impacts human capital.

H8b shows human capital strongly positive influent psychological capital with a high correlation coefficient (0.406,  $p < 0.001$ ). If workers have human capital and knowledge and expertise, they will get confidence in their job, career and life; they will think and act positively, overcome obstacles and recover from difficulties.

### **The effect of social capital, human capital and psychological capital on individual job performance:**

The results of correlation coefficient and regression analysis indicated that relational, human capital, psychological capital has a positive impact to in-role behavior. In particular, psychological capital is the most powerful influence to in-role behavior (regression coefficient = 0.497) and in-role behavior is positively influenced by two concepts: cognitive and psychological capital. Sun T. et al (2012) focus on the impact of psychological capital on job performance (IJP) and claimed that social capital and psychological capital impact positively on performance of the individual. However, the study refers general work performance and did not identify the distinction between in-role behavior and extra-role behavior.

Our result provided further evidence of difference in the interaction with in-role behavior and extra-role behavior. This will help researchers understand better which works of individuals need to be enhanced further. Even if factors (such as relational and human capital) are improved, the individual job performance through extra-role behavior will not increase.

## **6 CONCLUSION**

The research provided a relatively comprehensive view of the non-physical capital, which is concerned by many scholars of management (Luthans et al, 2004). Research has integrated the theories related to the social capital, human capital and psychological capital source and extended the hypothesis of the relationship between these source and then conduct the experiment.

Research also shows that the influence of social capital, human capital and psychological capital on the individual job performance through in-role behavior. In the other hand, extra-role behavior requires a higher level of voluntarily awareness and consciousness of each employee (Borman & Motowidlo, 1997), only affected positively by a few factors. This can be explained that the most of Vietnam employees' voluntary conscious level, community-driven awareness is not high.

In terms of management practices, this study contributes to provide more scientific basis to help companies: (i) to identify aspects of in-role behavior and extra-role behavior as well as dimensions of social capital, human capital and psychological capital in the context of their organization; (ii) to estimate the interaction of the three capital factors; and (iii) to evaluate the impact of them on the individual job performance of employees in the organization. This is expected to help enterprises improve their competitiveness through increase performance of human resources (Bontis & Dragonetti, 1999).

A number of works have studied the effect of human capital and social capital on business performance. A recent study in Vietnam by Tran Thu Hien et al (2012) claimed the positive impact of human capital, which concludes education and professional experience of the staff, on the success of the business establishment. Moreover, because human capital have a strong effect on psychological capital and in-role behavior, it is important to improve human capital. The interposers could provide the skill-improvement and specialized knowledge courses, training for new employees.

This study focused on the interactions of social capital on the other non-physical capital and its impact on individual job performance. The result showed that, in general, social capital has a positive impact on the human capital, psychological and influence on the individual job performance. This finding confirms that the respect, help and trust among employees always uphold in Vietnamese foreign enterprises. Besides, communication and the use of common, understandable common terminology were most focused by staff, and they always try to spend enough time to communicate and maintain relationships well with colleagues. This suggests that, all three dimensions of social capital help to improve workers' mood and can put all their effort into the job, in order to improve job performance.

It is important to note that psychological capital effects individual job performance and managers should improve their workers' psychological health and satisfaction in job. Enhancing psychological capital for every member of the organization is essential and can be fully implemented: organizing courses on life skills, positive and optimism thinking by researchers and activists.

Further studies are needed to estimate the relationship between the non-physical capitals with the performance of the organization (Rauch et al, 2009) instead of individual work performance as the current topic. More broadly, research is also needed to determine the differences between the various sectors, such as manufacturing and services among and between financial services and information technology services, etc. Finally, this study focus on the staff and manager of the enterprise with 100% foreign investment in the South, mainly consisting of Binh Duong and Ho Chi Minh city, it should be validated by a larger sample size with all the other regions in Vietnam (as in Central and North).

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## **CREDIT CHANNEL IN MONETARY POLICY TRANSMISSION IN VIETNAM**

*Nguyen Duy Suu, Phung Quang Hung*

### **Abstract**

This paper examines the impact of credit channel in monetary policy transmission in Vietnam which resulted in the fact that discount interest rate has caused a great effect on the lending one. Private sector claims experienced changes caused by the growth of industrial output, lending interest rate and money supply M2. An increase in retailing goods and services has affected by the growth of industrial output and lending interest rate. The increase in claims on private sector, lending interest rate, inflation and money supply influenced international equity index. We have analyzed economic shocks, growth of private credit and huge variables. We analyze the impact of private credit lending on industrial output growth, lending interest rate and money supply. We found that private credit lending had effect. Analysis of variance has revealed that interest rate has put a great influence on private sector claims, mostly in 4<sup>th</sup> month. Money supply and industrial output grow on private credit in the 16<sup>th</sup> and the 24<sup>th</sup> respectively. On the other hand, claims on private sector on economic growth hit rock bottom but remained highest in the 24<sup>th</sup> month.

*Keywords: credit channel, monetary policy, equity index, money supply, lending interest rate*

JEL Classification: E42, E51

### **1 INTRODUCTION**

Credit channel is known as one of the most essential channels of conveying monetary policy. There are many points of views existing, which relate to concerning the ability of conveying of credit channel in monetary policy. According to Christina D. Romer and David H. Romer (1993), the monetary policy actions worked through credit channels can be classified into two categories. The first one was that monetary tightening policy by interest rate instruments will eventually lead to the rise of all interest rates. Whenever the current rate of interest slumps, for which it will result in narrowing choices of borrowing while lending takes over. Thus, it lowers demand of investment and expenditure. The second one was that the act of monetary policy might cause a direct effect to the finance supplying ability of the lenders. In addition, it was also influenced by the supplement from banks via tools of monetary policy applied by the State Bank such as reserve ratio, open market operations. In case there is a change in reserve ratio, it may give away the opportunity cost of money; and in order to make it up, commercial banks have to raise interest charges. For which, it is undeniable that monetary policy features a key role in organizations and households relying on borrowings and interest payments. However, according to Mishkin (1995), Bernanke and Gertler (1995), they believed that it worked in 2 different categories which are the lending channel and the borrowers' asset balance sheet channel. To be more specific, the lending channel was affected by tools of monetary policy, namely interest rate, reserve ratio, or capital adequacy ratio required to each commercial bank. Through this channel, the higher discounted interest rate raises, the higher lending one becomes, which reduces the borrowing came from organizations and households. Concerning the borrowers' asset balance sheet channel, it is undoubtedly put a direct effect on the borrowing ability of borrowers. Apparently, the variety of monetary policy actions through credit channel is quite a striking feature. In conclusion, those viewpoints above share

a common use of contributing to the effect of finance supplement relying on growth target and inflation stability.

Since the credit channel has brought up so useful and important feature, researchers have spent time carrying out studies about it. Observation by Bernanke and Gertler (1989) suggested that struggle happened during the crisis could cause the downward of property value of the borrowers, thus leading to the rise of borrowing costs and eventually it will cease the demand of investment and obviously, the economy crisis. In Bernanke's view, the borrowing depends on net asset. More specifically, if the net asset value rises, cost of borrowing will experience a fall and vice versa. That is the cost used for debt management and observation offered by lenders when it comes to finance supply to customers. Friedman and Kuttner (1992) both took the view that the difference between interest rate and government bond yield could see as equity risk premium. This seems true when it comes to dealing with equity risk premium, which will take into amount. Latest studies have figured out the influence of credit channel throughout the huge variables, which, particularly, is the impact claim private sector put on inflation of money supply, equity index and economic growth. Frankel and Romer (1999) took the variables relating to the growth of commercial activities through credit actions as to verify economic growth. Davis (2004) took equity index, revenue securities, number of companies and finance institutions as to verify credit in securities market. Crowley (2008) took the variables of claims on private sector in relation with growth of economy and other variables as to verify the conveying mission of credit channel to the variable factors. Tang (2003) concluded that there was a link between the growth and the development of the financial market, by which it means that the rise in financial market will cause the economy to grow in either long or short term.

The purpose of this paper is to examine the effect of credit channel in the way of operating interest rate policy of State Bank. Among these effects, one remained as the most crucial is the growth of claims on private sector followed by macroscopic factors, namely equity index, good and service retailing growth, inflation and lastly, economic growth.

## **2 LITERATURE REVIEW**

The act of monetary policy relating to credit channel was divided into 2 sides: Lending channel and balance sheet channel. With the help of lending channel, here is how the monetary policy works: Money supply rises → Deposit raises → lending from banks rises → Investment rises → Output rise. The other side is interest rate: Money supply declines → interest payments raises → lending from banks declines → Investment declines → Output decline (Mishkin, 1995).

Otherwise, the act of monetary policy via credit channel rests on the relationship between market and its problems, such as imbalanced information and other financial instruments given out by the government, companies and non-banking financial companies, namely government bond, corporate bond and fund certificate. Once the monetary policy is extended, money supply will increase in number, which apparently creates a necessary condition for credit bureaus and commercial banks to call off for deposit. Therefore, not only from which companies are fully provided with credit, but also contribute to gain investment and expenditure as well. This simply explains for a rise in output. Finally, with the increase in incomes comes either the rise in saving or expenditure. Regarding saving, its high rating will help providing credit for a part of the saving amount will be mobilized by commercial banks which cause the lending to go up. In a perpetual way, all of the activities above keep coming up and with this circulation, the economy is surely on its way towards the growth and stability.

Borrowers usually relied upon banks - when monetary tightening policy is on the way, they cannot get access to other credit channels - although they are aware of the significant rate of interest. In 1981, Stiglitz and Weiss decided to examine carefully the imbalanced information lowering credit granted by the commercial banks. To be more specific, lenders and borrowers received information from different sources building up doubts, thus leads to the reduce in credit granted, this is simply explained by the fact that the higher credit risk reaches, the higher interest rate becomes so as to make up for commercial banks. In contradict; borrowers are usually aware that they can always find supply with a reasonable interest rate, higher than what they expected - which seems unaffordable - will cease them from borrowing. Among requests of borrowing, interest rate higher based on the imbalanced information. According to Bernanke and Blinder (1992), financial intermediaries play an important role in supplying lending money. Many banks are expecting for some actions such as categorizing, selecting and controlling the consumers. A monetary tightening policy aims to lower deposits and bank securities.

Financial innovations and an act of loosening rules are causes making the credit channel become less and less essential. However, asset channel plays a key factor in expansionary monetary policy. Balance sheet channel has expressed its concern about the change in monetary policy based on consumers' financial statements and balance sheet.

Money supply decreases → value of assets decreases → financial assets decrease → financial crisis advances → expense constant and household expense drop → output decreases.

Money supply decreases → value of assets decreases → adverse selection and moral hazard raise → lending budget falls → investment decreases → output decreases.

Balance sheet channel is also known as either net assets value channel, or credit expansion channel. Based on the assumption that financial insurance needs to be solved within limits of the financial situation of debtors (Bernanke and Gertler, 1995), balance sheet channel bears just one similarity to the lending channel in which it explains that the impact of monetary policy placed on real output could reach a higher level by credit limit of debtors. In fact, those channels are actually two worlds apart: firstly stressing the importance of banks in the economy, and then followed by aiming at level balance asset. Precisely, monetary tightening policy will cause the value of assets to decrease and thus lowers the pledged assets value. A decline in value of net assets – total value of pledged assets and net cash flow – of the company will stand a good chance of advancing adverse selection and moral hazard, which fortunately is an encouragement for companies to invest in higher risk containing projects. These things create higher possibility of errors in increased spending and borrowing (Mishkin, 1995).

In summary, the credit channel has tremendous potential to explain the reaction of real economy or financial shocks remain strong base on the acts of financial institutions. It is also stressed that the credit channel is considered as a rule to add point of view in the transmission policy monetary. It was the shock in monetary tightening policy to cause both asset value and overhead one to shrink, which resulted in a rise of external finance followed by a significant decline in outputs and cash conversion cycle. A decrease in cash conversion cycle will have the asset value to increase (Hall, 2001). Furthermore, differences in monetary point view and credit channel explain the impact of the policy on lenders and borrowers. Different situation of the bank departments and balance asset of large companies contributes to various effects of monetary policy in the real economy.

### 3 RESEARCH METHODS

#### 3.1 Research model

Research model, which is promoted by Bernanke and Gertler (1995), Bayoumi and Melander (2008), improved in a way that fits the economy of Vietnam:

$$\mathbf{IRD}_t = \alpha + \beta(\mathbf{CPI}_t - \mathbf{CPI}_{t-1}) + \rho(\mathbf{IPG}_t - \mathbf{IPG}_{t-1}) + \varepsilon_t \quad (1)$$

Including:  $\mathbf{IRD}_t$  refers to discount rate, which State Bank is applying in commercial banks.  $\mathbf{CPI}_t$  refers to inflation happening at a specific time  $t$ .  $\mathbf{CPI}_{t-1}$  refers to inflation happening at the time of  $t-1$ .  $\mathbf{IPG}_t$  refers to the ratio of the industrial output growth, which represents the economic growth at a specific time.  $\mathbf{IPG}_{t-1}$  was the same as  $\mathbf{IPG}_t$  but applied at the time of  $t-1$ . From the equation (1), the change in discount rate is a result of difference in inflation between time  $t$  and  $t-1$ . To many countries, when it comes to fixing discount rate, they usually depend on expected inflation rate or that of the previous period. Another target of monetary policy is the economic growth, so that, from the equation above, discount rate should have an adjustment when the industrial output growth changes through the time.

$$\mathbf{IRB}_t = \alpha + \beta \mathbf{IRD}_t + \rho \mathbf{CPI}_{t-1} + \delta \mathbf{IRU}_t - \gamma \mathbf{M2}_t + \varepsilon_t \quad (2)$$

Including:  $\mathbf{IRB}_t$  refers to the base interest rate provided by the State Bank.  $\mathbf{CPI}_{t-1}$  refers to inflation of the previous stage.  $\mathbf{IRU}_t$  refers to the United State interest rate.  $\mathbf{M2}_t$  refers to real money supply.  $\varepsilon_t$  refers to errors.

The following equation is to find out how the base interest rate (IRB) was formed. Another question is that whether discount interest rate has an influence, which causes a change in IRB. IRB is the kind of rate announced by the State Bank so that commercial banks could decide their lending interest rate and that of deposit. It depends on each period and the operation of monetary policy that the IRB effects market interest rate in different ways. However, IRB is also considered as a monetary policy instrument. Inflation adjustment and interest rate operation are up to the inflation- fluctuation. The IRB is a form-based of the global rates and for a country, there is one-called national rates, which contains currency and trade relationship to an economy ( $\mathbf{IRU}_t$ ).  $\mathbf{IRU}_t$  refers to the IRB of the Federal Reserve System (FED). Moreover, money supply is the result as well as the reason why the State Bank operate the credit and interest rate policy.

$$\mathbf{IRL}_t = \alpha + \beta \mathbf{IRD}_t + \varepsilon_t \quad (3)$$

Including:  $\mathbf{IRL}_t$  refers to average lending interest rate of commercial banks. It is directly affected by discount rate, which can be explained by when there is a change happened in discount rate, lending one would experience the same thing. Would it be exact from what the theory states as each country has its own different financial market? There are many other factors, on which it depend, namely the huge difference between deposit and lending interest rates, credit supply and demand. However, the State Bank, with the help of equation (3), could consider carefully when it comes to reconciling money supply through credit channel and especially, places an indirect impact on lending interest rate.

$$\mathbf{CPS}_t = \alpha + \beta \mathbf{IPG}_t - \rho(\mathbf{IRL}_t - \mathbf{CPI}_t) + \lambda \mathbf{M2}_t + \varepsilon_t \quad (4)$$

Including:  $\mathbf{CPS}_t$  refers to claims on private sector,  $\mathbf{IPG}_t$  refers to the value of industrial outputs growth,  $\mathbf{IRL}_t$  refers to lending interest rate,  $\mathbf{CPI}_t$  refers to inflation and lastly,  $\mathbf{M2}_t$  refers to money supply. The equation clearly states that change in private credit depends on real outputs. There is an inverse relationship between private credit and real lending interest rate. By which, it means that when the interest rate of lending goes up, borrowing cost will follow the same pattern which will cause a cease in borrowing for investment and as a result, private

credit have a tendency to go down. Another thing is that money supply  $M2_t$  has a direct impact on claims on private sector meaning that when money supply raises, capital supply on market raises leading to gain possibility in credit and in addition to that, private sectors feel easier in asking for capital borrowing.

$$RSG_t = \alpha + \beta IPG_t + \delta M2_t + \gamma CPS_t - \lambda(IRD_t - CPI_t) + \varepsilon_t \quad (5)$$

Including:  $RSG_t$  refers to the growth of retail goods and services;  $IPG_t$  refers to industrial outputs representing real income.  $M2_t$  refers to money supply. Expense is in direct proportion to income, money supply, private credit sector and in inverse proportion to real interest rate. It is obvious that when people get higher income, they spend more money and cause the money demand to escalate. Money demand meets all the needs of spending, thus makes a gain in expense.

$$VNI_t = \alpha + \beta CPS_t + \lambda IRL_t + \gamma CPI_t + \theta IPG_t + \delta M2_t + \nu EXU_t + \varepsilon_t \quad (6)$$

Including:  $VNI_t$  refers to equity index, which represents market value of listed companies.  $(IRL_t - CPI_t)$  refers to real lending interest rate,  $EXU_t$  refers to exchange rate. This model is based on the one that Montiel (2003) had used. Since credit has a strong control over investment, it undoubtedly plays a key role in contributing to the growth of output and more importantly, the growth of economy.

What will happen to investment when interest rate experiences a change? Borrowing cost, according to Keynes, is resulted from an increase in interest charge, as it is the price of loan capital. Therefore, with other factors remaining unchanged and interest rate advancing, the value of investment will decline and vice versa.

In order to evaluate the shocking effect brought by credit on the macro variables, author has used the VAR model to examine the shocking reaction and variance decomposition. This model is highly recommended for references by other researchers in the world such as Gertler and Gilchrist (1994), Tang (2003), Bernanke and Blinder (2007). Here is the VAR model:

$$X_t = (IPG_t, CPS_t, IRL_t - CPT_t, M2_t) \quad (7)$$

Variables included in this equation are endogenous, which means that the entire variables do has influence to one another.

### **3.2 Variables and research data**

This table below including details which were from the monographs of the pioneers and adopt selectively to fit the economy of Vietnam.

Tab. 1 – Summary of variables

No.	Variables	Name	Source
1	IRD	Discount rate	State Bank of Vietnam, IMF
2	IRB	Base interest rate	State Bank of Vietnam
3	IRL	Average of lending interest rate	IMF
4	CPI	Consumer price index	IMF, ADB
5	CPS	Claims on private sector	IMF, ADB
6	M2	Money supply growth M2	IMF
7	IPG	Growth value of industrial	IMF, ADB
8	RSG	Growth rate for retail goods and services	ADB
9	VNI	Stock index	HCM Stock Exchange
10	EXU	Exchange rate	ADB
11	IRU	Federal funds rate	IMF

## 4 RESULTS OF STUDY

### 4.1 Test of stationary

Tab. 2 – Test of stationary

Variables	Name	T-Statistic	Prob	Result
$IP_t$	Industrial production index	12.689	0.000	Stationary D(1)*
$CPI_t$	Consumer price index	4.122	0.0014	Stationary D(0)*
$IRD_t$	Discount rate	3.377	0.013	Stationary D(1)*
$IRB_t$	Base interest rate	5.388	0.000	Stationary D(1)*
$IRL_t$	Average of lending interest rate	4.266	0.0008	Stationary D(1)*
$RSG_t$	Growth rate for retail goods and services	5.878	0.000	Stationary D(1)*
$M2_t$	Money supply M2	4.75	0.0001	Stationary D(1)*
$CPS_t$	Private credit	6.485	0.000	Stationary D(1)*
$LNVNI_t$	Stock index	7.58	0.000	Stationary D(1)*
$EXU_t$	Exchange rate (US Dollar)	9.304	0.000	Stationary D(1)*
$IRU_t$	Federal funds rate	6.77	0.0002	Stationary D(1)*

Notes: \* Significant at the 1% level

Table 2 shows that only consumer price index ( $CPI_t$ ) is station at corner data series. The others, under the significant level of 1%, they are station at first difference.

## 4.2 Determining the optimal lag

Tab. 3 – Determining the optimal lag

Formula	Variable	LR	FPE	AIC	HQ	Optimal lag
1	CPI	3	3	3	2	3
	IPG	2	3	2	2	2
2	IRD	5	6	2	2	2
	CPI	4	4	4	3	4
	IRU	8	8	8	5	8
	M2	3	5	5	2	5
3	IRD	6	6	6	3	6
4	IPG	3	3	3	3	3
	IRLT	3	3	3	3	3
	M2	2	3	3	3	3
5	IPG	2	2	2	2	2
	M2	3	3	3	3	3
	CPS	2	3	2	2	2
	IRLT	3	3	3	2	3
6	CPS	6	7	7	3	7
	IRL	3	6	6	3	6
	CPI	6	3	3	3	3
	IPG	2	4	4	2	4
	M2	2	2	2	2	2
	EXU	2	2	2	2	2

## 4.3 Results of study

### Results and analyzing research models

Tab. 4 – The result of IRD

IRD			
Variable	Coefficient	T-statistic	P
$\Delta$ CPI(-3)	0.228	3.852	0.0002
$\Delta$ IPG(-2)	-0.0055	0.528	0.598
C	0.000197	0.2476	0.8049
R <sup>2</sup>	0.126		
DW	1.737		

The result from table 4 points out relation resting on discount rate, which is operated by the State Bank and inflation along with economic growth. There is a direct correlation between change in either inflation or discount rate while it is an inverse one between economic growth and change in discount rate. When inflation increases by 1%, discount rate experiences the same pattern at the rate of 0.228% at 1% level. By which, it clearly states that the operation of



discount rate was always to depend on previous inflation rate and stick to the goal of lowering it. That is to say, it appears effectively the goal works while economic growth sees a downward trend. In other words, it seems impossible to achieve the two targets. Monetary tightening policy is as control inflation. Another point of the result is higher rate of inflation comes with the same of discount rate. Therefore, an action is needed to affect positively the economic growth with inflation controlled by tight monetary policy. The credit channel in transmission through interest payment, according to Bernanke, Gertler and Gilchrist (1995), works with efficiency for when: interest rate rises in condition that the financial situation of companies remains fine, which is when interest rate is considered as an advantage to stimulate economic growth. However, if it advances in an opposite situation, which turns out to be a negative thing. An increase in interest rate seems to be a burden as it causes the weight cost of capital at present or in the future to go up too. Lowering the borrowing rate leads to a decline in investment. The result come a decrease in manufacture, rise in unemployment; fall in expense and slowing the economy.

Throughout the period, the economy, in fact, has shown us how the credit tightening policy works by raising interest charges. To be more specific, from 2010 to 2011, the State Bank has been running the monetary tightening policy through the interest rate instrument. Discount rate started to go up by 9% from September, 2010, continued to rise and finally reached and end at 15% in October, 2011 and kept following the same pattern until February, 2012. It resulted in the fact that growing economy remained at the rate of only 5.89% in 2011.

Tab. 5 – The result of IRB

<b>IRB</b>			
<b>Variable</b>	<b>Coefficient</b>	<b>T-statistic</b>	<b>p</b>
IRD(-2)	0.308915	4.778393	0.0000
CPI(-4)	0.000210	0.007844	0.9938
IRU(-8)	0.069331	1.046113	0.2980
M2(-5)	0.054138	3.377244	0.0010
C	0.043357	6.585737	0.0000
R <sup>2</sup>	0,374		
DW	0,967		

Based on table 5, the two variables, IRD and M2, are significant at 1% level, while the others such as CPI and IRU remain nothing. Therefore, we can only examine IRD and M2. Besides, R<sup>2</sup> =0.373 refers to an act of explaining 36.3% the base interest rate (IRB) when putting the IRD and M2 into model.

It is believed that IRD and IRB both vary in the same way which proves that the State Bank operate the base interest rate through discount rate and vice versa. In case the discount rate increases by 1%, the base interest rate has to follow by 0.31%. The advancing rate has not come to expectation yet although the base interest rate was only for commercial banks to reference. Still, M2 has not come to expectation of efficient working either. The expectation mentioned here is that when money supply M2 gains, the base interest rate has to follow in order to cease the growth of it. While as the result given, direct correlation that they are in. Money supply gains by 1%, base interest rate follows by 0.054%. Though this effect seems weak, it is against the goal of policy, which is preventing inflation by slowing the growth of money supply resulted from tightening the currency. All of the events above together make a phenomenon called “Puzzle” whose definition is against the goal of policy. Yet that problem

does not seem to cause any damage to the variables for two reasons. Firstly, it is for reference that the base interest rate means. Secondly, apart from interest rate, many more factors can make influences to the money supply. Operating monetary policy involves discount rate, refinancing rate and other tools such as reserve ratio and fiscal policy.

Tab. 6 – The result of IRL

<b>IRL</b>			
<b>Variable</b>	<b>Coefficient</b>	<b>T-statistic</b>	<b>p</b>
IRD	0.797533	18.33988	0.0000
C	0.059691	15.10506	0.0000
R <sup>2</sup>	0.752		
DW	1.212		

The estimation states that  $R^2 = 0.752$  refers to an act of discounting rate explaining 75.2% the variation of an average lending interest rate from commercial banks. Apart from discount rate, there are many other factors which are not put into this model have an influence on interest rate, namely money supply, economic growth... as the model above is only considered to examine the relationship between discount and average lending rate from commercial banks. The result figures that convulsion in lending interest rate is dependent on discount one. It conclusively proves the efficiency of the interest rate policy in which discount rate remains a helpful tool.

When discount rate gains by 1%, lending one advances by 0.797% with the significant level of 1%. The figure illustrates that discount rate and average lending interest rate vary in the same direction, which explains that the State Bank has been operating monetary policy through interest rate and credit channel efficiently and right in time and with that, inflation might be ceased for a while.

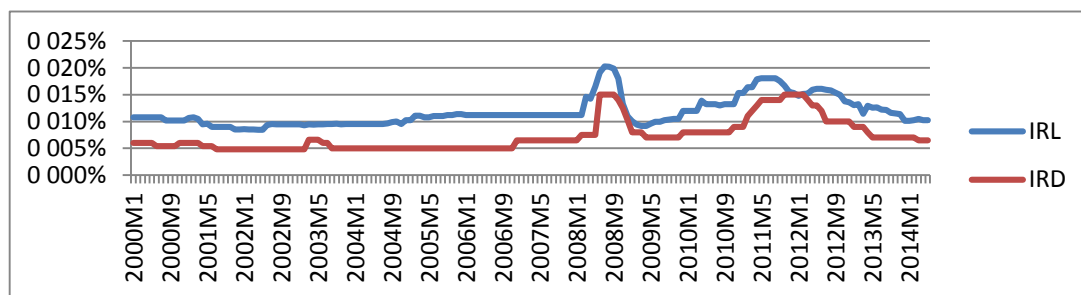


Fig. 1 – IRL and IRD. Source: IMF

Tab. 7 – The result of CPS

<b>CPS</b>			
<b>Variable</b>	<b>Coefficient</b>	<b>T-statistic</b>	<b>p</b>
IPG(-3)	0.252970	2.768265	0.0067
IRLT(-3)	-0.804409	-5.199073	0.0000
M2(-3)	1.331905	15.76638	0.0000
C	-0.107079	-4.391518	0.0000
R <sup>2</sup>	0.736		
DW	1.082		

It is shown from table 7 that  $R^2 = 0.736$  refers to an act of independent variable in the model explaining 73.6% in change of CPS with the significant level of 1%. From which, it is believed that CPS replies on variables put into the model. When industrial production growth gains by 1%, CPS experience the same gain by 0.253%. Growth of credit must interact and stimulate that of the economy. Credit channel, according to Bernanke (1995), could represent a group of factors, which either affect or spread to growth and inflation. Therefore, it is undeniable about the important role in monetary policy that credit channel plays. In interest rate channel, take a special look at the real lending one, when it rises, it will also have the difference between lending interest rate and inflation gained. Thus causes financial cost of companies to rise resulting in restricting borrowings. That is explained by a decrease or even falling under the real lending interest rate. As the result above shows, CPS suffers a decline of 0.8% from a gain by 1% of the real lending interest rate. This effect is considered extreme of an effect to the interest rate compared to credit related activities. In the research of Bernanke and Gertler (1995), from the previous theories they claim that it was the shock in monetary tightening policy that lowers such many things as investment, household expense and permanent consumption. From which, in can be drawn that monetary tightening policy in Vietnam does have an influence which cause a fall in investment through credit. More specifically, interest rate advances  $\rightarrow$  credit drops  $\rightarrow$  investment drops. This is about that same as the point view of Gertler and Gilchrist (1994). In which, it urged that monetary tightening policy effected merchandise inventory of manufacture companies due to a short term decrease in credit.

Tab. 8 – The result of RSG

<b>RSG</b>			
<b>Variable</b>	<b>Coefficient</b>	<b>T-statistic</b>	<b>p</b>
IPG(-2)	0.167021	2.115731	0.0371
M2(-3)	0.097565	0.761775	0.4481
CPS(-3)	0.108177	1.330234	0.1867
IRLT(-3)	-0.476292	-3.763465	0.0003
C	0.185647	9.020540	0.0000
R <sup>2</sup>	0.268		
DW	2.195		

From the table above,  $R^2 = 0.268$  refers to an act of the variables put into model explaining 26.8% of change in RSG. Furthermore, there are 2 of the 4 variables which has the significant level of 1%, are IPG and IRLT. From the result, we can see that value of goods and services growth varies the same way as industrial productions but the other way around of the real

lending interest rate. This totally lifts up to an expectation of monetary policy that is when industrial production gained by 1%, retail goods and services value rise by 0.16% as well with the significant level of 5%. Meanwhile, if real lending interest rate advances by 1%, retail goods and services value drops by 0.476% with the significant level of 1%. The monetary policy causes lending interest rate to go up and inflation to go down. The larger the gap between them gets, the higher expense both private enterprise and government pay. This will follow causes restriction in good exchange and a decrease in retail goods and services value.

Tab. 9 – The result of LNVNI

<b>LNVNI</b>			
<b>Variable</b>	<b>Coefficient</b>	<b>T-statistic</b>	<b>p</b>
CPS(-2)	-1.530513	-3.943959	0.0002
IRL(-3)	-4.494183	-2.396962	0.0185
CPI(-3)	2.118297	2.271359	0.0254
IPG(-2)	-0.092982	-0.214812	0.8304
M2(-2)	1.540107	3.270377	0.0015
EXU(-2)	-2.99E-05	-1.308309	0.1939
C	7.127290	11.77197	0.0000
R <sup>2</sup>	0.469		
DW	1.624		

Equation 9 is used to estimate how the monetary policy, through credit channel, affects the value of listed companies as well as that of portfolio on the stock market based on the variation of stock exchange index. This model includes a dependent variable (VNI), independent one (CPS), lending interest rate (IRL), inflation (CPI), industrial production growth (IPG), money supply M2 and exchange rate (EXU). Most independent variables are analyzed in percentage terms so the author keeps original chain. Except for VNI, this is a value chain, in logarithm. Variables are taken in optimal lag from table 2.

In table 9,  $R^2 = 0.469$  refers to an act of variables explaining 46.9% in change of VNI. With the aim of testing how the policy through credit channel affects the VNI, it finally results in the fact that private credit growth, lending interest rate, money supply do have an impact on VNI with significant level of under 5%. However, it is an opposite effect that private credit places on VNI, which compared to what was expected, failed to gain credit in order to stimulate stock index. This can be recognized as “Puzzle” to credit growth compared to stock index. As stock market of Vietnam appears to be quite new, stock index might experience a variation from many factors. Stock prices vastly outweighs its real one for so many times so it is in a viable that CPS growth and stock index are contrary. It is because stock market of Vietnam has been manipulated by information and herd behavior the whole past period.

Meanwhile, lending interest rate actually lifts up to the model’s expectation in which it oppositely affects the stock index. With that outcome, when interest rate rises by 1% leading to a decrease of 4.49 points in stock index. It is easily aware that interest rate has a direct impact on either stock supply or demand. When it comes to enterprises mobilizing funds to expand a large-scale plan, a gain in interest rate will have weight cost of capital to escalate and profit to shrink. Following that will be a decline in value of stock. To investors, when interest rate gains, it will lower the need of borrowing which is used to invest. Thus, have the investment demand fell. There are factors other than interest rate that affects the stock price, take money channel as an example. It affects exactly the same way as stock index, which is of

the expectation. To be precise, with 1% gain of the money channel comes only 1.5 points up of stock index.

Not only is the stock index affected by variances from monetary policy but also by inflation factor. As inflations grow, return rate has to follow. As a result, stock value varies the same way as inflation. Precisely, with 1% increase in inflation comes only 2.11 points up in stock index. This can also happen when the two objects switch position. By which, it means that increase in stock value will follow that of inflation. Between inflation and stock index lays a causality relationship, it especially happens to the rising market of Vietnam.

### Analyzing shock

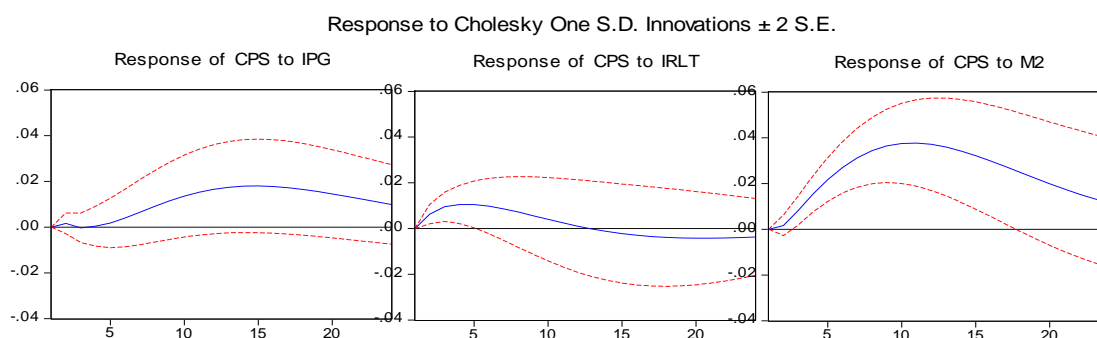


Fig. 2 – Response of CPS to IPG, IRLT, M2. Source: Eview

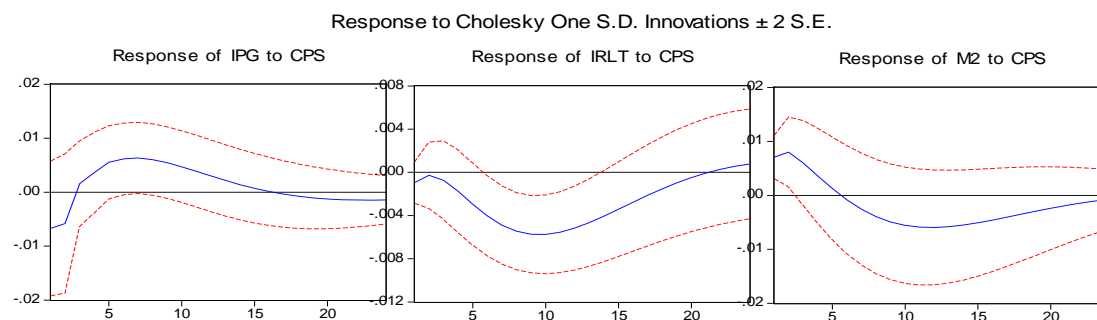


Fig. 3 – Response of IPG, IRLT, M2 to CPS. Source: Eview

The figure illustrates that industrial production growth; real lending interest and money supply are affected by shocks in private credit. Regarding the first sector, the shock started working in the 3<sup>rd</sup> month, remaining strongest in the 15<sup>th</sup> month and gradually slowing down then. From which, we can see the potential role that private credit plays in the industrial growth and to further, economic growth. The impact credit shock burdened on real lending interest rate started in the 1<sup>st</sup> month, then lasting for 10 more months and finally saturating in the 12<sup>th</sup> month. Regarding money supply, it is heavily affected by the credit shock. An increase in credit is followed by that of money supply, which started in the 1<sup>st</sup> month, up and reaching its peak in the 12<sup>th</sup> month but gradually falling in 24<sup>th</sup> month and eventually remaining saturated. That is to say, such great influence credit growth has on money supply in scale of either time or level.

So how do other variables affect private credit? CPS has suffered from the shock of industrial production, which started to gain in the 1<sup>st</sup> month to the 7<sup>th</sup> then falling till the 15<sup>th</sup> and saturated in the end. In addition, it suffered from shock of real interest rate. To be more specific, real interest rate rises, which will put a decrease in private credit growth and that fall will last until the 10<sup>th</sup> month after returning to advance till the 20<sup>th</sup>. It is undoubted that the effect on private credit caused by interest rate shock is huge, on both level and time scales. Other than that, CPS has the same problem with money supply M2 as well. The result only lasts for 3 month since the 1<sup>st</sup> to the 3<sup>rd</sup>.

**Analyzing variance decomposition.**

Tab. 10 – The result of decomposing variance

Variance Decomposition					
Period	S.E.	CPS	IPG	IRLT	M2
<b>CPS</b>					
1	0.023726	100.0000	0.000000	0.000000	0.000000
4	0.056207	82.64500	0.090522	<b>7.548948</b>	9.715528
16	0.145626	22.13147	10.57368	3.019363	<b>64.27548</b>
24	0.161887	18.53866	<b>14.56549</b>	2.924827	63.97103
<b>IPG</b>					
1	0.065984	1.041600	98.95840	0.000000	0.000000
4	0.074605	1.699025	94.81095	3.166646	0.323379
8	0.079091	3.829804	87.74862	<b>5.663417</b>	2.758160
24	0.089034	<b>4.219979</b>	73.67220	5.420141	<b>16.68768</b>
<b>IRLT</b>					
1	0.010119	0.875123	0.051285	99.07359	0.000000
4	0.024280	0.779804	3.450900	89.80199	<b>5.967304</b>
8	0.030331	9.054862	<b>6.840025</b>	78.69039	5.414726
16	0.040556	<b>16.03071</b>	5.757779	45.07144	33.14006
24	0.050786	10.57316	<b>10.55182</b>	29.02159	<b>49.85343</b>
<b>M2</b>					
1	0.021667	<b>10.67135</b>	2.862161	0.166747	86.29974
4	0.054582	5.479156	4.507106	0.822430	89.19131
8	0.079248	2.988122	12.18391	0.492095	84.33587
24	0.094859	<b>5.262376</b>	<b>18.93257</b>	<b>1.385007</b>	74.42005

A synthesis of variance decomposition of private credit on macro-economic factors and vice versa. The impact of other factors on CPS do have optimal lag, usually lasting for months. Having been affected firstly by itself, coming second are factors such as industrial production, real lending interest rate and money supply. Industrial production growth, which represents economic growth, with its effect on CPS, remains weak from the first few months. (The 1<sup>st</sup> to the 8<sup>th</sup>), getting gradually stronger since and reaching its peak in the 24<sup>th</sup> month. The given result shows that the growth of CPS does not seem to follow the economic growth advances. That was the same of Crowley’s opinion being that private credit has experienced a slow change compared to economic growth in North Africa and Mid –Asia. Vietnam’s is still an emerging one; for which, the effects that macro-economic factors causing on each other seem week and slow, especially indirect ones.

Real lending interest rate happens to be the variable causing direct effect on private credit. Result states out that effect seems fast and strong in the first few months (from the 2<sup>nd</sup> to the 4<sup>th</sup>), reaching its strongest in the 4<sup>th</sup> followed by a gradual slowing. This looks true based on previous research claiming that real interest rate very much affects borrowing needs of individuals and enterprises. Interest rate falls, which immediately influences borrowing need. Loose monetary policy ranging from basic interest rate to discount rate affects the lending one. On contrary, tight monetary policy rises along with inflation slowly changes causing interest rate to advance, thus limits borrowing need. After a period, it is when interest rate gets to be saturated that private credit suffers less from the real one but from money supply, rate of return and other macro-economic factors, instead. Of which, money supply is considered as the most powerful factor. Estimated result from table 6 shows that it places huge impact on private credit with the p-value of 1%. In order to know how it works and lasts, we have to examine with the help of variance decomposition table. In the table states, that money supply affects in a strong and fast way. Money supply, in the 8<sup>th</sup> month, affected due to the change of 9% of CPS, the 9<sup>th</sup> month with 64% and the 24<sup>th</sup> with 63% then gradually slowing down. An immediate change in money supply will cause an influence to credit and the other way around. Credit does contribute to accelerate the pace of cash flows

## **5 CONCLUSION**

The credit channel of monetary policy transmission to macroeconomics factors of Vietnam's economic is unstable. From interest rate policy to market interest rate have some improper problems, operating the base interest rate among them although the operating state of the interest rate ceiling through the base rate. However, the discount rate has caused a great effect on the lending one. CPS is strongly affected by macro variables such as the growth of the industrial output, effective interest rate and money supply M2. An increase in retailing of goods and service only affected by the industrial output, effective interest rate. International equity index was affected by the increase in CPS, effective interest rate, inflation and money supply.

According to analysis of shock, the growth of CPS and the huge variable showed that CPS had put an deep influence on macro variable the same as increasing industrial production, real interest rate and money supply M2 was prolong but unstable. Analysis of variance had pointed out that the impact of real interest rate on private credit, mostly in 4<sup>th</sup> month. Money supply M2 and economic growth made a tremendous impact on CPS highest in the 16<sup>th</sup> and 24<sup>th</sup> month while CPS was just weak influencing on economic growth, highest in the 24<sup>th</sup> month. Economic growth relatively was also impacted by money supply in the 24<sup>th</sup> month and real lending rate in the 8<sup>th</sup> month.

Credit channel in Vietnamese currency policy is in accordance with the result of this detailed multi-stage analysis. Although there has been a strong connection between lending, and discount rate, connection between credit to economic growth and inflation were still slow and weak. Private credit was impacted by the economic growth, real interest rate and money supply. However, in opposite way private credit has still put a weak influence on economic growth. Private credit might not be the representative of all credit economy. Therefore, the detail analysis did not appreciate exact result although private credit was important to economic growth. It is also the limit of this detailed analysis.

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## **THE INTEREST RATE CHANNEL IN THE TRANSMISSION OF MONETARY POLICY IN IN VIETNAM**

*Nguyen Duy Suu, Bui Thi Phuong Thao*

### **Abstract**

Interest rate is one of the effective instruments of implementing monetary policy, which central banks use to regulate the currency flow, consequently stabilizing inflation and stimulating economic growth. Hence, this study aims to examine the levels of transmission of interest rate to the price factors in Vietnam's economy during the period from 2005 to 2013 by SVAR models. The results indicate an existence of long-term relationship between interest rates using co-integration test. Between interest rate and economic variables, only one-way causality from consumer price index to interest rate is found. Results from shock response and variance decomposition test show that the shocks of interest rate affect most of economic factors. However, only money supply and stock price index are strongly affected in all four periods

*Keywords: interest rate, interest rate policy, interest rate channel, SVAR model*

JEL Classification: E42, E51

### **1 INTRODUCTION**

Monetary policy in most countries always pays attention to two important objectives that are stabilizing inflation and stimulating economic growth. The implement of monetary policy instruments bases on the actual situation of each economic development stage, in which interest rate policy is used with other policies to regulate the circulation of monetary. A reduction in interest rate may not only contribute to increase domestic production, but also causes pressure on inflation. According to the economic model of the famous economist John Keynes, the transmission of interest rate channel to economic growth is expressed by following process: Reducing money supply => Interest rate will increase => Investment will decrease => Yield will decrease. However, interest rates not only affect investment through the creation of fund, but also effect to money supply. It is also acknowledged by Mishkin (1995), he suggested that interest rates could affect the spending decisions in investing.

Agreeing with this point of view, many famous economists, in which Taylor (1995) also indicated that interest rate channel is the key channel in monetary policy. In his model, a contractionary Monetary Policy will make nominal interest rate increase in short-term. This thing makes wage and price be not as expected. However, in long-term the real interest rate will increase. High interest rates cause many companies fix those investments in which private sector investment as well as regular consumption will decrease and even the investment in inventory will decrease too, therefore the total output decreases.

Since the 1990s, Central banks in many countries around the world have seen that interest rate is the intermediate target of monetary policy. When the economic is in overheat growth and high inflation period, central bank will raise short – term interest rate and vice versa, if economic is in slowdown and deflation period the central bank will cut short – term interest rate to regulate money supply to achieve the targets of monetary policy. In addition, most central banks of industrialized countries also take short-term interest rate as activity target (BIS, 1998).

For example, State bank of Germany (Germany Bundesbank) is using interest rate (the call money rate), Federal Reserve is using federal interest rate (federal funds rate).

In the period of 2001 – 2003, Central banks of countries in the world applied easy monetary policy and finance policy to stimulate investment and increase in demand to prevent the economic downturn which caused by monetary and financial crisis in previous years. In this time, most countries in the world had low growth, the export, and import between countries significantly reduced. The foreign direct investment fell by more than 40% from 2001 -2003.

In recent years, there are many studies about the level of interest rate transmission to price factor in many countries' economy. According to Mohanty and Turner [2008], the monetary policy framework was launched on Emes (Emerging Markets Economies) in recent years has strengthened the transmission of interest rate channel in monetary policy.

Mukherjee and Bhattachaya [2011] discovered that the interest rate channel affects private spending and private investment in EMEs. Acosta - Ormaechea and Coble [2011] compared the transmissions of monetary policy between dollarized countries and not dollarized countries and found that in controlling inflation, the traditional interest rate channel was more important in Chile and New Zealand while the exchange rate channel was more important in Peru and Uruguay.

The objective of this paper is solving three questions: (1) Is there a major transmission from interest rate channel to price factor and other macro-economic factors? (2) Is there or not the causal relationship between interest rate and macro economic factors? (3) How do the shocks in interest rate impact on macro-economic factors?

This study includes the following contents: (1) introduction, (2) the literature review about the impact of interest rate to macro economic factors, (3) research model, (4) result of research, (5) Concludes.

## **2 LITERATURE REVIEW**

The interest rate parity theory and international Fisher effect explain the impact of interest rate on foreign exchange. The interest rate parity theory pays attention to explain why spot rate differs from forward rate and the gap of them. This theory involves a certain time (forward rate), this confirms interest rates affect exchange rate.

According to the interest rate parity theory, currency of a country, which has a lower interest rate, will have the term premium for forward contract with currency of another country, which has a higher interest rate.

In other words, the term premium of forward price is approximated with the gap of two currency's interest rates. In contrast, international Fisher effect focused on explaining why spot rate of a currency changes over time and confirming that spot rate will change according to the gap of two countries' interest rates.

Svensson (2000) explained that in an open economy, exchange rates depend on the operations of economic. The open economy allows transmission channels in monetary policy operate much more. He also said that a change in short term interest rate would affect to nominal exchange rate and real exchange rate. This observation is similar to Taylor (2001) when it suggested that Central bank should react to the changing in short term interest rate. On the other hand, the other said that if the change in interest rate is large enough to change exchange rate, this will lead to reduce property value and increase inflation (Berbanke and Gertler, 2000 and Taylor, 2001)

Meltzer (1995) re-emphasised transmission through multiple asset prices, extending beyond interest rates, exchange rate and equity prices. Some studies, on the other hand, have argued that monetary policy transmission is weak in the EMEs and low income countries. Reviewing monetary policy transmission in low income countries, Mishra *et al.* (2010) found that weak institutional mechanism impaired the efficacy of traditional monetary transmission channels viz., interest rate, bank lending, and asset price. Similarly, for a group of EMEs, Bhattacharya *et al.* (2011) argued that the weakness in domestic financial system and the presence of a large and segmented informal sector led to ineffective monetary policy transmission.

The transmission mechanism relates to stock price, which impacts to: (i) investment; (ii) the balance of asset of company and (iii) the wealth of household.

The impact to investment: the q-Tobin model (1969) set up the relationship between stock price and investment spending. Q of Tobin is defined as market price of company divided by the replacement of cost (tool or asset procurement cost...)

If q was high, the market price of company's stock would be higher than the replacement cost of capital. At that time, companies issue securities and receive a higher price than price of other capital asset, which they bought. Therefore, the spending for investment capital will increase because companies can buy much more capital assets by a small amount of issued securities.

Expansionary Monetary Policy ( $M \uparrow$ ) decrease market interest rate, while bonds will be less attractive than stocks. The result is the demand and price of stock rising highly. The higher stock prices are ( $P_s \uparrow$ ), the much more capital is raised in each issued stock ( $q \uparrow$ ), and this will lead to the replacement cost decrease ( $c \downarrow$ ), stimulate investment and increase total demand ( $Y \uparrow$ ).

The impact of interest rate to the balance sheet of company: credit and stock price impact to the balance sheet of company. The expansionary monetary policy ( $M \uparrow$ ) leads to increase stock price ( $P_s \uparrow$ ), resulting net worth of company will increase ( $NW \uparrow$ ). The increasing in net worth will enhance the ability of mortgage credit so loan will increase ( $L \uparrow$ ). The more the debt is, the more the investment spending is, so  $Y \uparrow$ .

The impact of interest rate to the wealth of household: the life circle model of Modigliani (1963) set up the theory below: consumption is determined by the lifetime resources of consumers. An important component of lifetime resources of consumers is financial assets, in which stock is a principal component. Expansionary monetary policy will make increase the stock price, increase the wealthy of household ( $W \uparrow$ ), this leads to increase lifetime resources of consumers, and the result is the total of consumption increases.

The transmission of interest rate to stock price index through supply and demand. Interest rate is the price of using capital, changing in interest rate will impact to the supply and demand of capital and impact directly to supply and demand of securities. When having the decreasing in interest rate, the demand of stock investment will be higher; this makes the demand of stock increase in short-term so the stock price index will increase. The decreasing in interest rate makes decrease the attractiveness of deposit in commercial bank, people tends to transfer money from saving to investing securities. The decreasing in interest rate also makes the attractiveness in speculating securities. Who recognize that this is a profitable investment opportunities so they will borrow to invest. From the above reasons the demand of securities increases, while the supply of securities does not change timely, resulting stock price index will increase.

Wong et al (2005) found the relationship between money supply and interest rate to stock price index in Singapore in the period 1982 to 2002. Angaro et al (2002) found that no long-

term relationship between interest rate and stock price index in Bogota in the period 1994 to 2000. However Uddin and Alam (2007), Leon (2008) stated when interest rates rise, the stock price will decrease in short-term.

In addition, there are many evidences, which prove if there are changes in interest rate, stock price index will change in different directions. Ehrmann and Fratzscher (2004) discovered that every stock in S&P500 index responds differently with monetary policy, the responds depend on the financial constraints and coefficient  $q$ . Besides, Bjornland and Leitemo (2009) discovered that stock market price fell 7-9% if Fed raised interest rate higher than the expectation of market 1%.

The second channel is the impact of monetary policy to the properties of people. In MPS model of Modigliani (1971) about consumption, the increasing in interest rate will make stock, bond price decrease, and adversely affect to the properties of people, this leads to decrease in consumption and finally impact negatively on the business operations. The experimental studies offer the compelling evidences about the inverse relationship between basic interest rate and stock market.

Rigobon and Sack (2004) discovered that American stock market decreased if Fed raised interest rate higher than the market expectations. Bernanke and Kuttner (2005) discovered that if Fed cut the interest rate higher than the market expectation 0.25%, the stock price index increased 1%. Besides, if Fed raised interest rate higher than the expectation, The American stock market would change much more. Similarly, Bomfim (2003) discovered that the market would be more stable in close days before the meeting of FOMC; however, in the decision day of FOMC, market would change strongly. In addition, the decision, which is higher than the market expectations, will affect stronger than the lower.

Real estate prices impact on total demand through channels: (i) the house expends, (ii) the wealth of household, (iii) the balance sheet.

The impact on housing expenditure: the housing expenditure model is a modified form of  $q$ -Tobin theory. Expansionary monetary policy ( $M \uparrow$ ) makes decrease interest rate, reduce the cost of housing funding and therefore increase the price of housing ( $P_h \uparrow$ ). The increasing in house price increases the building company's profit and thus increase housing expenditure ( $H \uparrow$ ), leading to the total demand of society increase.

The impact on the wealth of households: housing price is an important component of the wealth of households, it affects to consumption. Thus, expansionary monetary policy ( $M \uparrow$ ) makes increase housing price ( $P_h \uparrow$ ), increase the wealth of households ( $W \uparrow$ ), leading to the increasing in consumption ( $C \uparrow$ ) and total demand of society ( $Y \uparrow$ ).

The impact on the balance sheet asset of bank: this model is based on theory below, when borrowing the investor must mortgage real estate in bank. Expansionary monetary policy ( $M \uparrow$ ) makes increase real estate price ( $P_h \uparrow$ ), increase the price of mortgage asset and capital of bank ( $W_b \uparrow$ ), leading to investment, and output increase.

A number of studies have also examined the efficacy of various channel in Emerging and Developing Economies. Using VAR framework, Disyatat and Vongsinsirikul (2003), in Thailand, found that in addition to the traditional interest rate channel, banks play an important role in monetary policy transmission mechanism, while exchange rate and asset price channels were relatively less significant. A number of studies have also examined the importance of different channels of monetary policy transmission in India. Singh and Kalirajan (2007) showed the significance of interest rate as the major policy variable for conducting monetary policy in the post-liberalised Indian economy. Pandit and Vashisht

(2011) found that policy rate channel of transmission mechanism, a hybrid of the traditional interest rate channel and credit channel, works in India, as in other six EMEs considered by them. In Sri Lanka, Amarasekara (2008) found interest rate channel to be important for monetary policy transmission.

### **3 RESEARCH METHODS**

#### **3.1 Research model**

In the framework of analyzing the transmission of monetary policy to price indexes of economy, there are many methods of measuring the level of transmission. The first, using the linear regression model. The second, using the VAR and SVAR model, and the third approaching the Co-integration Test and ECM model.

In the 1990s, economic researchers around the world used vector autoregressive model (VAR is abbreviation) for analyzing the transmission mechanism of monetary policy and the monetary policy framework of economies. The advantage of VAR model is the using time series data, in which previous observation values were used to determine the forecast, which was accurate as possible. Sim (1980) suggested that if exist the relationship between variables, variables must be considered with the same role, i.e. all variables are considered to be the endogenous variables. The following years, the variant form of the VAR model such as SVAR model or Vector error correction model (VECM), they have been used popularly to analyze the relationship between macroeconomic variables and policy instruments.

The paper have used the SVAR model to model the monetary policy framework of a market economy which has level of large opening like Vietnam in the period after the crisis financial sector in 1997. SVAR model was applied by Bernanke and Blinder (1992) in researches related with monetary policy. SVAR method is known that is very flexible because it can contain multiple relationships between macroeconomic variables based on economic theory and in turn allows us to identify the orthogonal currency shock.

In this model, the authors establish the necessary condition to find out monetary shock and exchange rate shock of Vietnam, after that evaluate the effectiveness of the impact of monetary policy and other transmission channels to commodity price and business operations of domestic economy.

Simultaneously, the analysis of transmission mechanism of monetary policy and the responds of monetary policy after the effect of shocks outside the economy will be done through Choleski decomposition mechanism.

Theoretically, the relationship between macroeconomic variables and policy instruments is shown by SVAR model below:

$$A_0 Y_t = A_1 Y_{t-1} + A_2 Y_{t-2} + \dots + A_p Y_{t-p} + \varepsilon_t$$

In which,  $Y_t$  is vector (Nx1) of endogenous variables at time t

$A_i$  is matrix of parameters (NxN) with  $i = 0, 1, 2, \dots, p$

$\varepsilon_t$  is (n+1) white noise vectors ( White noise: the time series are uncorrelated)

It also turns out as the variable which change the structure or shock structure

The assumption of the error components (error terms):

- Expectations of the residual is 0:  $E[\varepsilon_{i,t}] = 0$

- The residual is not correlated:  $E[\varepsilon_{i,t}, \varepsilon_{j,\tau}] = 0$  với  $t \neq \tau$

Var structural model has been used to test the interest rate channel in Vietnam

To study transmission of interest rate to price variables in economy, authors have used SVAR regression model. The SVAR model is applied for the relationship between interest rate and other variables as below:

$$Y_t = f(IP_t, CPI_t, IRD_t, M2_t, CPS_t, VNI_t, EXU_t)$$

Performing the above equations in matrix form:

$$B_i = A_0^{-1} A_i \text{ in which } i=1, 2, \dots, p \text{ and shock } e_t = A_0^{-1} \varepsilon_t$$

$$\text{And } B(L) y_t = e_t$$

$$\text{With } B(L) = B_0 - B_1L - B_2L^2 - \dots - B_pL^p$$

To perform the systems of equations in matrix form

$A_0$  matrix in Svar model is determined as form below:

$$\begin{pmatrix} e_t^{IP} \\ e_t^{CPI} \\ e_t^{IRD} \\ e_t^{M2} \\ e_t^{CPS} \\ e_t^{VNI} \\ e_t^{EXU} \end{pmatrix} = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ a_{21} & 1 & 0 & 0 & 0 & 0 & 0 \\ a_{31} & a_{32} & 1 & 0 & 0 & 0 & 0 \\ a_{41} & a_{42} & a_{43} & 1 & 0 & 0 & 0 \\ a_{51} & a_{52} & a_{53} & a_{54} & 1 & 0 & 0 \\ a_{61} & a_{62} & a_{63} & a_{64} & a_{65} & 1 & 0 \\ a_{71} & a_{72} & a_{73} & a_{74} & a_{75} & a_{76} & 1 \end{pmatrix} \begin{pmatrix} \varepsilon_t^{IP} \\ \varepsilon_t^{CPI} \\ \varepsilon_t^{IRD} \\ \varepsilon_t^{M2} \\ \varepsilon_t^{CPS} \\ \varepsilon_t^{VNI} \\ \varepsilon_t^{EXU} \end{pmatrix}$$

$B(L)$  matrix in Svar model is determined as below:

$$\begin{pmatrix} b_{11} & b_{12} & b_{13} & b_{14} & b_{15} & b_{16} & b_{17} \\ b_{21} & b_{22} & b_{23} & b_{24} & b_{25} & b_{26} & b_{27} \\ b_{31} & b_{32} & b_{33} & b_{34} & b_{35} & b_{36} & b_{37} \\ b_{41} & b_{42} & b_{43} & b_{44} & b_{45} & b_{46} & b_{47} \\ b_{51} & b_{52} & b_{53} & b_{54} & b_{55} & b_{56} & b_{57} \\ b_{61} & b_{62} & b_{63} & b_{64} & b_{65} & b_{66} & b_{67} \\ b_{71} & b_{72} & b_{73} & b_{74} & b_{75} & b_{76} & b_{77} \end{pmatrix} \begin{pmatrix} IP_t \\ CPI_t \\ IRD_t \\ M2_t \\ CPS_t \\ VNI_t \\ EXU_t \end{pmatrix} = \begin{pmatrix} e_t^{IP} \\ e_t^{CPI} \\ e_t^{IRD} \\ e_t^{M2} \\ e_t^{CPS} \\ e_t^{VNI} \\ e_t^{EXU} \end{pmatrix}$$

### 3.2 Variables and research data

Research data of paper is secondary. Data was obtained from reputable statistic website. Specifically, in interest rate variables, re-discount interest rate (IRD) was obtained from website of state bank of Vietnam, consumer price index (CPI), which represents for inflation was obtained from IMF, industrial production index (IP), which represents for economic growth was obtained from general statistics office Vietnam, growth in money supply (M2) was obtained from IMF, stock price index of Vietnam was obtained from website of HCM Stock exchange, exchange rate of USD (EXU) was obtained from website of state bank of Vietnam. Growth of private sector credit (CPS) was taken from statistic website of ADB. Data was collected monthly, starting from January 2005 to December 2013

### 3.3 The Order in study

Basing on the model and variables, the authors used methods of quantitative analysis by examining the appropriateness of the research model. The method of Unit root test was used to evaluate the stationary of time series data. To test the causal relationship between interest rates and other macro-economic variables, the authors used Granger causality test. Besides, the authors used Co-integration Test to consider the long-term relationship between interest rate and other macroeconomic variables. To evaluate the impact of the shock of interest rate to other macro-economic variables in economy, the authors used shock respond test associated with the variance decomposition analysis to evaluate the level of impact of interest rate on macroeconomic variables over time and evaluate the strong or weak impact on variables.

## 4 RESULTS OF STUDY

### 4.1 Test of stationary

Testing the angle data string the results is not all variables are stationary so the authors perform variables in first differences. The test result below:

Tab. 1 - The result of Unit root test. Source:own analysis.

Variable	Name of variable	T statistic	P value	Result
IP <sub>t</sub>	Industrial production index	13.636	0.000	Stationary at D(1)*
CPI <sub>t</sub>	Consumer price index	4.133	0.0013	Stationary at D(0)*
IRD <sub>t</sub>	Re-discount interest rate	6.8	0.000	Stationary at D(1)*
M2 <sub>t</sub>	Money supply (M2)	4.75	0.0001	Stationary at D(1)*
CPS <sub>t</sub>	Claims private sector credit	5.385	0.000	Stationary at D(1)*
VNI <sub>t</sub>	Stock price VN index	7.58	0.000	Stationary at D(1)*
EXU <sub>t</sub>	Exchange rate of USD	9.304	0.000	Stationary at D(1)*

Notes: D: differences, D(0) angle string, D(1) first differences

\*(\*\*), (\*\*\*) significance level 1%, 5% and 10%

The result of unit root test showed that data series of CPI stopped at corner, the rest stopped at first differences with significance level 1%. From these results, the variables in model fit with SVAR model



## 4.2 Determining the optimal lag

Tab. 2 - Determining the appropriate lag. Source: own analysis.

Lag	Log L	LR	FPE	AIC	SC	HQ
0	-2068.105	NA	3.46e+08	39.52581	39.70274	39.59751
1	-1098.883	1790.753	8.454578	21.99778	23.41322*	22.57134*
2	-1030.370	<b>117.4519*</b>	<b>5.898649*</b>	<b>21.62609*</b>	24.28005	22.70153
3	-990.5783	62.90821	7.245959	21.80149	25.69397	23.37880
4	-969.4404	30.59958	13.06763	22.33220	27.46319	24.41138
5	-935.2600	44.92285	19.14249	22.61448	28.98398	25.19553
6	-888.0876	55.70833	23.13532	22.64929	30.25731	25.73221
7	-828.3976	62.53246	23.72442	22.44567	31.29220	26.03046
8	-769.0567	54.25454	27.06729	22.24870	32.33375	26.33536

From the test result above, we can find out the appropriate lag for this model is 2 months according to the same standards which having the same results such as LR, FPE and AIC. As this result, the lags of the macro-economic variables, which estimated together, were 2 months

## 4.3 Johansen Co-integration Test

To examine the long-term relationship between variables in model, the authors using Johansen Co-integration Test, especially the relationship between interest rate and other macroeconomic variables. Gujarati (1999) suggested that although the time series cannot stop but may exist equilibrium relationship between them if the long-term time series have co-integration – that means the residuals of regression in model of non-stationary time series is a stationary string.

Tab. 3 - Johansen Co-integration Test. Source: own analysis.

Hypothesized		Statistic	0.05	
No. of CE(s)	Coefficient	Trace	Significance level	P value
None *	0.374644	173.3906	125.6154	0.0000
At most 1 *	0.339481	123.6305	95.75366	0.0002
At most 2 *	0.246513	79.66914	69.81889	0.0067
At most 3 *	0.209314	49.66654	47.85613	0.0334
At most 4	0.126659	24.77191	29.79707	0.1697
At most 5	0.093083	10.41638	15.49471	0.2501
At most 6	0.000563	0.059685	3.841466	0.8070

Trace test indicates 4 co-integrating eqn (s) at the 0.05 level  
 \* denotes rejection of the hypothesis at the 0.05 level  
 \*\*MacKinnon-Haug-Michelis (1999) p-values

The result of Johansen Co-integration Test above showed us: survive the long-term relationship between variables in model. This indicates that changes in monetary policy are shifted from interest rate to other factors in both short-term and long term.

To find out if the macro-economic variables in the model have a causal relationship or not, the authors used Granger causality test model. According to Granger, macro-economic variables can have the causal relationship, that means variables affect other variables and vice versa. However, this relationship will depend on identifying appropriate lag. In this test, the authors used 4 months lag for all variables

#### 4.4 Granger causality test

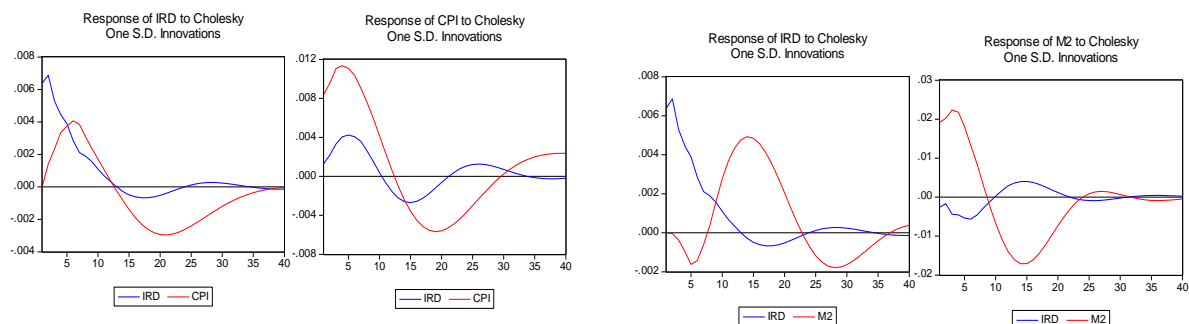
Tab. 4 - Result of Granger test. Source: own analysis.

Result	observat ions	F statistic	Significance level
<b>CPI does not Granger Cause IRD</b>	<b>109</b>	<b>4.87816</b>	<b>0.0012</b>
<b>IRD does not Granger Cause CPI</b>		<b>0.38202</b>	<b>0.8210</b>
VNI does not Granger Cause IRD	109	2.09609	0.0869
IRD does not Granger Cause VNI		2.62557	0.0390

The table result of Granger causality test showed that: survive the two ways causal relationship between discount rate and VN-Index. Among other variables, survive one-way causal relationship such as IP and CPS, CPS and CPI, M2 and CPS, M2 and CPI, VN-Index and M2. This result showed that the changes in interest rate would impact on CPI and vice versa. With an efficient market, this will not happen. This result proved that Vietnam finance market is still not efficient. Therefore, any fluctuations related to macroeconomic factors are not still reflected in the price level of economy.

It is very difficult for policy makers because of the Asymmetric Information Problem. The market manipulation through Asymmetric Information is still in financial market, especially in stock market in recent years. This problem affects greatly to the stability and liquidity of market

#### 4.5 Shock response analysis



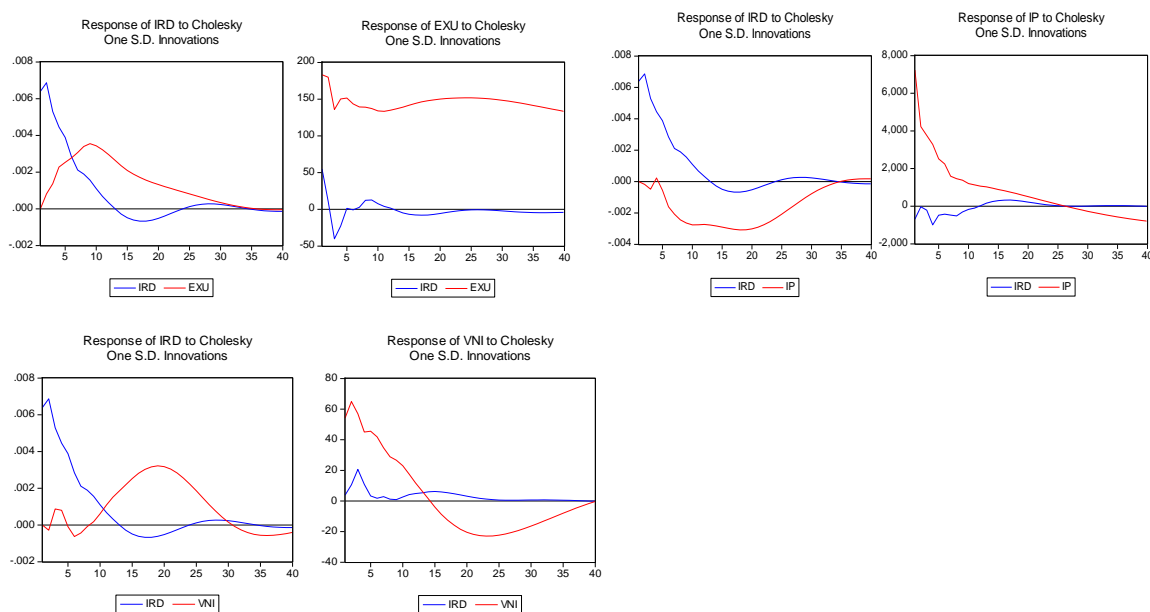


Fig. 2 - The shock response between interest rate and macroeconomic factors. Source: own.

Looking at the graph expressed shock response we found that the early stage of changing interest rates, inflation tends to change in the opposite direction. Specifically, before the time the interest rate shocks occur, inflation tends to rise, which is considering the late effect of policy. Basing on the graphs above, we found that the late effect of interest rate to inflation was 5 periods or 5 months.

The interest rate and inflation have the same trend during the period. However, under the impact of prolonged lag, inflation still decreases while interest rates rise again. The increasing in interest rate makes input cost increase, these combines with previous lag and impact of new shock will make inflation rise again. Now inflation tends to increase with interest rate.

Interest rate and money supply changed in opposite direction. However, the shock of interest rate affected to money supply slowly: interest rate decreased continuously in 9 periods while money supply only increased 3 periods after affected by the shock of interest rate. We see that the impact of interest rate to money supply still lagged, and the lag was approximate 6 periods. In the later period, the order followed the rule when interest rates increase, money supply will decrease and vice versa.

We see that, the implementing of money supply policies through discount rate tool of Vietnam in recent year still works but slower than expectation. The adverse effect from money supply to interest rates showed the relationship between interest rates and the money is adverse.

This is a clear finding, which showed that besides other instruments that are being used in Vietnam, interest rate plays an important role in implementing monetary policy. Interest rates remain a key instrument in implementing monetary policy and stabilizing the macroeconomic and inflation.

The impact of the shock of interest rate on IP was instantaneous. However, this impact lasted in 2 periods. After that, the phenomenon “puzzle” occurred when industrial output tended to fluctuate in the same direction with interest rate. This shows that interest rates were not impact directly to industrial output but through the credit channel. Although interest rates

changed, the lag impact of credit channel lead to the impact of interest rate was not great on industrial output.

In addition, because IP is a variable, which represents growth so when interest rates increase, IP also increases, and this is right with Vietnam economy in period 2007 – 2010. This period, interest rates increase continuously and growth also increases. However, growth in this period will not sustainable and this shows that Vietnam economy is not stable.

About interest rate and exchange rate: 2 variables have relationship through interest rate parity between countries. Interest rate and exchange rate have relationship in long term. When having the difference in interest rates, exchange rate must be adjusted. If not the arbitrage phenomenon will occur. The increasing in domestic interest rate will attract the foreign investment flow in, thereby causes the excess foreign currency supply, so leads to decrease exchange rate.

The monetary policy always aims at make the capital flow efficiently and timely, in which stock market is one of the channels of raising and creating capital for economic. The operation of Stock market relates to financial market. Therefore, the factors such as interest rate, inflation, and credit always impact greatly on this market. According to many economist in the world, most interest rate policies impact on the stock price index both in short term and long term. Testing the relationship between interest rate and VNI shows that interest rates impacted on stock market

With credit: the shock of interest rate impacted on private sector credit in 4 periods. This result shows that appeared positive signs in implementing interest rate policy. This is a good evidence for interest rate policy makers reviewing and implementing the interest rate policy successfully, especially when economic is in crisis period with phenomenon as excess and lack of capital in firms and banks (Banks limited to lend while corporations have a big capital demand but offered high interest rate or refused to lend). This leads to the business operations could not cover interest cost

#### 4.6 The variance decomposition analysis

Tab. 5 - The result of decomposing variance. Source: own analysis

Period	Variance decomposition analysis						
	IP	CPI	IRD	M2	CPS	VNI	EXU
<b>IP</b>							
1	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
4	78.05354	0.604907	1.026138	18.65208	0.176981	0.447213	1.039146
12	69.21821	1.974740	1.502144	22.97602	1.151855	0.722508	2.454522
24	62.48525	3.434049	<b>1.779208</b>	22.08348	1.596052	0.930796	7.691162
48	37.70670	<b>5.317770</b>	1.312911	<b>40.93544</b>	<b>3.673065</b>	<b>1.060458</b>	<b>9.993657</b>
<b>CPI</b>							
1	0.175031	99.82497	0.000000	0.000000	0.000000	0.000000	0.000000
4	12.49451	84.20404	0.590514	0.306517	0.248071	0.194956	1.961397
12	<b>23.57650</b>	60.48853	<b>2.206488</b>	7.454078	0.663954	1.921796	3.688649
24	13.22941	38.22259	1.368697	29.95049	4.988506	<b>2.382331</b>	9.857965
48	6.111303	21.24032	0.718255	<b>52.38582</b>	<b>6.590841</b>	2.063132	<b>10.89033</b>
<b>IRD</b>							
1	0.055688	0.636904	99.30741	0.000000	0.000000	0.000000	0.000000
4	0.155355	0.952621	89.59488	0.284173	2.758206	0.387695	5.867066
12	2.237267	<b>3.157428</b>	59.96611	13.64924	<b>13.96193</b>	0.830721	<b>6.197300</b>
24	3.775923	2.020876	35.27708	39.55122	12.15148	3.476128	3.747286

48	<b>4.204228</b>	1.959081	33.84100	<b>39.83784</b>	12.65958	<b>3.749579</b>	3.748690
<b>M2</b>							
1	0.014166	0.058311	3.463073	96.46445	0.000000	0.000000	0.000000
4	<b>13.73124</b>	3.394630	<b>5.082652</b>	74.26753	3.020046	0.384021	0.119885
12	9.848904	6.705189	4.357299	56.17431	<b>16.20745</b>	<b>3.805283</b>	2.901563
24	7.217109	<b>9.248834</b>	3.957166	52.84558	14.05269	3.022475	9.656151
48	3.523242	7.980720	1.976973	62.86208	10.91173	2.523511	<b>10.22174</b>
<b>CPS</b>							
1	0.722347	<b>2.960298</b>	2.528201	7.697403	86.81402	0.000000	0.000000
4	<b>2.711794</b>	0.956747	2.595687	25.14952	58.17462	1.930225	8.481405
12	1.715359	0.288665	<b>7.526761</b>	<b>48.96617</b>	20.63790	12.58113	8.284019
24	2.592852	0.557187	6.590722	44.41631	25.94033	<b>14.41532</b>	5.487279
48	2.440176	1.074157	5.719045	47.82778	24.38555	13.00765	5.545642
<b>VNI</b>							
1	0.014706	0.024208	1.391303	3.178513	0.449718	94.94155	0.000000
4	0.131363	0.296422	<b>13.57862</b>	4.878121	9.949547	70.35999	0.805938
12	2.159368	0.357545	10.17450	4.693757	<b>21.39915</b>	59.00509	2.210592
24	1.994716	0.607558	7.763899	26.94768	18.36562	41.91845	<b>2.402071</b>
48	<b>2.410706</b>	<b>0.620537</b>	7.441596	<b>27.76372</b>	19.21616	40.13511	2.412172
<b>EXU</b>							
1	8.699505	3.712301	8.430801	0.776639	0.142423	0.552760	77.68557
4	9.991687	<b>12.50170</b>	4.448799	0.642684	1.753126	1.964225	68.69778
12	7.144081	7.592402	5.069683	20.35111	2.017722	<b>5.206812</b>	52.61819
24	2.816226	6.198871	4.190484	56.70082	2.607607	2.555971	24.93002
48	1.583513	5.871435	2.058524	<b>66.30881</b>	<b>5.855230</b>	2.759157	15.56333

Looking at the the summary result table of variance decomposition, we find that IP was influenced more primarily by the shock of interest rate than other variables and the highest impact is during 24 months. By the way, we found that IP was influenced indirectly by interest rate, especially by M2.

The impact of the shock of M2 increased continuously by the length of the periods, 18% for 4 periods, and 22% for 12 periods. Therefore, in early stage IP was impacted strongly by the shock of money supply. CPI was impacted most strongly by the shock of interest rate in 12 periods however weaker by M2, IP, and EXU.

This is also right with the theory when money supply impacted strongly on CPI because money supply impacted directly on the circulation of goods. Interest rate impacted strongly on M2 in 4 periods and this impact was weaker than the impact of the shock of IP on M2 in the same periods.

It is easy to understand because M2 and interest rate have direct relationship, so when implementing the monetary policy to regulate money supply, interest rate is the most priority tool. However, the result of this paper shows that M2 was impact most strongly by the shock of IP (13% compared with 15%). Credit private section growth was impacted most strongly by the shock of interest rate in 12 periods. However, this impact was weaker than money supply, VNI and EXU. Therefore, CPS could impact indirectly through interest rate. This is a concern in managing the monetary policy when the changes in interest rate impacted weakly on CPS. VNI was impacted most strongly by the shock of interest rate in 4 periods and this is the biggest impact in rest of variables. This is one of significant findings for the stock market.

The changes in interest rate impacted strongly on stock market. The result of this paper is suitable with the theory and practice of Vietnam stock market. Foreign exchange was impacted by the shock of interest rate in 12 periods and impacted weakly by other variables. This issue is suitable when exchange rate and interest rate have the closed relationship in

practice, when having the changes in interest rate the exchange rate was adjusted by the interest rate parity theorys

## 5 CONCLUSION

This paper tested the transmission of interest rate to monetary policy by the Var model. The result of shock response analysis and variance decomposition analysis show that the interest rate plays an important role in managing economic. A shock of interest rate in monetary policy impacts most of variables of macroeconomic in model. However, besides money supply variable and VNI, other impacts were weak and late. The result also shows that duration of interest rate policy impacted other price factors such as CPI, VNI. This result suggests that appropriate interest rate policy through macroeconomic factor can foster its aims: economic growth and inflation stabilization.

This study does not consider other macroeconomic variables such as the real estate price, the product price index, the growth of credit yet. Furthermore, interest rates, which the authors used to study, is discount interest rate, this is the limitation of paper. In the next study, the authors will include variables mentioned above to the model and will try to find effect of the transmission through average interbank interest rate and refinancing interest rate.

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## **THE FACTORS AFFECTING THE SUCCESS OF A PROJECT OF CONSTRUCTION COMPANY IN VIETNAM**

*Huong Thi Mai Nguyen, Thuy Thi Phuong Nguyen, Trieu Thi Nguyen*

### **Abstract**

The construction sector of any country in the world always plays an important role in the economy and keeps the task of forming, building and developing infrastructure. A poor infrastructure cannot create a modern society. With the specific characteristics of the construction industry, during construction progress, the projects will face with any risks and difficulties. The project teams in Vietnam are facing unprecedented changes in technology, products, investment resources...and ect. Therefore, the measurement of the factors affecting to the success of the project in Vietnam is aimed to improving the efficiency of the project.

Based on relevant previous studies and comments from the experts in the construction industry, a rough questionnaire was formed and sent to six individuals who have extensive experience in the field of construction management for testing interview. After analysing, evaluating, eliminating superfluous elements, adding elements to the draft questionnaire, finally the research team had completed the questionnaire and established the four criteria for evaluating the success of the project, which are included of cost, time, technical completion and customer satisfaction. These criteria will be measured through four groups of factors that affect the success of the project, namely the external environment, the ability of the construction project manager, the capacity of project members and the way to organize the projects. This questionnaire requires each individual participating in the survey to give their opinions about the impact of these factors on the success of a project, based on a seven-level Likert scale (from less stable the high stability), corresponding to the score of 1-7.

*Keywords: Manage the investment Project of Vietnamese Enterprise, Vietnam's construction enterprise, the success of construction projects, factors affecting the success of the project.*

## **1 INTRODUCE**

After nearly 30 years of innovation, the construction industry in general and the construction enterprise in Vietnam in particular have made significant strides towards modernization, not only in the field of site construction, building materials, architect and construction planning, but also in other sectors such as urban and housing development, ability to plan the site schedule, ect... meeting the need of itself industrial development and innovation. Besides, Vietnam's construction industry still has a lot of restrictions, such as:

- Restrictions on financial capability, most of the construction companies have to pay in advance to proceed their works and get back the payment after inspection from the owner as contract. The contractors have to pay a monthly rate for banks while there is no interest for the debt of the owner, and cannot force the owner either. Fund planning is essential for the contractors, in which we need to evaluate the potential risks (e.g. price fluctuations, changes of state policy...). The financial matter of contractors in the construction process is the major issues in the developing countries like Vietnam;



- The degree of synchronization for construction machinery and equipment reached 26.5% - 39.4%. The obsolescence of technology and techniques will affect to the cost, quality and price of products;
- The experience and qualifications of the management organization is limited, such as the way to organize marketing activities to find markets, materials resource, qualifications of staff responsible of the tender contract, construction schedule management, the possibility of joint ventures;
- Shortage of technical and high quality labor force .

Vietnam has a dynamic economy, and together with other Southeast Asian countries, in recent years, the prospect for Vietnam economy in general continues to improve. The construction sector of Vietnam is a kind of special material production that combines many factors from ideas for construction planning, design, manufacture and supply of materials, technical materials, management of site construction until to be completed. And finally it forms the fixed assets in use, then those products were warranted, maintained and transferred to the final possessed owner, all the achievements of the natural sciences, social sciences and humanities can be applied and focused on the building. That makes construction products contain high levels of intelligence and material values.

The construction industry is constantly changing with the development of business methods and new technologies. The success is the ultimate goal of each company because it is considered an indicator for the existence in competitive business environment. Therefore, the construction companies have to use and develop appropriate strategies to be successful in their business.

Meeting deadline, cost and quality is considered as the success criteria of project. In addition, the success of the construction projects is to meet the strategic objectives of the owners and the organization; to satisfy the needs of users and of all parties, including related products. However, the issue that the research team wants to raise is to identify the factors that mostly influence the remaining elements after reviewing and measuring, the construction companies prepare the priority solution to make timely adjustments, and ensure maximum effectiveness of the project.

## **2 OVERVIEW FOR PREVIOUS RESEARCH**

Construction industry is considered one of the most important industries in the economy. It interacts with almost all fields of human endeavor. Unfortunately, the intrinsic complexity, uncertainty and dynamics of most construction projects makes difficulties for even the best project manager. The decision timelines are used to predict outcomes,. Risk management is done to prevent disasters, Repeated sequence is used to ensure that the planned facility is available. However, the project still ends with delay progress, budget overruns and technical details intrusion (Meyer et al., 2002). For that reason, the challenge is how to handle a successful construction project has attracted considerable researchs in the past few decades.

Previous studies (de Wit, A. 1988; Munns & Bjeirmi, 1996; Cooke-Davies, 2002) states that the success of the project is evaluated with the overall objectives of the project when project management success is measured against the cost, time and quality. This research indicated that the distinction between a successful project which cannot be measured until the project is completed and the project implementation which could be measured in the life of the project is an important matter.

However, Baccarini (1999) asserted that project success is measured in terms of successful products (including equipment) and successful project management. Despite this controversy, under the broad definition of successful project this study is aimed to disseminate the common elements to the managers in Vietnam and the projects in developing countries where the knowledge about project management is not high.

Beside, success factors of the project are defined as the knowledge, skills, traits, motives, attitudes, values or individuals characteristics that are necessary to perform the job (PEPDS, 2004). Then Ashley et al. (1987 cited in Sanvido et al., 1992) referred to the project to be called a success if it has much better results than expected such as cost, schedule, quality, safety, and satisfaction of the participants.

Or De Wit (1988) noted that a project is considered to be successful if it meets the specification of technical performance or task is done, and if there is a high degree of satisfaction of the project's results among key figures of the management and the users or customers.

Albert P. C. Chan<sup>1</sup>; David Scott<sup>2</sup>; and Ada P. L. Chan<sup>3</sup> (2004), this paper focuses on the csfs and not on the measurement of project success, the key performance indicators (KPIs). Further study should be directed to identify the KPIs, so that the causal relationships between CSFs and KPIs can be identified. The causal relationships, once identified, will be a useful piece of information to implement a project successfully. It can help in selecting project team members, identifying the development needs of the project team members, and most important for forecasting the performance level of a construction project before it commences.

Abdelnaser Omran, Mohammed Alnor Abdulbagel, Abdelwahab O.Gebril (2012), the paper identifies ten critical success factors that are important and will impact positively on construction projects if they are focused on by all the stakeholders, that examines different situations and environments and it will improve the construction industry development in Libya.

Clearly, determining the success or failure of a project is complex and ambiguous because of factors affecting both contain elements of quantitative and qualitative aspects. We noticed there are many factors that affect the success of the project - the reason for this difference may be due to the approach and different research objectives of each above authors. After the overall achievement of the impact factors connected with the scope and control capabilities, combined with hierarchical micro-environment and micro factors affecting to identify the causes which takes subjective or objective effect, the research team has collected, processed data as well as conducting inspection and measurement of each element in each group of factors that affect the success of the project of construction enterprises in Vietnam.

### **3 RESEARCH MODEL AND HYPOTHESES**

#### **3.1. Research model**

Based on the above theory, the article proposed the research model shown in below Figure 1:

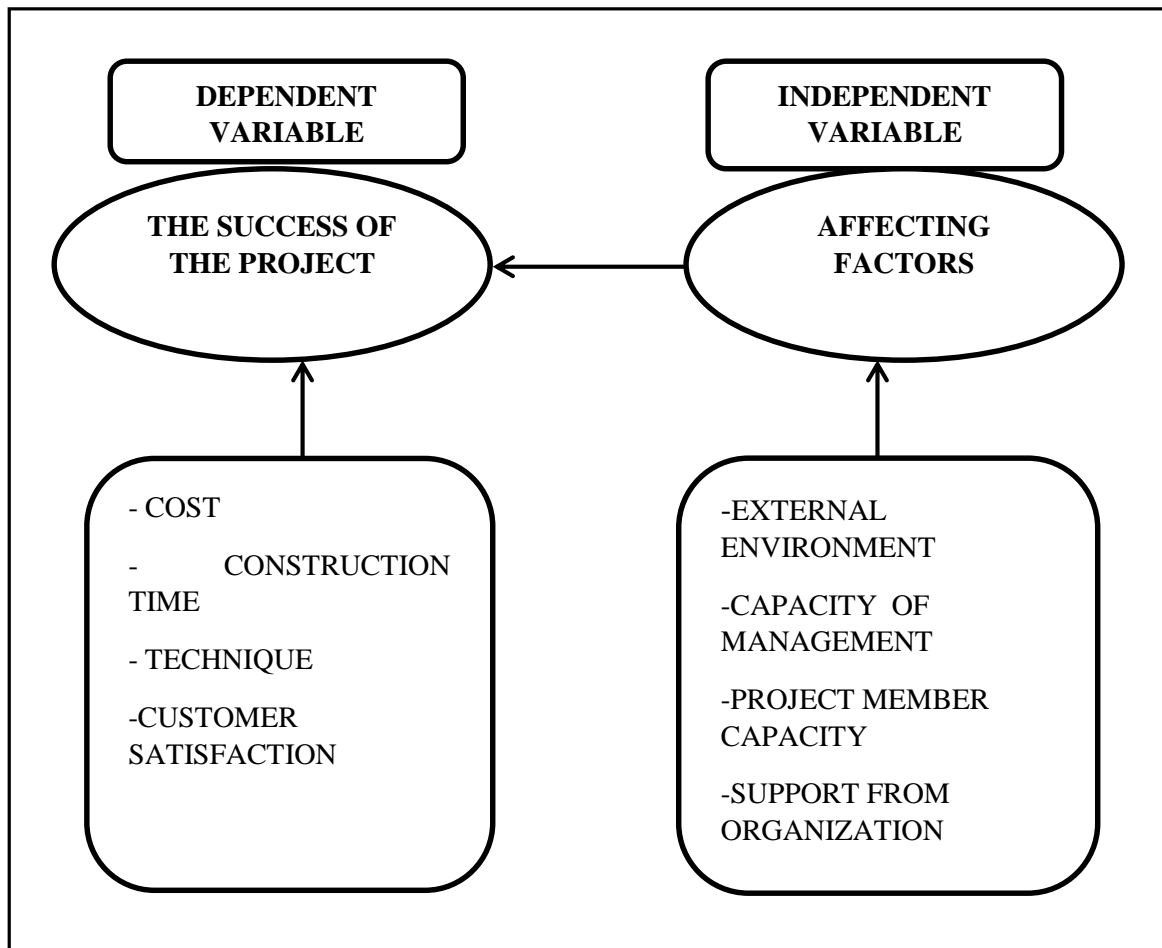


Fig. 1 - Research model. Source: Cited by the authors.

### 3.2. Research assumption

#### Firstly, external environment

The factors of the external environment that have an impact on the success of construction projects including: the political environment, economic environment, social environment, law, technology, natural environment (air climate, weather...), competitors, subcontractors and feedback from customers.

H1: The more stable the external environment is, the more impact it has on the success of construction projects

#### Secondly, capability of management

Project management board is operating and coordinating center in the work of the project. In big projects in Vietnam, the problem is coordinating a capable team to implement the project successfully. A project management is a collection of individuals performing work on the specialty, so that we need a capable project leader to lead them following a common orientation. The characteristics to evaluate a good project leader is to build a team with good communication skills, enforce the confidence and focus on results. Two factors influence throughout the lifecycle of the project. The capacity of the project managers is demonstrated by the following criteria: ability of decentralization, discussing skill, coordination, decision-making ability, the ability to perceive the role and administrative tasks, ability to withstand the pressure of work.

H2: The higher capacity the project manager has, the higher the success of construction projects impact.

### **Thirdly, the project member capacity**

In the construction projects, virtually all activities are dependent on human resources. There are many parties involved in a construction project like the chain linked together. When any link is broken, the project will be disrupted. For that reason the cooperation as well as the determination of the parties is critical factors to the project. This is the concern of the consulting company, usually independent party, with cultural projects, they want the active cooperation between the parties (especially between investors and contractors) to complete a good project. The criteria for measuring their abilities are: professional knowledge, communication skills, ability to solve risky problems, the ability to commit the goals, ability to face problem, teamwork ability, withstand work pressure.

H3: The higher capacity the project member has, the more it impacts on the success of the construction project.

### **Fourthly, the support from organization**

The relevant parties, either directly or indirectly involved in the project, have different views about success, play a very important roles in every project. The satisfaction of the stakeholders, both internal and external (including clients, contractors, managers, etc.), with the final product as a project success criteria are given special importance.

H4. The more support from organization, the more impact on the success of the construction project.

## **4 RESEARCH METHOD**

### **4.1. Research method**

The research process is done through two steps: preliminary research and formal research.

- Preliminary research was conducted through qualitative research methods, such as communication, expert interviews, collect reference information from the relevant article and the comments... etc. Then, we discuss general factors affecting the success of the project to establish a questionnaire survey using in formal study.
- In formal research, the team employed quantitative methods, and the questionnaire survey. In particular, the random sample of non-probabilistic method for conducting data collection. The data is encrypted and processed by SPSS 22.0 software. To consolidate multiple choice and composition of the scale, we use the method Cronbach's Alpha testing, EFA factor analysis in order to determine the hidden factor behind the observed variables. Binomial logistic regression (binary logistic) analysis is used to determine the coefficient of the factors in the regression and analyze the impact of these factors to the success of the project.

### **4.2. Research sample**

With 180 samples issued, a number of collected samples met the requirements of 150 (counts for 83.3%). The questionnaire was distributed to the director, deputy director of the project, head of supervisor, head of construction at various construction companies. After being collected, the questionnaires were reviewed and eliminated the wrong ones. We continued coding variables, inserting date and cleaning data by SPSS version 22.0 software to perform statistical analysis of the data.

### **4.3. Design data collection**

There are Discussions with experts to prepare interview questions, for testing interview, adjusting and distributing survey questionnaire. In formal questionnaire has 26 items asked for the level of factor affecting the success of the project. Each item is scored according to unidirectional Likert scale from 1 to 7 with the convention from lowest (1) to highest (7). The questionnaire consists of 26 statements, in which nine questions are about the "external environment", 6 questions about "The capacity of the project management", 7 questions about "The capacity of the project members "and 4 questions about" the support of the project organization ".

## **5 RESULTS**

### **5.1. The model analyzes the factors affecting the success of the project**

Based on the elements inside that affect the success of the project is pointed out, regression models were established:

In which:

$\beta_1, \beta_2, \beta_3, \beta_4$ : Regression coefficients

BPT: the success of the project

MT: External environment

NQT: Capacity of project management

TV: Capacity of project member

HT: The support from project organization

### **5.2. Building scale**

The success of the project is measured by 04 observed variables code TC1 to TC4

The external environment is measured in 09 observed variations code MT1 to MT9

The capacity of project managers is measured by 06 observed variables code NQT1 to NQT6

Capacity project members was measured by 07 observed variables code TV1 to TV7

The support of the project organization is measured by 04 observed variables code HT1 to HT4

### **5.3. Measurement model inspection**

Cronbach's alpha coefficient helps us to access whether using the observed variables which belongs to a researching variable (latent variables, factors) is appropriate or not. According to the rules of experience, if the coefficient reaches alpha of 0.7 or higher, the scale will be reliable and effective explanation (Nunnally & Bernstein, 1994, p.264-265). Or as Peterson (1994), the alpha coefficient of 0.7 or higher, even 0.77 or higher, the scale is considered to be reliable and efficient.

At the same time, to have a high reliable scale , we need the observed variables strongly correlated each other. This is reflected in the correlation index between variables - total (Corrected item - total correlation). Accordingly, correlated variables - the total is greater than 0.3 is considered good and usable.

Also, in the opposite case, if the coefficient alpha is too high (greater than 0.95), it is capable of superfluous observed variables appear in scale. The superfluous observed variables are

variables measuring a concept almost identical to other measuring variables when the superfluous variables should be eliminated.

After testing the Cronbach's Alpha many times, the research team excluded six observed variables, that is, "Social Environment" (MT3), "Natural Environment" (MT6), "Clients Comments" (MT7) "Competitor" (MT8), "The ability to perceive the role and administrative tasks" (NQT5) and "Ability to endure the pressure of work" (TV7) because the coefficient of Cronbach's Alpha is larger the coefficient Alpha of each factors group. The remaining variables have Cronbach's alpha coefficient in accordance with standards of measurement, the inspection results measurement model shown in Table 1.

Tab. 1 - Item-Total Statistics. Source: authors' calculations.

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Cronbach's Alpha if Item Deleted
Scale of "External Environment" (MT), Alpha = 0.968				
Political Environment	20.2467	19.798	0.869	0.967
Economy Environment	20.2800	19.384	0.918	0.959
Environmental laws	20.2267	19.358	0.960	0.953
Environmental Technology	20.4267	19.280	0.906	0.961
Sub contractors	20.4467	18.907	0.894	0.963
Scale of "The ability of project management" (NQT), Alpha = 0.944				
The possibility of decentralization	20.2200	9.206	0.859	0.929
The ability to discussing	20.2800	9.304	0.847	0.931
The ability to coordinate	20.1733	9.258	0.871	0.927
The ability to make decision	20.2400	9.754	0.785	0.942
The ability to withstand the pressure of work	20.2867	9.199	0.877	0.926
Scale of "The ability of project members" (TV), Alpha = 0.954				
Expertise knowledge	24.9067	14.139	0.913	0.939
Communication skill	24.9200	14.262	0.890	0.941
The ability to settle the problem	24.8133	14.394	0.843	0.947
The ability to commit to targets	24.8400	14.833	0.781	0.954
Ability to solve problems	24.8600	14.497	0.818	0.950

Teamwork skill	24.9267	14.310	0.898	0.941
	Scale of “The support from project organization” (HT), Alpha = 0.880			
The support of senior management board	14.4067	6.109	0.743	0.846
The support of the project structure	14.5333	6.452	0.800	0.826
The support of the functions management	14.7533	6.791	0.774	0.840
The support of project leaders	14.1067	5.921	0.686	0.876
	Scale of “The success of the project”, Alpha = 0.931			
Cost	14.8733	13.266	0.855	0.906
Time	14.7933	13.427	0.801	0.923
Technique	13.9200	13.067	0.804	0.922
Customer	14.3133	12.069	0.900	0.890

#### **5.4. Exploring Factor Analysis EFA**

Exploring Factor Analysis EFA considers the convergence of the observed variables for each component and distinguished value between the factors.

According to Hair and ctg. (1998, 111), Factor loading (load factor or weighting factor) is an indicator to ensure the practical meaning of EFA:

Factor loading > 0.3 is considered to reach a minimum

Factor loading > 0.4 is considered important

Factor loading > 0.5 are considered to have practical significance

Hair and ctg. (1998, 111) also suggest that: if choosing the factor loading standard > 0.3 then your sample size is at least 350. If your sample size around 100, you should choose the factor loading > 0.55. If the sample size is around 50, the factor loading should be > 0.75. For that reason, the condition for analyzing the exploring factor has to meet these requirements: Factor loading > 0.5.

- $0.5 \leq KMO \leq 1$ : the coefficient of KMO (Kaiser – Meyer – Olkin) is an index used to examine the appropriateness of factor analysis. Larger KMO values means the factor analysis is appropriate.
- Bartlett Inspection has statistical meaning (Sig. <0.05): This is a statistical quantity to consider the hypothesis of the variables is not uncorrelated with overall. If this testing has statistical meaning (Sig. <0.05), the observed variables correlated with each other in overall.
- Percentage of variance > 50%: Shows the percentage of variation of the observed variables. Means that if we considered the variation as 100%, the value shows how many percentage the explanation factor is.

Exploring Factor Analysis EFA the independent variables:

The results of total variance table (Table 3) shows that the four extracted factors may explain for the variability of 83.05% observed variables. Moreover, KMO coefficient is  $0.81 > 0.50$  with a significance level of  $< 5\%$  (Table 2) which is consistent with accreditation standards.

Results from the rotation matrix factors (Table 4) shows the initial 20 observed variables has practical significance (greater than 0.50) and are aggregated into four factors in the table.

Tab. 2 - KMO and Bartlett's Test. Source: authors' calculations.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	0.808
Bartlett's Test of Sphericity	Approx. Chi-Square
	4245.469
	df
	190
	Sig.
	0.000

Tab. 3 - Total Variance Explained. Source: authors' calculations.

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	9.305	46.524	46.524	9.305	46.524	46.524	4.762	23.808	23.808
2	3.264	16.318	62.842	3.264	16.318	62.842	4.522	22.611	46.419
3	2.144	10.722	73.564	2.144	10.722	73.564	4.254	21.272	67.691
4	1.897	9.486	83.049	1.897	9.486	83.049	3.072	15.358	83.049
5	0.670	3.350	86.400						
6	0.549	2.744	89.144						
7	0.439	2.197	91.341						
8	0.331	1.653	92.994						
9	0.294	1.470	94.463						
10	0.224	1.122	95.586						
11	0.219	1.095	96.681						
12	0.152	0.760	97.441						
13	0.147	0.734	98.175						
14	0.118	0.591	98.766						
15	0.092	0.461	99.227						
16	0.072	0.361	99.588						
17	0.040	0.199	99.787						
18	0.023	0.117	99.904						
19	0.015	0.077	99.980						
20	0.004	0.020	100.000						

Extraction Method: Principal Component Analysis.

Tab. 4 - Rotated Component Matrix<sup>a</sup>. Source: authors' calculations

	Component			
	1	2	3	4
Expertise Knowledge	0.888			
The ability to solve problem	0.867			
The ability to commit target	0.848			
The ability to settle problem	0.810			
Teamwork skill	0.808			
Communication skill	0.803			
Environmental Laws		0.947		
Economy Environment		0.917		
Technical Environment		0.898		



Sub contractors	0.891		
Political Environment	0.887		
The possibility of decentralization		0.889	
The ability to coordinate		0.877	
The ability to discussing		0.855	
The ability to withstand the pressure of work		0.842	
The ability to make decision		0.749	
The support of functions management			0.904
The support from project organization			0.887
The support of senior management board			0.793
The support of project leader			0.730

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.<sup>a</sup>

a. Rotation converged in 6 iterations.

The scale after evaluation and structure has four components with 20 observed variables. The components are encoded as follows:

- + Component 1: "Capacity of project members"
- + Component 2: "External Environment"
- + Component 3: "Capacity of project management"
- + Component 4: "The support of the project organization"

Exploring Factor Analysis EFA the dependent variable: satisfactory with KMO = 0.708 (>0.5) with a significance level of sig = 0.000 (significance level > 0.5), the eigenvalues = 3.322 (>1) and the total variance extracted = 83.044% (>50%). The Table for result of the dependent variable as follows (Table 5 and 6):

Tab. 5 - KMO and Bartlett's Test. Source: authors' calculations.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.708
Bartlett's Test of Sphericity	Approx. Chi-Square	702.974
	df	6
	Sig.	0.000

Tab. 6 - Total Variance Explained. Source: authors' calculations.

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.322	83.044	83.044	3.322	83.044	83.044
2	0.535	13.365	96.409			
3	0.093	2.335	98.744			
4	0.050	1.256	100.000			

Extraction Method: Principal Component Analysis.

### 5.5. Regression analysis

Using Binary Logistic Regression models for binary dependent variable, we performed three testing as following:

- Inspection of partial correlation regression coefficient: The objective of the inspection is to examine whether the independent variables are correlated with the dependent variables or not (for each independent variables). Using the Wald test, the level of significance of the partial regression coefficient is least ( $\text{sig.} \leq 0.05$ ). We concluded that the correlation between the independent variables and the dependent variable has statistical significance. The results at Table 1 shows the "External Environment" variables, "Capacity of project management" and "The support of the project organization" has partially correlated with variables "The success of the project" ( $\text{sig.} < 0.05$ ), only the " Capacity of project members " variable has no statistical significance with the significance level of  $0.887 > 0.05$ .

Tab. 7 - Variables in the Equation. Source: authors' calculations.

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Step 1 <sup>a</sup> FACT1	0.961	0.286	11.326	1	0.001	2.615	1.494	4.578
FACT2	1.944	0.555	12.258	1	0.000	6.989	2.353	20.756
FACT3	0.068	0.480	0.020	1	0.887	1.070	0.418	2.743
FACT4	0.814	0.338	5.792	1	0.016	2.258	1.163	4.383
Constant	-16.780	3.194	27.599	1	0.000	0.000		

a. Variable(s) entered on step 1: FACT1, FACT2, FACT3, FACT4.

*- The suitability of model*

Referring to the accuracy of forecast: in Table 8, with 26 failed projects, the model correctly predicted 23 projects, counting for 71.9%. At the same time, in 124 successful projects, the model correctly predicted 115 projects, counts for 97.5%. The percentage of correct prediction of the whole model is 92%.

Tab. 8 - Classification Table<sup>a</sup>. Source: authors' calculations.

Observed		Predicted			
		The success of the project		Percentage Correct	
		0	1		
Step 1	The success of the project	0	23	9	71.9
		1	3	115	97.5
Overall Percentage					92.0

a. The cut value is 0.500

Regarding the suitability of the model: , The Omnibus testing shows  $\text{sig.} < 0.0001$  (the significance is 99%). Thus, the independent variables generally have a linear relationship with the dependent variable in the overall. In other words, the model is a suitable.

Tab. 9 - Omnibus Tests of Model Coefficients. Source: authors' calculations.

		Chi-square	df	Sig.
Step 1	Step	79.367	4	0.000
	Block	79.367	4	0.000
	Model	79.367	4	0.000

- *The level of explanation of the model:*

Table 10 shows the index R<sup>2</sup> - Nagelkerke = 0.637, means that 63.7% of changing in the dependent variable are explained by the independent variables.

In addition, the regression coefficient (B) in Table 2, shows that the factors affecting the success of the project in order of importance is are the "Capacity of project management" (B = 1944 ), "External environment" (B = 0961), "The support of the project organization" (B = 0814) while the "Capacity of project members" (B = 0068).

Thus, by the result of the logistic regression model, we concluded the factors, such as "Capacity of project management," "External environment" and "The support of the project organization", affect "The success of the project. The factor of "Capacity of project members", however, has not enough statistical evidence to confirm the influence to "The success of the project".

Tab. 10 - Model Summary. Source: authors' calculations.

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	76.135 <sup>a</sup>	0.411	0.637

a. Estimation terminated at iteration number 6 because parameter estimates changed by less than 0.001.

## 6 DISCUSSION MATTER

Identifying critical success factors will support for reliance on the cognitive objectives of the organization. With the conclusion from the analysis of the logistic regression model, the factors of "Capacity of project management," "External environment" and "The support of the project organization" may affect "The success of the project ". However, with the constituents on the survey for each group as well as the collected information after processing of the data, the research team proposed that to make a success of construction project in Vietnam, the role of "The capacity of the project management" plays a very important role.

A good project management requires a combination of many factors such as multi-dimensional capabilities (including communication skills, technical and administrative), determine their level of participation, the power and control they have. Besides, the project manager must have good technical knowledge and experience, because most of the projects are high technique. At the same time, they need to have the ability to convince the other members on their opinion, to resolve conflicts between the parties, to encourage and convince the project team to perform duties together and to adapt to the adjustment.

The convergence of all these factors in the project manager proves that he has ability to catch up, to solve the problem, and ability to coordinate... All these things will help savings time and cost to create a successful project. For that reason, the problem is how to have a good manager before implementing a construction project, in other words , how the construction industry of Vietnam can find out and train expert and skillful project managers for professional working. That is the solution to sustainable and effective development in Vietnam construction market.

Besides, we need to improve the capacity and the cooperation of the relevant parties: the characteristic of multiple parties involved in the various stages in construction leads to the affecting among contractors. All parties need to improve their capacity. The good cooperation among the parties is critical to the success of the project. All parties should be aware that in addition to their good work, they should make good working conditions for the others. This is a modern cooperative "win - win" situation. To Promote the role of State management in the

construction sector, the State should give favorable conditions to investors, simultaneously also have strict management of the planning, urban architecture and reject inappropriate projects. Successful project management is successfully to manage the works, the major factors which affecting the success of the project.

Meanwhile, to solve the problem of financial management of construction enterprises in Vietnam, these enterprises may need to organize management accounting for stages of estimation, valuation, analysis and measurement of information in short-term and long-term in order to build the effective internal control system. By these actions, the management accounting activities will contribute to give the information on time in order to meet the "dynamic feature" of the construction enterprises in Vietnam in the current competitive conditions.

## **7 CONCLUSION**

On the whole, the entire content of the article is done for the purpose of identifying and measuring the factors that affect the success of a project. We hope that the findings in this study will expectedly contribute to prevention of "delay" factors as well as the ability to improve success in construction projects in Vietnam. Based on data analysis, we have proven that there is completely a link and influence of four groups of factors to the success of the project, and possibility of measuring the impact of each factor group on predicting value of their impact when implementing the project.

In addition, we want to affirm the role of "harmonization" of the project managers system in the organization system. They must be those who is assertive and professional to assume this position in the project. And the talents of the project managers will narrow the "gaps" of the external environment, the members of the project and the support of the organization. The support of relevant parties and management accounting, completedly internal control system has the same meaning as improving the efficiency of time and cost for a project to give the most customers satisfaction on the quality of the building.

Some limitations of this study are that the scope of research subjects of 150 is not much, not classified in the type of project, not deeply assessing the interaction of each element in each factors group affecting the success of the project. From here, we propose the following research is to increase the number of research subjects in order to improve reliability, measure the customer satisfaction and assess the environmental friendliness of the project.

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## **PRICE LIMITS AND STOCK MARKET VOLATILITY: EMPIRICAL EVIDENCE FROM THE HO CHI MINH STOCK EXCHANGE**

*Nguyen Thi Tuyet Nhung*

### **Abstract**

The paper aims to examine the effect of stock price limits on the volatility of its return in the Ho Chi Minh Stock Exchange. By employing GARCH (1,1) model, the estimated results indicate that the price limits has an impact on the stock return during the first testing period. However, during later period, the paper detects no effect of price limits.

*Keywords: price limits, stock return volatility, Ho Chi Minh Stock Exchange*

JEL Classification: G15

### **1 INTRODUCTION**

After the U.S. market crash in October 1987, price limits was implemented and widely considered as a necessary protection mechanism to many stock exchanges. As defined by Kim (2001), price limits are simply a maximum upward and downward boundaries of daily price movements and set to provide a cooling-off period for investors under extreme market conditions. However, the effectiveness of price limits on stock market remains controversial to market participants, regulators and academics. One main argument is that price limits would succeed in reducing stock market volatility. Conversely, many researchers strongly suggest that price limits will have no impact on the stock market volatility. This inconsistency of opinion has accordingly attracted considerable empirical analysis, and is also the motivation of this research.

This paper particularly examines the effect of price limits on the volatility of the Ho Chi Minh stock exchange (HOSE), the biggest stock exchange in Vietnam. Since established in July 2000, HOSE has implemented daily price limits to restrict extreme price movement in the market during a trading date. However, it is worth noting that, during 14 years, HOSE has changed its daily price limits 10 times. This raises an interesting question that whether changing the price limits actually has an impact on the Ho Chi Minh stock market volatility. To answer this question, we employ an asymmetric GARCH model to test the impact of price limits on the stock market volatility during its price limits changes. To our best knowledge, there is no research on price limit has been conducted in the Ho Chi Minh stock exchange. Hence, the inferences of this study expectedly offer practical implications to investors and policymakers in the stock market.

The remaining of the study is constructed as follows. Section two briefly provides a literature review of the effect of price limits on stock price volatility. Section three describes data and methodology utilized while empirical findings are focused in section four. Section five provides a conclusion.

## **2 LITERATURE REVIEW**

Theoretical debates on the effect of price limits on stock volatility have provided conflicting conclusions which are mostly motivated from two major hypotheses. First, the information hypothesis, also known as the delayed price discovery hypothesis, basically argues that, price limits exhibit the delaying effect under efficient market condition (Fama, 1989). Phylaktis et al. (1999) further explain that the presence of price limits only lengthen the number of trading days it will take for the market to absorb the new information into the equilibrium stock price and hence the volatility of stock returns should be indifferent between pre- and post-limit period.

Second, the impact of price limits is discussed under the overreaction hypothesis, which considers the activation of price limits under an inefficient market condition. Phylaktis et al. (1999) explain that when new information occurs in the market, investors are likely to overreact to the information, causing an increase in the volatility of stock returns in this short-run period. In such circumstance, the presence of price limits provides an additional time for the investors to reassessment the market, resulting in a less volatility of the market. Therefore, this hypothesis concludes that volatility of returns in the post-limit period should be less than in the pre-limit period.

The theoretical debate over the impact of price limits on stock price volatility results in an increasing number of empirical studies, which have been conducted in different stock markets and methodologies. For example, Phylaktis et al. (1999) studied the role of price limits on stock market volatility on Athens stock exchange. By testing the serial correlations of ten stocks, which exhibit highest number of price hitting during testing period, they found that the price limits have a delaying effect as predicted by the information hypothesis. Additionally, they report that the price limits have no power in reducing the stock market volatility. A similar study by Kim (2001) on the stock exchange of Thailand also documents that when price limits are made more (less) restrictive stock market volatility is usually not lower (higher). Huang et al. (2001), alternatively, shows that the impact of price limits observed in the Taiwanese stock exchange is consistent with the overreaction hypothesis, indicating that the volatility of stock returns is stabilized after the activation of price limits. Other previous researches also investigate the effect of price limits in destabilizing stock returns volatility such as DeBondt and Thaler (1985, 1987) on the U.S stock market, Chen (1993), and Lee and Kim (1995), Berkman and Lee (2002), etc. However, inconsistent conclusions have been reported.

## **3 METHODOLOGY AND DATA**

### **3.1 Methodology**

Testing the impact of daily price limits changes on stock market volatility is basically to compare stock volatility between pre and post changing periods. Although several empirical techniques have been used in measuring the stock volatility, the generalized ARCH (GARCH) (Engle, 1982; Bollerslev, 1986) appears to be the most commonly used process due to two reasons. Firstly, GARCH process can capture the tendency of volatility clustering in financial data. Secondly, Fama (1965) and Bollerslev et al. (1992) consistently conclude that heteroscedasticity usually occurs in stock return series. Hence, GARCH can overcome the heteroscedasticity problem by modeling the conditional variance of the error term as a linear function of the lagged squared residuals and the lagged residual conditional variance. In our study, the simplest GARCH model, GARCH (1,1), is employed.

To effectively capture the volatility of stock market follows by the change of price limits, a dummy variable is incorporated in the conditional variance equation. Besides, a proxy variable is also employed in the conditional mean equation to filter off the market-wide effects. The usage of the proxy variable is basically to ensure that any volatility observed is only caused by the modification of price limits. Therefore, the conditional mean and variance equations of GARCH (1,1) model have the following form:

$$(1) \quad R_t = a_0 + a_1RX_t + u_t \quad u_t \mid \Psi_{t-1} \sim N(0, h_t)$$

$$(2) \quad h_t = \alpha_0 + \alpha_1u_{t-1}^2 + \beta_1h_{t-1} + \gamma DP$$

where  $R_t$  and  $RX_t$  are respectively continuous returns of spot prices and proxy variable prices at time  $t$ ,  $u_t$  is an error term representing unexplained price changes and  $\Psi_t$  is the information set available at time  $t$ ,  $DP$  is the price limits dummy which takes value of 0 before the price limits changes and value of 1 after the price limits changes.

### 3.2 Data

During its 14 years operation, the HOSE has changed its price limits 10 times, which is disclosed in Tab. 1. It is interesting to note that there are 2 times where the price limits were significantly changed, 13/06/2001 and 27/03/2008. However, at 13/06/2001, there are only 5 stocks listed on the market. The small number of listed stocks during this period may cause bias in conclusion of this paper. Moreover, after 4 years, the price limits was changed again on 15/01/2013. Hence, to investigate the impact of price limits changes on the volatility of the Ho Chi Minh stock market, we will only focus on two times where the price limits noticeably changed, 27/03/2008 and 15/01/2013.

Tab. 1 - Price Limits Changes in the Ho Chi Minh Stock Exchange. Source: Own processing

No.	Date of change	Increased/decreased	Price limits
	<b>Expected</b>		<b>+/-5%</b>
1	28/07/2000	Decreased	+/-2%
2	13/06/2001	Increased	+/-7%
3	15/10/2001	Decreased	+/-2%
4	01/08/2002	Increased	+/-3%
5	23/12/2002	Increased	+/-5%
6	27/03/2008	Decreased	+/-1%
7	07/04/2008	Increased	+/-2%
8	16/06/2008	Increased	+/-3%
9	18/08/2008	Increased	+/-5%
10	15/01/2013	Increased	+/-7%

Following a study of Phylaktis et al. (1999), we comprises daily closing price of ten stocks which have the highest number of price limit hit for each examined time. Without directly detecting price hitting, we identify the occurrences of hitting prices by examining the daily open, low, high, and closing price of all stocks listed in one year after and before the price limit changes. The final samples for each period also cover a variety of sectors as given in Tab. 2.



Tab. 2 - Information on Individual Stocks. Source: Own processing

PERIOD 1			PERIOD 2		
Stock code	Abbreviation	Sector	Stock code	Abbreviation	Sector
LBM	A1	Construction and Material	DRH	B1	Real Estates
VIS	A2	Essential Resources	CYC	B2	Construction and Material
VTB	A3	Essential Resources	BGM	B3	Essential Resources
HTV	A4	Essential Resources	CIG	B4	Construction and Material
FPC	A5	Construction and Material	CLG	B5	Real Estates
TNA	A6	Foods-beverage	CCL	B6	Real Estates
HAX	A7	Car and accessory	CMG	B7	Information technology
MCP	A8	Goods-industrial services	ALP	B8	Goods-industrial services
SCD	A9	Foods-beverage	CNT	B9	Construction and Material
VPK	A10	Goods-industrial services	DHC	B10	Essential Resources

As discussed in the earlier section, it is required to eliminate market-wide effects on stock price fluctuation by introducing a proxy variable in the conditional mean equation. Since we will perform the test for each individual stock, the priority choice for proxy variable should be an industrial stock index. By doing so, the proxy variable could be able to efficiently reflect worldwide, domestic and industrial impacts on the stock market. However, there is no industrial stock index provided in Vietnamese stock market. Hence, we will conduct the Arithmetic Stock Price Average (ASPA), which was used in a study by Ryoo and Smith (2004), for all listed stocks for each sector. The ASPA of each sector will be used as a proxy variable in our model. Daily continuously compounded returns for the each stock and the ASPA are also calculated as  $R_t = 100 * \ln(P_t / P_{t-1})$  where  $P_t$  and  $R_t$  are respectively daily stock prices and returns. Additionally, to successfully capture the fluctuation of stock markets followed by the change in the price market, we apply testing window for 1 year before and after the price limits changing time.

## 4 EMPIRICAL RESULTS AND DISCUSSION

### 4.1 Statistical Descriptions

Tab. 3 and Tab. 4 respectively show descriptive statistics for 20 sample stocks returns in the two testing periods. It is interesting to note that the mean values of stock returns in both periods are negative. Mean values of period 1 exhibit higher negative values compared to those of period 2, indicating that a bigger loss of stocks during period 1. The conclusion is consistent with maximum and minimum values during the periods. Period 1 discloses higher negative minimum than those of period 2. However, the standard deviations of all stocks are indifferent during the periods. This surprisingly implies that the impact of the global financial crisis on the stock markets during period 1 is unable to confirm.

Besides, the Augmented Dickey-Fuller (ADF) unit root tests are used to examine the stationary property of all the series, 20 stocks and industrial variables as required by GARCH (1,1) model. The results from Tab. 3 and 4 specify that the null hypothesis of unit root is rejected at 1% level for all the series, meaning the data is stationary and hence appropriate for GARCH (1,1) model.

Tab. 3 - Summary Statistics of Daily Stock Returns for Testing Period 1. Source: Own processing

<b>Stock</b>	<b>Mean</b>	<b>Max</b>	<b>Min</b>	<b>Std. Dev</b>	<b>Skewness</b>	<b>Kurtosis</b>	<b>Jarque-Bera</b>	<b>ADF test</b>
<b>A1</b>	-0.088	5.510	-44.820	4.006	-2.700	31.195	17753.126	-17.199***
<b>A2</b>	-0.109	5.260	-37.870	3.705	-2.006	22.088	8195.542	-15.768***
<b>A3</b>	-0.316	8.960	-16.860	2.862	-0.341	4.576	63.538	-13.420***
<b>A4</b>	-0.223	6.570	-40.550	3.790	-2.264	25.966	11803.615	-19.170***
<b>A5</b>	-0.102	5.700	-38.080	3.344	-2.831	33.516	20750.359	-18.235***
<b>A6</b>	-0.146	9.450	-7.140	3.132	0.098	2.003	22.247	-19.038***
<b>A7</b>	-0.184	7.710	-35.670	3.654	-1.745	18.566	5481.887	-19.525***
<b>A8</b>	-0.175	8.420	-17.440	3.235	-0.239	3.345	7.487	-19.712***
<b>A9</b>	-0.209	5.130	-5.590	2.913	-0.017	2.114	16.923	-17.494***
<b>A10</b>	-0.192	4.880	-11.060	2.940	0.026	2.455	6.456	-16.937***

\*\*\* Reject the null hypothesis that the series have unit root at 1% level.

Tab. 4 - Summary Statistics of Daily Stock Returns for Testing Period 2. Source: Own processing

<b>Stock</b>	<b>Mean</b>	<b>Max</b>	<b>Min</b>	<b>Std. Dev</b>	<b>Skewness</b>	<b>Kurtosis</b>	<b>Jarque-Bera</b>	<b>ADF test</b>
<b>B1</b>	-0.007	7.410	-7.410	3.490	-0.024	2.011	21.131	-19.547***
<b>B2</b>	0.114	8.460	-7.200	3.439	-0.095	2.319	10.764	-20.282***
<b>B3</b>	-0.029	7.280	-7.230	3.310	0.023	1.829	29.562	-20.024***
<b>B4</b>	-0.051	6.670	-7.150	3.134	-0.071	1.973	23.181	-20.787***
<b>B5</b>	-0.056	6.740	-15.080	3.561	-0.197	2.869	3.726	-17.727***
<b>B6</b>	-0.187	6.320	-7.230	2.851	-0.045	2.417	7.484	-21.129***
<b>B7</b>	-0.051	6.740	-7.060	2.817	-0.160	2.632	5.129	-22.315***
<b>B8</b>	-0.119	6.770	-7.260	3.310	-0.244	2.418	12.411	-22.624***
<b>B9</b>	-0.166	6.740	-7.150	3.369	-0.035	2.122	16.730	-21.851***
<b>B10</b>	0.093	6.710	-7.230	3.221	-0.094	2.673	3.061	-23.243***

\*\*\* Reject the null hypothesis that the series have unit root at 1% level.

## 4.2 Empirical Results

Tab. 5 presents GARCH (1,1) estimated results for the period 1. During the period, all of the proxy variable coefficients are statistically significant at 1% level, meaning that the industrial variables are highly correlated to the stock returns. This also strongly indicates that using ASPA value of each industry as the proxy variables are appropriate for our purpose of filtering the other effects in the market. By considering the coefficients of the conditional variance equation, except for the constant, most coefficient of  $\alpha_1$  and  $\beta_1$  are statistically significant at 1% level, confirming the presence of significant GARCH effects.

Besides, it is noticeable that seven testing stocks exhibit statistically significant coefficient of price limits dummy ( $\gamma$ ), implying the changing in stock volatility before and after the price limits change. Hence, it is reasonable to conclude that the price limits change at 27/03/2008 has material effect on the stock price volatility. Another point to note is that most of the coefficients ( $\gamma$ ) have negative values. The negative values of ( $\gamma$ ) may present that the stock volatility was decreased after the price limits was decreased to +/- 1%. In other words, price limit change is likely to stabilize the stock volatility. This finding is consistent to argument of the overreaction hypothesis of price limits.

It is moreover interesting to observe that, among 7 stocks which exhibit the effect of price limits change, three stocks are classified in Essential resource sector. The other 4 stocks belong to Construction and material, Car and accessory, Food and beverage sector. Unfortunately, the paper findings are not sufficient to conclude whether the price limits changes has different affect on the stocks of different sectors. Further investigations are required to deal with this concern.

Tab. 5 - GARCH (1,1) Results for Period 1. Source: Own processing

Stock	$\alpha_0$	$\alpha_1$	$\alpha_0$	$\alpha_1$	$\beta_1$	$\gamma$
<b>A1</b>	- 0.0509 (0.1200)	0.6765*** (0.0391)	1.9065** (0.7486)	0.4667*** (0.0866)	0.5220*** (0.1079)	- 0.9681** ( 0.4641)
<b>A2</b>	0.1824 (0.1175)	0.5110*** (0.0214)	9.1050*** (1.6121)	0.8490*** (0.1281)	- 0.0103 (0.0197)	- 6.1732*** (1.5828)
<b>A3</b>	- 0.4293*** (0.1278)	0.0970*** (0.0128)	9.4894*** (1.0326)	0.1974** (0.0887)	- 0.2194** (0.1087)	- 2.0806** (0.9010)
<b>A4</b>	- 0.3625*** (0.1150)	0.2306*** (0.0290)	4.0010*** (1.4448)	0.3816*** (0.0919)	0.5311*** (0.1219)	- 3.4141*** (1.1929)
<b>A5</b>	- 0.0939 (0.1091)	0.3394*** (0.0313)	1.4671*** (0.4963)	0.5411*** (0.0759)	0.3866*** (0.0934)	0.4306 (0.4201)
<b>A6</b>	0.1114 (0.1041)	0.9732*** (0.0619)	0.0070 (0.0154)	0.0034 (0.0076)	0.9881*** (0.0064)	0.0718*** (0.0111)

<b>A7</b>	- 0.0009 (0.0948)	0.8514*** (0.0225)	1.9919*** (0.3783)	0.4436*** (0.0498)	0.3415*** (0.0443)	- 0.5675* (0.3402)
<b>A8</b>	0.0222 (0.1080)	0.7162*** (0.0541)	1.4843** (0.6060)	0.2146*** (0.0595)	0.6398*** (0.0950)	- 0.5747 (0.3500)
<b>A9</b>	0.0003 (0.1011)	0.7821*** (0.0564)	0.1520 (0.0986)	0.0912*** (0.0317)	0.8782*** (0.0422)	0.0698* (0.0765)
<b>A10</b>	- 0.1146*** (0.0752)	0.7073*** (0.0330)	0.6666*** (0.2161)	0.3860*** (0.0921)	0.5445*** (0.0774)	- 0.066 (0.1694)

Note:\*\*\*, \*\*, \* indicate statistical significance at the 1% , 5%, and 10% levels, respectively. Numbers in the parentheses are standard errors

Tab. 6 represents the estimated results for period 2. In parallel with the results of period 1, coefficients of proxy variables exhibit the appropriateness in the model. The parameters  $\alpha_1$  and  $\beta_1$  also have statistically significant coefficients at 1% and 5% level, except for B1, B3, and B4 stock. This indicates the presence of GARCH effect during this period. Nevertheless, if the period 1 results strongly confirm the impact of price limits change on the stock volatility, the impact of price limits change is not observed in the period 2. All coefficient of price limits dummy ( $\gamma$ ) are noted with insignificant values during this period.

The inconsistency in the effect of price limits change found in the two periods is explainable. During the first period, the stock market was believed to be strongly affected by the global financial crisis during the year of 2008. Under this extreme market scenario, the HOSE has significantly decreased the price limits from +/-5% to +/-1%. This change was helpful to cool-off the market, causing a decrease in the stock volatility during the later period. Alternatively, after over 4 years since the last change of price limit on 18/08/2008, the price limit was changed again from +/-5% to +/-7% on 13/01/2013. However, the investors were not as sensitive to the change as previous time, reflected by the insignificant coefficient ( $\gamma$ ) of all testing stocks.

Tab. 6 - GARCH (1,1) Results for Period 2. Source: Own processing

<b>Stock</b>	<b><math>\alpha_0</math></b>	<b><math>\alpha_1</math></b>	<b><math>\alpha_0</math></b>	<b><math>\alpha_1</math></b>	<b><math>\beta_1</math></b>	<b><math>\gamma</math></b>
<b>B1</b>	- 0.0201 (0.1430)	0.1338*** (0.0475)	3.0500 (2.1840)	0.1977* (0.1042)	0.4555 (0.2994)	2.1032 (1.8027)
<b>B2</b>	- 0.0707 (0.1422)	0.0132 (0.0328)	0.1994*** (0.0633)	0.0832*** (0.0314)	0.9014*** (0.0317)	0.0707 (0.1644)
<b>B3</b>	- 0.0903 (0.1336)	0.5498*** (0.0729)	7.1403 (7.3516)	0.0986 (0.0863)	0.1889 (0.7575)	- 0.8893 (1.6768)
<b>B4</b>	- 0.0923	0.0749**	3.2488	0.1105	0.5411	0.2853

	(0.1396)	(0.0375)	(3.5854)	(0.0988)	(0.4314)	(0.8878)
<b>B5</b>	- 0.1763	0.2462***	0.7343	0.1212**	0.8075***	0.2101
	(0.1438)	(0.0473)	(0.4684)	(0.0520)	(0.0793)	(0.2778)
<b>B6</b>	- 0.1903	0.0918**	0.7677*	0.1584***	0.7476***	- 0.0263
	(0.1173)	(0.0393)	(0.4545)	(0.0577)	(0.0965)	(0.2212)
<b>B7</b>	- 0.0421	0.0017	1.0691	0.1224**	0.7228***	0.2882
	(0.1164)	(0.0133)	(0.705)	(0.0594)	(0.1389)	(0.3184)
<b>B8</b>	- 0.0578	0.0941***	0.5694*	0.1697***	0.7663***	0.2433
	(0.1208)	(0.0327)	(0.3360)	(0.0619)	(0.0788)	(0.2837)
<b>B9</b>	- 0.2339*	0.1448***	2.8988	0.1558**	0.5704**	0.1668
	(0.1389)	(0.0377)	(2.0109)	(0.0759)	(0.2240)	(0.7119)
<b>B10</b>	0.0217	0.0787	0.9905*	0.1176**	0.7505***	0.7935
	(0.1349)	(0.0613)	(0.5800)	(0.0533)	(0.1146)	(0.5793)

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Note:\*\*\*, \*\*, \* indicate statistical significance at the 1% , 5%, and 10% levels, respectively. Numbers in the parentheses are standard errors

## 5 CONCLUSIONS

The study has examined the impact of price limits on the stock returns volatility in the Ho Chi Minh stock exchange. The estimated results of GARCH (1,1) model suggests that the stock return volatility seems to be lower after the price limits is decreased in the first period. The conclusion is derived from the significance of price limits dummy in 7 out of 10 sample stocks. However, during the second period, an increase in price limits has no significant effect on the stock return volatility. The findings strongly indicate that the implementation of new price limit only affect the stock return volatility during the extreme market scenario. The conclusion strongly supports the overreaction hypothesis of price limits. During this period, a decrease of price limit effectively helped to calm the investors and cooled off the market. As the result, the volatility was significantly decreased and the market was recovered. Conversely, the price limit change under normal market condition seems to have no impact on the stock market and the stock volatility was driven by other market factors.

Nevertheless, the study is sustained with several limitations. Firstly, the study drawn the conclusion regarding the impact of price limits on the stock returns volatility by only investigating the 10 stocks which usually experience limit-hits as suggested by Phylaktis et al. (1999). Therefore, it is questionable if the conclusion would change with an increase of the sample. Besides, the findings are unable to clarify if stocks in different industries may react differently to the change in price limits. Due to these limitations, further investigations are required in order to deal with those concerns by which could provide more information about the effect of price limits on stock volatility.

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## **COMPARISON OF MANAGERIAL IMPLICATIONS FOR UTILIZATION OF VARIABLE COSTING AND THROUGHPUT ACCOUNTING METHODS**

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### **Abstract**

Variable costing (VC) and throughput accounting (TA) are methods frequently used for decisions affecting product mix. Both methods feature some similarities in data processing, but they are applied in different situations. The VC method is preferred in situations when product mix decisions are based on maximizing a product's contribution margin, while TA depends on maximum utilization of resource constraints. Both take a different approach to variable costs, which are assigned to individual products. While TA conceives of total variable cost in the meaning of absolute variable cost, VA accepts the maximum level of variable cost.

The objective of the study presented herein is to analyze the differing approaches of the VA and TA methods to cost variability and any consequent managerial implications. Adhering to a different approach to variable costs could result in a variety of product mix decisions. Such distinctions between the methods are given, through the analysis of several examples, and the authors' final conclusions on making effective product mix decisions are deduced.

*Keywords: variable costing, throughput accounting, TOC, cost behavior, cost variability*

JEL Classification: M10, M49

## **1 INTRODUCTION**

Businesses today have to face increasing challenges from competitors relating to time and quality. A company simply could not survive unless it capitalized on competitive advantages gained through providing high quality products and services in a shorter throughput time and with quicker inventory turnover. (Rahman, 1998)

The relevance of cost information to managerial decision-making has been a central issue in cost accounting for the past 100 years. Decision-making is the most important objective of a cost accounting system. (Boyd and Cox, 2002)

The aim of this paper is to compare two approaches - throughput accounting and variable costing - and their impact on decisions affecting the structure of production. These methods are very similar in many ways, but instigating them highlights the major impact they make on decisions concerning production structures. This study applies these methods to the same product structure, mainly focusing on the influence of accuracy and details of cost allocation (according to their variability) when judging the prioritization of individual products.

## **2 LITERATURE REVIEW**

Throughput accounting (TA) is based on the concepts of TOC and is implemented in management accounting (Waldron and Galloway, 1988). Throughput accounting has been designed to inform decisions that boost the profitability of an organization and to accommodate assigning responsibility for those decisions. This is because throughput



accounting ensures transparency and visibility of the underlying data and principles on which decision-making rests (Ruhl, 2000).

Variable costing is an inventory costing method that only applies variable production costs to a product; under this method, a fixed factory overhead is not assigned to the product. Typically variable production costs are direct material costs, direct labor costs and variable overhead costs. (Horngren and Sorter, 1961) From a variable costing perspective, fixed costs are generally considered to relate to a period of time, i.e. they are period costs (Green, 1960). Many fixed costs can be viewed as typically representing resources that provide productive capacity for a period of time (McFarland, 1966). If, during an accounting period, the given capacity is not fully utilized, then some of the fixed costs represent costs of such idle capacity (Fess and Ferrara, 1961).

Noreen according to Goldratt stated that traditional accounting proved reasonably accurate when direct labor was variable and there was little overhead. However, labor is now termed a fixed cost and has become a large part of total cost. (Noreen, 1995) A number of authors claim that TOC is useful only in the short-term, while other accounting methods are more suitable for informing long-term decisions. (Kee and Schmidt, 2000, Graves and Gurd, 1998; Dugdale and Jones, 1997; Holmen, 1995) Applying TOC can be useful in other management areas such as purchasing, quality management or information management. (Rahman, 1998)

Balderstone and Keef (1999) reported that many authors highlight that throughput is defective to the degree that it ignores other variable costs, and the debate on its use is misguided in addition to being based on incorrect specifications. They claim that there may be situations where direct materials are not true variable costs, thus adversely affecting the throughput measure. Some feel there is little or no difference in throughput and contribution margin (Balderstone and Keef, 1999; Tollington, 1998).

Table 1 describes the basic characteristics of direct costing and the theory of constraints.

Tab. 1 – Basic characteristics – direct costing, the theory of constraints. Source: Boyd and Cox, 2002, Dugdale and Jones, 1998

<b>Cost system</b>	<b>Basic characteristics</b>
<b>Direct costing</b>	<ul style="list-style-type: none"> <li>• Fixed overhead is not allocated to products</li> <li>• Product costs consist of direct labor, direct material, and the portion of overhead that varies with the units produced</li> <li>• An inventory is understood as an asset</li> <li>• Contribution per unit: selling price less direct labor, direct material and variable overhead</li> </ul>
<b>Theory of constraints</b>	<ul style="list-style-type: none"> <li>• No concept of product cost</li> <li>• Throughput is defined as the price of a unit less the raw material and other costs that vary for each unit of production</li> <li>• All costs other than raw material costs and any other costs that vary for a unit of production are considered an operating expense</li> <li>• An inventory is understood as a liability that binds money</li> <li>• Throughput per unit of the constraint: selling price less raw material cost, divided by units of the constraint used in making the product</li> </ul>

It is necessary to realize that costs need to be discerned as either variable (linked to load capacity) or fixed (independent of load capacity). How the Wagner (2012) states, in the vast

majority of the literature is the issue of variability of costs examined only from the perspective of a relationship quantities for which the volume is considered performance (outputs). Volumes of output as the fundamental cost driver, however, individual professional sources usually further specify. Indeed, part of such a fixed cost can have a proportional character by maintaining continuity (e.g. costs associated with a charge for production). As Zamecnik (2014) states, when implementing the method of allocating indirect costs, it is necessary to keep in mind a very important rule, i.e., that it is necessary to distinguish between total indirect costs actually related to the given activity and part of indirect costs – can be specified as eligible indirect costs. For example, it is possible to distinguish costs united with the dose and its level that change in accordance with the quantity of doses, but that remain fixed in connection with individually produced units or products. As Weil states, costs can be controllable or uncontrollable. The success of a responsible accounting system depends on the ability of the company to correctly identify which costs each level of management can control. (Weil and Maher, 2005) The next possibility is to distinguish costs related to a group of products or services. Discussion could continue on such enumeration of variability, for example, through costs, their formation being induced by specific customers and the individual attitude to the same (e.g. in marketing, support from customers, and so on). It is also possible to evaluate the variability of costs in terms of the influence of time.

Knowledge of cost behavior is very important, especially for decision-making. Balakrishnan (2014), however, emphasizes that virtually every firm has some resources whose adjustment costs are sufficiently large to preclude capacity adjustments in the short-run (e.g., a year, which is the usual time period chosen). Weiss (2010) proposed the following: results indicate that firms with stickier cost behavior obtain less accurate earnings forecasts by analysts than firms with less sticky cost behavior. Activity or volume may be measured in terms of units of production or sales, hours worked, distance traveled or any other appropriate measure of the activity of an organization. For each decision taken, the management of a company requires estimates of costs and revenues at different levels of activity for alternative courses of action (Drury, 2004). Meanwhile the behavior of the costs and any subsequent decision depends on the cost driver. This also highlights Rajnoha (2011), adding that for detailed cost management could be further also use methods such as Activity Based Costing, Target Costing, Kaizen Costing and many others, which are based on the detailed calculations according to cost activities and processes.

### **3 METHODS**

The behavior of cost, from the perspective of its variability, is crucial for informing **managerial decisions**. Naturally, it is also necessary to apply appropriate costing methods and procedures.

Traditionally, two different product costing systems are defined – process costing (e.g. via traditional absorption costing) and alternative variable costing. These two major costing approaches differ from one another in the degree of costs assigned to the cost object. A widely utilized method is the traditional absorption full-costing procedure (job-order costing). Currently, this simple model denotes overhead rates as costs allocated (most commonly), although this would appear insufficient, as significant inaccuracies arise in the assignment of overheads costs. These inaccuracies can be eliminated by using costing methods based on partial cost absorption.

The authors of this study have performed a number of follow-up surveys in the past, which focused on cost management and the utilization of different calculation methods adopted by manufacturing firms in the Czech Republic. One of the objectives of this research was to find

out how the companies worked with costs (especially overheads) and how they performed their allocation of various cost objects. The last survey was conducted in 2014 as a lead-in to a quantitative research project – “Variability of cost groups and its projection in the costing system in manufacturing enterprises”.

Such research led to conclusions that the authors reported in an article comparing two methods which did not allocate all costs. These methods are frequently applied so as to aid decisions on product mix - variable costing (VC) and throughput accounting (TA).

In order to present the differences between the individual methods that assist decision-making on product mix, it is possible to demonstrate these through providing a model portfolio of four products. The authors registered, for each product, lead time as limiting the input factor, the price, absolute variable cost (TVC), and other variable costs (OVC). These costs were also recalculated, by the relative percentages, in relation to the selling price of products. As can be seen in Table 2, these parameters for individual products differ from each other and it is possible to examine and compare the impact of calculation methods specified for managerial decision-making. Furthermore, the process of optimizing the production portfolio was conducted due to the limited overall production time, using the variable costing and throughput accounting methods. It was based on indicators of contribution margin, throughput and their share of the limited factor of lead time. These indicators determined classification of the benefits of products. Finally, the overall effects were determined (total contribution) resulting from the proposed product mix.

## **4 RESULTS**

Surveying the current level of knowledge in this field clearly reveals that constant change and development occur in the business and economic environment; hence companies require new approaches to constantly assess costs and their variability. Obviously, the more accurate the determination of the variability costs, the more possible it is, and it supports their recognition by appropriate calculation methods. Companies very often lack sophisticated tools for proper identification and allocation of costs, which explains why they are not properly factored into the price of products. Supporters of Activity-Based Costing espouse that all costs are variable over the long-term. The Activity-Based model captures this variability by assigning costs to products in proportion to the expected long-term demand of each product for costly resources. Nevertheless, there are proponents of the Theory of Constraints, who take a very short-term perspective and assume that the costs of most resources are fixed and inescapable. This means that the TOC model usually only assigns variable material costs to products while seeking to optimize throughput (i.e. the contribution margin) on the fixed resource capacities that constrain the overall system. (Novák and Popesko, 2014)

From the research carried out, it was found out that companies use calculations pertaining to partial allocation of costs in approximately 25% of cases. This was also confirmed by recent research, through utilizing the afore-mentioned calculation methods, as occurring in 34% of cases. Consequently, comparison is required of variable costing (VC) and throughput accounting (TA). The following table shows the basic data model example, thereby demonstrating the major differences in decision-making on various cost allocations. For this example, the authors wish to simply by selecting just four types of products - A to D, which vary in their method of manufacture. It can be assumed that the manufacturing process differs in length of production time, thus labor content. Additionally, it is presumed that production time is a limiting factor, with 210,000 minutes given over to production for the period in total.

Tab. 2 – Basic data – lead time, price and cost of products. Source: own

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
<b>Lead time (LT) (min per unit)</b>	12	20	80	10
<b>Price (P)of unit (CZK)</b>	250	400	1200	150
<b>Direct material (TVC)</b>	110	300	600	30
<b>Other variable costs (OVC)</b>	50	40	200	100
<b>TVC portion (of price)</b>	44%	75%	50%	20%
<b>OVC portion (of price)</b>	20%	10%	17%	67%

\*TVC = absolute variable cost

The basis for evaluating the effectiveness of products A to D by using variable costing is determining the contribution margin (c) as the difference between price and variable costs (note: variable cost = TVC+OVC).

$$c = P - VC$$

A crucial factor for throughput accounting is the difference between price and absolute variable costs (TVC).

$$tp = P - TVC$$

Tab. 3 – Comparison of contribution margin (c) and throughput (tp) of products Source: own

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
<b>c (CZK per unit)</b>	90	60	400	20
<b>tp (CZK per unit)</b>	140	100	600	120
<b>rank by c</b>	2 <sup>nd</sup>	3 <sup>rd</sup>	1 <sup>st</sup>	4 <sup>th</sup>
<b>rank by tp</b>	2 <sup>nd</sup>	4 <sup>th</sup>	1 <sup>st</sup>	3 <sup>rd</sup>

The first option for management decisions is to determine the order of profitability of the product, either according to contribution margin or according to throughput. The table shows that the most profitable product is product C, which shows the highest absolute contribution margin and throughput value. The second is product A, which is somewhat similar to C. The greatest difference pertains to products B and D. Due to the substantially varying other variable costs, the ranking of the products in the methods is reversed. As can be seen, the OVC portion of product D is about 67% of the price, while it is only 10% for product B. In this situation the manager would have to consider, according to which criteria will be for example put products into production process, whether to adhere to the figure of the contribution margin or throughput.

Continuing on, it is necessary to consider which criteria should inform decision-making. Since the products are not equivalent from the viewpoint of labor, it is desirable to evaluate them based on relative values linked to a limiting factor, therefore comparing:

$$c/LT \text{ and } tp/LT$$

From Table 4, it is evident totally different results are obtained in the relative expression of c and tp, which also dramatically alters the order of the products informing such a decision-making process. When deciding on product order based on c/LT, it seems the best product would be A, and product D the least advantageous. Conversely, according to tp/LT, the

evaluation is for D as the best product, exactly the opposite compared to assessment following c/LT. The least advantageous would then seem to be product B.

Tab. 4 – Comparison of relative contribution margin and throughput. Source: own

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
<b>LT (min per unit)</b>	12	20	80	10
<b>c</b>	90	60	400	20
<b>tp</b>	140	100	600	120
<b>c/PT</b>	7.5	3.0	5.0	2.0
<b>tp/PT</b>	11.7	5.0	7.5	12.0
<b>rank by c</b>	2 <sup>nd</sup>	3 <sup>rd</sup>	1 <sup>st</sup>	4 <sup>th</sup>
<b>rank by tp</b>	2 <sup>nd</sup>	4 <sup>th</sup>	1 <sup>st</sup>	3 <sup>rd</sup>
<b>rank by c/LT</b>	1 <sup>st</sup>	3 <sup>rd</sup>	2 <sup>nd</sup>	4 <sup>th</sup>
<b>rank by tp/LT</b>	2 <sup>nd</sup>	4 <sup>th</sup>	3 <sup>rd</sup>	1 <sup>st</sup>

Now this begs a question: what do these approaches mean with a view to the overall effect on the company? For consideration, there might also be the possibility of production due to market demand (see Table 5, row 2). It is evident that to supply a quantity thus demanded, total installed capacity would be exceeded (see total LT, row 3; 260,000 minutes of manufacture would be needed, but the limit is only 210,000 minutes). This would represent the need to make a managerial decision on setting the product mix. The question is, however, which calculation method should be used to make a good decision? The following table illustrates the overall contribution of product mix adjusted according to individual methods and criteria.

Tab. 5 – Design of product mix according to variable costing or throughput accounting  
Source: own

<b>1</b>		<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>Total PT (min)</b>	<b>TCM (CZK)</b>
<b>2</b>	<b>total demand (pcs)</b>	5,000	4,000	500	8,000		
<b>3</b>	<b>LT (min)</b>	60,000	80,000	40,000	80,000	260,000	
<b>4</b>	<b>production based on c (pcs)</b>	5,000	4,000	500	3,000	210,000	<b>26,800,000</b>
<b>5</b>	<b>production based on tp (pcs)</b>	5,000	1,500	500	8,000	210,000	24,800,000
<b>6</b>	<b>production based on c/LT (pcs)</b>	5,000	4,000	500	3,000	210,000	<b>26,800,000</b>
<b>7</b>	<b>production based on tp/LT (pcs)</b>	5,000	1,500	500	8,000	210,000	24,800,000

\* TCM = total contribution margin

In this case, managers would have to decide which products and the amounts of these they should produce to achieve the greatest effect. Rows 4 - 7 show a model of setting a product mix based on the order of products from Table 4. In all cases it would be necessary to eliminate part of the production of one product by the maximum possible capacity. In the case of setting production by variable costing (rows 4 and 6), products A – C are fully included in production, but capability would be limited to producing only 3,000 pieces of product D (although demand outstrips this at 8,000 pieces). Should managers set the product mix based on the order specified by throughput accounting, the decision would be to fully produce

products C, A and D, although product B would be restricted to 1,500 pieces (compared to a potential 4,000 pieces). The total effect is expressed in the column labeled TCM. Here it is evident that settling on a product mix based on the order derived from variable costing would bring a greater overall effect in the form of a higher total contribution margin – 26.8 million CZK, compared to 24.8 million CZK resulting from throughput accounting.

## **5 DISCUSSION AND CONCLUSION**

The example given above is not intended to determine which calculation method is more suitable for a company. The aim is to point out the importance of properly allocating costs and forming opinions based on relevant information. The above example clearly shows the need for more detailed cost allocation. In the case of throughput accounting, only the allocation of direct costs would seem insufficient for effective decision-making. Comparing this with the variable costing method, this appears more appropriate as it also allocates other variable costs. Despite these disadvantages, however, frequently manufacturing companies only allocate absolute direct costs - direct material, even when using standard variable costing.

Needless to say, the advantage of this approach is the simplicity to assign merely the cost of direct materials, which are usually accurately recorded in relation to defined products. Companies thus avoid possible problems arising from improper allocation of costs of other groups – e.g. the allocation of salaries in manufacturing. Hence they work with the throughput indicator (i.e. the price minus absolute direct costs) and determine its relative amount in relation to the quoted price of the product, which should be sufficient to cover other costs (other variable costs and overheads). However, as illustrated by the model above, decisions on the basis of throughput could lead to incorrect setting of the product mix. Consequently, the company might well experience reduced profit.

Therefore, important factors relating to this would be detailed allocation of costs and determining other variable costs that significantly affect the efficiency of individual products (see other variable costs of product B and D in Table 1).

### **Other variable cost**

A certain degree of uncertainty in direct and clear allocation of these costs plays a large role in the frequent absence of allotting other variable costs. In other words, it is a challenge even considering which costs should be included. For example, labor cost cannot be clearly identified as direct. Would it be worthwhile looking for a link which could describe labor cost as absolutely direct? In fact, only one single case exists where workers were strictly rewarded by piecework pay for labor, which would preclude the possibility of a worker being rewarded at all (even if earning reduced wages), but is also relevant if performance was limited (e.g. due to lack of orders and reduced production at the company). Another could lie, for example, in the character of production, where automation and robots work would become a more indirect factor due to actual physical work by employees being replaced by servicing activities – by machine operators. In such cases it is hard to look for a strictly direct relationship to production. Under circumstances like these, such costs can be considered variable, because they correspond to the volume of production, although they cannot be considered as strictly direct. Even more striking is the case of production executives, who do not participate directly in the actual production of individual units – effectively being the masters overseeing production.

The same may also be true with other costs which can be categorized as other variable cost, such as excipients in production, e.g. lubricants, auxiliary tools, etc. Not least there is also the

figure for costs which can be described as "variable production overheads", relating to things such as electricity (for operating factory premises), heating costs, cleaning services, and so on. All of these costs need to be accordingly assigned to their individual performances, which can sometimes be difficult or inaccurate.

Furthermore, as product costing research in Europe shows, a significant proportion of units using a direct labor-based overhead rate (either direct labor cost or direct labor hour rates) or other volume-based overhead rates (e.g. machine hour, material cost, units produced and production time-based rates) have been applied extensively (Brierley et al., 2001) Many firms are likely to incur overheads driven by direct labor hours, and hence it is not surprising that researchers have found direct labor being used as a basis for assigning overheads to products. However, given the relatively low proportion of product costs that are made up of direct labor costs, it is perhaps surprising to see that it is the most commonly used overhead rate. Simply using a labor-based overhead rate for allocating production overheads can lead to problems relating to inaccurate direct allocation to a unit in the case of automated production.

The problem described above demonstrates that using calculations which only allocate absolute direct costs (direct material) for informing the decision-making process is insufficient, revealing the importance of understanding cost behavior and its proper projection in calculation systems. The more detail determined in the variability of costs (as a consequence of various factors and not merely volume of production), the more reliable information one obtains to aid subsequent decisions – on the product mix, pricing of products, production capacity utilization, and so on. Hence, it is apparent that the variability of costs is of utmost importance and indicates the need for further research in this area.

### **Acknowledgements**

This paper is one of the research outputs of the project GA 14-21654P/P403 “Variability of cost groups and its projection in the costing system in manufacturing enterprises” registered at the Czech Science Foundation.

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## **HOW BRAND-ORIENTED CULTURE AND ENTREPRENEURIAL ORIENTATION INFLUENCE FINANCIAL SERVICES SMEs FINANCIAL PERFORMANCE? AN EMPIRICAL STUDY**

*Christian Nedu Osakwe, Benson U. Ogbonna*

### **Abstract**

This paper is aimed at examining the interplay between brand-oriented culture, entrepreneurial orientation, workforce motivation and the financial performance of SMEs in a selected services sector, that of the financial services industry and in the context of a Sub-Saharan African economy. The contributions of this article to the fledgling SMEs marketing literature are threefold. First, we show that a brand-oriented culture is positively associated with a service-oriented enterprise financial performance. Second, we provide empirical support that workforce motivation is a direct antecedent of both entrepreneurial orientation and financial performance of this set of service-oriented SMEs. Third, we show that the complementarity of brand-oriented culture and entrepreneurial orientation is a key predictor of SMEs financial performance. Our study equally shows that in terms of relative strength, the complementary effect of brand-oriented culture and entrepreneurial orientation exceeds the individual effects of both on SMEs financial performance. Arguably, ours is the first quantitative study to report this particular finding in the SMEs marketing literature. More importantly, we have offered some strategic insights that could help deepen practitioners' understandings on how they could go about unlocking more marketing opportunities in the marketplace and ultimately become more financially successful in a rapidly changing business environment that is fuelled in part by ongoing technological advances, changing consumers' preferences, and hypercompetition.

*Keywords: brand-oriented culture, entrepreneurial orientation, financial performance, financial services SMEs, Nigeria, workforce motivation*

JEL Classification: C00, L1, L2, L80, M30, M31

### **1 RESEARCH BACKGROUND AND SIGNIFICANCE OF STUDY**

Globally, financial services firms are facing more intense competition both within and outside their industry (Crittenden, Crittenden, & Crittenden, 2014). At the same time, relevant stakeholders are increasingly becoming more demanding about the financial transparency and performance of these firms in the aftermath of the recent global economic meltdown. Be that as it may, the focus of this study is not on large financial service providers but rather on SMEs in this sector with a particular focus on whether or not brand-oriented oriented culture and entrepreneurial orientation have direct consequences on the financial performance of these enterprises in the context of an 'emerging' market that is situated in the African continent. This paper is further grounded in the resource-based theory (RBT) of the firm which largely posits that the competitiveness of a firm stems from having the right mix of intangible marketing resources such as market orientation, entrepreneurial orientation, management capability, learning orientation, and brand-oriented culture (Barney, 2001; Jaworski & Kohli, 1993; Urde, 1994).

More specifically, this research is premised on the need to provide a better understanding on how the interplay of brand-oriented culture, entrepreneurial orientation and possibly their

complementarity impact upon the financial performance of SMEs using the Nigerian financial services industry as our empirical evidence. Additionally, we explore the interplay between workforce motivation, entrepreneurial orientation and the financial performance of these enterprises. In a way, this research responds to the call in Laukkanen et al. (2013) for further empirical investigation on how brand-oriented culture can indeed impact on the performance of SMEs. More so, the authors apparently suggested that entrepreneurial orientation is an antecedent of brand-oriented culture. Thus, we sought to further investigate if entrepreneurial orientation is a driver of brand-oriented culture in the context of SMEs in a service sector that is highly competitive in the country of study, but less ‘sophisticated’ when compared with what is obtainable in most advanced economies.

By and large, this paper will enrich the inchoate SMEs marketing literature by providing deep insights on how the mix of some strategic orientations could be of benefit to SMEs financial performance in a marketplace that is constantly driven by changing consumers’ preferences, hypercompetition and technological innovations. To the best of our knowledge, this is arguably the first study of its kind in Anglophone West Africa and similar developing countries that seek to model these impacts on the financial performance of financial services enterprises using the Partial Least Squares (PLS) approach to causal modelling. Thus, we can state that this work contributes appropriately to the methodological applications of PLS-SEM in the SMEs marketing literature.

So to recapitulate, primarily the main objective of this paper is to cast some light on the role that a brand-oriented culture either implicitly or explicitly role plays in enhancing the financial performance of small and medium-sized financial enterprises in Africa’s largest commercial hub, Nigeria. A quick recap of the study’s sub-objectives have been itemized below:

- [1] To empirically investigate whether or not entrepreneurial orientation is an antecedent to a brand-oriented culture in financial services SMEs;
- [2] To empirically investigate and establish the relationship between brand-oriented culture and financial performance of financial services SMEs;
- [3] To demonstrate the complementary effect of entrepreneurial orientation and brand-oriented culture on financial performance of the SMEs; and
- [4] To an extent explore the dominant role that workers’ motivation play to the realization of a firm’s financial well-being and entrepreneurial orientation.

This paper is further structured as follows. In the next section, we provide a conceptual framework of the study with hypotheses while the subsequent section covers the research design, data collection and data analysis. In the last but not the least section, we painstakingly provide discussion of the research findings, implications, limitations and possible future research directions.

## **2 CONCEPTUAL FRAMEWORK AND HYPOTHESES FORMULATION**

The conceptual framework of this research paper as well as its associated hypotheses is depicted in Figure 1.

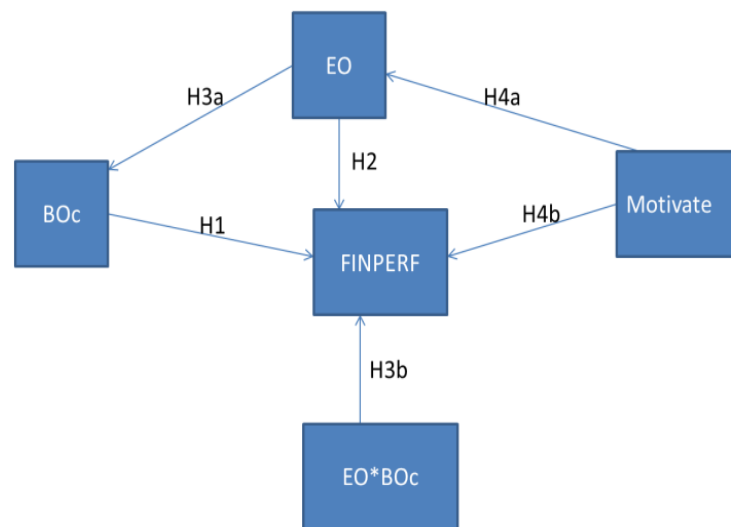


Fig. 1 – Theoretical Model. Source: Authors’

Extant literature has it that a firm’s brand-oriented culture, entrepreneurial orientation likewise workforce motivation underpin the market and financial success of the firm in the marketplace. These three main concepts are deeply rooted in the marketing field and some marketing scholars (Hudson, Smart & Bourne, 2001; Otubanjo, 2011; Urde, Baumgarth & Merrilees, 2011) assert that these are strategic resources that are capable of making a firm ‘easily’ stand out from the rest of the competition.

A firm’s brand-oriented culture is rooted in the understanding that the firm’s internal business processes, marketing activities, and its communication with relevant stakeholders uniformly conform to a unique identity in the marketplace (Urde et al., 2011). In fact, as Urde (1994) puts it, a firm’s brand-oriented culture should be seen as a strategy for survival since this will distinguish the firm from the rest of the pack. Thus, the concept of brand-oriented culture encompasses the full spectrum of enterprise business activities, marketing strategies, and relationship-building with stakeholders, particularly customers. Enterprises with a high brand-oriented culture are perceived to be enterprises that are focused on building a strong brand name and carving a niche for itself in their target market(s). Narrowing it down further to the SMEs context, the main question would be this-is a brand-oriented culture relevant for these enterprises to compete in the marketplace? Indeed, there is a dearth of scholarly literature dealing with SMEs branding. Nonetheless, a recent study appears to show that brand-oriented culture (BOc) is positively associated with SMEs brand performance and market performance (Laukkanen et al., 2013). Against this background, we propose that:

***H1: BOc positively influences SME financial performance.***

Moving forward, prior studies seem to suggest that entrepreneurial orientation (EO) or what some new studies have dubbed as ‘corporate entrepreneurship’ is key to enhancing enterprises’ market competitiveness and financial performance (Helm, Mauroner & Dowling, 2010; Nadia, Achtenhagen & Davidsson, 2014). EO obviously has to do with the disposition of the firm towards innovation, clarity in the identification of business/consumer needs, proactiveness as well as the propensity to venture into ‘high-risk’ business dealings (Lumpkin & Dess, 1996). Another important dimension of EO has to do with the firm’s business owner

stoic determination to succeed in the marketplace regardless of its present business challenges. Based on the evidence provided by the aforementioned studies, we propose that:

***H2: EO positively influences SME financial performance.***

It may well seem reasonable so to picture EO as a direct antecedent of SMEs brand-oriented culture (Laukkanen et al., 2013; Wong & Merrilees, 2005). More so, the configurations of EO and BOc, that is the complementary effect of EO and BOc could provide greater financial benefits for these enterprises. Some recent research (Ngo & O' Cass, 2012; Sok, O'Cass & Sok, 2013) appear to suggest that since most intangible strategic resources strongly complement one another, it is important to investigate how this configuration might have an effect on enterprise performance. Thus, in line with the above-mentioned studies, we propose that:

***H3a: The greater the intensity of EO, the greater will be the BOc of the SME.***

***H3b: In addition to their independent effects, the complementary effect of EO and BOc will have an increasing effect on an SME financial performance.***

More so, research has consistently shown that business owners desire to build a business model with a motivated workforce that could serve customers' needs in multifarious ways. Extant literature in human resource development clearly shows that employees who are well-motivated perform better, add value and will positively affect organizational performance (Kovach, 1995; Kruger & Rootman, 2010; Perry, Mesch & Paarlberg, 2006). Similarly, a related study that was conducted among German SMEs appears to indicate that workforce motivation is a direct antecedent of corporate entrepreneurship in SMEs (Schmelter et al., 2010). Thus, in line with these studies, we further propose that:

***H4a: Workforce motivation will rub off positively on the EO of an SME.***

***H4b: Workforce motivation will rub off positively on an SME financial performance.***

### **3 RESEARCH DESIGN, DATA COLLECTION AND DATA ANALYSIS**

The unit of analysis in this study is an enterprise employing between 10-249 employees, which is an SME. To guide against industry heterogeneity, we concentrated on a particular service sector - financial services sector. Three Nigerian cities and/or states were chosen as the survey locale for this study. These three Nigeria cities (Abuja, Lagos, and Port Harcourt/Rivers State) were chosen based on their strategic relevance to the Nigerian economy. Moreover, Lagos State alone accounts for a majority of the financial services firms as well as SMEs in the country while Abuja happens to be the administrative capital of the Nigerian state and Port Harcourt/Rivers State is the oil hub in Nigeria. A structured questionnaire was used as the instrument for this study. Due to the challenges of inefficient postal delivery system in Nigeria, a drop and pick procedure was adopted for this study. In all, we got 156 effective responses from our target population. The key informants for this study are SMEs' owners and/or managers.

The main constructs in our structured questionnaire were adapted from prior studies. For an example, the perceptual measure of financial performance was gotten from Baker & Sinkula (2009) while the construct measuring brand-oriented culture was adapted from Wong & Merrilees (2008). The items measuring entrepreneurial orientation were adopted from Laukkanen et al. (2013). All the items measuring the key constructs were anchored on a 5-point Likert scale. The measure for workforce motivation was anchored on 'Yes/No' option. Prior to the main survey, a pretested survey was carried out in order to enable us to get initial

feedback from our target population. Based on this initial survey, we were able to come up with a more terse research instrument.

Further to check for non-response bias, we checked whether the late respondents were somewhat different from our early respondents. Based on our findings from the data, we did not notice any significant difference across enterprise demographic variables. More so, all those who participated in this study all have university qualifications and a majority of these enterprises have between 10 to 49 employees while relatively few have 50-249 employees. Most of the SMEs in our study are micro finance banks (MFBs), finance houses, and insurance firms. Consistent with extant literature, we checked for common method bias (CMB) using the procedure suggested by Podsakoff et al. (2003), that is Harman's unrotated one-factor analysis solution. From our result (using PCA- Principal Component Analysis), a single factor solution did not emerge and no single factor accounted for the majority (50%) of the variance. Thus, it appears that CMB is not a major issue in this study.

Given that the centrality of this study is aimed at predicting the interrelationship between brand-oriented culture, entrepreneurial orientation and financial performance of SMEs; we further proceeded to evaluate the measurement model as the well as the structural model using the two-stage approach of model verification in Partial Least Squares-Structural Equation Modelling (PLS-SEM).

Specifically, we made use of SmartPLS (Ringle, Wende & Will, 2005) for the soft modelling of our theoretical model. All the constructs in our model are first-order reflective constructs. All the items' factor loadings are statistically significant ( $p < 0.01$ ), with the exception of one item in the BOc construct ( $p < 0.1$ ) using 5000 bootstrapped samples. Checking further for convergent validity, we based our criterion values of 0.7 and 0.5 for composite reliability (CR) and average variance extracted (AVE) respectively in accordance with these studies (e.g., see Fornell & Larcker, 1981; Hair et al., 2012). All the constructs, including the interaction term (complementarity) of BOc and EO fulfil the assumption of convergent validity (see Table 1). Next, we check for discriminant validity using the suggestions given by Fornell and Larcker (1981). Our results satisfy the assumptions of the outer model's discriminant validity (see Table 1).

Tab. 1 – Results of the Outer Model Evaluation (Source: Authors' Elaboration)

	AVE	CR	Cronbach's $\alpha$	SFL (range)
BOc	.648	.874	.858	.481 - .953
EO	.900	.978	.972	.921 - .965
EO*BOc	.554	.952	.958	-
FinPerf	.573	.800	.649	.721 - .817
Motivate	-	-	-	-

	BOc	EO	EO*BOc	FinPerf	Motivate
BO	<b>.805</b>				
EO	.085	<b>.948</b>			
EO *BOc	.357	.188	<b>.744</b>		
FinPerf	.409	.174	.482	<b>.757</b>	
Motivate	.044	.246	.145	.367	-

Consequently, the inner model was assessed by examining the coefficient of determination ( $R^2$ ), path coefficients, predictive relevance (Stone-Geisser's  $Q^2$ ) and the model's global Goodness-of-Fit (GoF) measure (Hair et al., 2012; Tenenhaus et al., 2005). The results of the overall quality of the research model, including the path coefficients are displayed in Table 2. In order to ascertain the statistical power and effect size of the sample ( $n=156$ ) used in this study, we went further by conducting a post-hoc power analysis test in G\*Power software, a tool provided by Faul et al. (2009). The result of the test exceeds the minimum required statistical power of 0.8 as suggested by Cohen (1988), albeit moderate effect size.

Table 2- Overall Research Model's Regression Weights and Quality Parameters (Source: Authors' Elaboration)

Direction of Paths	Beta Coefficient	T Statistics	P-Value
BOc -> FinPerf	0.274	2.511	$P < 0.05$
EO -> Boc	0.085	0.377	$P > 0.05$
EO -> FinPerf	0.013	0.171	$P > 0.05$
EO*BOc -> FinPerf	0.338	3.266	$P < 0.01$
Motivate ->EO	0.246	3.145	$P < 0.01$
Motivate -> FinPerf	0.303	3.308	$P < 0.01$
$R^2$ for FinPerf	0.388	Cross-validated redundancy ( $Q^2$ ) $Q^2$ for FinPerf is 0.189 $Q^2$ for BOc is -0.010 $Q^2$ for EO is 0.053	
$R^2$ for Boc	0.007		
$R^2$ for EO	0.06		
Model's GoF	0.318		

#### **4 DISCUSSION OF RESEARCH FINDINGS, IMPLICATIONS, LIMITATIONS AND FUTURE STUDIES**

Recall that this paper sought to model the form of relationship between the interplay of brand-oriented culture, entrepreneurial orientation, workforce motivation and financial performance of SMEs in the financial services industry. Based on our findings, we have empirical support for four out of the six hypothesized relationships. First, BOc has been found in this study to increase the financial performance (Finperf) of SMEs. This particular finding provides ample support for the sparse literature on the significance of brand-oriented culture to SMEs market and/or financial performance (e.g., see Berthon, Ewing & Napoli, 2008; Laukkanen et al., 2013; Wong & Merrilees, 2005). Similarly, the complementary effect of BOc and EO appears to have an increasing effect on SMEs financial performance. To our best of knowledge, this is arguably the first study to report of this particular finding in the research stream on SMEs marketing.

Furthermore, we have empirical evidence that workforce motivation rubs off positively on both EO and Finperf of SMEs. This finding is consistent with previous studies (Hudson et al., 2001; ILO, 2013; Muogbo, 2013). Although EO appears to have the expected signs on both BOc and Finperf of SMEs, we do not have further evidence that EO is indeed a significant predictor of BOc and Finperf. This particular result appears to be in contrast with a related study that was conducted in two EU countries (see Laukkanen et al., 2013), such a difference may be attributed to the peculiarity of the financial services industry when compared with other industries as well as differences in geographical settings.



Given the outcomes of the present study, it follows that SMEs' owners/managers in the service sector, particularly financial services, should endeavour to develop a brand-oriented culture that cuts across all their service contact points. Such a culture should be able to permeate all the marketing activities of any enterprise that is interested in a building a strong brand name in the marketplace.

Thus, it is imperative for an SME in the financial services sector to synchronize its marketing activities with an 'umbrella' brand name, that is, the corporate brand. These enterprises should equally endeavour to engage more with their target market(s) through cost-effective traditional marketing channels as well as the use of social media in evangelizing their corporate brand names and unique selling proposition (USP). Creating an enviable financial brand status in this present era of 'Internetization' as well as globalization would demand enterprises to be more sociable, innovation driven, prudential, transparent in their financial dealings with stakeholders, and importantly, a copper-bottomed organization.

More so, given the competitive nature of this sector of the Nigerian economy, SMEs could leverage on a multiple strategic orientation at the same time, particularly the simultaneity of entrepreneurial orientation and brand-oriented culture. Such a 'co-alignment' has been found in this study to enhance the financial success of an enterprise. An enterprise that is proactive, takes calculated business risks, innovative and equally perceives branding as a strategic value to its long-term business success will most likely financially outperform its rivals in the marketplace.

In addition, this study has equally demonstrated that workforce motivation is a direct antecedent of EO and Finperf. Therefore, enterprises should endeavour to continuously incentivize its workforce. In the Nigerian setting, workforce motivation could be in the form of a pay raise, prompt payment of staff salary and/or bonus. More importantly, is the need to create a learning and conducive workplace environment.

Notwithstanding the interesting findings in this study, our research model is only able to capture about 40% of the variance in the outcome variable (Finperf). This possibly indicates that there may be other more relevant predictors that were not covered in the current study that could impact upon the financial performance of these enterprises in Nigeria. This leaves room for future studies to explore other relevant intangible and tangible resources that could impact positively on the financial performance of SMEs in the financial services sector as well as in related industries. To further establish the veracity of these findings, researchers could replicate this study in another developing country context. Moreover, researchers could explore this research model further by comparing the outcomes with objective measures of financial performance. In all this research paper makes a significant contribution to the financial services and SMEs marketing literature.

### **Acknowledgement**

This paper was in part supported by IGA/FAME/2015/039 as well as IGA/FaME/2015/025.

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## **INFLUENCE OF STATISTICAL METHODS ON EFFICIENCY OF FINANCIAL AUDIT IN PUBLIC ADMINISTRATION**

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### **Abstract**

The paper aims to analyze the use of statistical methods and the efficiency of their use on financial performance in the public administration. The paper defines the performance audit and states it as currently one of the effective tools to support performance. This paper explores a new model for testing the probability of the occurrence of errors in the audit sampling for verifying the accuracy of operations when performing financial control in public administration. To be able to assess some sample statistically, it is necessary to apply the methods of probability sampling, which enable accurate quantification of the level of ascertained certainty.

*Keywords: performance audit, financial audit, statistical methods, audit sampling, probability*

JEL Classification: M41

### **1 INTRODUCTION**

Financial control as a part of a performance audit is not the domain of only commercial entities, but also of public administration as a whole. All mechanisms of performance measurement are adequate and useful if they are designed to achieve goals. The goal of this paper is to obtain answers to the following key question: Using statistical methods, is it possible to contribute to the efficiency of public administration in the performance of financial control?

In the first part of this paper, the authors discuss the main purpose of the theoretical background of performance management in public administration and the principles of "3E's" as a basic principle for the area of financial control in public administration. Then the chapter summarizes the main findings from the literature review of using statistical methods in the financial audit. The third part presents the methodology used in the paper. The fourth part presents a new model of testing the probability of the occurrence of errors in the auditor's sampling for verifying the accuracy of operations when performing financial control in public administration. The last part concludes by discussing the results.

### **2 THEORETICAL BACKGROUND AND PROBLEM FORMULATION**

Specialized literature has been dealing with the issue of performance of the public administration, see, e.g. Arnaboldi, M. (2010), Behn (2003), Lapsley (2008), Wholey & Newcomer (1997) and Modell (2009). It is true that all mechanisms of performance measurement and management are adequate and useful if they are designed to achieve goals. If we want to assess the success of public administration using performance measures, it is first necessary to define the term performance. The definition of performance or performance measurement is not very clearly defined anywhere in the literature. As Neely et al. (1995) states, "performance measurement is a topic often discussed but rarely defined". The same authors present their own definition of how to understand performance and its measurement:

"Performance measurement can be defined as the process of quantifying the efficiency and effectiveness of action".

The principles of economy, efficiency and effectiveness are collectively defined in the Czech environment as organizational performance, and the model concept of the "3E's" is considered the basis for performance monitoring in public administration, when based on the objectives, inputs are provided, i.e. resources that are in the form of personnel and material securing transformed into outputs. Outputs are developing effects in which public administration is interested. Even with a separate study of the economy or efficiency of the given activity, it is essential to assess the effectiveness at least in general, which has fundamental importance. And vice versa, in assessing the effectiveness, it is necessary to evaluate the economy and efficiency, because assessed activities, programs, operations, etc. could indeed have the desired result, but resources to achieve this result have not been used economically and efficiently. A generally known and customary explanation of how to understand various terms is represented in a quote by Drucker (1993): "Efficiency is doing things right, effectiveness is doing right things." In the Czech Republic, the principle of "3E's" is a basic principle for the area of financial control in public administration under the rule of statutory regulations (Act No. 320/2001 Coll., on Financial Control). Within the Financial Control Act (2001) and Pastuszkova et al. (2011), the meaning of words can be loosely interpreted as follows: Economy = the lowest possible expenditure of funds within the appropriate quality (performance in relation to price), the evaluation criterion for input based on the principle of doing things inexpensively. Efficiency = achieving the necessary outputs for little money, the relationship between inputs and outputs based on the principle of doing things the most suitable way. Effectiveness = expresses the degree of progress towards the set objectives (Do we have what we wanted?), the evaluation criterion for output based on the principle of doing only those things that really should be done.

Financial control as a part of a performance audit is not the domain of only commercial entities, but also of public administration as a whole. In terms of financial flows, public administration is ranked amongst large organizations, so thorough control of all activities is necessary. In general, financial control is considered one of the guarantees of upholding the legality and financial discipline in the area of financial relations. Financial control is one of the parts of monitoring public expenditures. Its essence is monitoring selected indicators that concern the problem of handling and using public expenditures. The essence of a financial audit of public expenditures can be both control of relevant expenditure processes, and monitoring of economic indicators concerning rational use of invested resources, i.e. assessment of results and performances for which the designation performance audit is used. Rosa (2014) and Kells (2011) take up the issue of the performance audit in public administration in their respective papers. Control of public expenditures primarily includes review of financial accounting expenditures of resources in terms of the appropriateness of use of resources, and simultaneously acts as oversight that the given expenditure processes correspond to legal standards and regulations. The performance audit is monitoring of followed indicators from the aspect of performance and result, their verification and comparison with target statuses, with consequent ascertaining of possible deviations from the target condition and defining of recommendations for changes. The essence of the performance audit is monitoring how effectively resources were spent. During the performance audit, we monitor the qualitative and the quantitative side. Focus on the quantitative side means that we monitor economy, (cost) efficiency and effectiveness. According to Reichborn- Kjennerund (2013), the performance audit is widely used in public administration, but there still exists little proof of its usefulness.

Mainly the accounting of the given organization provides the necessary data and information for assessing all financial controls, financial and performance audits. Accounting aids in responsible decision-making. An integral accounting system is a comprehensive and reliable source of data for all forms of differentiated (external and internal) control, and is the basic and most important diagnostic instrument (Kolářová, 2013). It enables assessment in causation, in input-output relations, and in relations to the past, present and future. Evidential documentation for verifying the accuracy of operations when performing financial control in public administration comprises a group of assembled certificates and documents by which the derived conclusions are substantiated with regard to a specific aim of control activity. Without sufficient volume of complex, timely and reliable information elaborated in terms of needs of variously differentiated control, it is not possible to ensure efficient control or an audit.

A summary of all data on verified facts forms a basic group. Testing is understood as the process of ascertaining the true status of verified items, groups of items, selected samples or entire basic files, an analysis of the factual status and its comparison with relevant criteria. The aim is to gain certainty based on the evidential documentation of the fact of whether the information systems of the public administration authority are reliable, i.e. whether the verified data on handling public funds faithfully and completely illustrates the sources, status and movement of public funds. The basic aim of the financial audit is increasing the trustworthiness of accounting information. Auditors or employees involved in control in practice generally do not test all items of the basic group due to the great volume of data and thus the rigorous time and financial performance involved. The sampling includes examination of less than 100 % of the items forming the audited set. The selected sample (sampling) forms items that were selected from the basic group for testing in order to draw conclusions that are valid for the entire basic group. It is founded upon the expectation that such a sample may be a sufficient representative of the audited set for proving valid and reliable conclusions without having to test the entire set. The sampling risk expresses the tendency that conclusions based on testing the sampling may differ from conclusions that would be achieved if testing were applied to all items of the basic group.

In the area of the audited sampling, its testing and evaluation of results, various statistical methods are used, which apply the principle of mathematical probability. Many authors such as Smith (1979), Ponemon (1995), Gob (2012) and others presents statistical sampling in auditing from the statistician's or auditor's viewpoint. Rotaru et al. (2009) presents a statistical model for measuring the auditing risk, which arises from not uncovering errors upon sampling for testing. Taillard et al. (2008) assesses *Few statistical tests for proportions comparison*. For the auditor to test whether transactions were registered correctly, he must select a suitable sample for comparing compliance with internal control procedures; tests of compliance and substance tests are applied (Knight (1979), Hitzig (1998)). The aim of the auditing sampling is to draw conclusions on one or more characteristics of the audited set without testing the entire set. Even amongst the most carefully proposed selection procedures there exists a certain degree of uncertainty of whether results of the sample represent the audited set (Anderson (1986), Batenburg (1994), Cabras et al. (2015) and Gillett (2000)).

## **2.1 Problem formulation**

The paper deals with statistical methods in the financial audit. The aim is to discuss the possibility of quantifying the level of probability of gained certainty upon statistical evaluation of the number of accounting errors in the audited sampling. The paper introduces a decision-making statistical model using the probability function of hypergeometric distribution.

Two basic questions were formulated in relation to control (testing) of less than 100 % of the items forming the audited set:

1. How many errors is it possible to expect with the highest probability in the basic group?
2. What is the probability that a specific number of erroneous data entries will be found in the basic group?

### **3 METHODOLOGY**

To obtain the information necessary for complex processing of the issue, some of the basic methods of scientific research were used. The methods usually complement each other and, in consequence, overlap. Especially the methods of induction and deduction, analysis and subsequent synthesis were used. Procedures of analysis were used: identification of the processes, analysis of running of processes and analysis of value-added of identified processes. Also, some specific statistical methods and procedures are commented on in the paper.

To meet our research goal, a literature review has been performed following a multiple-step process. First, we searched the literature and identified the relevant journals for our review. Second, we selected a list of empirical papers that focus on performance of public administration and statistical sampling in auditing. Third, we chose those papers/studies that met our specific selection criteria. Fourth, we read the papers selected and tried to organize the papers into logically structured topics of statistical tests for comparing proportions. Fifth, we synthesized the insights extracted from the literature review in order to answer our research question and we proposed a draft of the model. Our first step in the literature review process was to identify keywords that could help us find relevant papers or studies. After that, we searched the literature in two electronic databases, namely ISI Web of Knowledge and SCOPUS, using the keywords selected. We conducted our searches in two different databases to maximize our likelihood of finding relevant studies and to improve the reliability of our research.

To resolve the draft model, mathematical and statistical methods were used that are founded on the principle of determining the level of importance, selection testing of samples, methods of sampling, probability statistical methods of selection, quantitative assessment, testing strategy and analytical test of reliability. Hypergeometric distribution means distribution of a discrete random quantity. The described methods and instruments are mutually intertwined, they mutually influence each other and are only effective in practical combination. On the basis of results, the decision-making statistic model for the financial audit is prepared.

### **4 PROBLEM SOLUTION**

To verify the quantification of the level of probability of gained certainty during statistical assessment of the number of accounting errors in the audited sampling, an analogy was used with manufacturing processes, whereas hypergeometric distribution was used to determine the probability of the number of scrapped product units in series manufacture.

Discrete random variable of dependent Bernoulli trials can be described by hypergeometric distribution. This distribution estimates probability of realization of a phenomenon (number of elements (x) with a certain characteristic) in several selections (n) without returning. The entire group has a total of N elements, which contain a total of M elements with a certain characteristic. The probability that the result of a random attempt performed on



(phenomenon) a random quantity X, which is governed by hypergeometric distribution, will be the very x realization is determined according to:

$$P(X = x) = \frac{\binom{M}{x} \binom{N-M}{n-x}}{\binom{N}{n}} \quad (1)$$

The mean value of hypergeometric distribution is gained from the formula:

$$E(X) = n \frac{M}{N} \quad (2)$$

and variance according to:

$$D(X) = n \frac{M}{N} \left(1 - \frac{M}{N}\right) \left(\frac{N-n}{N-1}\right) \quad (3)$$

In the case where  $\frac{n}{N} < 0.05$  it is possible to approximate hypergeometric distribution by

binomial distribution with the parameters  $\left(n, \frac{M}{N}\right)$ .

Statistics in (1-3) describe both the uncertainty of the studied problem and our expectations. Based on the random sample and prior knowledge (M) analyst can draw a conclusion whether a number of cases with some characteristics in the sample is close to the expected number or not. In our case of incorrect documents if there are more than expected cases analyst should enlarge the set of documents to study.

Following illustrations present means of estimating probabilities and total counts of erroneous documents based on expectations and random sample.

Illustration 1:

There are 200 documents which have to be checked for errors ( $N=200$ ). To estimate whether quality of documents (in terms of absence/presence of error) is the same as required (by long-term standard) five documents ( $n=5$ ) were selected by random and were further analysed. For a long-term standard 5 % error rate is considered. Given the sample size and error rate we expect that there are 10 erroneous documents ( $M=10$ ).

What is the probability that in the control-sample of 5 documents there will be exactly 1 erroneous document ( $x=1$ )?

Solution: We estimate the probability by employing equation (1).

$$P(X = 1) = \frac{\binom{10}{1} \binom{200-10}{5-1}}{\binom{200}{5}} = 0.207$$

Interpretation: We assume 5 % document error rate. Probability of observing 1 erroneous document in control sample consisting of 5 documents is therefore 0.207. Auditor after observing one erroneous document has to decide whether this observation is unique enough to be incompatible with 5 % error rate. Note that estimated probability of observing 2 erroneous documents is 0.0199. Therefore, observation of two erroneous documents would be strong

evidence against low error rate. These results might be caused by the sampling error (“bad luck” in selecting documents) or by the fact that the error rate is not 5 % (both results suggest higher rate).

In the second illustration we extend the idea of probabilities of occurrence given the expected error rate. Let’s consider the situation where the number of all documents ( $N$ ), the number of erroneous documents in sample ( $x$ ) and the number of checked documents ( $n$ ) is known. Number of erroneous documents in the total sample ( $M$ ) to be estimated. We will summarise results graphically to highlight non-linear relation between estimated number of erroneous documents and corresponding probabilities. We have changed the settings to Illustration 2 as the purpose of illustration 2 is different.

#### Illustration 2:

There are 150 documents to be checked for errors ( $N=150$ ). Ten documents ( $n=10$ ) are randomly selected; 3 documents were found erroneous ( $x=3$ ). How many erroneous documents can be expected in the whole set of documents?

Solution: We create a probability graph for all permissible  $M$  and we find it with the highest probability.

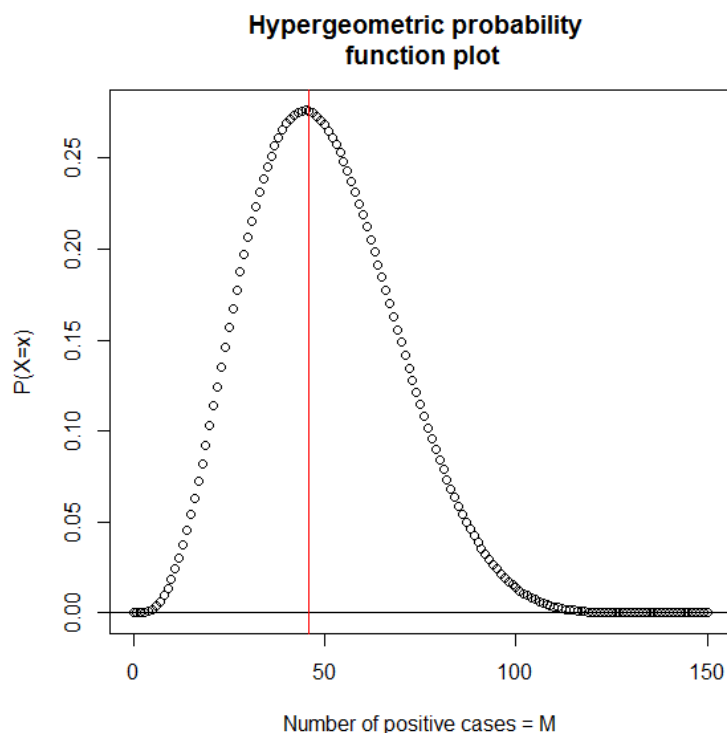


Figure 1 – Hypergeometric probability function in Figure 1 presents estimates of probabilities of observing  $M$  cases (each point represents number of erroneous documents) out of total sample size  $N=150$ . Source: Own processing.

Hypergeometric probability function in Figure 1 presents estimates of probabilities of observing  $M$  cases (each point represents number of erroneous documents) out of total sample size  $N=150$ . From Figure 1 we can read that the most probable number of erroneous documents is 45 ( $M =45$  with probability  $P=0.276$ ). This 45 occurrences refer to  $45/200 = 22.5\%$  error rate.

Interpretation: If this estimated error rate exceeds threshold for unacceptable quality set by the auditor more attention should be paid for such a set of documents. These documents are likely to be more erroneous. Moreover, the asymmetrical shape of the distribution indicates that probability of observing some amount of erroneous documents is higher on the right off the most probable value rather on the left. It is therefore more likely to have +1 erroneous document than -1 erroneous document compared to the most probable value.

Presented results object to sampling error and therefore should be used only as a signal indicator of low quality.

The proposed statistical model can be applied similarly to any size of the basic group from which it is necessary to generalize errors from the tested sampling for the number of errors in the basic group with definite specific probability. The model is founded on the method where using probability, we determine the reliability of estimating the total number of erroneous pieces of data, and we can generalize errors in the sample for errors in the basic group. When using the proposed model, the probability of erroneous interpretations is determined based on the theory of probability of realization of the phenomenon in the selection, i.e. the tested group.

## **5 DISCUSSION**

To achieve the smallest amount possible of incorrect conclusions from the interpretation of results of the model display by the probability method, it is necessary always prior to testing the sampling to determine the size of the sample, i.e. how many items must be tested. This can either be resolved mathematically or using judgment based on experience. The sampling may be either statistical or non-statistical. For large groups, statistical sampling is mostly selected. When using judgment, the period necessary for determining the size of the sample is shorter, data necessary for mathematical selection need not be collected, and the actual selection and statistical evaluation need not be performed. A disadvantage however is that the size of the sample and interpretation of the probability of errors in the total group is neither mathematically nor statistically founded.

The risk of the selection procedure stems from the fact that a certain audited sample need not be a typical representative of the tested set. This means that the sample may contain unreasonably more or less control deviations or financial differences than there exists in the group of transactions or accounting balances as a whole. Conclusions of the auditor or controller may be different from the conclusions that he would make if the entire set were tested. The selection risk varies inversely to the sample size - the larger the size of the sample, the less the selection risk is. Upon formulating the overall conclusion of the auditor or controller, it is necessary to apply various analytical procedures. The final assessment should be in accordance with all information gained from performed analytical tests and selection of samples ascertaining risk in relation to the necessary level of certainty, and with the testing strategy. Performing tests and their efficiency depends on correct relation of the relation input - output. A basic rule applies that costs spent on gaining information may not exceed the benefits gained from this information. One must not underestimate the quality of information, as quantity is never a substitute for quality of the given information, and it is mostly possible to judge the whole even from a small quantity of information.

## **6 CONCLUSION**

A financial control or performance audit deals with researching the economy, effectiveness and efficiency, whereas an individual performance audit may be aimed at examining one or

more aspects. Performance in the performance audit is seen as minimizing the costs of resources or the use of public funds for the activity (inputs) regarding the relevant quality. The economy may in some cases mean maximizing the income from the activity. It is assessed as the relationship between outputs and inputs used to produce them. One element in the overall effectiveness assessment involves cost-effectiveness. The term cost-effectiveness concerns the effectiveness of spending on individual subjects, the activity, program or operation in achieving the results in relation to costs. Cost-effectiveness analysis studies the relationship between costs and results expressed by the cost per unit of output. Performance measurement refers to what extent objectives have been achieved and the relationship between intended and actual impact of activities. Usually it is more appropriate to try to determine the extent to which the tools have contributed to achieving the objectives. The performance audit in its true meaning requires evidence that the observed outputs are indeed outputs in relation to the defined objectives. The conclusions can be used to improve performance in such a way that it is possible to focus on those principles, which have shown as failing in practice. The further step is in the mobilization of the public administration in the adoption and implementation of statistical methods in the performance audit. These results suggest some avenues for future research.

### **Acknowledgments**

*The authors are thankful to the Operational Programme Education for Competitiveness co-funded by the European Social Fund (ESF) and national budget of the Czech Republic for the grant No. CZ.1.07/2.3.00/20.0147 - "Human Resources Development in the field of Measurement and Management of Companies, Clusters and Regions Performance", which provided financial support for this research. This article has been elaborated also as one of the outcomes of research project IGA/FaME/2014/015.*

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## **AUDIT AND FINANCIAL CONTROL IN PUBLIC ADMINISTRATION THROUGH THE EYES OF STUDENTS OF ECONOMICS FIELDS**

*Milana Otrusínová, Eliška Pastuszková*

### **Abstract**

In general, the lay public does not quite understand the differences between the terms audit, internal audit, controlling and financial control, although these terms all mean something different. Based on questionnaire survey, this paper aims to assess the knowledge of terminology relating to the issue of financial control in public administration, audit and controlling amongst students of relating master's degree programs in the field of Finance and Financial Control at the Faculty of Management and Economics of Tomas Bata University in Zlín, Czech Republic. The aim is to ascertain whether with their existing knowledge in accounting, financial management and controlling, they can distinguish and state the essence of these terms. One may generally state that the modern concept of control leads to covering up the difference in meaning between the verb "to control" and the noun "control", and the respondents also comprehend them as one and the same.

*Keywords: internal audit, financial control, controlling, performance, public finance*

JEL Classification: M41

### **1 INTRODUCTION**

A necessary part of the knowledge of every financial manager must be correct knowledge of the principles "control" and "controlling". This is no different in public administration institutions and the public sector. Students of the master's degree program encounter the issue of financial control, audit, internal audit and controlling during their studies at the Faculty of Management of Tomas Bata University ("FaME UTB") in Zlín in multiple subjects. Based on questionnaire survey, this paper aims to assess the knowledge of terminology relating to the issue of financial control in public administration, audit and controlling amongst students of relating master's degree programs in the field of Finance and Financial Control at the Faculty of Management and Economics of Tomas Bata University in Zlín, Czech Republic. The first part of the paper concentrates on explanation of the context of public administration performance and the theoretical background of financial control, audit, internal audit and controlling. The next part presents the methodology used in the paper and then the results are discussed. Findings presented in the paper are derived mainly from research carried out that respondents comprehend the terms control, audit and controlling as a synonym, where control mainly has a repressive task.

### **2 THEORETICAL BACKGROUND**

Since the late 1980s a variety of approaches, termed New Public Management, have been considered international best practice (Wynne, 2012). New Public Management represents a strategy oriented on increasing efficiency and satisfaction of citizens who are understood as

customers (see e.g. Lapsley, 2008; Mörth, 2009). One part of the new Public Management concept should be the role of accounting and financial control. Moraru & Dumitru (2012) present the role of internal audit as a tool in changing the mentality of management and employees of entities. Sterck & Bouckaert (2006) state that the modernization of financial management in the public sector has led to an increased focus on auditing and control. The same authors present their study that compares the internal audit function in the governments of six OECD countries: Australia, Canada, the Netherlands, Sweden, Great Britain and the United States, the research shows that internal auditing is receiving increased attention in the public sector.

Amongst the important accounting functions such as registration, recognition, information, analytical and communication functions, the control function is no less vital. This especially relates to the implementation of new methods of how to measure performance of public sector institutions. All public administration reforms that have been undertaken are accompanied by questions regarding the efficiency of various functions of public administration. According to Bolivar et al. (2014), analysis of government sustainability is considered very important. Unlike the private sector, public administration institutions and other public sector organizations are disadvantaged concerning the evaluation of performance and efficiency, because they are managed primarily on non-profit basis and therefore cannot apply the profit criterion as a performance indicator. Information on prosperity, profitability or loss are among the important information necessary for financial management and performance measurement, including information on cost structure and its links to revenues. This applies even to public sector institutions, although they often do not provide paid services, however, they always have their performance and thus revenues as well (in the form of various subsidies and transfers, tax revenues, etc.).

Today in the Czech Republic, efficient ways are being sought out of how to manage public administration and allocation of public resources. For the given process, the principles of new public management are applied, which can also be implemented in the area of public expenditures, see e.g. Jurcik (2013). In interconnecting with system changes in budgeting, leaning on the demand approach to creating a budget, it is possible to perform transformation of the public sector in the area of allocating public resources. Managing public expenditures is connected to monitoring results, when the expenditure policy resolves the strategic problem: "what is necessary to implement, what needs, or public interest, to satisfy"? Budgeting is then a tool used to search for an answer to the question of "in what ways or by what form will the stated needs be budgeted and by what form will achieved performance be monitored"? Rosa (2014) and Kells (2011) deal with the issue of the performance audit in public administration in their papers. During a performance audit, we monitor the quantitative and qualitative side. Focus on quantitative side means that we monitor the efficiency, cost effectiveness and effectiveness. According to Reichborn- Kjennerund (2013), the performance audit is widely used in public administration, but little proof exists of its effectiveness.

The principles of economy, efficiency and effectiveness are in the Czech environment collectively defined as organizational performance and the model concept of the "3E's" is considered the basis for performance monitoring in public administration, when based on the objectives are provided inputs, i.e. resources that are in the form of personnel and material securing transformed into outputs. In the Czech Republic, the principle of "3E's" is a basic principle for the area of financial control in public administration under the rule of statutory regulations (Act No. 320/2001 Coll., on Financial Control).



The law respects the main principles of financial control and internationally recognized standards, which are a basis of control systems of countries of the European Community. The main aims of financial control are verification of upholding legal regulations and adopted measures when managing public funds for securing determined aims; providing protection of public funds against risks, discrepancies or other deficiencies caused mainly by violation of legal regulations, by inefficient, purposeless and ineffective handling of public funds or criminal activity; timely and reliable informing of managing public administration on handling public funds, on performed operations, on their demonstrable accounting elaboration for the purpose of effective channeling of activities of public administration authorities in accordance with established tasks; thus economical, efficient and effective performance of public administration.

Public administration authorities are responsible for the system of internal management and control, including public financial control. Internal control activities verify the efficiency of the internal system of management and control (thus also the financial control system). Complexity of organization, or tasks carried out in public administration, require the need to verify the status of their fulfillment also by means of other functional means. Such means include units for internal audit (internal control), subordinate directly to the supervisor of the relevant level of public administration in the interest of maximum application of the principles of independence and objectivity, as well as the principles of reasonableness and efficiency of control structures. Emmanuel et al. (2013) presents an assessment of internal control audit of public sector. Many authors such as Iskandar (2014), Alzeban & Geilliam (2014), Sterck (2006) and others present the factors affecting the internal audit effectiveness. Factors such as competency, independence and objectivity of Internal auditors affect the effectiveness of the IA function; however, the internal audit office constantly face the problem of low technical staff proficiency and high staff turnover, with limited capacity to provide effective service to management (Baharud –din et.al, 2014).

According to Balalia (2011) "public internal audit has developed over the years. The internal public audit applies to all central and local public institutions, auditors assuring and advising managers for management of revenue and public expenditure. Through the completed audits, auditors should help public institutions to meet their objectives through and gradual and methodical approach, by assessing and recommending more efficient public management".

The main aim of the internal audit is channeling the audit in public administration towards the International Standards for Internal Audit. One condition is constant enhancement of knowledge amongst employees by studying legal regulations and taking part in professional seminars and training sessions. Tasks of the internal audit must be performed professionally, so the auditor must possess knowledge, skills and other capabilities, which are necessary for performing the given obligations and responsibilities. (see e.g. Peytcheva, 2013, Hardiman, 2006).

*Why is high professional and accounting qualification one of the essential conditions for quality performance of the profession of the internal auditor?* High requirements should be placed on internal auditors, especially within public financing, not only in the area of upholding the code of ethics, ensuring independence, communication and other skills, but mainly for securing high professionalism, which includes gaining, maintaining and expanding technical knowledge, including accounting. Further education is a must for maintaining and updating technical knowledge, because requirements and relevant legislation are always changing. The opposite case could lead to weakening economic function of control, if not directly to annulling efforts or even to discredit all other functions and requirements of

upholding the principles of "3E". According to Emmanuel et al. (2013) "an effective internal control system free from interference is needed. There is also the need for upgrading the skills of auditing personnel and also strict adherence to statutory and professional standards". According to Baharud –din et.al, 2014 internal auditors working in Malaysian public sector have lack of qualification, skill and experience.

In relation to improving management systems, we very often encounter the term controlling. But what are we to understand by this term? Almost every auditor defines the term controlling differently, but content definitions always have something in common. There are plenty of ways to understand the term controlling and its definitions. Here one may quote the publications of prof. Eschenbach (2004): *"Each has his or her own impressions of what controlling means or what it should mean, only everybody is thinking something different."* The verbal base of the term controlling is the English verb "to control", which can be understood in the meaning of managing, controlling to have under control or in the meaning of controlling or verifying. The following definition is drawn from the Controlling Dictionary: *"We call controlling the entire process of determining aims, planning and control of finances and performances."*

### **3 RESEARCH METHODOLOGY AND PROBLEM FORMULATION**

This section describes research methodology - data collection, the process of designing and implementing and questionnaire survey, identifying individual variables. Furthermore, it specifies the scientific methods used to answer the research questions. The research was performed in the year 2014 by the students research work, there were collected sources of 47 questionnaires (i.e. 76% of the total number of respondents). Every valid questionnaire was statistically analyzed and followed by synthesis of obtained information.

The aim of the survey was to highlight the views of students at the Faculty of Management and Economics TBU, particularly the Master's programs Finance and Financial Control, on the issue of the area of performance of public sector institutions. The questionnaire survey served as a source for the following areas selected for the purpose of presenting the results in this paper:

- The management process in public administration and the public sector
- Control, audit and controlling
- Essence of the performance audit

Based on the research questions, a null hypothesis was determined:

H01: The majority of questioned students of the Master's degree program in the fields Finance and Financial control cannot definitely distinguish the terms control, audit and controlling.

In contrast, an alternative hypothesis that rejects the null hypothesis was determined as follows:

H1: The majority of questioned students of the Master's degree program in the fields Finance and Financial control comprehend the terms control, audit and controlling as being synonyms of one another.

## **4 PROBLEM SOLUTION**

### **4.1 The management process in public administration and the public sector**

Respondents were asked based on their opinion to rank the given terms in order of importance for the management process in public administration, the public sector and non-profit organizations. A grading scale was added from 0 to 5, where 0 expressed the situation that none of the listed terms are a part of management in public administration, and 5 represented the fact that all types of "control and audits" are equally as important and indispensable. The vast majority of those surveyed ranked terms such as external audit, internal audit, internal control system and external control amongst the most important for management. By presenting a 5, the respondents judge that all types of "control and audits" are equally important and indispensable.

### **4.2 Control, audit and controlling**

The figure listed below (Fig. 1) displays the replies of respondents who were asked if they comprehend the terms control, audit and controlling as synonyms of one another. Out of 47 surveyed, only four agree that the task of control, controlling and audit is to verify accordance of a fact with aims or legal regulations, monitoring a condition that has already past, where this basically concerns control of conformity. Twenty-two students comprehend these terms where control has a repressive task (informs on deficiencies), an audit gives information about controlled facts, and also includes a methodical task, controlling includes feedback and management of deviations. The remaining twenty-one students comprehended these terms only in part as synonyms. They believe that all these systems blend together, the audit involves control, audit and controlling are monitoring as well as an analysis of efficiency of achieving the established aim, and they include a system of risk management, on the whole concerning a performance audit in essence.

Hypothesis H0 was established: Most respondents are not capable of definitely distinguish the terms control, audit and controlling

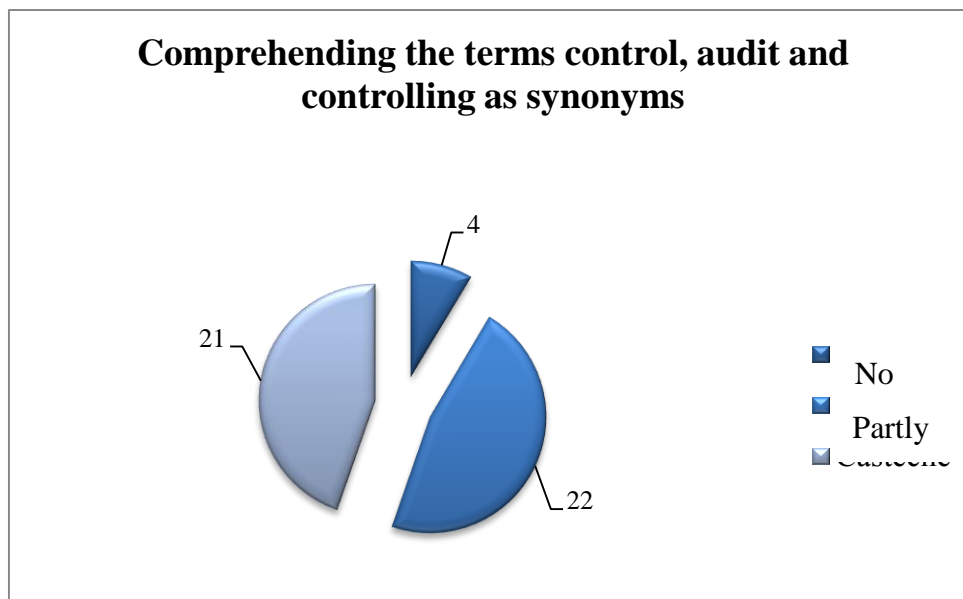


Fig. 1 - Comprehending the terms control, audit and controlling. Source: Author's illustration

Tab. 1 - Statistical test of appointed the hypotheses. Source: authors' calculations

H0:	$\pi_1 = 0.5$
H1:	$\pi_1 > 0.5$
1-sample proportions test with continuity correction	(x=25, n=47, alternative = "g" )
data:	25 out of 47, null probability 0.5
X-squared = 0.0851	0.0851
df	1
p-value	0.3852
alternative hypothesis:	true p is greater than 0.5
95 percent confidence interval:	0.4035657 1.0000000
sample estimates: p	0.5319149

On the importance level of 5%, we do not refute the null hypothesis, meaning that we cannot claim that the majority of respondents from the ranks of students of the Faculty of Management and Economics cannot definitely distinguish the terms control, audit and controlling. We do not have enough proof to overturn the null hypothesis.

### 4.3 Essence of the performance audit

Figure 2 shows that by their affirmative responses. 38 respondents confirmed that the essence of the performance audit in public administration is control of upholding the principles of economy, efficiency and effectiveness. The remaining nine addressed veered away from this statement or did not know at all.

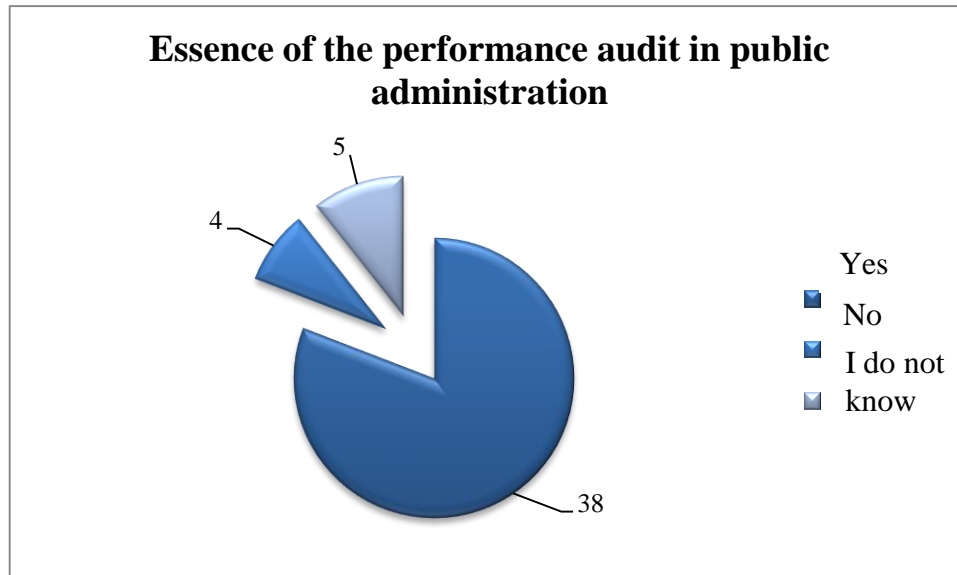


Fig. 2 - Essence of the performance audit in public administration. Source: Author's illustration

## 5 CONCLUSION AND DISCUSSION

It is undeniably important to stress the importance of financial management in every organization, and it deals with a system of financial control in public administration with application of an internal control system, which is a must in every company. It is vital that the internal control system meets all up-to-date requirements of the Law governing financial control. Good internal system of financial control can improve financial management.

The modern concept of control leads to covering up the difference in meaning between the verb "to control" and the noun "control". These words have specific differing meanings in the business and government sector. The verb represents activity ensuring that what is to be performed is performed, and preventing that which is prohibited. The noun represents a means that helps those wanting to have something under supervision ("controller"). Internal auditors oriented towards management and aims needs to join the managerial function of management and control with means enabling performance of this function in all activities of the organization. Thus conceived, a joining occurs of the verb "to control" and the noun "controls". Control means applying all means created in a company for support, management, limiting, administration and controlling their various activities, which aim to ensure the achievement of company aims. Controls include the form of organization, principles, systems, procedures, instructions, standards, directives, chart of accounts, forecasts, budgets, plans, reports, records, control lists, methods and instruments.

From the aforementioned research, the following facts have been determined:

Most respondents from amongst students of fields of Finance and Financial control prefer emphasis on internal systems of control (internal audit and internal control system) to the external form of various controls, and believe that controls are more effective.

The majority of respondents agree with the opinion that the essence of the performance audit in public administration is control of upholding the principles of economy, efficiency and effectiveness.

On the question of whether respondents comprehend the terms control, audit and controlling as a synonym, 47%, replied no, because control has a repressive task, the audit gives information on controlled facts, and include a methodical task, controlling includes feedback and management of deficiencies. Then 45% respondents agree with the opinion that this partially concerns a synonym, whereas all these systems blend together, audit includes control, audit and controlling are monitoring as well as an analysis of efficiency of achieving the determined aim.

In conclusion, one may surmise that various definitions of management and control are however less important than the actual purpose of management and control. It applies that managing and controlling mechanisms are adequate and necessary if they are designed to achieve aims.

### **Acknowledgments**

The authors are thankful to the Operational Programme Education for Competitiveness co-funded by the European Social Fund (ESF) and the national budget of the Czech Republic for the Grant No. CZ.1.07/2.3.00/20.0147 - "Human Resources Development in the Field of Measurement and Management of Companies, Clusters and Regions Performance", which provided financial support for this research. This article has been elaborated also as one of the outcomes of the research project IGA/FaME/2014/015.

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## **EFFICIENCY CHANGE IN BANKING SECTORS OF VISEGRAD COUNTRIES**

*Iveta Palečková*

### **Abstract**

The aim of the paper is to estimate efficiency change in banking sectors of the group of Visegrad countries during the period 2009-2013. We applied Malmquist index on the data of commercial banks. Average efficiency was slightly decreasing within the period 2009-2012 that was probably as a result of financial crisis. The most efficient was the group of small and medium-sized banks. We found the positive efficiency change during the period 2009-2013 that was especially due to the catch-up effect. Results of technological change indicates the negative average annual growth of 3%. Average efficiency change achieved the positive growth in most groups of banks. Technology had a negative effect on the total efficiency change. The highest technological change reached the group of small banks.

*Keywords: banking sector, Data Envelopment Analysis, Malmquist index, Visegrad countries*

JEL Classification: G21, C51

### **1 INTRODUCTION**

The aim of this paper is to estimate efficiency change in banking sectors of the group of Visegrad countries during the period 2009–2013. In accordance with the aim of the paper, we ask a research question: “What is the main reason for positive/negative efficiency change in Visegrad countries?” The group of Visegrad countries (V4) includes the Czech Republic, Hungary, Poland and Slovakia. For the estimation we applied Malmquist index (MI) on the data of commercial banks. The Malmquist index is determined in order to investigate the levels of and the changes in the efficiency of the Visegrad countries’ commercial banks over the analysed period. The Malmquist index is based on Data Envelopment Analysis (DEA) models. The DEA measures the relative efficiency of a homogeneous set of decision-making units (DMUs) in their use of multiple inputs to produce multiple outputs. We simultaneously use two alternative specifications of DEA approach, specifically CCR model and BCC model that differ in returns to scale assumption.

In empirical analysis there is a lack of studies in Visegrad countries’ banking sectors examining efficiency change, which creates an opportunity for this research. According to the author’s awareness, in empirical literature exists only a few studies which estimated efficiency change in banking sectors of V4. E.g. Řepková (2012) estimated efficiency change in the Czech banking sector using Malmquist index. Hančlová and Staníčková (2012) measured the efficiency change in Visegrad countries or Lyroudi and Angelidis (2006) estimated efficiency change of selected countries of the European Union.

The structure of the paper is follow. Following section describe empirical analysis about banking efficiency. Next section presents methodology and data, the Data Envelopment Analysis and the Malmquist index and selection of variables are described. Section 4 reveals and discusses the estimated results and Section 5 concludes the paper with summary of key findings and discussion.

## **2 LITERATURE REVIEW**

Several empirical analyses of efficiency of the Czech, Slovak, Polish and Hungarian banking sectors exist and we refer to some of them. Some empirical studies e.g. Grigorian and Manole (2006), Yildirim and Philippatos (2007), Bems and Sorsa (2008), Matoušek (2008), Mamatzakis et al. (2008) or Baruník and Soták (2010) examined the banking efficiency in several European countries and the Czech, Slovak, Polish and Hungarian banking sectors were included in panel data. Stavárek and Polouček (2004) estimated efficiency and profitability in selected banking sectors, including Visegrad countries. They found that Central European Countries were less efficient than their counterparts in European Union member countries. They also found that the Czech and Hungarian banking sectors were on average evaluated as the most efficient and the Czech banking sector showed itself as the most aligned banking industry among transition countries. Their conclusion was a refutation of the conventional wisdom that foreign-owned banks are more efficient than domestic-owned banks, and that size is one of the factors that determines efficiency. To achieve greater efficiency, a bank should be large, well-known, easily accessible and offer a wide range of products and services, or if small, must focus on specific market segments, offering special products. Any other structure leads to lower relative efficiency for the bank. Anayiotos et al. (2010) estimated relative efficiency of banks in emerging Europe before the recent boom, just before the crisis and right after the crisis using the Data Envelopment Analysis. Their results suggested that the banking efficiency decreased during the pre-crisis boom and also fell during the crisis.

Stavárek (2005) estimated commercial bank efficiency in the group of Visegrad countries before joining the EU. He concluded that the Czech banking sector is the most efficient, followed by the Hungarian with a marginal gap. Although there has been an improvement in levels of efficiency in all countries since 1999, its intensity was not sufficient to converge with Western European banking sectors. He also examined the increasing value of the efficiency of the Slovak banking sector during the period 1999–2003, but they also found that Slovak banking sector was lower efficient banking sector than other Visegrad countries. Also, Staničková and Skokan (2012) and Melecký and Staničková (2012) estimated banking efficiency of Visegrad countries and evaluated the banking sector of the Czech Republic as highly efficient.

Weill (2003) found a positive influence of foreign ownership on the cost efficiency of banks in the Czech Republic and Poland. The degree of openness of the banking sector to foreign capital has a positive impact on performance. It may also have a positive influence on the macroeconomic performance of these countries, because of the important role of the banking sector in the financing of these economies. Erina and Erins (2013) evaluate cost-benefit efficiency of the banks of seven CEE states (the Czech Republic, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia) in the period 2006-2011 (ie. before and during the crisis, and in the period of economic recovery). They found that banking systems most effectively operate in Lithuania and Slovenia, while the Latvian banking system is most inefficient.

The results of Andries and Cocris (2010) showed that banks in the Czech Republic are inefficient from the perspective of costs. Staněk (2010) found that the efficiency of the Czech banking sector has improved in the last ten years and come closer to the efficiency of the Austrian banking sector. Stavárek and Řepková (2012) found that efficiency increased in the period 2000–2010 and they found that the largest banks perform significantly worse than medium-sized and small banks.

Rossi et al. (2005) examined that the banking systems of Slovakia showed significant levels of cost and profit inefficiency, indicating that on average banks operate far above (below)

from the cost (profit) efficient frontiers. Vincová (2006) found that the average efficiency slightly decreased and the number of efficient bank also decreased in Slovak banking sector. Iršová and Havránek (2011) estimated banking efficiency in five countries of Central and Eastern Europe including Slovakia. In Slovakia the results showed that the average cost efficiency was 51.8% and profit efficiency reached 43.2% in the years 1995–2006. Stavárek and Šulganová (2009) found that the average efficiency increased and their results point out a better ability of Slovak banks to use the inputs in the production process. Řepková (2013) estimated the cost and profit efficiency of the Slovak commercial banks and they found that the average cost and profit efficiency was decreasing in the Slovak banking sector during the period 2003-2012. And then they found that small and medium-sized banks were more efficient than the largest banks in the Slovak banking market. Zimková (2014) estimated the technical efficiency and the super-efficiency of the banking institutions in Slovakia in 2012 under transmission approach and found that that the level of efficiency differ from one bank to another. More than half of institutions under research were found technically efficient by applying conventional the input-oriented BBC-I and SBM-I models under variable return to scale. Also Bod'a and Zimková (2013a and 2013b) examined technical efficiency of the Slovak banking sector. Zemanová (2007) examined the Slovak banking sector's efficiency over the period 2002-2003.

Hasan and Marton (2003) examined the cost and profit inefficiency of Hungarian banking sector within the period 1993-1998 and found that average cost inefficiency was about 29% and average profit efficiency reached the value 34.5%. His conclusions were that banks with foreign involvement were found to be significantly less inefficient than their domestic counterparts. Among the foreign-involved institutions, a higher share of foreign ownership was associated with lower inefficiency.

Nikiel and Opiela (2002) estimated banking efficiency in Poland and found that that foreign banks are more cost-, profit-, and operationally efficient than state-owned or domestic private banks. Large banks are more efficient than small banks and foreign banks servicing foreign and business customers are more cost-efficient and less profit-efficient than other banks in Poland. Havrylchuk (2006) estimated efficiency of the Polish banking industry during the period 1997-2001. He found that bank efficiency has not improved during the analysed period. Wozniowska (2008) estimated efficiency of the Polish banking sector within the period 2000-2007.

The empirical literature review concluded that only few studies examined the Czech, Slovak, Polish and Hungarian banking sector individually. Most of the empirical studies research several banking sector which included the group of Visegrad countries and the second findings is that the most studies examined banking efficiency during 1990s. Thus, the literature review shows the motivation for this paper. This paper could fill the gap following time line in the empirical literature. Banking efficiency was estimated using the Stochastic Frontier Approach or Data Envelopment Analysis model. The contributions of this paper is the fact, that the DEA window analysis approach will be applied on the data of the Czech, Slovak, Polish and Hungarian commercial banks.

### **3 METHODOLOGY AND DATA**

#### **3.1 Data Envelopment Analysis**

The Data Envelopment Analysis is a mathematical programming technique that measures the efficiency of a decision-making unit relative to other similar DMUs with the simple restriction that all DMUs lie on or below the efficiency frontier Seiford and Thrall (1990).

DEA also identifies, for inefficient DMUs, the sources and level of inefficiency for each of the inputs and outputs Charnes et al. (1995).

The CCR (Charnes, Cooper and Rhodes, 1978) model presupposes that there is no significant relationship between the scale of operations and efficiency by assuming constant returns to scale (CRS) and it delivers the overall technical efficiency. The CRS assumption is only justifiable when all DMUs are operating at an optimal scale. However, firms or DMUs in practice might face either economies or diseconomies to scale. Thus, if one makes the CRS assumption when not all DMUs are operating at the optimal scale, the computed measures of technical efficiency will be contaminated with scale efficiencies. Banker et al. (1984) extended the CCR model by relaxing the CRS assumption. The resulting BCC (Banker, Charnes and Cooper) model was used to assess the efficiency of DMUs characterized by variable returns to scale (VRS). The VRS assumption provides the measurement of pure technical efficiency (PTE), which is the measurement of technical efficiency devoid of the scale efficiency (SE) effects. If there appears to be a difference between the technical efficiency (TE) and PTE scores of a particular DMU, then it indicates the existence to scale inefficiency (Sufian, 2007).

DEA begins with a fractional programming formulation. Assume that there are  $n$  DMUs to be evaluated. DMU <sub>$j$</sub>  consumes  $x_{ij}$  amounts of input to produce  $y_{rj}$  amounts of output. It is assumed that these inputs,  $x_{ij}$ , and outputs,  $y_{rj}$ , are non-negative, and each DMU has at least one positive input and output value. The productivity of a DMU can be written as:

$$h_j = \frac{\sum_{r=1}^s u_r y_{rj}}{\sum_{i=1}^m v_i x_{ij}}, \quad (1)$$

In this equation,  $u$  and  $v$  are the weights assigned to each input and output. By using mathematical programming techniques, DEA optimally assigns the weights subject to the following constraints. The weights for each DMU are assigned subject to the constraint that no other DMU has efficiency greater than 1 if it uses the same weights, implying that efficient DMUs will have a ratio value of 1. The objective function of DMU is the ratio of the total weighted output divided by the total weighted input:

$$\max h_0(u, v) = \frac{\sum_{r=1}^s u_r y_{r0}}{\sum_{i=1}^m v_i x_{i0}}, \quad (2)$$

subject to 
$$\frac{\sum_{r=1}^s u_r y_{rj}}{\sum_{i=1}^m v_i x_{ij}} \leq 1, j = 1, 2, \dots, j_0, \dots, n, \quad (3)$$

$$u_r \geq 0, \quad r = 1, 2, \dots, s, \quad (4)$$

$$v_i \geq 0, \quad i = 1, 2, \dots, m, \quad (5)$$

where  $h_0$  is the technical efficiency of DMU<sub>0</sub> to be estimated,  $u_r$  and  $v_i$  are weights to be optimized,  $y_{rj}$  is the observed amount of output of the  $r^{\text{th}}$  type for the  $j^{\text{th}}$  DMU,  $x_{ij}$  is the observed amount of input of the  $i^{\text{th}}$  type for the  $j^{\text{th}}$  DMU,  $r$  indicates the  $s$  different outputs,  $i$  denotes the  $m$  different inputs and  $j$  indicates the  $n$  different DMUs.

Conditions of CCR model:

$$\max h_0 = \sum_{r=1}^s u_r y_{r0}, \quad (6)$$

$$\sum_{i=1}^m v_i x_{i0} = 1, \quad (7)$$

$$\sum_{r=1}^s u_r y_{r0} - \sum_{i=1}^m v_i x_{i0} \leq 0, \quad (8)$$

$$v_i \geq 0, u_r \geq 0, j = 1, 2, \dots, n, i = 1, 2, \dots, m, r = 1, 2, \dots, s. \quad (9)$$

Conditions of BCC model:

$$\max h_0 = \sum_{r=1}^s u_r y_{r0} + u_0, \quad (10)$$

$$\sum_{i=1}^m v_i x_{i0} = 1, \quad (11)$$

$$\sum_{r=1}^s u_r y_{r0} - \sum_{i=1}^m v_i x_{i0} + u_0 \leq 0, \quad (12)$$

$$v_i \geq 0, u_r \geq 0, j = 1, 2, \dots, n, i = 1, 2, \dots, m, r = 1, 2, \dots, s, \quad (13)$$

where index  $o$  shows DMU, which efficiency is estimated,  $x_s$  denotes inputs,  $y_s$  denotes outputs,  $v_s$  is value of efficiency of the DMU,  $n$  shows number of DMU,  $m$  in number of inputs,  $s$  is number of outputs,  $u_0$  denotes return to scale.

### 3.2 Malmquist index

The Malmquist index (1953) evaluates efficiency change over time. The MI, based on DEA models, is one of the prominent indexes for measuring the relative productivity change of DMUs in multiple time periods. This index breaks down into various components. The index provides a useful way of distinguishing between changes in technical efficiency, pure technical efficiency, scale, total factor productivity (TFPC) and shifts in the efficiency frontier (technological change) over time. This index is the geometric mean of two TFPC indices, one evaluated with respect to the technology (efficiency frontier) in the current period  $t$  and the other with respect to the technology in the base period  $s$  (Coelli et al., 1998). One extension with DEA is to apply MI to panel data to estimate changes in technical efficiency, technological progress and total factor productivity.

The original idea of the Malmquist index was proposed by Malmquist (1953) who suggested comparing the input of a firm at two different points of time in terms of the maximum factor by which the input in one period could be decreased such that the firm could still produce the same output level of the other time period. Caves et al. (1982) extended the original Malmquist input index and introduced the first type of the Malmquist index, and then Fare et al. (1992) showed that the Malmquist index can be calculated using a nonparametric DEA-like approach, given that suitable panel data are available and they applied DEA for

measuring the Malmquist index. They assumed constant returns to scale and identified the technological change and the change of technical efficiency as two components of the productivity changes over time. Next, Fare et al. (1994) considered variable return to scale and offered an extended decomposition of the Malmquist index with another important factor capturing change in scale efficiency.

Following Fare et al. (1994) we use DEA to construct an input based MI between period  $t$  (the base period) and period  $s$ :

$$M_I(y^s, x^s, y^t, x^t) = \left[ \frac{D_I^t(y^s, x^s)}{D_I^t(y^t, x^t)} * \frac{D_I^s(y^s, x^s)}{D_I^s(y^t, x^t)} \right]^{\frac{1}{2}}, \quad (14)$$

where  $M_I(\cdot)$  is the input-oriented MI,  $D_I^t(y^s, x^s)$  is the distance function showing a maximal proportional reduction of the observed period  $s$  inputs under the period  $t$  technology. The distance function is defined as follows:

$$D_I^t(y^s, x^s) = \min_{\theta, \lambda} \theta, \quad (15)$$

subject to  $y_{is} \leq \lambda Y^t, \quad (16)$

$$\theta x_{is} \geq \lambda X^t, \quad (17)$$

$$\lambda_i \geq 0, i = 1, \dots, n, \quad (18)$$

where  $\theta$  is a scalar and  $\lambda$  is a vector of constants. The value of  $\theta$  obtained is the component score of the  $i$ -th firm.  $X$  and  $Y$  are input and output vectors, and the amounts of the  $i^{th}$  input consumed and output generated by the DMU<sub>0</sub>, are denoted by  $x$  and  $y$ .

The above measure actually is the geometric mean of two Caves et al. (1982) Malmquist productivity indexes. Fare et al. (1992) define that  $M_I > 1$  indicates productivity gain;  $M_I < 1$  indicates productivity loss; and  $M_I = 1$  means no change in productivity from time  $t$  to  $s$ . Relaxing Caves et al. (1982) assumption that  $D_I^t(y^t, x^t)$  and  $D_I^s(y^t, x^t)$  should equal to one, and allowing for technical inefficiency, Fare et al. (1992) decompose their Malmquist productivity index into two components:

$$M_I = \left[ \frac{D_I^t(y^s, x^s)}{D_I^t(y^t, x^t)} * \frac{D_I^s(y^s, x^s)}{D_I^s(y^t, x^t)} \right]^{\frac{1}{2}} = \frac{D_I^s(y^s, x^s)}{D_I^t(y^t, x^t)} \left[ \frac{D_I^t(y^s, x^s)}{D_I^s(y^s, x^s)} * \frac{D_I^t(y^t, x^t)}{D_I^s(y^t, x^t)} \right]^{\frac{1}{2}}. \quad (19)$$

The first component  $TEC = \frac{D_I^s(y^s, x^s)}{D_I^t(y^t, x^t)}$  measures the change in technical efficiency (technical efficiency change, TEC). The second component  $TCC = \left[ \frac{D_I^t(y^s, x^s)}{D_I^s(y^s, x^s)} * \frac{D_I^t(y^t, x^t)}{D_I^s(y^t, x^t)} \right]^{\frac{1}{2}}$  measures the technology frontier shift (technological change, TCC) between time period  $t$  and  $s$ . TCC can be seen as an average aggregated change in technology of a DMU from time period  $t$  to  $s$ .

Fare et al. (1992, 1994) point out that a value of  $TCC > 1$  indicates a positive shift or technical progress, a value of  $TCC < 1$  indicates a negative shift or technical regress, and value of  $TCC = 1$  indicates no shift in technology frontier. In this paper we use the decomposition of Malmquist index into two components, namely technological change and efficiency change ( $EC = \frac{D_{CRS}^s(y^s, x^s)}{D_{CRS}^t(y^t, x^t)}$ ), which is catch-up effect.

### 3.3 Data and selection of variables

The data set used in this study was obtained from the annual reports of commercial banks during the period 2009–2013 and all the data is reported on unconsolidated basis. We analysed only commercial banks that are operating as independent legal entities. As we have reliable data extracted directly from annual reports we eliminate the risk that incomplete or biased data may distort the estimation results.

In order to conduct the DEA estimation, inputs and outputs need to be defined. In the empirical literature four main approaches have been developed to define the input-output relationship in financial institution behaviour (intermediation, production, asset and profit approach). We adopt intermediation approach which assumes that the banks' main aim is to transform liabilities (deposits) into loans (assets). The bank collects deposits to transform them in loans. Consistently with this approach, we assume that banks use the three inputs (labour, fixed assets and deposits), and two outputs (loans and net interest income). We measure labour by the total personnel costs covering wages and all associated expenses and deposits by the sum of demand and time deposits from customers, interbank deposits and sources obtained by bonds issued. Loans are measured by the net value of loans to customers and other financial institutions and net interest income as the difference between interest incomes and interest expenses. Descriptive statistics of inputs and outputs is presented in Table 1.

Tab. 1 – Descriptive statistics. Source: Author's compilation

Variable	Deposits	Labor	Fixed assets	Loans	NII
Mean	330 242	5 523	6 861	266 122	17 434
Median	20 522	381	170	18 257	833
Minimum	0.00	2.22	0.09	0.00	0.29
Maximum	7 876 341	204 277	261 523	7 047 179	656 202
St. Dev.	1 001 014	21 246	28 642	854 692	74 368

## 4 EMPIRICAL ANALYSIS AND FINDINGS

DEA can be used to estimate efficiency under the assumptions of constant and variable returns to scale. For empirical analysis we use MaxDEA software. The DEA method is suitable in the banking sector because it can easily handle multiple inputs-outputs producers such as banks and it does not require the specification of an explicit functional form for the production frontier or an explicit statistical distribution for the inefficiency terms unlike the econometric methods (Sufian, 2007). The banking efficiency have been estimated using the DEA models, input-oriented model with constant returns to scale and input-oriented model with variable returns to scale. The reason for the using of both techniques is the fact that the assumption of constant returns of scale is accepted only in the event that all production units

are operating at optimum size. This assumption, however, in practice it is impossible to fill, so in order to solve this problem we calculate also with variable returns of scale. We used unbalanced panel data from 13 Czech commercial banks, 11 Slovak commercial banks, 23 Hungarian commercial banks and 38 Polish commercial banks (with regard to mergers and acquisitions of banks).

Tab. 2 – Efficiency score estimated in CCR and BCC model. Source: Author’s calculation

	CCR					BCC				
	2009	2010	2011	2012	2013	2009	2010	2011	2012	2013
Visegrad countries	0.50	0.49	0.45	0.31	0.56	0.63	0.63	0.62	0.42	0.73
Czech Republic	0.53	0.51	0.41	0.27	0.61	0.71	0.66	0.63	0.33	0.82
Hungary	0.56	0.50	0.45	0.31	0.47	0.79	0.74	0.73	0.54	0.77
Poland	0.48	0.49	0.46	0.34	0.58	0.53	0.58	0.58	0.38	0.69
Slovakia	0.43	0.44	0.43	0.27	0.57	0.55	0.55	0.52	0.37	0.66

Table 2 presents average efficiency in Visegrad countries, as well as in the Czech, Hungarian, Polish and Slovak banking sector estimated in CCR and BCC model. The average efficiency calculated in assumption of constant return to scale reach the value 21-61%. On the other hand, average efficiency with variable return to scale was between 33 to 82%. Efficiency in BCC model attained the higher value that efficiency in CCR model. The BCC model decomposes efficiency into two components: pure technical efficiency and efficiency to scale. The values of efficiency computed by the BCC model reach higher values than efficiency computed by the CCR model by eliminating the part of the inefficiency that is caused by a lack of size of production units. This situation may occur when a bank, which has been marked as ineffective in the CCR model due to its inaccurate size, will be marked as an efficient in the BCC model.

It was found that the Hungarian commercial banks were the most efficient in both models.

The results of the average efficiency scores based on constant returns to scale and variable returns to scale, which are divided into three groups of banks according total assets amount, are presented in Table 3. We adopt the breakdown of banks into the groups according Vodová (2012). We distinguish between small, medium-sized and large banks based on the amount of their total assets. Following Vodová (2012) we define large banks as banks with total assets greater than 6% of the total assets of the banking sector. Medium-sized banks have total assets of between 2% and 6% of total assets. Small banks are banks with total assets of less than 2% of the total assets of the banking sector.

Comparing the group of banks results show that according CCR model the group of small banks in Visegrad countries was the most efficient over the whole estimated period. In BCC model the highest efficient were medium-sized and large banks in Visegrad countries. In the Czech banking sector, the most efficient was the group of medium-sized banks in both models. In the Hungarian banking sector the most efficient were small banks in CCR model and the most efficient banks was the group of large banks in BCC model. It shows that large banks in the market are too large and have improperly chosen their size (range of operation). In the Polish banking sector the group of small banks was the most efficient in both model. And in the Slovak banking sector the most efficient were medium-sized banks in CCR model. In BCC model the group of small banks was the most efficient.

Tab. 3 – Average efficiency in CCR and BCC model in groups of banks.



Source: Author's calculation

	CCR					BCC				
	2009	2010	2011	2012	2013	2009	2010	2011	2012	2013
<b>Visegrad countries</b>										
Large banks	0.41	0.41	0.42	0.27	0.55	0.64	0.62	0.68	0.49	0.77
Medium-sized banks	0.44	0.51	0.44	0.30	0.59	0.61	0.66	0.65	0.46	0.82
Small banks	0.56	0.52	0.48	0.34	0.57	0.64	0.62	0.59	0.40	0.65
<b>Czech Republic</b>										
Large banks	0.37	0.36	0.36	0.25	0.53	0.60	0.53	0.65	0.45	0.81
Medium-sized banks	0.56	0.71	0.53	0.32	0.70	0.92	0.82	0.76	0.33	1.00
Small banks	0.60	0.49	0.38	0.27	0.60	0.65	0.65	0.56	0.28	0.73
<b>Hungary</b>										
Large banks	0.43	0.44	0.43	0.29	0.49	0.92	0.92	0.92	1.00	1.00
Medium-sized banks	0.41	0.45	0.41	0.22	0.46	0.80	0.90	1.00	0.87	1.00
Small banks	0.65	0.53	0.46	0.34	0.47	0.74	0.62	0.59	0.37	0.59
<b>Poland</b>										
Large banks	0.40	0.41	0.42	0.26	0.56	0.57	0.49	0.59	0.27	0.68
Medium-sized banks	0.39	0.47	0.40	0.35	0.61	0.43	0.54	0.49	0.35	0.71
Small banks	0.52	0.51	0.49	0.34	0.57	0.55	0.60	0.60	0.40	0.67
<b>Slovakia</b>										
Large banks	0.44	0.42	0.44	0.28	0.60	0.44	0.49	0.54	0.31	0.64
Medium-sized banks	0.45	0.50	0.46	0.28	0.60	0.48	0.52	0.50	0.36	0.73
Small banks	0.40	0.37	0.37	0.23	0.48	0.79	0.73	0.54	0.49	0.60

The large volume of information derived from DEA may be difficult to summarize and evaluate. Therefore, it is often helpful to break down the information using the Malmquist index. We calculate Malmquist index from the DEA scores between adjacent periods. The application of the Malmquist index is also conducted in MaxDEA software. The Malmquist change indices are computed using DEA. The indices measure TFPC for sampled banks in adjacent year during the period from 2009/2010 to 2012/2013. Its decomposition into technological change (TCC) and efficiency change (EC).

Table 4 presents the results of the average Malmquist indices in banking sectors of the group of Visegrad countries, as well as in the Czech, Hungarian, Polish and Slovak banking sectors during the analysed period.

Tab. 4 – Average Malmquist indices in banking sectors. Source: Author's calculations

	CCR				BCC			
	2009-10	2010-11	2011-12	2012-13	2009-10	2010-11	2011-12	2012-13
Visegrad countries								
EC	1.02	0.97	0.69	2.15	1.04	1.03	0.69	2.17
TCC	1.03	1.06	1.61	0.51	1.15	1.00	1.72	0.54
MI	1.05	1.03	2.29	1.04	1.17	1.02	1.12	1.04
Czech Republic								
EC	0.98	0.90	0.64	2.48	0.92	1.00	0.61	2.70
TCC	1.01	1.07	1.68	0.50	1.04	0.97	2.01	0.45
MI	1.00	0.96	8.08	1.15	0.97	0.95	1.13	1.11
Hungary								
EC	0.98	0.95	0.65	2.04	0.98	1.02	0.70	1.88
TCC	1.07	1.02	1.51	0.53	1.63	0.93	1.50	0.66
MI	1.02	1.00	0.96	1.04	1.57	0.97	0.94	1.04
Poland								
EC	1.04	1.00	0.76	2.08	1.10	1.05	0.70	2.22
TCC	1.00	1.07	1.65	0.50	0.97	1.03	1.82	0.49
MI	1.07	1.07	1.25	0.99	1.05	1.07	1.28	1.00
Slovakia								
EC	1.05	0.99	0.63	2.12	1.07	1.00	0.72	1.84
TCC	1.03	1.06	1.58	0.50	0.97	1.04	1.43	0.62
MI	1.08	1.04	0.98	1.04	1.03	1.02	0.96	1.07

The average Malmquist index reaches the annual average growth of 27% in CCR and 9% in BCC. This positive efficiency change can be dichotomized into its catch-up and frontier-shift components. The catch-up or recovery component (efficiency change) below 1.00 indicating regress or negative efficiency change. The mean value of EC (catch-up or recovery component) registered 1.00 or above 1.00 indicating progress or positive efficiency change. The catch-up effect is comprised of pure and scale efficiency changes. Pure efficiency change represents core efficiency due to improved operations and management while scale efficiency change is associated with returns to scale effects. In Visegrad region the average annual efficiency change (catch-up) was 10% in CCR and 12% in BCC model. On a year-by-year score, efficiency change only registered below the 1.0 mark for the 2011-2012 period.

Technological change or frontier-shift represents the innovation in the banking system that has been developed, adapted or absorbed by the players. Technological change reached average value of 0.97 in CCR model and 1.00 in BCC model. It indicated the negative average annual growth of 3%.

In the Czech, Hungarian, Poland and Slovakia banking sector, average Malmquist index ranges 1.00-1.09 in CCR and 1.02-1.10 in BCC model. It shows the positive efficiency change. Technological change registered the negative average annual growth of 2-4%. This is due to the negative growth in 2012-2013 which was probably caused as results of a financial crisis. Efficiency change (catch-up) was above 1 besides 2011-2012. It was probably caused due to reduce operations and managements and decreasing effect of return to scale.

Tab. 5 – Average Malmquist indices in the individual groups of commercial banks.

Source: Author's calculations

	CCR			BCC		
	EC	TCC	MI	EC	TCC	MI
Visegrad countries						
Large banks	1.07	0.95	1.01	1.09	0.98	1.02
Medium-sized banks	1.14	0.97	1.10	1.17	0.99	1.12
Small banks	1.09	0.98	1.05	1.10	1.06	1.10
Czech Republic						
Large banks	1.10	0.93	1.03	1.08	0.97	1.05
Medium-sized banks	1.08	0.95	1.02	1.04	0.98	1.00
Small banks	1.07	1.01	1.96	1.13	0.95	1.04
Hungary						
Large banks	1.02	0.97	0.98	1.00	0.94	0.94
Medium-sized banks	1.04	0.96	0.98	1.07	0.94	1.00
Small banks	1.06	0.97	1.02	1.07	1.15	1.19
Poland						
Large banks	1.09	0.95	1.03	1.05	0.99	1.04
Medium-sized banks	1.22	0.98	1.20	1.24	0.98	1.25
Small banks	1.11	0.98	1.06	1.13	0.97	1.05
Slovakia						
Large banks	1.08	0.95	1.03	1.10	0.94	1.03
Medium-sized banks	1.09	0.98	1.05	1.12	0.94	1.03
Small banks	1.07	0.96	1.02	0.97	1.03	0.98

Average Malmquist indices of individual group of banks are given in Table 5. The average efficiency change achieved the positive growth in most groups of banks (besides the group of medium-sized and large banks in Hungary) indicating that analysed banks registered positive efficiency growth in the group of banks in Visegrad countries.

We decomposed the efficiency change into the catch-up and frontier-shift effects and found that the catch-up effect was primarily accountable for the productivity growth rather than the frontier-shift effect, suggesting that the industry has lacked innovation or technological progress in the past 5 years. Technological efficiency change register below 1.00 in the most group of banks (besides small Czech commercial banks). It means that technology has a negative effect on the total efficiency change. The highest technological change attained the group of small banks.

The values of catch-up registered values above 1.00 in all group of banks, which indicate the progress or positive efficiency change. The highest efficiency change reach the group of medium-sized banks.

## 5 CONCLUSION AND DISCUSSION

The aim of this paper was to estimate efficiency change in the banking sectors of the group of Visegrad countries during the period 2009–2013. The group of Visegrad countries includes

the Czech Republic, Hungary, Poland and Slovakia. For the estimation we applied Malmquist index on the data of commercial banks. We estimated banking efficiency applying input-oriented model under the assumptions of constant and variable returns to scale. We used unbalanced panel data from 13 Czech commercial banks, 11 Slovak commercial banks, 23 Hungarian commercial banks and 38 Polish commercial banks.

The results show that average efficiency was slightly decreasing within the period 2009-2011. In 2012 average efficiency significantly decreased in banking sectors of Visegrad countries. This decrease was probably as a result of financial crisis. Average efficiency again increased in 2013. Our finding confirms the study of Anayiotos et al. (2010) who concluded that the banking efficiency decreased during the period of financial crisis. The Czech banking sector attained the highest efficiency under the assumptions of constant return to scale. On the other hand, the Hungarian banking sector was the most efficient under the assumptions of variable return to scale. The result shows that the Hungarian commercial banks, especially large banks in the market have improperly chosen their size. Our result is consistent with the conclusion of Stavárek and Polouček (2004), Stavárek (2005), Staníčková and Skokan (2012) and Melecký and Staníčková (2012) who evaluated the Czech banking industry as the highest efficient.

Next, we distinguish between the efficiency of the group of large banks, medium-sized banks and small banks in Visegrad countries as well as in the Czech Republic, Hungary, Polish and Slovakia. Results show that the group of small banks was the most efficient in CCR model and the group of medium-sized banks was the most efficient in BCC model. On the contrary, Nikiel and Opiela (2002) found that large banks were more efficient than small banks in Poland during 1990s. Our results show that small banks were the most efficient in the period 2009-2013. Difference in results can be due to different periods. In Slovakia we confirm the result of Řepková (2013) that large banks were the lowest efficient. Also this result is consistent with results of Stavárek and Řepková (2012) who found that largest banks performed significantly worse than medium-sized and small banks.

We asked this research question: "What is the main reason for positive/negative efficiency change in Visegrad countries?" The average Malmquist index reaches the annual average growth of 27% in CCR and 9% in BCC. We found the positive efficiency change during the period 2009-2013. We can answer that this positive efficiency change is especially due to the catch-up effect. Results of technological change indicates the negative average annual growth of 3%. The negative growth of technological change is due to the negative growth in 2012-2013 which was probably caused as results of a financial crisis. Efficiency change (catch-up) was above 1 besides 2011-2012. It was probably caused due to reduce operations and managements and decreasing effect of return to scale. Our findings are consistent with results of Hančlová and Staníčková (2012) who concluded that all Visegrad countries had the total efficiency increase through the period 1999-2007. They also found the most productivity growth was in the Czech Republic which illustrated the biggest performance change and thus efficiency trend.

Comparing the group of banks we found that average efficiency change achieved the positive growth in most groups of banks (besides the group of medium-sized and large banks in Hungary) indicating that analysed banks registered positive efficiency growth in the group of banks in Visegrad countries. We also found that that technology has a negative effect on the total efficiency change. The highest technological change attained the group of small banks.

#### **Acknowledgements:**

Research behind this paper was supported by the Czech Science Foundation within the project GAČR 13-03783S ‘Banking Sector and Monetary Policy: Lessons from New EU Countries after Ten Years of Membership’.

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## **DEBT RELIEF OF INDIVIDUALS AND THE RATE OF SATISFACTION OF THEIR CREDITORS IN THE CZECH REPUBLIC**

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### **Abstract**

According to statistics, the indebtedness of Czech households has been on the rise since 2000, while a broadening supply from the financial sector, the growing standard of living (which is connected with debt financing of housing) and the tendency to favour a consumer lifestyle have contributed to the growing volume of credits.

The aim of our survey is to ascertain the extent to which creditors of debtors in debt relief are satisfied. A sample of insolvency proceedings permitted in 2008 was surveyed. Of these insolvency proceedings, we selected personal bankruptcies which underwent the five-year repayment period required by the insolvency act. A situation emerges in which we can for the first time evaluate the success of creditors satisfaction on the basis of concrete data which we gained from the insolvency register. On the basis of a survey, it was found that individual creditors are satisfied to 50 % of their ascertained receivables. The given initial finding is interesting especially in view of the fact that the law itself prescribes a 30 % minimal limit of satisfaction for debtors.

Further, the survey focused on the problem of securing receivables. The insolvency act has markedly changed the position of the creditor which secures its receivable by some form of collateral. A secured receivable can be monetized during the course of insolvency proceedings, and following the deduction of connected expenses the entire proceeds from the monetized property belong to the secured creditor. By contrast, in a case of personal bankruptcy a non-secured creditor is satisfied according to a percentage in a payment schedule. We surveyed especially the proportion of secured receivables and the form of collateral. From the data it stemmed that 19.62 % of receivables are secured with the debtor's property, most frequently a house, plot of land, flat or other form of collateral.

*Keywords: Debt relief, personal bankruptcy, insolvency, creditors' satisfaction, secured receivable*

JEL Classification: G33

## **1 INTRODUCTION**

The implementation of the institute of personal bankruptcy entailed a significant change for citizens of the Czech Republic when settling their debts. Given the fulfilment of given conditions, debtors get a chance to rid themselves of their debts definitely, whilst decision-making and supervision throughout the entire insolvency proceedings is the province of the pertinent regional courts. The Insolvency Act assigned to insolvency courts the role of supervision over insolvency proceedings and likewise significantly changed the position of secured creditors. Economic subjects have been forced to adapt to the new conditions. Debt relief deeply affects each debtor, especially in the social area.

Debt relief (also labelled as personal bankruptcy) is a manner of settling bankruptcy that was implemented by the Insolvency Act (Act No. 182/2006 Coll. on Insolvency and its Resolution) on 1 January 2008; it was primarily intended for individuals who are not

entrepreneurs. The amendment to the act, effective as of 1.1.2014, opened the possibility of debt relief also for individuals – entrepreneurs given fulfilment of conditions laid down by the law.

The point of debt relief is to help citizens who wish to settle their adverse situation in an active manner – they thus get a “second chance” and cover their debts at least partially.

There are two ways of clearing a non-entrepreneurial subject's debt. One of these is monetization of the debtor's property; the second possibility is debt relief by completing a payment schedule over a period of five years; the debtor, however, has to be able to repay non-secured debtors at least 30 % of their receivables. Unlike settlement of financial failure by bankruptcy, the amendment of debt clearance provides the debtor with a benefit in the form of cessation of obligation to repay the remainder of a debt after the debt relief process ends. A further specific feature is the fact that debt relief can only be proposed by the debtor (unlike bankruptcy).

Although the conditions are strict for the debtors, a growing number of filed requests for debt relief bears witness, nevertheless, to the fact that there is a great need in Czech society to solve this problem.

Throughout the payment period, the debtor should eliminate all unnecessary expenditures and should calculate its family budget, which should be compiled in such a way that the outgoing component should not exceed the income component. In the reasoned report, the legislators state that it is precisely the necessity of long-term economic activity with a limited budget that should have a positive effect on the debtor's behaviour after the close of the five-year period and personal bankruptcy, and it is thereby to fulfil also a certain instructional role. While the payment schedule is underway, the debtor is not to create further debts which it cannot repay and will therefore have to do without consumer loans which, as a rule, lead households and individuals into the debt spiral.

## **2 LITERATURE REVIEW**

Insolvency proceedings fulfil a significant purpose on a macro and microeconomic level. On a macroeconomic level, they provide a platform for the departure of economically unsuccessful subjects from the market. The task of insolvency law is to increase the efficiency of this process. Furthermore, it prevents all-societal losses, for it removes from separate creditors the individual legal means of enforcement and replaces them with the collective process. A further major goal is to ensure that regardless of the disparateness of the claims on the debtor's property, its assets are to be handled, if possible, in a manner as effective as would be the case if a homogenous proprietor – a single investor – handled them. An equally important function of insolvency law is the impact of its effect on solvent, i.e. non-bankrupting subjects and their investors. In this regard, we speak of ex ante effects (Richter, 2008).

The authors Carter and Van Auken (2006) focused on an analysis of the main reasons for the rise of insolvency among small firms. Their research, in which they compared demographic and potential problems in 57 bankrupting companies and 55 non-bankrupting companies in the American state of Iowa, pointed towards the three main causes of insolvency: lack of knowledge, the impossibility of debt financing and the economic climate. The necessity of economic knowledge as a safeguard against financial failure is documented, for instance also by the older research of Graham Hall (1992), who statistically processed data which British businesses in insolvency have to provide to the court by law. He saw the main cause of insolvency in the inability of a business to foresee the need for capital and, furthermore, in the inefficiency of money markets. Yet the authors Shepherd, Wiklund and Haynie (2007) point

out that besides the financial prospect of company bankruptcies, the emotional perspective (which, according to them, is the reason why entrepreneurs lengthen the agony period of a bankrupting company) also has to be taken into account. The connection of financial literacy and social standing was proved, for instance, by Jappeli (2010) in a comprehensive analysis of the financial literacy of inhabitants in 55 countries. According to him, financial literacy markedly varies in individual countries. One can, however, notice that it grows with education and the level of human capital, and also with the proportional representation of the town population; furthermore, the study proved lower financial literacy among inhabitants of countries with a generous social security system.

A hitherto relatively little-researched theme is the problem of the behavior of debtors and creditors after completion of personal bankruptcy. In the *Journal of Banking and Finance* (2013), the authors Cohen-Cole, Duygan-Bump and Montoriol-Garriga published a study in which they empirically surveyed the possibilities of credit accessibility for individuals immediately after the end of personal bankruptcy. On the basis of surveyed data, the authors arrived at the conclusion that, in American credit companies, the “debt-cleared” individual represents a better and less risky investment, and thus has a better chance of acquiring a potential credit. The authors likewise proved that credit-scoring models are unable to characterize adequately the debt risk of natural person bankruptcy, for there is here the risk of incorrect allocation or adjustment of a credit and, thereby, the non-repayment thereof.

### **3 AIM AND METODOLOGY**

The data for this survey was gained from the publically accessible insolvency register, whilst data were sought on debtors – individuals among whom debt relief was permitted in 2008, and it was thus possible to ascertain the final satisfaction of creditors after five years.

The aim of our survey is to ascertain the extent to which creditors of debtors in debt relief are satisfied. The survey included 664 insolvency proceedings of individuals commenced in 2008. This sample included both insolvency proceedings which took place in the form of bankruptcy, personal bankruptcy or other possibilities (adjourned or suspended proceedings, change of personal bankruptcy to bankruptcy etc.). Debtors, whose debt relief was approved in 2008, already have 60 instalments completed or are close to fulfilling the instalments. A situation emerges in which we can for the first time evaluate the success of creditors satisfaction on the basis of concrete data which we gained from the insolvency register. 191 debtors out of the surveyed sample of natural persons underwent the entire process of personal bankruptcy. When assessing the rate of creditor satisfaction, data on debtors from the category of debtors in and after debt relief and thereafter formed the departure point (i.e. 191 debtors). Among those, who completed the process of debt relief (i.e., they paid 60 instalments), the total paid amount was taken into account. Among debtors who have fewer than 60 instalments paid, the extrapolated total amount of instalments was taken to be the total amount of debt coverage. This extrapolated figure was thus taken as 60 multiples of the amount of their theretofore average monthly instalment. The extrapolated total amount of debt coverage was, however, limited by the total amount of debt.

Data concerning the level of debt and satisfaction of creditor according to individual characteristics – for instance, age, sex, position of secured creditor was acquired from the register; in the next part, the survey focuses on the length of insolvency rulings according to individual courts and position of secured creditors.

## **4 SURVEY RESULTS**

### **4.1 The focus on debtors**

The average level of debt and the average level of satisfaction of creditors were monitored especially in the categories of “women” (which represented 36.1% of the monitored sample) and “men” (representation 63.9%). The average level of debt among women was CZK 537 thousand, while the average level of creditors’ satisfaction reached 46.2%. Men in the monitored sample had an average level of reported receivables of CZK 652 thousand, satisfaction of creditors reached 58.8%.

The average amount of debt and the average rate of creditor satisfaction according to debtor sex are given in Tab. 1.

Tab. 1 – Average amount of debt and average rate of creditor satisfaction. Source: Insolvency register + own calculations

	Women	Men
Relative number of debtors in %	36.1	63.9
Average amount of debt in CZK thousands	537	652
Average amount of creditor satisfaction in %	46.2	58.8

From the gained and evaluated data on debtors, it stems that debt relief applies to all age categories. The average amount of debt was in the vicinity of between CZK 500 – 600 thousand. Men and women of so-called productive age between 35 – 60 years have the highest owed amounts.

When comparing the ability among men and women to repay their debts, there is a slightly lower ability among women between 30 – 60 years to repay their debts. This is probably caused by the fact that women in their productive years care for children whom they have in their care, and alimented persons, even after divorce, are included in the non-forfeitable minimum. Their economic situation thereby differs from that of divorced men.

### **4.2 Securing receivables**

One of the ways towards reducing creditor risks is the securing of loans. When collecting data, especially securing with a flat, detached house, cottage, plot of land or other item was monitored.

A secured creditor has a special position in insolvency proceedings. In insolvency proceedings, the secured creditor is satisfied especially from sale of the collateral, only under the assumption that it duly reports its receivable to the insolvency proceedings, its receivable is ascertained during review proceedings and such a creditor requests the insolvency administrator’s instructions as to the sale of this collateral. Secured creditors form a group in insolvency proceedings which, given its standing and its interests, markedly differs from the other groups of creditors. Precisely in view of their rights from securing gained prior to the commencement of insolvency proceedings, they are given the possibility to influence the course of the proceedings in a significant way.

In the event that debt relief is approved and a ruling on the form of debt relief by payment schedule is passed, the secured creditor's receivable is satisfied solely from the proceeds from monetization, which is reduced by a maximum 4 % for administration costs, 5 % for monetization expenses and 9 % for the insolvency administrator's fees, and this secured receivable therefore cannot be a part of the payment schedule.

The proportion of secured receivables to the total volume of receivables is 19.62 %. The representation of individual methods of securing in the total volume of secured receivables is shown on Figure 1.

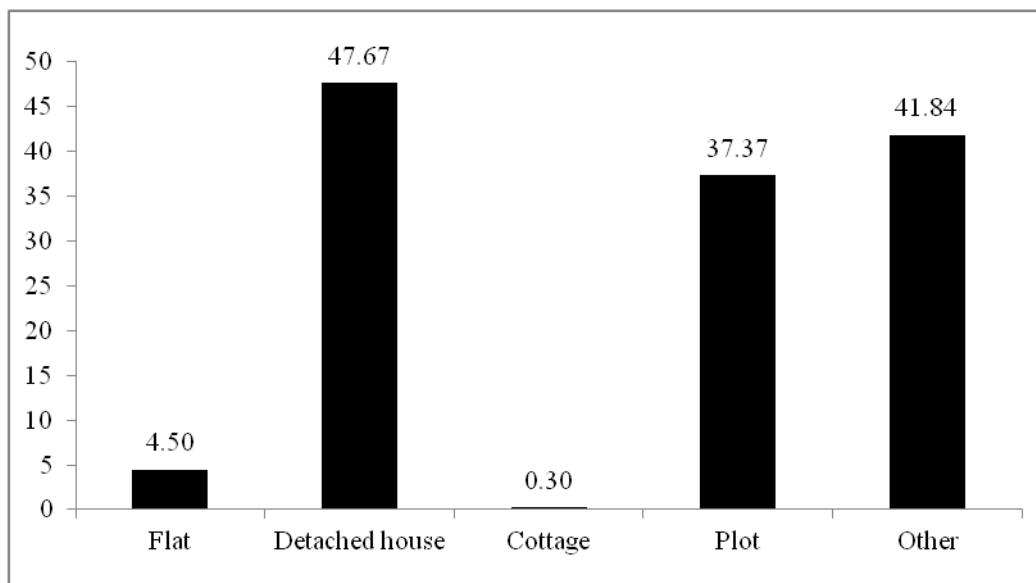


Fig. 1 – Relative representation of individual types of secured receivables in % with a view to the total volume of secured receivables. Source: Insolvency register + own calculations

The graph on Figure 1 was compiled for assessing individual types of collateral. Let us mark the entire number of debtors that acquired a loan when they provided collateral  $I$ . Every such debtor is represented in our set by the pair  $\{ P_i, K_i \}_{i=1, \dots, I}$ , where  $P_i$  is the amount of the loan of the  $i$ -th debtor and  $K_i \in K$  a  $K$  is the set of all non-empty sets containing various combinations of one or more considered types of collateral. In view of the fact that the number of considered types of collateral is equal to 5, the power of set  $K$  is equal to  $2^5 - 1$ . Then in the graph, the value

$$r_k = 100 \cdot \frac{\sum_{\forall i: k \in K_i} P_i}{\sum_{\forall i} P_i}$$

pertains to the  $k$ -th type of collateral of relative representation of individual types of secured receivables in %.

The height of the column of type of collateral corresponds to the percentage of the given collateral in total secured receivables. The sum exceeds 100, as the debt is sometimes secured by several types of collateral. The amount of the due receivable always appears in the total for the type of collateral when the debtor stated the given type of collateral in a provided list of collateral types. The relative value is the total level of debt with a type of collateral.

Figure 2 shows the proportion of secured receivables for debtors in the categories “in bankruptcy from the beginning” and “in debt relief or debt cleared” is significant. The graph

represents the relative proportion of secured and non-secured receivables related to the total sum of receivables in a given category. The subject of collateral is, as a rule, real estate.

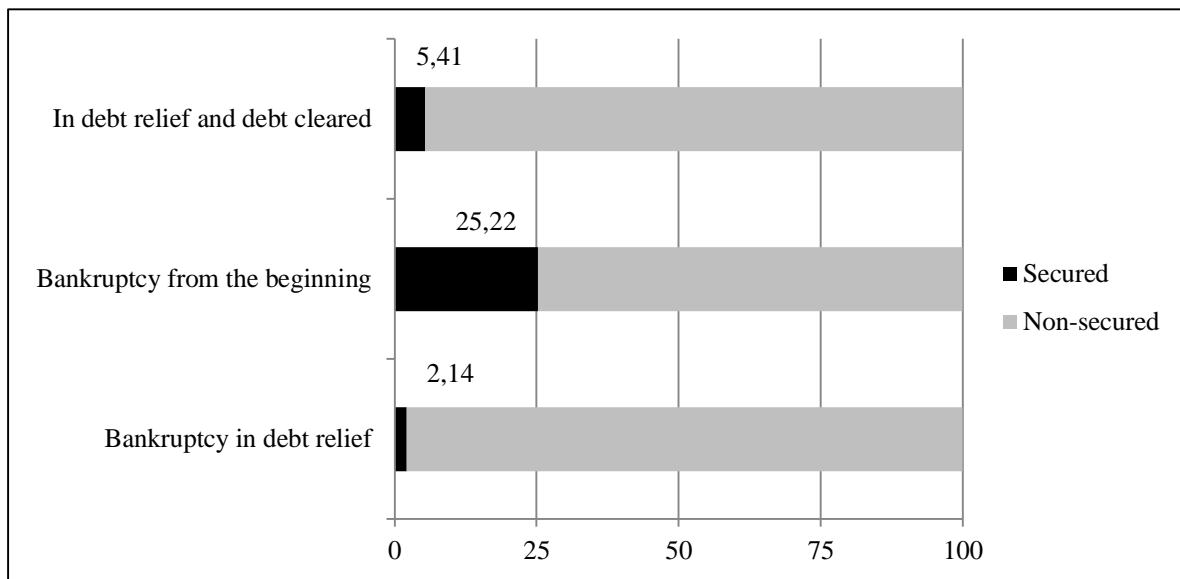


Fig. 2 – Relative representation in % of amount of secured and non-secured debts in individual debtor. Source: Insolvency register + own calculations

## 5 DISCUSSION

The conditions for secured loans are, markedly unfavorable for the debtor, as the loaned sum does not exceed the estimated price of the real estate, and if the debtor does not cover the owed sum within the fixed term, they lose their immovable property, as the creditor sells the subject of collateralized object.

This corresponds also to the results of similarly- focused foreign surveys. Davydenko and Franks (2008) have proved that banks in countries that provide debtors with less protection require higher collateral for their credits and vice versa.

## 6 CONCLUSION

The aim of this contribution was to gain a deeper insight on debtors who complete personal bankruptcy, both by analysis of the level of their debt with which they enter into insolvency proceedings and by surveying the level of creditors' satisfaction after the close of personal bankruptcy. We surveyed these categories in dependence to the age structure of debtors and according to a division according to sex of persons. The survey according to sex proved a lower initial debt among women, but at the same time also lower satisfaction of their creditors – the average level of debt among women was CZK 537 thousand, while the average level of creditor satisfaction reached 46.2%. Men in the monitored sample had an average level of reported receivables of CZK 652 thousand, satisfaction of creditors reached 58.8%. The division according to age proved (in both sexes) the highest growth of debt during productive age (35-60 years), while among women aged 30 – 50 years there is clearly a lower level of satisfaction of creditors in comparison to men in the same age category, which can be explained not only by generally lower income among women in comparison to men, but also by the fact that women care for children who are not provided for, which increases the non-forfeitable minimum sum, thereby decreasing the percentage of satisfaction of creditors.

The next part of the survey focused on creditors' securing of receivables. It was found that 19,62 % of receivables registered in insolvency proceedings consist of receivables secured by a certain form of collateral. Most frequently, a detached house, flat, plot of land or other form of collateral (e.g. an automobile) was at issue. In the course of the survey, it was also found that markedly more secured receivables appear when insolvency proceedings take place from the outset in the form of bankruptcy. This can be explained by the fact that personal bankruptcy has, since its implementation, been conceived of as a solution for debts predominantly from consumer loans which did not utilize the institute to a high degree.

From the data up to the present it can, for the time being, only be judged that this is among of the first completed debt reliefs, and the ascertained fulfilment expresses the debtor's real possibility to satisfy creditors' receivables. It can be expected that the position of the secured creditor and the level of satisfaction of receivables in insolvency proceedings will affect the approach of creditors in the Czech Republic in securing their receivables and the direction of their risk-management.

### **Acknowledgment**

*This article has been processed as one of the outputs of the research project "Research of insolvency practice in the CR, with the aim of forming proposals for changes in the legislation that would enable increased yields from insolvency proceedings for creditors, which would contribute towards increasing the competitiveness of the Czech economy", registered at the Technological Agency of the Czech Republic (TA CR) under the registration number TD020190, of the project IGA/FaME/2015/021, "Analysis of the bank approaches in the enforcement of receivables from subjects in insolvency" registered at TBU Zlín.*

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## **PERFORMANCE OF SMES AND THE ROLE OF RESILIENCE**

*Reinhard Paulesich*

### **Abstract**

Peak oil is increasingly seen as a major threat to economy as well as infrastructures. Peak oil either happened (2008) or is to be expected in the near future. European gas production has peaked and it is doubtful if imports will be sufficient. A decline in oil production will possibly trigger a decline in economic production or even a collapse.

Thus, regional development policies should consider regional resilience strategies. In order to do this it is necessary to clarify the resilience and operationalize resilience components: economic, ecological, social factors and factors of the built environment.

This describes the background for answering our research questions.

What can be SMEs contributions? How social sciences can measure their performance and their strategic options to get statement rich in scientific content. Regional, national and EU policies are challenged.

We carry out workshops with local entrepreneurs and their local stakeholders as well as interested public from May to July 2013 underpinned by social surveys within various organizations and business in order to crosscheck analyses from explorative interviews with key stakeholders before. The empirical data are basis for case studies in two regions rounded up by energy expert workshops in each region for analyzing sensitivity of empirical results (derived scenarios) against various expert scenarios.

*Keywords: SMEs Performance Measurement, Regional Development, Resilience and Innovation, Intervention in Social Capital.*

JEL Classification: L25, O31, R58

## **1 INTRODUCTION**

Let me first add measuring organizational capabilities to performance measuring of SMEs. It becomes clear when you get to know the background of the question which I will answer in this paper. The background refers to resilience. The question is, which methods and instruments do we need additionally to performance measuring for SMEs to assessing their resilience? Furthermore we have to take into account innovation because we propose that it is the back side of the same medal.

We – whatever you will understand by “we”: polity, community, region, organization or firm – we want to gain both (1) to be resilient and hence get the certainty to have capabilities to overcome possible crises and (2) to be progressive and hence get the certainty to have capabilities to move continuously forward to a more convenient life. Finally the question arises where and how to intervene for shaping and strengthening capabilities.

## **2 CONCEPTUAL BACKGROUND**

Resilience has become a prominent concept to understand system vulnerabilities and flexible ways of adapting to crises. Recently, it gained importance in discussions about the possible peak oil and its consequences, which might affect economic performance, social well-being

and political stability, and thus also the very energy transition to a low-carbon economy, which is the ultimate rationale of impact of a Peak Oil.

The resilience discourse seems to mark a significant shift in societal debates, as its upswing coincides with a range of intertwined dynamics that are now often discussed as multiple crises: the nearly breakdown of the world economy in 2008, with continuing economic, political and social challenges in its wake; the extraordinary price increases for food, energy and many other raw materials, which reshaped a whole socio-economic landscape from geopolitics to developmental issues and the stability of governments; and the seeming lack of climate policy success (Exner et al. 2013).

The innovation discourse seems to mark a program for redemption from crisis caused by economic and / or societal distortions. The sermon repeats investment in education, re-research and technology to create an appropriate climate for business founding and start-ups. Regions and nations should retain their competitiveness. This should be reflected mainly in media agenda main-streamed policy intentions, interests and attention.

What can we state by the look to regional policies? The concept of Regional Innovation Systems has evolved into a widely used analytical framework generating the empirical foundation for innovation policy making. Yet, the approaches utilizing this framework remain ambiguous on such key issues as the territorial dimension of innovation, e.g., the region, and the apparently important role played by “institutions” or the institutional context in the emergence and sustenance of regional innovation systems.

Institutions are “social relations” that frame the activities of production, consumption, and exchange - the substance rather than merely the boundaries of social life - and the guide to reduce uncertainty in human interactions. As such, institutions operate at and through different arenas. The medium is (verbal) (personal) communication.

This describes the background for my research question: What is the part of SMEs? How SMEs can contribute to resilience respective innovation? Can we directly conclude from performance measuring to resilience measuring? It is a challenge for social research to measure organizational performance and capabilities to get statements rich in scientific content. Which strategic options such statements provide at least?

Resilience is a matter of organizational slack – on firm level – and redundancies on regional level and as we mentioned above for innovative milieus too. When we accept this bivalent character we can open the door to multiple aspects of organizational development.

### **3 DATA AND METHOD**

What we want to measure? Slack or rather redundancy is to understand as a surplus to requirements. It can be measured by questioning what the volume is in time, intensity and satisfaction with verbal and personal communication. Another point of view is to look at the opposite pair of flexibility and idling. Flexibility is a highly valued property of an organization but idling is highly rejected as well. In conventional economic theory organizational slack is zero, at least at equilibrium. Cyert and March claim that organizational slack plays a stabilizing and adaptive role. Grabher describes organizational slack and regional redundancy as the provision of uncommitted and unspecific resources which then characterize and enable an organization to perceive various options

1. on the one hand to follow objectives and goals even in times of uncertainty and surprises,

2. on the other hand to experimental handling of resources through a “relaxed” communication, which is a prerequisite for creativity and innovation.

## 4 RESEARCH

Diversity and redundancy are preconditions for the availability of alternatives in cases of shocks particularly affecting single regions or industries. The research where the data which I will figure out come from was about resilience of regions. The data collection comprised criteria within five dimensions.

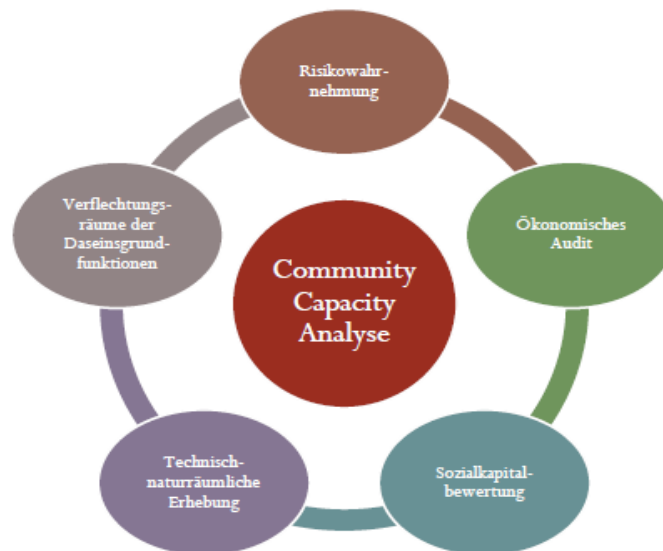


Figure 1: Community Capacity Analyses. Source: Own elaboration (ROE 2014, Klima- und Energiefonds)

Here I want to talk about the social capital and the economic audit dimension. For data collection we carried out workshops with local entrepreneurs and their local stakeholders as well as interested public from May to July 2013 underpinned by social capital surveys within various organizations and businesses in order to crosscheck analyses from explorative interviews with key stakeholders before. The empirical data are basis for case studies in two regions rounded up by energy expert workshops in each region for analyzing sensitivity of empirical results (derived scenarios) against various expert scenarios.

In each phase of our research process we patterned the communication relevant data by volume, intensity and satisfaction with personal contacts of our interview partners. Data for the other three dimensions was collected along the scheme described by the next table.

Table 1: Distribution of indicator data along scale levels Source: Own elaboration (ROE 2014 Klima- und Energiefonds)

	No of indicators per data level						total
	State	Federal states	Judicial parishes	NUTS3	Districts	Municipalities	
Energy			4			1	5
Spatial structure and mobility		1				4	6
Reciprocity		2		1			11
Skills							2
Conventional economy		1	2		2	1	9
Organizational capacity and collective competencies		1	5				8
		5	17	1	2	6	41

Three of the six research fields for the analyses of quantitative data - selection from various existing databases of Statistics Austria – provide various interfaces to qualitative data and the making of indices from social capital and economic audit, which is illustrated by the following table.

Table 2: Quantitative and qualitative data interface. Source: Own elaboration (ROE 2014 Klima- und Energiefonds)

Interfaces	Quantitative	Qualitative
<b>Energy</b>	<ul style="list-style-type: none"> <li>• Electricity consumption</li> <li>• Renewables Production</li> </ul>	<ul style="list-style-type: none"> <li>• Trust in institutions</li> <li>• Willingness to invest</li> </ul>
<b>Reciprocity</b>	<ul style="list-style-type: none"> <li>• Member of conventional associations</li> <li>• Engaged in volunteer work</li> </ul>	<ul style="list-style-type: none"> <li>• Social capital I</li> <li>• Social capital II</li> </ul>
<b>Organisational Capacity ...</b>	<ul style="list-style-type: none"> <li>• Income gap m/f</li> <li>• Regional energy &amp; social initiatives</li> <li>• Access to information &amp; knowledge</li> </ul>	<ul style="list-style-type: none"> <li>• Social capital I</li> <li>• Social capital II</li> <li>• Work place stress</li> </ul>

#### 4.1 Social Capital Analysis

Formation and description of qualitative indicators by 6 Indices are presented in Tab 3.

Table 3: Quantitative qualitative data interface. Source: Own (ROE 2014 Klima- und Energiefonds)

<p><b>Social Capital-Index 1</b> has 6 dimensions.</p> <p>A high value characterises the core property of social cohesion, which sometimes can coincide with understanding and practicing solidarity. Therefore the assumption is: high value correlates positive with the ability to overcome crisis.</p>	<p><b>SCI 1</b></p> <ol style="list-style-type: none"> <li>1. sense making work,</li> <li>2. friends will help in emergency cases,</li> <li>3. sufficient number of friends and acquaintances,</li> <li>4. aktive engagement,</li> <li>5. mixed work – community work,</li> <li>6. mixed work – aktive work.</li> </ol>
<p><b>Social Capital-Index 2</b> has two times 5 dimensions and is a composition of community and active work (for Mixed Work see ANNEX 2 figure 2).</p> <p>A high value in terms of time expenses characterises the second important property of social cohesion. The assumption is: high value – restrictions because of gainful occupation – correlates positive with resilience because there are more social and practical skills.</p>	<p><b>SCI 2</b></p> <ol style="list-style-type: none"> <li>1. time expenses,</li> <li>2. self assessment – satisfaction,</li> <li>3. intention to increase / decrease,</li> <li>4. feedback – acknowledgment,</li> <li>5. feedback – trust,</li> <li>6. feedback – respect,</li> <li>7. impact on family life.</li> </ol>

<p><b>Work Place Stress-Index</b> has 3 dimensions.</p> <p>A high value means high stress and would threaten respondents' health. The impact on the organisation is loss of resilience respective loss of productivity.</p> <p>There is an option to check the plausibility of answers by an European and additionally a national (AK OOE) survey.</p>	<p><b>WPSTI</b></p> <ol style="list-style-type: none"> <li>1. Stress exposure – physical,</li> <li>2. Stress exposure – mental,</li> <li>3. Work place well being.</li> </ol>
<p><b>Well being Index</b> has 6 dimensions.</p> <p>A high value means a sufficient well being. There is an option to check the plausibility of answers by UN Quality of Life &amp; OECD Better Life Index and additionally by an ongoing FP7 research project coordinated by the Austrian WIFO: <a href="http://www.foreurope.eu">wwwforeurope – welfare wealth work</a> <a href="http://www.foreurope.eu/">http://www.foreurope.eu/</a></p>	<p><b>WBI 1</b></p> <ol style="list-style-type: none"> <li>1. Stress – private life,</li> <li>2. social burdens,</li> <li>3. self assessment - position in society,</li> <li>4. assessment of living environment,</li> <li>5. succeeding private life,</li> <li>6. assessment personal health status.</li> </ol>
<p><b>Trust in Institutions Index</b> has 3 dimensions.</p> <p>A high value means a high trust in institutions of the state but particularly of the market. Additionally the intensity of the personal messaging believes in everyday communication was questioned.</p>	<p><b>TII 1</b></p> <ol style="list-style-type: none"> <li>1. Personal message at home, at work place and both,</li> <li>2. Trust in cohesiveness of family, society,</li> <li>3. Trust in capabilities of market institutions.</li> </ol>
<p><b>Willingness to Invest Index</b> has 5 dimensions.</p> <p>A high value means a willingness to invest in renewable energy projects (PVD, Wind Wheels, and innovative SMEs). The restrictions were: (1) spatially closeness (2) the profit does not exceed 3%. Additionally the amount willing to invest as well as the free disposable income was questioned.</p>	<p><b>WII 1</b></p> <ol style="list-style-type: none"> <li>1. Photo Voltaic Devices, Wind Wheels, SMEs;</li> <li>2. Income – free disposable,</li> <li>3. Amount willing to invest,</li> <li>4. Ethical ecological rating,</li> <li>5. Yield on share (max 3% - high valued).</li> </ol>

For ordering the results we choose a scale of 5 stages according to the school grades from 1 equals best to 5 equals worst. For displaying we choose colors from red to green Red equals 5, green equals 1. The results are presented in Fig. 2.

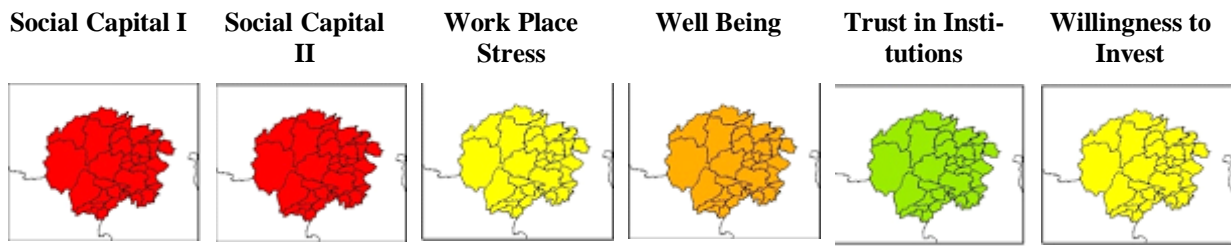


Figure 3: Resilience rating scale. Source: Own elaboration

high	
moderate	
medium	
poor	
insufficient	

Figure 2: Social Capital Lower Austria [LA] (n=165; 09 – 11 2013). Source: Own Elaboration (ROE 2014 Klima- und Energiefonds)

Both SC indices in Lower Austria are red. That means to less active engagement in associations etc. and subsequently less communication between communities. Community work and active work is underrepresented in comparison to the Austrian average.

The value (occurrence) of Work Place Stress and Willingness to Invest range in the middle: yellow. Work Place Stress corresponds to the annual survey which is published by the chamber of labor (Upper Austria). The Willingness to Invest is a little higher than we had collected 2004 and the Austrian Central Bank publishes annually for private investments even under mentioned restrictions of return. This seems to be due to the low interest rates banks give to conventional savings.

Private Well Being – ocher yellow – seems to be closer at value to both SC I & II than to Work Place Stress. That means respondents are more satisfied by their jobs than by their private circumstances. This has to be deeper questioned next time. Trust in Institutions is the only index in green: light green. In spite of a suboptimal value of Well Being the value of Trust in societal and market institutions is held up.

Only one SC index – the SC 1 – in Upper Austria is red but this is the core part with strong references to social cohesion. (It has a high scientific content.) That means the similar as for Lower Austria: to less active engagement in associations etc. and subsequently less communication between communities. Community work and active work is underrepresented in comparison to the Austrian average. The SC II has a poor value possibly due to the companies function as an incubation center. Most of the professionals there has an honorary office or are engaged in volunteer work. Results are presented in following Fig 4.

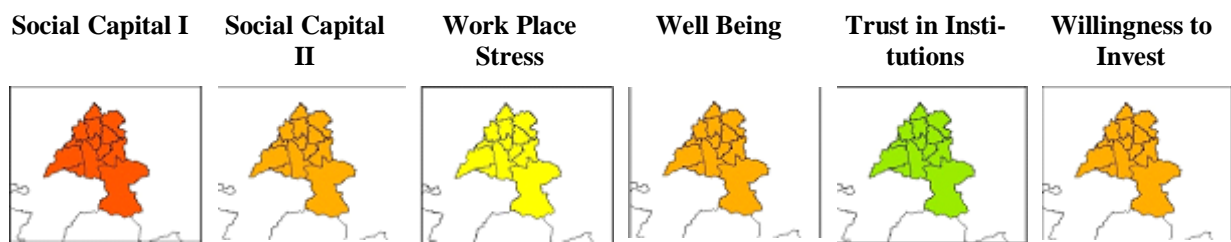


Figure 4: Social Capital Upper Austria [UA] (n=22; 09 – 11 2013). Source: Own elaboration (ROE 2014 Klima- und Energiefonds)

The value (occurrence) of Work Place Stress range in the middle: yellow. Work Place Stress corresponds to the annual survey which is published by the chamber of labor (Upper Austria). The Upper Austrians assess their work place situation above Austrian average.

The Willingness to Invest is as poor as we had collected 2004 and the Austrian Central Bank publishes annually for private investments. This looks embarrassing and needs a deeper questioning because most of the respondents are affiliated at an incubation center which has the function to advice and support start-ups.

Private Well Being as well as Willingness to Invest is colored in ocher yellow – seems to be closer at value to both SC I & II than to Work Place Stress. That means respondents are more satisfied by their jobs than by their private circumstances. This has to be deeper questioned next time. Trust in Institutions is the only index in green: light green. In spite of a suboptimal value of Well Being the value of Trust in societal and market institutions is held up.

#### **4.1.1 Discussion**

The data base is poor but for planning serious policy interventions it would need a policy committed regional programme development instead of research. The data base consists of 3 companies in Lower Austria and 1 company (and various single persons) in Upper Austria. In spite of it fulfils the intended purpose, to discover a track to methodologically combine existing data set with primarily generated qualitative data for deriving from analyses some statements with scientific content.

- The values of both social capital indices (measuring volume, intensity and satisfaction by communication) are red that means management should identify organizational weaknesses and conceptualize interventions for minimizing them.
- The values of wellbeing indices (concerning private life) in both regions are at a low level compared to the values for work place stress.
- The values of trust in institutions indices (both regions) are the only of the five within the green range.
- Maybe the difference between private and occupational wellbeing partly explains the level of trust in institutions. Family as an institution is lightly less weighted than society respective market. It seems that respondents would relax more at their workplace than at home.

## 4.2 Economic Audit Analyses

We analyzed 4 Indices. Formation and description of qualitative indicators are presented in Tab 4.

Table 4: Qualitative indicators. Source: Own elaboration

Certainty strategy	Intrinsic motivation, market pressure, state regulations, certainty of energy supply required
Change strategy	Intrinsic motivation, attitude to energy change, priorities energy change, required market transparency
Level of activities	Devices installed, energy saving concepts (management) employed, insulation, assessment of organisational preparedness
Willingness to invest	The same as above (investment target and restrictions)

The Economic Audit is a feature of our social capital research in the two mentioned regions. The intention is to collect verbal data from managers separately and with more focus on economic issues. When our research would have had a political commitment we would have made a programme for intervening in regional administration and market.

Respondents would have an equal distribution between certainty and change. The opinion dominates that an equal weighting would keep options for future decisions at an optimal level. Activities and Willingness to Invest are both on a poor level. Both can be explained by expenses for restructuring some important industries of the region in the last 2 decades. These industries were nationalized and were reorganized for privatizing. That implies a requalification of work force, rebuilding some sites to attract new businesses etc. Therefore we think that they will follow such developments in energy supply with a little time lag. Results of the Economic Audit in Lower Austria are presented in Fig 5.

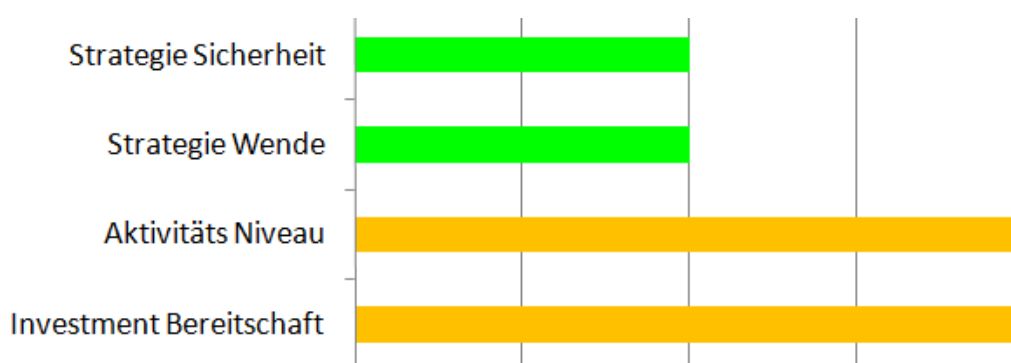


Figure 5: Economic Audit Lower Austria [LA] (n=44; 11 – 12 2014). Source: Own elaboration (ROE 2014 Klima- und Energiefonds)

Respondents would have an equal distribution between certainty and change. The opinion dominates that an equal weighting would keep options for future decisions at an optimal level. But compared to the Lower Austria region the Upper Austria region climbs up to a higher level of resilience – dark green. Activities are on a middle level. They have invested in re-



newable energy more per capita than the others. But *Willingness to Invest* is valued almost as poor as Lower Austria. For that we don't have an explanation. The Economic Audit in Upper Austria is presented in Fig 6.



Figure 6: Economic Audit Upper Austria [UA] (n=20; 10 – 12 2014). Source: Own (ROE 2014 Klima- und Energiefonds)

#### 4.2.1 Analysis

- Comparing the willingness to invest between staff and managers / owners (see tables further down) the index value differs strongly. Staff in Upper Austria (Traunstein) have a significant lower interest to invest in spatial close projects than the managers (more than six tenth).
- Managers are weighting certainty of energy provision as equal as energy change by their strategy concept

#### 4.2.2 Discussion

First we have to mention that we have a significant low number of respondents in the Upper Austria region. But we have various analyses and survey which foster the impression we got by comparing LA and UA. The similarities of both regions are:

- Topographic structure,
- Number of small towns,
- Structure of educational institutions,

The differences are:

- a little more rural structure in UA region,
- big and former nationalized industry in LA,
- small und middle sized industry in UA,
- technology and innovation center in UA region.

The LA region shows positive values of indices for only 5 from 37. That is:

- electricity from renewable energy in relation to over all electricity consumption,
- some aspects of regional autochton food production,
- some aspects of traffic, and
- trust institutions.

The UA region shows positive values of indices for 8 from 37. That is:

- overall production of electricity from renewable energy and its future potentials,
- some aspects of regional autochton food production,
- some aspects of private independence from energy supply,
- some aspects of traffic, and
- trust institutions.

## 5 CONCLUSION

Where and how management can intervene? It is an issue for private firm management as well as for public management and policies / politics. The first request is for coalitioneers. Where and how regional policies e.g. public management on a communal level can intervene?

How to proceed and what to recommend?

1. The new institutional economics [NIE] are the ground from where we start to build the bridge from theory to policies;
2. When the criteria we have shown in table 1 are existing points for data generating than we should go backward from there;
3. The intention is to identify structures in public administration, market etc we can characterise them as institutions of the first order;
4. This procedure we can repeat by the qualitative criteria which we used for measuring social capital;
5. So will come to deeper laying structures which we can call institutions of second order;
6. From here we can start the final analyses to identify measurements for interventions (see the following table)

The differences we enumerated above imply different methods and instruments of intervention. We assign the categories of the two columns from table 2 at the formal and informal institutions of the New Institutional Economics and reason along our empirical analyses.

Table 5: Interfaces for Interventions. Source: Own elaboration (ROE 2014 Klima- und Energiefonds)

<b>Formal Institutions</b>	<b>Informal Institutions</b>	<b>Intervention - Change</b>
• Electricity consumption	• Trust in institutions	A voluntary reduction is not to expect, provision of security of energy supply requests for a network of regional organisations to establish various independent plants as well as grids etc.
• Renewables Production	• Willingness to invest	To reduce the pressure on public finance existing PPP models for financing renewable energy plants should not only pay attention to returns but also to secure supply.
• Member of conventional associations	• Social capital I	The numbers of both categories decrease in most of the EU states but solidarity is sotosay still alive – a more or less counter diction to the analyses of formal structures.
• Engaged in volunteer work	• Social capital II	

<ul style="list-style-type: none"> <li>• Income gap m/f</li> </ul>	<ul style="list-style-type: none"> <li>• Social capital I</li> </ul>	<p>Only interventions on nation level will help for equality policies</p>
<ul style="list-style-type: none"> <li>• Regional energy &amp; social initiatives</li> </ul>	<ul style="list-style-type: none"> <li>• Social capital II</li> </ul>	<p>Individual private contributions to PPP models could also consist of volunteer work (mixed work) and crowd funding.</p>
<ul style="list-style-type: none"> <li>• Access to information &amp; knowledge</li> </ul>	<ul style="list-style-type: none"> <li>• Work place stress</li> <li>• Well Being</li> <li>• Trust in institutions</li> </ul>	<p>The question is how new media will influence informal institutions in regions – the effect will become evidence when the young generation will come to the labour market</p>

This needs a scientific justification and discussion we want to perform at the conference.

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## **MOTIVES FOR MERGERS AND ACQUISITIONS**

*Jan Pěta, Mária Režňáková*

### **Abstract**

It is a commonly held view that large companies are the decisive force in every economy. One of corporate growth strategies are mergers and acquisitions. Although some authors believe their development closely correlates with the development of the GDP, the number of transactions world-wide has grown continuously except slight dips in 2009 and in 2012 -2013. The average value of executed transactions has also grown. This paper looks into the motives for mergers and acquisitions. The authors analyze and systemize information about past mergers and acquisitions in terms of their motivation. The research conducted shows that in many cases it is not possible to unambiguously pinpoint the motive, or distinguish among individual motives at play. The performed analysis and systemization of findings, which are the main methodological tools of research in business and management, nevertheless help create new knowledge in the field of mergers and acquisitions.

*Keywords: mergers and acquisitions, tax motivation, synergy, motive of efficiency*

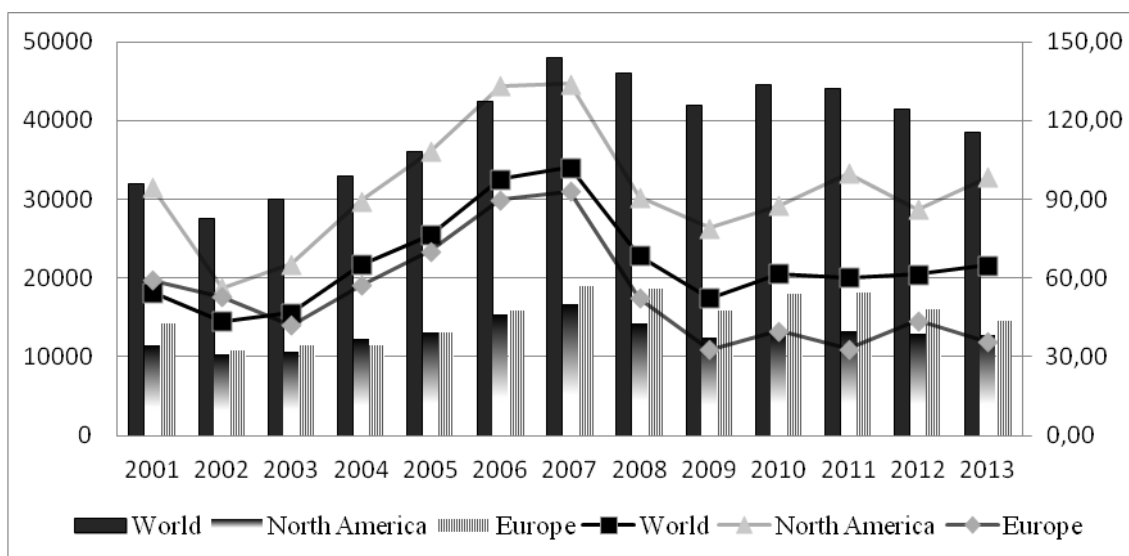
JEL Classification: G34

### **1 INTRODUCTION**

One of important areas for both research and strategic management of companies are mergers and acquisitions. Their volume is growing worldwide, even though they seem to come in waves. The reason may lie in the fact that large companies are generally considered as more stable, high performing and affecting the economic performance of the whole economy, in the case of large multinational corporations, the performance of the world economy. This fact is confirmed by research carried out in the field of bankruptcy, where the factor of company size (measured by asset value) is an important distinguishing feature marking the difference between prosperous businesses and businesses at risk of bankruptcy (see, e.g., Karas, Režňáková, 2013). Mergers and acquisitions are considered one of the ways how companies can grow and develop, and increase in value.

In general, mergers and acquisitions (M&A) are terms referring to the consolidation of companies, and many studies do not distinguish what type of consolidation it is. A merger is a combination of two companies to form a new company, while an acquisition is the purchase of one company by another in which no new company is formed.

The importance of M&A may be deduced from the data in Fig. 1.



*Note: Average values of M&A (right axis) are in million USD for World and North America, in million EUR for Europe*

Fig. 1 Numbers and Average Values of M&A. Source: Own analysis of data from Institute of Mergers, Acquisitions and Alliances (2014)

It clearly shows that the volume of executed M&A has been growing worldwide over time, and so has the average value of transactions completed. The highest values of transactions were achieved in 2006 and 2007, when also the number of transactions peaked. It is worth noting that the average growth rate of the number of transactions and the average value of transactions world-wide exceed the average rate of growth in Europe and North America.

What the situation is in the Czech Republic can be inferred from the results of research conducted by Ernst&Young (2014), according to which 38% of companies were planning some kind of an acquisition in the next 12 months, while in two previous years it was only 6%. Of the 38% of companies planning an acquisition, as many as 61% expected that the transaction size would exceed 50 million USD, which is also an increase compared to 39% in the previous year. The reason for the growing interest in acquisitions is a positive mood in the current economic situation in the Czech Republic, where 90% of managers think that the situation is stable or improving. A positive factor, which suggests that growth in M&A in the country will continue, is the opinion of 42% of the interviewed managers who believe that the difference between the expectations of buyers and sellers regarding the transaction price is lower than 10%. Nearly three-quarters of managers think that the convergence of transaction prices will stay at that level, or will continue.

## 2 RESEARCH OBJECTIVE AND METHODOLOGY

Each transaction can be assessed in terms of the objectives pursued. Although systemizing knowledge from this point of view, i.e. in terms of motives for the transaction, is very difficult because each transaction is unique, it is the goal that we set for ourselves in the present study.

For conducting research in the field of business and management, the choice of methodology is crucial. It significantly affects the credibility of the research and its depth. It helps to create high quality in knowledge (Arbnor, Bjerke, 2009). The main methodological approach in our research was the analytic approach supplemented by a systemic approach leading to the synthesis of the results.

Collis and Hussey (2003, p. 343) describe analysis as an ability to break down information into individual elements that can be more easily understood, and to decide what should be done with any particular element in the process. Synek et al. (2007, p. 20) claim that the breaking down into individual elements makes research and finding patterns easier. The aim of analysis is to get to know the individual elements and links between them, including patterns that apply there. In a broader sense, analysis can be understood as the acquisition, evaluation and sorting of information for the solving of a particular problem.

Collis and Hussey (2003, p. 343) define synthesis as an ability to build information from other information. For Synek et al. (2007, p. 20), synthesis means the combination of individual elements into a whole. By placing phenomena next to one another, mutual relationships can be identified and the set investigated more profoundly understood.

This paper presents results of the first stage of continuing research into reasons for the failure to attain expected benefits of M&A implementation. It is a part of a broader research focused on the modification of methods for determining the boundary price of the target company in M&A. The price paid for the target company influences the success of the M&A (e.g. Ismail, 2011 Netter et al, 2011 Zaheer et al, 2013). We will base our modifications on the assumption that the boundary price represents the value of the company being purchased for the individual investor. The maximum price depends on the motives and expected effects of the combination. The price should, however, be based on the value of the target company. The methods that can determine that value include discounted free cash flow or capitalized cash flow (see, e.g., Dutordoir et al., 2014).

### **3 RESULTS AND DISCUSSION**

M&A can be divided into four major groups:

- Horizontal M&A, i.e. a combination of two or more companies from the same market segment. The problem with these transactions is that they may lead to the establishment of a monopoly position for the successor company, and for that reason horizontal M&A are often investigated in terms of competition policy. According to Andrade et al. (2001), the number of horizontal M&A has been growing: from just under 30% in the 1970s to 40% in the eighties and almost 48% in the nineties.
- Vertical M&A are combinations of two companies that are in the customer-supplier relationship. The problem with vertical M&A is the possibility that they may influence market prices or discriminate against competing companies, and that is the reason why they are similarly scrutinized in terms of competition policy.
- Congeneric M&A are, from the economic competition point of view, on the borderline. The term is used for a combination of companies from the same industry but with different or completely unrelated products. They may be market extension mergers or product extension mergers.
- Conglomerate M&A represent the smallest problem from the competition perspective because they are concentrations of companies from different industries. An example might be when a company engaged in agricultural production buys a newspaper-publishing company Smrčka, 2013.)

Another approach to M&A classification has been proposed by Damodaran (2011), who distinguishes between friendly M&A and hostile takeover bids. Andrade et al. (2001) used his approach in their research of a total of 4,256 M&A. From their results, which they divided by decades, it follows that:

- in the 70s, of the total of 789 transactions only 8.4% were hostile takeover bids, of which only 4.1% were completed;
- in the 80s, of the total 1,427 transactions, 14.3% were hostile takeover bids, and 7.1% were completed;
- in the 90s, when their sample contained 2,040 transactions and the environment had calmed, the number of hostile takeover bids was 4%, of which 2.6% were completed. The cooling-off on the M&A market can also be observed in the number of bidders for one company, which decreased from 1.6 in the 80s to 1.2 in the 90s.

Mukherjee et al. (2004) think that the number of motives for M&A equals the number of transactions. Based on their research conducted between 1990 and 2001, they consider synergies (37%), diversification (29%) and restructuring (11%) the most common motives for M&A. After a detailed analysis of available literature, we identified the following motives for M&A:

### **3.1 Efficiency**

This motive is one of the most often cited. Its basic idea is that the combined company will perform certain activities more efficiently than two separate companies. The efficiency motive can be divided into synergy effects and economies of scale.

**Synergistic effects** are often further divided into operating and financial ones by many authors (e.g. Chatterjee, 1986 Trautwein, 1990; Mukherjee et al., 2004, Devos et al., 2009, Geiger, 2010, Vyas et al., 2012). According to Chatterjee (1986), operating synergies represent a class of limited resources which lead to the production and/or administrative efficiency. Trautwein (1990) adds that they can be attained through a common sales force or knowledge transfer. Chatterjee (1986) believes that financial synergies help reduce the cost of capital and hence increase the cost efficiency, which leads to lower prices that the competitors are unable to compete with.

Mukherjee et al. (2004) examined what are the percentages of the above synergies in the opinion of managers: 90% of managers mentioned operational synergies as the motive. The opinions of remaining 10% were evenly split between financial synergies and enhanced market power. Similar research was conducted by Devos et al. (2009), who examined 264 M&A. They found the synergy motive in 10.03% of executed M&A. Financial synergies due mainly to tax savings accounted for 1.64% of transactions, and operational synergies achieved principally by cuts in investment spending made possible by better use of resources made up the remaining 8.39%. Chatterjee (1986) came to the conclusion that financial synergies are influenced the relative size of the company: if the company makes full use the possibilities offered by financial synergies and benefits from M&A may be greater than those arising primarily from operating synergies. Motives for M&A were examined by Bhide (1990) between 1985 and 1986. The primary motive he identified in one third of the transactions were operational synergies.

Third category is mentioned by Trautwein (1990), who refers to it as managerial synergies. These are accomplished when bidder's managers have superior planning and monitoring abilities. Vyas et al. (2012) define managerial synergies as the ability to monitor and achieve the plan which has been set as a target.

**Economies of scale** can be looked at from two different angles, either as an increase in revenues, or a decrease in expenses.

Higher efficiency based on economies of scale can be achieved by increasing the volume of services offered, or by the sale of underutilized assets. Ross et al. (2008, p. 850) see three sources of revenue growth: improved marketing, improved distribution network and improved product mix. An example is the acquisition of the Vermeer company (FrontPage program) by Microsoft. Sales of the program increased immediately after the acquisition. The other category are strategic advantages that the company can transfer from one area to another. An example of that can be a company that produces sewing machine motors: thanks to its expertise, it can also make motors for printers.

Discussing economies of scale, Brealey et al. (2008) note that combining companies may merge together the managements, accounting, financial control and development. They give the example of the US banking sector from the early 1920s. Gaughan (2007) gives the example of a successful combination of Exxon and Mobil Oil Company, in which significant economies of scale were achieved. The merger was announced in 1998, with projected savings of 3.8 billion USD. Just two years after the transaction, it was announced that the objectives had been met and even surpassed by more than 20%.

Mellen and Evans (2010, p. 84) reported reduced costs achieved by consolidation of functions, positions and fixed assets that cause a reduction in overhead costs. For example, a merger of two major banks Chase and Chemical was motivated by a desire to reduce costs by up to 16% per annum, i.e. by 1.5 billion USD, by consolidating operations and eliminating unnecessary costs.

Smrčka (2013) notes that economies of scale may not always materialize and gives the example of the Skanska company, which acquired over ten construction companies through privatizations and acquisitions. The companies, however, were former competitors and their negative relationship spilled over into the new company. Individual divisions fought against each other by submitted bids for the same tenders. The problem lasted for over five years, and the main reason were unresolved issues concerning the choice of directors in individual divisions.

### **3.2 Economies of vertical integration**

Economies of vertical integration are another group of motives which was identified by Brealey et al. (2008). This type of savings is achieved when the company either gains control over the production process (combination with the supplier) or the distribution channels that are subsequently used for the sale of its products (combination with the distributor). Vertical M&A allow companies to control the quality of supplied raw materials, and such combinations can also increase the company's profit by eliminating at least one step of profit margins that existed in the supplier chain prior to the transaction. Brealey et al. (2008) give the example from the mid-20th century when General Motors produced most parts in companies it owned. That was an advantage over its competitors Ford and Chrysler.

Further savings can be achieved through coordination of related activities (see Ross et al., 2008). They give the example of wood-processing companies that often also own lumber companies or sawmills. Gaughan (2007) cites the case of the automobile company General Motors and the General Motors Acceptance Corporation, which provided low-cost loans to GM customers.

### **3.3 Enhancement of the market power**

The market power motive is not perceived uniformly by all authors. Some call it the monopolization of the market (e.g. Trautwein, 1990, Geiger, 2010). The monopoly theory is based on the belief that the company will be able to determine market prices thanks to the



increase in its power in the market, or even its monopoly position in the sector (e.g. Pawaskar, 2001, Devos et al., 2009, Asimakopoulou and Athanasoglou, 2013, Vyas et al., 2012). It needs to be added that this motive is only possible in horizontal and conglomerate M&A, as pointed out by Geiger (2010) and Vyas et al. (2012).

Gaughan (2007) states that there are three main sources of enhancing one's market position: product differentiation, barriers to market entry and market share. An example of a successful horizontal combination is the WorldCom Company, which, in the late eighties and in the nineties, successfully expanded its operations in the USA when it carried out over 40 transactions exclusively with regional telecommunications vendors. According to Sedláček et al. (2013), the growth of market power is cited as the reason by less than 7% of respondents in the Czech Republic.

### **3.4 Tax motive**

Lower taxes may be a strong motivation for M&A according to Ross et al. (2008, p. 852). That, however, applies only in countries where that option is allowed. The most commonly cited reason is the use of corporation tax loss. Another possibility is the increase in debt capacity. This has been highlighted by Pawaskar (2001) who believes that that is an important motive for M&A especially in companies in an uncorrelated sector. Companies with low debt levels become interesting for companies with high debt levels. Following a merger, they can claim a higher amount of paid interest and thus reduce the amount of taxes paid. The last option is the revaluation of assets and a related rescheduling of the depreciation plan. The result of this operation is again a reduction of the tax base and thus of the tax paid. The above motives have also been confirmed by Devos et al. (2009). Similarly, this motive is also confirmed by Mellen and Evans (2010), who see an opportunity to achieve financial savings by increased use of debt financing and interest tax shield. In the Czech Republic, the tax motive was responsible for more than 9% of transaction according to Sedláček et al. (2013, p. 73).

### **3.5 Excess cash motive**

Some companies may be tempted to merger with a company that has an excess of cash which it does not use at all either because of a lack of profitable investment opportunities or inadequate redistribution among the company owners. Brealey et al. (2008) pointed out that the retaining cash poses a risk for the company that it may become attractive for a raider interested in its cash. The raider theory has also been considered by Trautwein (1990). In an acquisition motivated by excess cash, wealth is being transferred from the purchased (target) company to the buying company (acquirer). It is not, however, possible to fully agree with this opinion because of the premium paid to acquire the stock of the company to be controlled. Discussing this M&A motivation, Jindřichovská (2013) adds that the acquirer restructures the target company and is able to use the excess cash more efficiently.

### **3.6 Managers' self-assurance**

This motif is specifically described by Trautwein (1990) in the empire building theory. According to this theory, managers maximize their goals rather than value for shareholders. The author mentions research conducted by You et al. in 1986, which indicated that the result of M&A is usually negative if managers own shares. Geiger (2010) adds that another reason for the negative outcome is that managers overestimate their managerial skills. The negative impact of managers' self-assurance on the success of M&A has also been investigated by other authors (see, e.g., Pawaskar, 2001, Huyghebaert and Luypaert, 2010, Vyas et al., 2012).

In their research, they agreed that management interests to carry out M&A usually have a negative effect on added value for the owners.

Also worth mentioning is another theory put forward by Trautwein (1990), namely the valuation theory. According to that theory, M&A are performed by managers who have better information than the stock market. He substantiates his claim by research results according to which 60% of managers believe that their company is undervalued.

### **3.7 Diversification motive**

Diversification outside the company's line of business prevailed in the late 1960s, i.e. at the time of the so-called third wave of M&A. A successful company with this motive is, according to Gaughan (2007), General Electric operating in electronics, which diversified into insurance, TV, healthcare and others industries. Mellen and Evans (2010) perceive the diversification motive as a broadening of the product line and the market in which the company operates that lead to higher revenues. According to Jindřichovská (2013), portfolio diversification may not always be the best of motives, because the company fixes a certain assets ratio and reduces the company's action-readiness.

Huyghebaert and Luypaert (2010) observed that just as a company can diversify into various industries, it can also diversify into various countries. Asimakopoulos and Athanasoglou (2013) see the advantage of cross-border M&A in access to a larger customer base and the related diversification of revenue sources. They explain this diversification using the Greek crisis as an example. The crisis did not occur in any other state, so that a bank that also operates on another market was not as severely affected as a bank operating only in the Greek market.

### **3.8 Complementary resources**

Asimakopoulos and Athanasoglou (2013) see the potential positives in the scope of services offered: the combined financial institutions will be able to offer a more comprehensive range of services and take advantage of an already well-established distribution network. The combination of complementary resources will, according to Jindřichovská (2013), improve utilization of production capacity. According to Brealey et al. (2008, p. 932), the reason may also be the fact that a small company may have a great idea that it cannot put into practice because it lacks the technology, funds, distribution network, etc. The missing resources preventing the implementation of the idea can be provided by a large established company, which, however, does not abound with ideas of its own - hence the name of resource complementation given to this motive.

An example given by Brealey et al. (2008, p. 932) is a merger of two companies manufacturing electrical instruments. Utah Power's manufactures air conditioning units and PacifiCorp's heating systems. Savings achieved thanks to this combination are estimated at 45 million USD per year.

### **3.9 Research and development**

Joint research or acquisitions of innovative companies is another reason mentioned. A huge potential for innovation exists outside the firm across the network of customers, suppliers and partners. According to research of Zizlavsky and Saghy Estelyi (2013) companies in Czech Republic are open to external cooperation. Gaughan (2007) gives an example of how a company can use M&A for its development: between 1995 and 2005, Johnson & Johnson carried out over 50 M&A. In all cases, it focused on innovative companies that had put a new product on the market. This procedure saves the cost of own research and development, which

may have uncertain results. On the other hand, Hall (1990) believes that M&A may have a negative effect on research and development. She argues that spending on research and development falls by more than 20% because of the need to repay debt, which arose as a result of the companies' merger. Valentini (2012) confirms her conclusions by the results of his examination of patent applications: M&A cause an increase in the number of patent outputs because of the pressure for immediate results. The downside of such pressure is the decreased effect, originality and versatility of inventions. He finds the reason in the motivation for M&A: if the connection was concluded because one of the companies had developed a specific patent of high quality, related patents of a lower added value will be derived from it after the transaction

## 4 CONCLUSION

Systematization of knowledge about motives for M&A shows that there are multiple reasons why companies resort to M&A. The groups of motives that were identified have no clear boundaries and in some cases they overlap each other, which, in an endeavour to synthesize the findings, can hardly be avoided. It also follows from different views on the consequences of specific motives for M&A. Results achieved in research and development as motivation for M&A can be cited as an example. On the one hand, it can be a path of development for the company if the acquiring company invests in innovative companies. On the other hand, it may lead to a decrease in added value (effect, originality and versatility of inventions), as well to decrease in research and development funding because of the need to repay a debt.

The results obtained will be used to modify the methods of determining the boundary price of the target company.

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## **IMPORTANCE OF CLASSIFICATION AND CLEAR DEFINITION OF REWARDS TYPES IN RESEARCH, PRACTICE AND TEACHING**

*Petr Petera, Katerina Knorova*

### **Abstract**

Our review paper may be particularly interesting for researchers in the field of rewarding. We provide relatively comprehensive overview of alternative approaches to classification of rewards and we also offer a concise evaluation of these approaches. Furthermore, by means of content analysis of relevant literature, we highlight that there is no general agreement on definitions of basic concepts, which are used in the field of rewarding. Because of these differences in definitions of key concepts there is a high risk of serious misunderstandings and these problems grow when it is necessary to combine findings from multiple disciplines. There is little hope for fast unification of terminology in the discussed area and we believe that these problems may be at least partially solved by providing clear definitions of terms in the beginning of each discourse about rewarding.

*Keywords: reward types, classification of rewards, rewards terminology, motivation, incentives*

JEL Classification: M52

### **1 INTRODUCTION**

The issue of alternative classifications of rewards, as well as terminology used in the field of motivation and rewarding of employees, are of a great importance for research, practice and teaching. Motivation and rewards are addressed by multiple disciplines (e.g. economics, management, human resources management, management accounting, organizational behavior theory, psychology, industrial and organizational psychology), and as we will try to demonstrate in this paper, problems related to terminology and classification can significantly complicate communication between disciplines as well as within disciplines. Similarly in practice, motivating and rewarding are very often managed across several departments of an organization (especially HR department, controlling department, and in general by managers of all levels), and again, the clear definition and understanding of terms is the basis for effective cooperation among these departments.

Terminological clarity and ability to unambiguously and meaningfully classify rewards is indispensable particularly in research (and especially in the contingency-based research) because it is vital for the systematic examination and understanding of the various types of rewards in terms of their effect on the recruitment, retention and motivation of employees. Terminological clarity is also a necessary condition for ensuring cumulative character of research. And yet, as we will demonstrate in this text, the same term is by different authors often used in diverse meaning, which can pose a significant problem.

Although problems of terminology and classification are deeply interconnected, we will discuss them in separate chapters. For the sake of completeness we also shortly discuss problems of combining classification of rewards with other variables (e.g., type of work - creative or routine; personality traits of individual workers; national cultures etc.), nevertheless this topic is in this paper covered only marginally.

It is not our ambition to establish a "standard terminology" in the field of rewarding and motivation. However, it is our ambition to point out the existence of significant differences in definitions of various concepts and draw attention of researchers and practitioners to the fact that within their discourse is always necessary to carefully examine how individual participants understand these concepts.

Specifically are addressed two main issues. First, we provide an overview of comprehensive approaches to classification of rewards and consequently we identify key criteria that can be used for classification of rewards. We also outline why the individual criteria are important and what are their strengths and weaknesses. Second, we provide examples of the key concepts from the area of rewarding, which are in literature defined divergently and highlight the main terminological discrepancies. These objectives are accomplished through a content analysis of the literature, which was selected based on our expert knowledge of the field.

## **2 CLASSIFICATIONS OF REWARDS**

In this chapter we deal with classifications of rewards and we decided to structure this chapter into two sub-sections (parts) because we see such approach as the most suitable.

First, we provide a literature review of relatively comprehensive approaches to classification of rewards. Second, based on comprehensive literature review, we provide a short overview of various criteria, which are meaningfully usable for classification of rewards. These criteria may be combined in various ways (according to the specific needs of a given research).

### **2.1 Overview of approaches to classification of rewards**

In literature we identified several relatively comprehensive approaches towards classification of rewards. According to our opinion, each of these approaches deserves attention because they have their strengths and weaknesses and it is only up to a researcher (or practitioner), which of these approaches will be adopted or whether their combination will be used. In the following text we also provide short characteristics of discussed rewards, nevertheless it is important to notice that these characteristics are usually specific for an author of a given classification and are not generally accepted.

O'Neal (1998, p. 7-8) classified rewards into four quadrants. In the upper left quadrant is placed pay (base salary, variable pay, recognition, stock) and in the upper right quadrant are placed benefits (health care, retirement, savings, time off). Together these two components of total rewards represent "transactional rewards", i.e., rewards, which are financial in nature. In the bottom left quadrant are placed learning and development (career development, learning experiences, performance management, succession planning, training) and in the bottom right quadrant is placed work environment (organization climate, leadership, performance support, work/life balance). Together these two components of total rewards represent "relational rewards" which are essential to enhancing the value of upper quadrants. O'Neal emphasized that differentiation of rewards into transactional ones and relational ones is important because relational rewards are difficult to copy by competitors. Using relational rewards, a company may create a competitive advantage.

Chen, Ford and Farris (1999) classified rewards into intrinsic, extrinsic monetary and extrinsic socioemotional. They further divided each of these rewards types into two sub-types (individual based and collective based). Finally, they distinguished fixed and variable monetary rewards.

Another approach to classification of rewards was introduced by Zingheim and Schuster (2000, p. 13). As a model framework are used four quadrants. In the bottom left quadrant is

placed total pay (base pay, variable pay including stock, benefits or indirect pay, recognition and celebration) and in the bottom right quadrant is placed positive workplace (people focus, leadership, colleagues, work itself, involvement, trust and commitment, open communications); together these two components of total rewards comprise “foundation” because they are crucial for attracting and keeping individuals. Nevertheless these two components alone are not sufficient and should be supplemented with another two components. In the upper left quadrant is therefore placed individual growth (investment in people, development and training, performance management, career enhancement) and in the upper right quadrant is placed compelling future (vision and values, company growth and success, company image and reputation, stakeholdership, win-win over time). To obtain competitive advantage, a company should according to Zingheim and Schuster (2000) provide rewards from all these quadrants.

We like comprehensiveness of this classification. From the viewpoint of terminology we find inclusion of recognition and celebration under “pay” relatively unusual.

Balsam (2002) suggested a classification whose components are depicted below:

- salary (defined as fixed contractual amount of compensation that does not explicitly vary with performance);
- bonus (which may be conditioned upon individual, group, or corporate performance and performance conditions used to determine the bonus can be explicit or implicit, objective or subjective, financial or non-financial, based upon one measure or more measures, and may be based on short-term or long-term measures);
- stock options (which allow their holder to purchase shares of stock at a fixed “exercise” price over a fixed period of time);
- stock grants (i.e., corporation give shares to their employees);
- other stock-based forms of compensation (e.g., stock appreciation rights, which are equivalent to stock options with exception that with a stock option the executive has to purchase and consequently sell the shares to receive their profit while with stock appreciation rights corporation pays executive the excess of the current market price of the shares over the aggregate exercise price; privately held corporations or publicly held corporations which do not want to dilute existing ownership often grant executives phantom stocks or equity units);
- pensions (i.e. form of deferred compensation);
- other compensation (e.g. corporate cars, the use of corporate airplanes and apartments, special dining facilities, health care etc.).

According to our opinion Balsam’s classification is quite comprehensive, nevertheless excessively accentuates financial rewards and all non-monetary rewards are placed in the “other” category. Furthermore, bonuses are understood here strictly as performance-based while other authors define bonuses more broadly.

Kantor and Kao (2004) suggested to distinguish rewards according to two main criteria – first, “transactional rewards and relational rewards”, second “direct rewards and indirect rewards”. Components of total rewards can be consequently placed into four quadrants framework. In the upper left quadrant is placed compensation, i.e., transactional direct reward (e.g., fixed pay, bonus plan and long-term incentives), in the upper right quadrant are placed benefits, i.e., transactional indirect reward (e.g., healthcare and welfare, retirement, paid time off), in the bottom left quadrant is placed personal development, i.e., relational direct reward (e.g., performance management, training and development, career development) and in the bottom



right quadrant is placed work environment, i.e., relational indirect reward (culture and climate, work design & flexibility, quality of working life). Kantor and Kao's classification is interesting, facilitates thinking about implemented rewards system from the viewpoint of their belonging to transactional and relational rewards, but is relatively ambiguous.

Chiang and Birtch (2005, p. 365-367) launched interesting classification of rewards into three main types: financial (basic salary, annual increase, benefits, individual performance incentives, team performance incentives, organizational performance incentives), extrinsic non-financial rewards (relationship, balance, task-related, appraisal system, client relationships, security) and intrinsic work-related rewards (job nature, job challenge, responsibility, skills used opportunities, variety, accomplishment, job satisfaction). Moreover this classification was combined with examination which reward system is preferred (authors understand term "reward system" more narrowly than is usual, specifically they distinguish performance-based, skill-based, competency-based, and COLA (cost-of-living adjustment) - based reward systems) as well as with examination which reward criteria (performance, human capital, job inputs, gender, personal needs, organizational features, market features, environmental) should be used. Although terminology used by Chiang and Birtch (2005) is a bit unusual, we like comprehensiveness of their approach.

Ellig (2007, p. 4-8) distinguished following elements of compensation:

- salary (essentially no-risk form of pay, often serves as basis on which the other elements of compensation are determined; importance of salary depends on the fact whether other (risk) components exist and how significant are these components);
- employee benefits and perquisites. Benefits include for example time off with pay, employee services, health care, survivor protection, and retirement coverage. Perquisites are employee benefits that are designed only to apply to executives and are also called executive benefits (e.g., a company car, financial planning, supplemental executive retirement plans), some may have form of intrinsic rewards (e.g., large, well-furnished office);
- short-term incentives (designed to include both downside risk and upside potential based on performance targets; determined on the basis of the extent of accomplishment of a short-term, normally yearly target; existence of possibility to obtain short-term incentives is usually accompanied by corresponding decrease of salary; objectives may be group or individual and should be connected to annual business targets; according to Ellig incentive pay increases as a percentage salary and short-time incentive plans range from highly individual accomplishments to profit-sharing plans that emphasize corporate, group or division performance; used may be both financial measures and non-financial measures; payments are typically in cash, but may be also a combination of cash and shares of stock);
- long-term incentives (pursue similar objectives like short-term incentives; period for which is performance evaluated is multiyear in nature; normally used are group-based performance measures; incentive award is typically significantly higher than the annual incentive; form of payment follows type of plan – i.e., shares of stock or cash).

On the one hand, Ellig's classification is quite comprehensive and avoids overlaps of individual reward types. On the other hand, Ellig's understanding of the term "extrinsic and intrinsic" rewards is according to our opinion a bit unusual and confusing (see chapters 3.2 and 4).

Kaplan (2007, p. 16) suggested to classify rewards into the following four groups:

- compensation (base salary, annual incentives, long/term cash incentives, equity, spot awards, project incentives, employee referral program, signing bonuses);
- benefits (health care, life insurance, disability, retirement, child-care resources, fitness center, elder-care programs, legal assistance);
- learning and development (career planning, professional memberships, training programs, annual conferences, mentoring programs, lunch and learns, sabbaticals);
- work environment (flexible workweek, telecommuting, job design modifications, comfortable workstations, recognition programs, community volunteer opportunities, casual dress, free meals).

Shields (2007, p. 30-32) suggested the following classification of rewards:

- extrinsic rewards:
  - financial rewards or remuneration (fixed or base pay, direct benefits, performance-related pay);
  - developmental rewards (learning, training and development, succession planning, career progression, other indirect or non-cash benefits);
  - social rewards (organizational climate or management culture, performance support, work group affinity, work-life balance, other indirect or non-cash benefits);
- intrinsic rewards (job challenge, responsibility, autonomy, task variety).

A comprehensive approach to classification of rewards was proposed by association WorldatWork (2007). According to this approach the following types of rewards are recognized:

- compensation (by WorldatWork 2007, p. 624 defined as “cash provided by an employer to an employee for services rendered”); compensation is the largest component of rewards system and a major cost for organizations and includes (WorldatWork, 2007, p. 90-91):
  - base pay (fixed pay, which does not vary with achieved performance and results):
    - salary, hourly or piece rates;
    - knowledge or skill based pay;
    - competency based pay;
    - differentials (weekend/holiday, expatriate etc.);
    - pay increases (merit, lump-sum, step-rate, general, cost-of-living, equity-based adjustments, market-based adjustments);
  - variable pay (pay-at-risk, which depends on achieved performance and results, must be re-established and re-earned each performance period); includes especially short-term incentive pay that is designed to focus and reward performance over a period of one year or less and long-term incentive pay that is designed to focus and reward performance over a period longer than one year (WorldatWork, 2007, p. 9):
    - organizational/team/individual;
    - profit-sharing plans;

- performance-sharing (gain-sharing) plans;
  - group/team incentives;
  - individual incentives (short-term incentive plans, sales-incentive plans, executive incentive plans);
  - discretionary bonuses (annual or spot);
  - equity-based compensation (stock options, stocks grants, etc.);
- benefits (social insurance, group insurance, pay for time not worked; WorldatWork, 2007, p. 9);
  - work-life balance (especially workplace flexibility, paid and unpaid time off, health and well-being, caring for dependents, financial support, community involvement, management involvement/culture change inventions (WorldatWork, 2007, p. 9); often mentioned are also telecommuting, flextime, compressed workweek and paid family leave);
  - performance and recognition (according to WorldatWork, 2007, p. 10 rewards system should aim at alignment of organizational, team and individual efforts toward the achievement of business goals; recognition includes acknowledges and special attention to employee actions, efforts, behavior or performance);
  - development (learning programs designed to enhance employees' skills and competencies) and career opportunities (includes plan for employees to advance in their career goals (WorldatWork, 2007, p. 8).

We consider the classification suggested by WorldatWork to be extremely comprehensive, but there are some flaws (at least from the viewpoint of using it e.g. for survey questionnaire research), specifically:

- approach of WorldatWork covers all aspects of total rewards, but some terms are defined ambiguously or inconsistently. For example the word “cash” is used in definition of compensation, but obviously some parts of compensation may be deferred (and therefore not paid in cash);
- classification of items under the category “compensation” is not fully clear because of mutual overlays of some terms (e.g., profit sharing plans are group plans, equity based compensation in fact is not a type of reward, but a form in which reward may be paid etc.);
- classification of total rewards into 5 categories – compensation, benefits, work-life, performance & recognition, development & career opportunities does not cover full spectrum of rewards defined by the term “total rewards” and it is necessary to add category “other total rewards activities”, see e.g., (Christofferson & King, 2006, p.26);
- there is not enough emphasis on creating a positive workplace (leadership, culture, atmosphere of trust and commitment, work content etc.) - a component of total rewards highlighted e.g. by Zingheim and Schuster (2000).

Vandenberghe, St-Onge and Robineau (2008, p. 432-433) identified 3 major types of compensation and reward components:

- direct compensation (which is paid in cash to employees): attraction bonuses, salary, variable pay based on individual performance, variable pay based on organizational performance;

- indirect pay (all other non-cash components): fringe benefits and time off, flexibility of working conditions, job security;
- psychological recognition: development opportunities, career opportunities, quality of social relationships, authority and control, autonomy, feedback and recognition, the relevance of the job to others, the relevance of job to the person, work load, and work variety.

According to this classification, direct compensation and indirect pay belong among extrinsic rewards, while psychological recognition represent intrinsic rewards.

The importance of classification by Vandenberghe, St-Onge and Robineau (2008) is based on the fact that it primarily divides rewards into extrinsic and intrinsic. Also putting “attraction bonuses” outside compensation based on performance clearly indicates that there are bonuses, which are not performance-based. Unfortunately, the classification is a bit confusing e.g. because it ignores the fact that direct compensation may be paid also in non-cash form. According to our opinion form in which is reward paid may have a significant influence on rewards’ behavioral consequences.

Wilson (2008, p. 26-27) within his classification underlined the fact that there are both rewards programs that are available to virtually everyone just because they are employed by the organization (these programs are a foundation for the employment relationship) and rewards programs based on performance or meeting other requirements of individuals or groups (in these programs not everyone receives these rewards). Moreover, there are both programs that are clearly compensation based (i.e. these programs represent total compensation) and programs that meet the personal needs of individuals (i.e. these programs represent workplace opportunities, e.g., training and education).

Kwon and Hein (2013, p. 32-33) recognized:

- financial rewards (i.e. rewards with clearly defined value or cost) and (as opposite) experiential rewards (which are experienced by the employee through interaction with the company – e.g., leadership, management, relationships with employees and customers);
- personal rewards (which are tailored to the individual, e.g., salary, bonus, development plan etc.) and (as opposite) company-wide rewards, which are provided in more or less the same way to all employees, e.g., benefits, culture, work environment.

These rewards were by Kwon and Hein (2013) placed into a model framework comprised of four quadrants. In the upper left quadrant can be found experiential, company-wide rewards (e.g. medical care), in the upper right quadrant are placed experiential, personal rewards (e.g. wellness), in the bottom left quadrant are placed financial, company-wide rewards (e.g. pension plans) and in the bottom right quadrant can be found financial personal rewards (e.g. various work-life programs like child care etc.). We appreciate comprehensiveness of this framework, nevertheless specific examples of individual types of rewards, which can be found in Kwon and Hein (2013), are from our viewpoint confusing and ambiguous. For example we do not understand why “child care” is classified as “personal” reward while according our opinion it is typical company-wide reward. Well, more detailed discussion of these problems is above the scope of this paper.

### **Our suggestion of alternative classification**

It is possible to conclude that from the viewpoint of completeness and/or unambiguity and clarity all the above mentioned classifications have some imperfections, which may pose a

problem for research, especially when direct contact between researcher and researched subject is impossible and threat of misunderstanding is therefore high. We prepared our own classification and we are convinced that the classification is easily understandable as well as unambiguous and therefore suitable e.g. for questionnaire surveys. This classification was briefly explained in Petera, Wagner and Mensik (2014) and below we outline our classification in a more detail:

- non-financial rewards:
  - benefits (e.g. recreation, various insurance);
  - perquisites (e.g. the possibility of using a business car or a laptop for private purposes);
  - work-life balance programs (e.g. flexible working hours, work from home, take the opportunity to work children);
  - non-financial recognition (e.g. praise from superiors, diplomas, celebrations);
  - transferable skills training (e.g. qualification in a profession, language courses);
  - procedure in the corporate hierarchy (promotion);
  - other non-financial rewards (e.g. leadership, a shared culture);
- financial rewards:
  - fixed (base salary);
  - variable financial rewards:
    - one-time reward for achieving of certain qualification/skills;
    - bonuses regardless of performance;
    - financial recognition (spot bonus);
    - rewards for success in performing a specific task;
    - short-term variable financial rewards for performance (awarded on the basis of performance measurement in the short period, i.e. up to 1 year);
    - long-term variable financial rewards for performance (awarded on the basis of performance measurement in the long period, i.e. over 1 year).

The above mentioned classification of rewards can be easily combined with various classifications of workers (e.g., according to position – top management, middle management, line management, non-managerial workers; according to type of work – routine, creative, professionals; according to job – e.g., sales, research and development, purchasing; personality traits etc.). Utilization of all rewards types can be then examined for each of these categories of workers separately. Furthermore, impact of these rewards on behavior of the mentioned types of employees may be addressed separately within contingency-based research and therefore it is possible to obtain more detailed information about behavioral consequences of the rewards.

Furthermore, if needed, relevance of numerous other criteria (contextual variables), which are considered to have an impact on the intensity of utilization of different types of rewards, may be tested. Among contextual variables belong e.g. organization size; type of organization – for-profit (publicly traded, privately held), non-for-profit; life-cycle of an organization – start-

up, growth, mature, declining organizations; and affiliation of an organization to “new economy” or “old economy.”

## **2.2 Key classification criteria and their properties**

Based on various classifications of rewards we summarized key classification criteria and our findings can be found below:

- financial and non-financial rewards (classification according to the nature of reward; classification is unambiguous, but very descriptive and both “financial” and “non-financial” rewards are inherently heterogeneous as for their expected behavioral impacts);
- extrinsic and intrinsic rewards (classification based on differentiation of extrinsic and intrinsic motivation; classification is important especially from the viewpoint of expected motivational impacts on employees);
- collective (organization, division, team) and individual rewards (classification according to whom is reward primarily allocated or according to whose performance is measured and consequently used for allocation of rewards);
- cash-based and deferred rewards (according to how long it takes till reward is really paid to an employee/worker; classification is important from the viewpoint of expected behavioral effects – cash-based compensation is often expected to have more short-term impact);
- form in which is reward paid (cash, stocks, stock options, etc.);
- performance-based reward and non-performance based rewards, e.g. skill-based reward, competency-based reward, seniority-based reward, cost of living-based (COLA) reward, right behavior-based reward (classification according to criteria taken into account for determining the reward / what is rewarded).

Rewards for performance are often further classified according to the following criteria:

- length of period during which is performance measured (short-term, long-term);
- type of performance criteria:
  - objective and subjective or their combination (by objective measures are usually understood direct measures of countable behaviors or outcomes and by subjective measures are understood supervisor ratings of employee performance, see Bommer, Johnson, Rich, Podsakoff, & Mackenzie, 1995, p. 588);
  - based on one or several measures;
  - quantitative and qualitative;
  - financial (which may include criteria based on financial accounting measures without any adjustments or adjusted criteria) and non-financial (or combination of financial and non-financial criteria);
  - absolute (plan, history) or relative – Bebchuk and Fried (2004) pointed out that bonuses are often tied to whether the executive meets a budget or whether profits exceed those of the preceding period. Such approach enables employees to obtain bonuses even when firm perform poorly having worst profits in an industry and still beat the prior period results.

And yet, according to Bebchuk and Fried, large majority of companies which base their bonus plans on objective measures do not base bonuses on the organization's performance relative to its peer group.

### **3 EXAMPLES OF IMPORTANT TERMS FROM THE FIELD OF REWARDING, WHICH ARE BY VARIOUS AUTHORS DEFINED DIVERSELY**

In this chapter we shortly discuss key terms from the field of rewarding, which are by different authors defined substantially diversely. Because of space limitations of this paper we do not intend to be comprehensive, nevertheless we want to highlight the main discrepancies.

The main lesson learned from this chapter should be that in order to avoid misunderstandings, definitions of rewards have to be agreed (or at least explained) before or during the discourse (e.g., within a questionnaire, during an interview, or within a discussion of practitioners). This conclusion is of critical importance e.g. for researchers who want to ask their subjects which types of rewards they use (e.g., via questionnaire survey) and consequently examine on which contextual variables is utilization of different rewards dependent. Also in case of research into behavioral consequences of different types of rewards researchers have to unify (or at least clarify) their terminology with researched subjects.

#### **3.1 Bonus**

In chapter 2.1 we mentioned that e.g. Balsam (2002) understood "bonus" as a performance-based reward. Nevertheless more common is approach according to which some bonuses are performance based and other may be non-performance based. For example Biswas (2013) distinguishes sign-on bonus, referral bonus, spot bonus and retention bonus; in this sense the bonus is incentive (e.g. to stay in a company), but is not performance-based.

#### **3.2 Extrinsic and intrinsic rewards**

Extrinsic rewards are by WorldatWork (2007, p. 663) defined as "work-related rewards received for performance that have value measurable in monetary or financial terms" and intrinsic rewards are usually defined as "those that an individual experiences through performing a job well" (Chen, Ford, & Farris, 1999) or "Rewards that are associated with the job itself, such as the opportunity to perform meaningful work, complete cycles of work, see finished products, experience variety, receive professional development training, enjoy good relations with coworkers and supervisors and receive feedback on work results." (WorldatWork, 2007, p 697). Quite interestingly, Ellig (2007, p. 4), used terms "extrinsic rewards" and "intrinsic rewards" in a bit different meaning when he suggested to "... think of pay as a form of extrinsic compensation whereas work environment, type of work, learning, developmental opportunities, and extent of recognition form intrinsic compensation – often called psychic income." Division of rewards into extrinsic and intrinsic ones is based on so called "extrinsic motivation" and "intrinsic motivation". There is a heat debate about problems of extrinsic and intrinsic motivation in psychology, see e.g. Gagne and Deci (2005), Gagne, M., and Forest (2008), Latham (2012) or Gagne (2014).

#### **3.3 Fixed and variable rewards**

Variable pay is by WorldatWork (2007, p. 812) defined as "Compensation that is contingent on discretion, performance or results achieved." Nevertheless it is possible to find substantially narrower definitions – e.g. Belcher (1996, p. 10) defines variable pay as "An alternative compensation system that ties pay to business outcomes and supports a

participative management process. Cash payouts are based on a predetermined measure or measures of group or organizational performance” and according to this definition the term “variable pay” includes only cash profit sharing, gain sharing and goal sharing (defined as a system under which a predetermined amount is paid for the meeting of group or organizational goals).

### **3.4 Profit sharing, profit-related pay and gain sharing**

Profit sharing is understood as a typical group-based pay for performance. For example Milkovich and Wigdor (1991, p. 10) state that “... profit-sharing plans or equity plans link individual employee’s pay to the overall fortunes of the firm as measured by some indicator of its financial health.” The term “profit sharing” is sometimes used as a synonym with the term “profit-related pay”, nevertheless Bell and Hanson (1987, p. 1) claim, that there is a difference between these terms. Specifically, profit sharing is in the Western world understood as reward providing an additional bonus, related to profit, over and above established wages or salaries. On the contrary, profit-related pay is part of basic remuneration linked to profit and in case that profit decreases, decreases also basic remuneration.

Gainsharing is by Welbourne and Mejia (1995, p. 559-660) defined as “an umbrella for a family of aggregate pay-for-performance approaches that link financial rewards for employees to improvements in the performance of the entire unit.” Similarly Belcher (1991, p. 6) defines gain sharing as “A compensation system that is designed to provide for variable compensation and support an employee involvement process by rewarding the members of a group or organization for improvements in organizational performance. Gains, as measured by a predetermined formula, are shared with all eligible employees, typically through the payment of cash bonuses.” Nevertheless, it is possible to find substantially broader definitions, for example Strauss (1990) recognized the following types of gainsharing – piecework, group incentives, cost-savings plans (i.e. gain sharing in its narrow definition) and profit sharing.

We can conclude that it is absolutely necessary to be very cautious whenever terms “profit sharing” and “gain sharing” are used because there is a high risk that different people will understand these terms very differently.

## **4 DISCUSSION**

In our review paper we addressed two deeply interconnected topics - classification of rewards and terminological issues in the field of rewarding and in this chapter we discuss implications of our findings for research.

### ***Discussion of alternative approaches to classification of rewards***

We are convinced that all classifications of rewards mentioned in this paper have their advantages and weak points.

For the sake of transparency we partially discussed the advantages and disadvantages of various approaches to classification of rewards directly after giving a description of a given classification. Nevertheless there are some typical weaknesses and properties, which we would like to summarize here.

First, reward types within classifications sometimes “overlap”, which should be avoided. This happens for example in the case of classification given by Balsam (2002), where at the same level of classification are distinguished bonuses and various stock-based rewards while it is obvious that bonus may be paid out in the form of stock options - we recommend to more carefully distinguish types of rewards and forms in which rewards are paid.



Second, terms “short-term incentives” and “long-term incentives” are within classifications usually used as an abbreviation, more precise would be “incentives based on short-term performance measurement” and “incentives based on long-term performance measurement.” Ellig (2007, p. 8) in this context expressed opinion that the incentive award for long-term plans is typically significantly higher than the annual incentive and that “Normally, there is no individual performance component in long-term incentives.” We propose that both these statements are hypotheses that deserve to be researched and this especially goes for relative significance of short-term and long-term incentives (see Westphal & Zajac, 1994). Moreover it is important to notice that discussed terms may be also related primarily to behavior (i.e. understanding of long-term rewards as rewards supporting long-term oriented behavior and not necessarily awarded on the basis of long-term performance measurement).

### ***Discussion of terminological issues***

Our comprehensive literature review proved our hypothesis that in the area of rewarding different authors often give very diverse meaning to the same term. Because of the space limitations of this paper it was absolutely impossible to discuss all such differences and therefore we tried to illustrate this problem by an example of several selected terms. Well, this heterogeneity in terminology according to our opinion does not have to be very harmful. On the one hand we do not believe in the fast unification of terminology because individual subjects will probably continue utilizing their own definitions. On the other hand, if terms are carefully defined within discourse, everyone will be able to follow and understand ongoing debate.

Although there is no “preferred” definition of individual terms, we are convinced that it is reasonable to respect at least the following recommendations.

First, we do not appreciate “creativity” of some authors in the utilization of the terms “extrinsic rewards” and “intrinsic rewards.” We understand these terms as based in psychology, where “extrinsic motivation” in general denotes “doing of an action that is not interesting and enjoyable to get a separate consequence” (Gagne, 2010, p. 3) and “intrinsic motivation” denotes “doing something for its own sake, out of interest and enjoyment.” (Gagne, 2010, p. 1). For example we see as very unusual to give as an example of intrinsic reward “large, well-furnished office” (Ellig, 2007, p. 6). We advocate that such approach may obscure the essence of the problem because if somebody does an activity (work) to get large office, his motivation for activity (work) is not intrinsic but, just on the contrary, extrinsic. Similarly, we do not agree with an approach, which identifies intrinsic rewards with “psychic income” because some kind of “psychic income” may according to our opinion stem both from extrinsic and intrinsic rewards. We therefore see the term “psychic income” as redundant and unhelpful.

Second, we noticed a lot of controversy in the area of “variable pay”. We question usefulness of utilization of too narrow understanding of this term - a typical example of narrow definition is the one given in Belcher (1996, p. 10) and mentioned in chapter 3.3 of this paper. We prefer definition of variable pay as of any compensation, which is contingent upon performance or results achieved (WorldatWork, p. 91) and any narrower understanding of this term we consider atypical and even illogical.

Third, following the previous point, we would like to mention that we prefer understanding of bonuses as a form of variable pay, which may be connected with performance (spot bonus) or not to be connected with performance (for example sign-on bonus, referral bonus and retention bonus). Again, considering bonuses as solely performance-based kind of reward is according to our opinion too narrow and illogical.

Last but not least, some authors consider the term “bonus” as synonym of the term “incentive pay”. We advocate another view, which differentiates these terms and understands incentive pay to be a form of variable pay, which represents a highly consistent method to pay for performance (WorldatWork, 2007, p. 102).

## **5 CONCLUSION**

In our review paper, we presented several approaches to classification of rewards and we pointed out their strengths and weaknesses.

Probably the most comprehensive classification of rewards is provided by association WorldatWork, but it is not a panacea. The other approaches also have their unique strengths (for example division of rewards into transactional and relational ones facilitates better understanding the different functions and the complementary nature of these types of rewards; sorting rewards into extrinsic and intrinsic may be significant in terms of their impact on motivation; our own classification has advantage in its simplicity and clarity and is therefore suitable e.g. for questionnaire surveys).

On the basis of comprehensive literature review we derived typically used classification criteria, which can be combined to create new classifications of rewards. It is important to understand that taking these criteria into account is significant especially for contingency-based research aimed both at finding contextual variables, which predetermine utilization of different types of rewards and at behavioral effects (impacts) of various types of rewards.

We proved that many of the key concepts that are used in the field of rewarding, are used by different authors in diverse meaning. This implicates the necessity to always clearly define the meaning of the terms in order to avoid possible misunderstandings.

We are convinced that our paper may be particularly useful for researchers. Knowledge of alternative approaches to classification of rewards is indispensable for any researcher who wants to comprehensively assess the quality of implemented rewards system of an organization. Nevertheless, such knowledge is useful also for practitioners, because it facilitates analysis of rewards systems as well as better understanding the literature dedicated to the discussed topic.

Last but not least, for the sake of completeness, it is important to mention other relevant variables that are especially in contingency-based research often combined with classifications of rewards (e.g., because different types of rewards have different impact on different types of people or because intensity of utilization of some types of rewards is considered to be dependent on contextual variables). Effects of various types of rewards are often examined for example in combination with variables like strategy of a company, national cultural values (Chiang & Birtch, 2005), type of job, type of work (routine or creative) or personality traits of a worker (Vandenberghe, St-Onge, & Robineau, 2008).

### **Acknowledgment**

*The article is processed as an output of a research project of Faculty of Finance and Accounting, University of Economics, Prague, within a scope of institutional support VŠE IP 100040.*

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## **ROLE OF INNOVATION ON FIRM PERFORMANCE: THE CASE OF SMALL AND MEDIUM-SIZED ENTERPRISES IN VIETNAM**

*Pham Tien Thanh, Pham ThiQuynhNhu, Nguyen DucTrung*

### **Abstract**

This study evaluates the impact of technology innovation on the performance of the small and medium-sized enterprises in Vietnam. This study applied independence sample t-test and propensity score matching (PSM) method to investigate the impact of innovation on firm performance. The results showed that innovation improves performance of SMEs in Vietnam via increasing revenue, value added and gross profit.

*Keywords: impact evaluation, SMEs, innovation, firms' performance, Vietnam*

JEL Classification:

### **1 INTRODUCTION**

In globalization period, transition and developing nations and their enterprises experience major obstacles for reinforcing their human and institutional capacities. SMEs contribute importantly to transition and developing countries. The performance of SMEs in terms of industrial regeneration, job creation, export evolution, and efficiency thus attracts the attention of policy makers.

The economic renovation started in Vietnam in 1986, but not until in 1989 did Vietnam actually apply a comprehensive and fundamental improvement package to stabilize and open the economy and enhance freedom of choice for economic units and competition as well. Also of importance is the fact that Vietnam's socioeconomic success has been remarkably attributed from SMEs. The SMEs account for a prodigious percentage in total number of nation's enterprises with 97 percent and 87 percent by regular workforce and registered capital in 2005, respectively. SMEs were found to account for 39 percent of gross domestic product (GDP) and 32 percent of total investment in 2006 (Ho, 2007), and about 85 percent of total corporate workforce in 2004 (Le et al. 2006). Apart from being a relatively dynamic sector in the economy, SMEs also play an important role in creating jobs, maintaining high mobility of the labor market, and reducing development gap among localities of the country.

There are many factors that may affect performance of SMEs, including innovation, capital, human resources, etc. This paper investigates the importance of technical innovation (product or process innovation) as a basis for improving performance of SMEs. Many studies about impact of innovation on firms' performance have been conducted, but the findings are inconsistent.

Innovation was considered as one of the most important drivers of economic growth (Grupp, 1998) and many researchers have paid attention on the subject since the 1920s. Nevertheless, only after a study by Solow (1957), the empirical researches indicating the connection between innovation and business accomplishment became more often. According to Drucker (1954), marketing and innovation play a vital role in the success of any companies.

Innovation was not only impact on the growth of an enterprises but also trigger social and economic adjustment (Cheng et al. 2013; Kim&Huarng, 2011; Wu, 2011). Innovation is fundamental to sustain competitive advantage (Chen & Huang, 2010; Subramaniam&Youndt, 2005). Innovation is significant to the development of modern enterprises (Ko et al.,2011). Even though enterprises frequently perceive innovation as innately positive for corporations (Liao & RICE, 2010), the connection between innovation and performance is still an unfastened question (Bowen, Rostami, & Steel, 2010).However, many researches concluded that there is no impact of innovation on firms' performance (Hitt et al., 1997; Ettl, 1983).

According to Tran, Le and Nguyen (2008), it should be noted that Vietnam is basically at the first stage among the three stages of technology development including adopting technology, mastering technology, and creating technology. Capacity utilization and technology efficiency of manufacturing SMEs in Vietnam was studied by Rand and Tarp (2007). This research found that when using current machine and equipment, only around 17 percent of SMEs in the survey were able to improve manufacturing performance and two-thirds could increase production by less than 25 percent.

In Vietnam, there are few studies about the impact evaluation of innovation on firms' performance. Unlike the previous studies in Vietnam, this study employs PSM with various techniques to assess this impact to capture the best conclusion. The analysis of this study relies on the data from two surveys on SMEs in Vietnam in the year 2009 and 2011.

The main objective of this study is to investigate whether innovation adoption has significant positive impact on firms' performance.

The structure of research as follows: Section 1 presents Introduction. Section 2 summarizes the relevant literature review. Section 3 describes methodology and data. Section 4 presents and discusses research results. Section 5 gives conclusion, policy implication and limitation.

## **2 LITERATURE REVIEW**

### **2.1 Determinants of the innovation adoption**

A study by Cuerva, Ángela and David (2013) suggested that there are four key factors that may drive innovation: (1) technological capabilities (2) organizational capabilities (3) market pull and (4) external influences related to regulatory push/pull and potential network connection. In this research, these authors conducted probit model to research on the determinants of innovation, including such variables as R&D, human capital, public subsidies, collaboration with competitors, suppliers, customers and public sector, firm age, firm size, etc. A research by Montalvo (2002) stated that innovation depends on firms' internal conditions (resources) and capacity; that is, knowledge resources, human skills and provision and access to finance are considered as determinants of green innovation. Innovation was also found to rely on resources as Physical, human and financial resources (Rumelt, 1984). Many studies for the case of environmental technology oriented firms, Horbach (2008) and Rehfeld et al. (2007) and Cuerva et al. (2013) concluded that technological capabilities is enhanced by R&D. Hemmelskamp (1999) found that high quality employment may result in high innovation probability; that is, high skill staffs are associated with more innovation. Aghion et al. (2009) and Cuerva (2013) concluded that financial constraint may be considered as a factor that limits firm's innovation. In a search for the case of SMES in a developing country, Forrero-Pineda et al. (2011) proved that firms' innovation capacity is associated with network connection. Montalvo (2002) confirmed the role of networks as a determinant of cleaner technologies.

## 2.2 Impact of innovation on firms' performance.

In the OECD Oslo Manual (2005), four various innovation types are presented including product innovation, process innovation, marketing innovation and organizational innovation.

Although many authors have conducted researches on the significance of innovation to firm success and performance (Han et al., 1998; Weerawardena, O'Cass, & Julian, 2006; Ngo & O'Cass, 2013). However, result findings from empirical studies were mixed.

Matsuo (2006) and Bolton (1993) found that there is a positive relationship. Kuratko and Hodgetts (1998) suggested that firms should concentrate on their business plans, especially on innovations. Researches by Tidd et al. (2001), Brown (1997) confirmed that innovation is considered as an extremely vital determinant in accomplishing firms' goals as well as achieve successful competition. Innovation was also found to be a dominant stimulus to national economic development in industrial, newly industrialized, and developing economies (Pavitt and Walker, 1976; Kim, 1980; Ernst and Kim, 2002; Guan and Chen, 2012). According to Guan (2005), effective diffusions of innovation played a significant role in the economic development. Alfranca et al. (2003) found that firm's returns and growth depend on its capacity to innovate. A research by Fagerberg et al. (2004) concluded that innovative nations had advanced productivity and more income than the less-innovative ones. McAdam and Keogh (2004) explored the relationship between companies' performance and innovation. They figured out that the companies with innovations are more dynamic in the competitive market. Geroski (1995) investigated the impact of innovations on firms' performance reflected via such criteria as profit, stock market rates of return and company growth. As a study on 113 automotive suppliers in Turkey, Atalay et al. (2013) stated that firms with innovation adoption have higher performance than firms without innovation.

Meanwhile, Hitt et al. (1997), Ettlie (1983), David et al. (2014), Koellinger (2008) concluded that there is no evidence for the innovation-firm performance nexus.

In a research for the case of firms in Brazil using structural equation modeling (SEM), David et al. (2014) proved that there is no relationship between innovation and firms' financial indicators. For the case of European firms, Koellinger (2008) investigated the impact of product or process innovation on firms' performance and found that innovation improves turnover and increases employment; however, there is no positive relationship between innovation and profitability.

## 3 METHOD

### 3.1 Model of determinants on probability of innovation adoption.

In order to identify the groups for comparison, we conduct a model to forecast the determinants on probability of innovation by SMEs, which can be later considered as the propensity score of each firms in PSM. Logit or probit model may be applied to estimate this probability. In this study, a probit model is employed to estimate the probability of firms' innovation. The following model was written as follows:

$$\Pr(INNOVATION_i=1) = \beta_0 + \beta_1 Z_i \quad (1)$$

Where  $INNOVATION_i$  represents adoption of innovation of firms (1 if firms adopt innovation; and 0 otherwise);  $Z_i$  denote vectors of variables that affect firms' innovation. Based on the literature review, to research on determinants of firm innovation, this research employed such variables as Firm age, firm size, total gross profits in 2008, total asset in 2008, member of a business association, R&D, Technology transfer certificate, business License, technology

sector, access to credit, new high skilled labors, share of unskilled production workers, professionals share of total workforce.

### **3.2 Impact evaluation of using PSM and DID method.**

PSM method was developed by Rosenbaum and Rubin (1983), Sascha&Ichino (2002) and Khandker (2010). Based on the impact evaluation procedure using PSM by these authors, the following steps should be conducted:

*Step 1:* a probit model of determinants on innovation adoption is conducted using probit model. The equation is written as follows:

$$\Pr(INNO_i=1) = \Phi(\beta_0 + \beta_1 Z_i + \varepsilon_i) \quad (2)$$

Where:  $INNO_{ij}$  denotes whether firm  $i$  adopts innovation; and  $Z$  represents determinants on innovation adoption. From this equation, probability of innovation adoption (propensity score of each firm) can be estimated. Literature on impact evaluation defines firms with innovation adoption as treatment units and firms without innovation as control units.

*Step 2,* the common support region will be determined; that is, some observations may be omitted due to their too low or too high propensity score. Also in this step is the balancing test conducted to check. Specifically, this testing process is conducted via categorizing the observations into blocks based on their propensity scores (Dehejia&Wahba, 2002).

*Step 3,* each treatment unit will be matched with one or some control units based on their most similar propensity score. Then, the difference in outcomes between each treatment and control units are calculated. This difference is considered as "individual gain". Various techniques of PSM such as Nearest-neighbor, Radius, Stratification and Kernel may be applied to match these two groups.

*Step 4,* mean of all individual gains will be calculated to achieve the program impact with respect to the participants.

*Step 5,* to overcome the problem of incorrect standard errors, it was suggested that estimating standard errors via using of the Bootstrap should be employed (Khandker, 2010). This technique draws repeated samples from original sample, and then re-estimates the properties such as standard error and bias with each sample.

PSM has become a widely applied method in impact evaluation of a program, activity or policy. PSM is considered as an effective technique to reduce the selection bias.

### **3.3 Data Description**

#### **3.3.1 Survey area**

Data is collected in the surveys of SMEs in Vietnam in the year 2009 and 2011. These surveys were conducted by the Central Institute for Economic Management (CIEM), Institute of Labor Science and Social Affairs (ILSSA), the United Nations University's World Institute for Development Economics Research (UNU-WIDER) Department of Economics (DoE) of Copenhagen University and Embassy of Denmark in Vietnam.

This dataset provides various information about firms' characteristics, firms' performance as well as adoption innovation. SMEs Survey is conducted nation-wide, specifically there are approximately 2,500 non-state manufacturing SMEs in 10 cities or provinces including Hanoi, Hai Phong, Ho Chi Minh City (HCMC), Ha Tay, Phu Tho, Nghe An, Quang Nam, Khanh Hoa, Lam Dong and Long An. SMEs survey is designed to be representative for the whole country.



### 3.3.2 Sample selection

In order to conduct impact evaluation of innovation adoption using PSM, cross-sectional data for the survey of 2009 and 2011 is employed. Based on the literature of PSM method, all the samples will be categorized into two comparison groups, including treatment group and control group. In this research, these two groups are defined as follows: (1) Treatment group includes the firms with innovation adoption within the survey of 2011. (2) Control group comprises the enterprises without innovation adoption. On the basis of this criteria, 374 firms are found to adopt innovation (Treated units) while there are 306 non-adopter (control units).

In order to investigate the probability of innovation adoption, this research applied the characteristics of firms before firms' innovation adoption (within 2 years of the SMEs survey in 2011); that is, these attributes were derived from the SMEs survey in 2009.

**Table 1** showed the characteristics of SMEs used for quantitative research in this study. Firms' attributes used for predicting the probability of firms' innovation adoption included such variables as Age of firm, Member of a business association, Research and development, Technology transfer certificate, Business License, Medium low technology sector, Medium High technology sector, High technology sector, Access to credit, Recruiting new high skilled labours, Share of unskilled production workers, Professionals share of total workforce, Real revenue 2008 (million 1994 VND) and Real total assets 2008 (million 1994 VND). The firms' performance is reflected via such criteria as Real total gross profits 2010 (million 1994 VND), Real value added 2010 (million 1994 VND) and Real revenue 2010 (million 1994 VND).

Tab. 1 – Characteristics of SMEs

Variable	All samples		Non-adopters		Adopters	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Real total gross profits 2010 (million 1994 VND)	303.6	480.3	242.6	355.3	353.6	557.9
Real value added 2010 (million 1994 VND)	574.6	757.2	447.2	551.7	678.9	877.8
Real revenue 2010 (million 1994 VND)	1956.1	2819.0	1538.6	2431.7	2297.8	3061.2
Age of firm	12.8	10.1	14.1	10.8	11.8	9.3
<i>Member of a business association</i>	0.23	0.42	0.23	0.42	0.22	0.42
<i>Research and development</i>	0.31	0.46	0.32	0.47	0.31	0.46
<i>Technology transfer certificate</i>	0.01	0.12	0.01	0.10	0.02	0.14
<i>Business License</i>	0.91	0.28	0.89	0.31	0.94	0.25
<i>Medium low technology sector</i>	0.34	0.47	0.38	0.49	0.30	0.46
<i>Medium High technology sector</i>	0.05	0.22	0.05	0.22	0.05	0.21
<i>High technology sector</i>	0.05	0.21	0.04	0.19	0.05	0.23
<i>Access to credit</i>	0.40	0.49	0.36	0.48	0.43	0.50
<i>Recruiting new high skilled labours</i>	0.53	0.50	0.49	0.50	0.56	0.50
Share of unskilled production workers	0.35	0.30	0.35	0.30	0.35	0.30
Professionals share of total workforce	0.06	0.07	0.06	0.07	0.07	0.07
Real revenue in 2008 (million 1994 VND)	2072.1	2950.7	1766.3	2410.0	2322.3	3310.7
Real total assets in 2008 (million 1994 VND)	2412.0	3605.8	2236.6	3648.2	2555.5	3569.2
<b>Obs</b>	680		306		374	

## 4 Results and discussion

### 4.1 Results on Determinants of Innovation Adoption

Tab.2 – Probit Estimations of Determinants on Innovation Adoption

Variable	Coef.	Marginal Effect	Z	VIF
Firm age	-0.009*	-0.004	-1.830	1.10
<i>Member of business association</i>	-0.064	-0.025	-0.530	1.06
<i>Research &amp; Development</i>	0.023	0.009	0.210	1.09
<i>Medium low technology sector</i>	-0.270**	-0.107	-2.510	1.10
<i>Medium high technology sector</i>	-0.157	-0.062	-0.680	1.06
<i>High technology sector</i>	0.019	0.008	0.080	1.06
<i>Accessibility to credit</i>	0.153	0.061	1.460	1.11
<i>Recruiting new high skilled labours</i>	0.109	0.043	1.080	1.07
<i>Technology transfer certificate</i>	0.316	0.121	0.720	1.02
<i>Business License</i>	0.294	0.117	1.560	1.15
Share of unskilled production workers	-0.071	-0.028	-0.430	1.04
Share of Professionals	1.241*	0.491	1.740	1.15
Revenue in 2009	3.3E-05	1.3E-05	1.630	1.33
Total Assess in 2009	-6.2E-06	-2.5E-06	-0.390	1.33
Constant	-0.145	0.208	-0.700	
<b>Count R Square</b>		<b>61.18%</b>		

Notes: \*significant at 5% level, \*\*significant at 1% level, \*\*\*significant at 10% level.

*Dummy variables are in Italic*

The value of Percentage of Correctness Prediction (Count  $R^2$ ) indicates that the observed characteristics in the probit model are rather well-specified and reliable. VIF values that there is no multi-collinearity among the variables in the research model. This model is then applied to estimate the probability of innovation adoption that is considered as propensity score in PSM method.

### 4.2 Results on Impact of innovation adoption on firms' performance

From **Table 3**, it was found that there is difference in mean of revenue, value added and gross profit between adopters and non-adopter at significant level of 1 percent. Firms with innovation adoption are 759 million VND (equivalent 43.8 percent) higher in revenue. The value added of the innovation adopters is 232 million VND (equivalent 36.1 percent) higher than that of the non-adopter, while the gross profit is 74 thousand 111 million VND (equivalent 33.2 percent) higher.

Tab. 3 – Impact of Innovation using Independent Sample T-Test Methods. *Source:* Calculated from SME2009 and 2011

	Amount (Million VND)		Percentage (%)	
	Difference	t-Stat	Difference	t-Stat
Revenue	759***	3.604	0.438***	4.822
Value Added	232***	4.194	0.361***	4.341
Gross Profit	111***	3.147	0.332***	3.489
Observation	680			
<i>Adopters</i>	374			
<i>Non-adopters</i>	306			

*Note:*\*significant at 10% level, \*\*significant at 5% level, \*\*\*significant at 1% level

Independent-Samples T-test is a method to compare the difference in mean of outcomes between two groups. However, this method does not take into account other characteristics that result in the difference in firms' performance, so the improvement of firms' outcomes may be explained by other factors. Therefore, the result generate by this method is not as reasonable and accurate as those of other impact evaluation methods such as PSM.

Tab. 4 – Common Support and Balance Test. *Source:* Calculated from SME2009 and 2011

	Before match	After match
<i>Control</i>	306	301
<i>Treatment</i>	374	374
Balancing test	Satisfying	
Common Support Region	[.2976733, .89374515]	
Inferior of block of pscore	6	

**Table 4** shows that, the balancing property test is satisfied. The numbers of firms falling into common support region are 675, including 374 treatments and 301 controls; while there are 5 firms dropped out of the sample due to their two high or two low propensity score, so the rate of loss equals to 0.74%.

Tab. 5 – Results on the impact of innovation adoption on firms' performance. *Source:* Calculated from SME2009 and 2011

	No. of treatments	No. of controls	Amount (Million VND)		Percentage (%)	
			ATT	T-Stat	ATT	T-Stat
<b><i>Real Revenue</i></b>						
Nearest Neighbor	374	175	534**	2.091	0.297**	2.333
Radius Matching	372	301	649***	2.849	0.368***	3.679
Stratification	374	301	179***	2.600	0.278***	4.251
Kernel Matching	374	301	531**	2.480	0.306***	3.558
<b><i>Real Value Added</i></b>						
Nearest Neighbor	374	175	175***	2.725	0.251**	2.265
Radius Matching	372	301	201***	3.797	0.294***	3.700

Stratification	374	301	159***	2.863	0.216***	2.779
Kernel Matching	374	301	175***	3.791	0.244***	3.047
<b><i>Real Gross Profit</i></b>						
Nearest Neighbor	374	175	67	1.403	0.195	1.623
Radius Matching	372	301	96***	2.615	0.273***	2.627
Stratification	374	301	69**	2.126	0.174**	2.248
Kernel Matching	374	301	79***	2.618	0.207**	2.215

*Note: \*significant at 10% level, \*\*significant at 5% level, \*\*\*significant at 1% level*

*ATT estimation using Bootstrapped standard errors; 50 bootstrap replications are performed.*

**Table 5** showed that innovation adoption truly results in a higher increase in firms' revenue when using PSM. At the significance level of 5%, the increase in revenue of innovation adopters is higher by 534 or 649 or 179 or 531 million VND (equivalently 29.7 percent or 36.8 percent or 27.8 percent or 30.6 percent) than that of non-adopters via using NN, Radius, Stratification and Kernel matching techniques respectively. This finding is similar to the result in a research by Therrien et al. (2011) in which stated that product innovation will improve sales of innovative firms.

According to the result in **Table 5**, it is also found that innovation makes a higher increase in the value added of firms at the significant level of 5%. The value added of the adopting firms was found to increase higher by about 175 or 201 or 159 or 175 million VND (equivalently 25.1 percent or 29.4 percent or 21.6 percent or 24.4 percent) than that of non-adopting firms via using various techniques of PSM.

**Table 5** also showed that the innovation adoption results in higher firms' performance regarding gross profit. Innovation-adopting firms are proved to improve their gross profit higher by 67 or 96 or 69 or 79 million VND (equivalently 19.5 percent or 27.3 percent or 17.4 percent or 20.7 percent) than that of firms without innovation adoption via using such techniques as NN, Radius, Stratification and Kernel matching techniques respectively. This result is consistent with the conclusion in a study by Geroski et al. (1993). In this research, Geroski et al. found that firms with innovation adoption are more profitable than non-adopting firms.

The research results conclude that technical innovation (product or process) has positive effect on firm performance regarding revenue, value added and gross profit. The conclusions are consistent with the findings by Gunday et al. (2011) and Artz et al. (2010). The reason why technical innovation improves firm performance may be explained by the characteristics of the SMES in research data. The performance of SMEs in the manufacturing sectors are strongly affected by technical innovation activities, particularly product or process or technology innovation.

## 5 CONCLUSIONS

This study investigated the relationship between innovation and firm performance for the case of SMEs in Vietnam. To capture the best result and conclusion, this study applied such method as independence sample T-test and PSM with various techniques to investigate the impact of innovation on firms' performance. Probit model was also employed to estimate the probability of innovation adoption of each firm. This estimated probability was propensity score used for matching the observations in two groups when investigating the impact of innovation using PSM. From the results of Independence sample T-test and PSM methods, this study found that innovation adoption has positive impact on firms' performance via

increasing gross profit, value added and revenue. It is consistent with many previous studies (Roberts, 1999; Calantone et al., 2002; Cho and Pucik, 2005), and the impact in this study is remarkable. This provides an empirical evidence about role of technical innovation on firm performance. The research results may be considered as basis for appropriate policy implications that are useful for SMEs in Vietnam as well as transition countries. The findings from this study suggest that SMEs in developing countries should pay attention to innovation activities to improve firm performance.

PSM has been considered as a popular method to investigate impact of a program or a policy. PSM may reduce the selection biases; however, hidden bias may still exist because PSM does not take into account the unobservable characteristics. For further research, in order to reap the better result, this research will apply other different methods such as Difference in Difference, Difference in Difference with PSM or Instrumental Variable. Moreover, qualitative research should be also applied to better explain and consolidate the research findings.

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## **THE IMPORTANCE OF CULTURE AS A FACTOR UNDERPINNING ACCOUNTING NATIONAL RULES: CONSEQUENCES FOR IFRS**

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### **Abstract**

This paper discusses the importance of Culture and of the Social Environment as a factor underpinning Accounting Rules at a national level. The aim is to highlight the “embeddedness” of Accounting. Accounting Rules are not devised in a vacuum but are often introduced keeping the characteristics of the local economic environment into high account. These particular characteristics, in turn, reflect also cultural patterns which are specific in certain national societies. As an example, the study considers the economic and cultural reasons underpinning the importance of the *Vorsicht* (roughly translated as Prudence) principle in the German Accounting system and the correspondent different approach to Prudence in the Anglo-Saxon Accounting settings. As a consequence of the link existing between Culture and Accounting Rules, devising International Accounting Standards has been even trickier, because it is not straightforward to devise rules which could be suitable to countries characterized by different cultural environments and where economic systems are regulated in a different way. The need to set compromises is often one of the reasons why IAS/IFRS are sometimes providing ambiguous guidance or allow companies the discretion to choose among alternative options which would result in quite different figures accounting for the same element. This, unfortunately, may undermine the comparability of statements issued respecting the same rules but is a probably unavoidable side-effect of the internalization of Accounting Standards.

*Key-words: Accounting Rules, IFRS, Culture, Institutions*

JEL Classification : M40

### **1 Introduction**

This paper discusses the importance of Culture and of the general Social Environment as a factor influencing the development of Accounting Rules. As said in the Abstract, the aim is to highlight how Accounting Rules find their basis in Culture. We consider this as a topic worth of research because Accounting Rules are often embedded within the environment where they are developed. As discussed by Hall and Soskice (2001) and Mc Cann (2014), countries (i.e. USA, Germany, UK) differ substantially as for the mechanisms governing and the patterns characterizing their economic environments. As a result, there are noticeable differences regarding elements like for example the intervention of the State in the economy, the prominence of the role played by banks and the term-orientation of their relationship with clients, the strength of Trade Unions, the propensity of companies to merge or their preference to continue operating as smaller economic units, the importance of financial markets. These differences are evident also within the group of Western market economies, which are far from presenting a homogeneous internal setting as for those factors mentioned above. Moving from this evidence, there are consequences for Accounting Standard setters: Accounting Rules need to be devised having in mind the particular characteristics of that economic environment where they are expected to be enforced. Otherwise, the very devised

rules may turn out to lead to inefficient outcomes as for the impact they may have on the performance of companies and the reaction of investors and banks.

The paper is structured as follows. The next section is focused on the links between Rules (including Accounting Rules) and Culture. The third section will discuss the cultural (social and economic) basis of two important Accounting Principles underpinning Accounting Rules in Germany and in the Anglo-Saxon world. The fourth section will expound the consequences that the social and cultural embeddedness of Accounting Rules has for the process of creation of International Accounting Standards.

## **2 The link between Rules and Culture in a society**

The link existing between Culture and Rules (including also Accounting Rules) has been described by North (1990, 2005), who has used the terminology of Institutions. According to North, Institutions are those formal rules (i.e. law issued by Parliaments, standards issued by Associations when these standards are mandatory for the members) and those informal (unwritten) codes of conducts and habits regulating the behavior of Individuals in a given society. Institutions, Formal and Informal, are normally the result of historical and social processes and reflect often those cultural patterns existing in a Society. Overall, Laws, Habits, History and Culture in a society are inter-linked and influence each other mutually (Gray, 1988; Doupnik and Salter, 1995; North, 1990, 2005; Doupnik and Tsakumis, 2004). Sometimes, Formal Institutions may be introduced even when they are not in harmony with the historical, social and cultural environment of a society. However, this type of action may lead to inefficient results at both social as well as economic levels, because they are not respected by the local community or because the social and economic basis is different from that which would be needed. A blatant example of Formal Institutions not matching the local social and economic environment is represented by those liberalizing and privatizing laws introduced after the collapse of Socialism in countries (i.e. Russia, Ukraine) which were not endowed with a social background where these laws could have helped to restructure the local economies (Hunya, 2003). The result has been a multiplication of criminal activities related to the process of Privatization, hyper-inflation and also a general impoverishment, which was the very opposite of what those International Organisations (i.e. IMF, World Bank) officially intended to achieve. The reason is that these mentioned Organisations held a belief regarding the superiority of these rules as mechanisms able to entail economic prosperity and growth. This belief was based on the model provided by that country (USA) which appeared as the winner of the Cold War, where these rules were considered almost dogmatically as the reason underpinning the economic success of that country. Nonetheless, it was later realized that rules cannot be successfully transplanted to other countries irrespective of the presence of a suitable social background.

Accounting Rules are also examples of Formal Institutions, because they are mandatory for companies according to national and EU legislation. Hence, they often reflect the specific characteristics of the Economic and Social Environment where they are mandatory (Gray, 1988; Shultz and Lopez, 2001; Watts, 2003; Tsakumis, 2007; Nobes and Parker, 2010 Kanagaretnam, 2014). This is important because Accounting Rules not in harmony with the local environment may jeopardize the development of a given economic system, as the examples provided in the next section below will highlight. Thus, Accounting Rules are also a “socially embedded fact” (Granovetter, 1985; Choi and Meek, 2010; Salter et.al., 2013), a social construction which must take into account human factors and the whole social-historical context when the fact happens. It follows that it is meaningless to discuss which, among the various alternative methods available to measure accounting data (i.e. fair value vs.

historical cost, methods of depreciation) is the most efficient. There is nothing like a “superior” method which will better ensure the transmission of more accurate Accounting information (Siller and Podda, 2014). Accounting standard setters should, indeed, reflect on the correspondence existing between a specific Accounting rule and the wider cultural, social and economic environment where this particular rule would find its enforcement. The following section will focus better on this particular issue.

This paper has mentioned the link existing between Culture and Accounting Rules in a specific environment. Culture itself is a set of values, beliefs and “mental programming” diffused in a given Community and underpinning Institutions (Hofstede, 1980, 2001; North, 1990 2005). The study of Culture is normally carried on by scholars within the field of Sociology, however the effects, influence and links characterising the relations between cultural patterns and economic ones have been expounded for a long time (Veblen, 1999; Granovetter, 1985; North, 1990, 2001; Scott, 2001;). In particular, Hofstede has devised five parameters representing Culture in various societies, measuring them (Hofstede, 1980, 2001). These are:

- 1) Uncertainty Avoidance reflects the propensity of members of a society to refrain from introducing changes to their ordinary lives.
- 2) Power Distance measures the actual degree of formality existing among people working at different hierarchical levels.
- 3) Masculinity vs. Femininity (also known as Assertiveness vs. Nurturing) A masculine society rewards competitiveness, aggressive attitudes, whereas a feminine society is more prone to promote harmony of human relationships.
- 4) Individualism vs. Collectivism. A person considers him/herself as an individual entitled to pursue his/her own interest without accepting any responsibilities towards others (Individualistic societies) rather than as a member of a group with specific duties to care about other members of the group and about the group in general (Collectivist Societies ).
- 5) Long term vs. Short term Orientation. A long-term society is oriented towards the consolidation of personal (and economic) relationships among individuals, whereas a Short-Term oriented society is characterized by occasional and impersonal contacts.

### **3 Vorsicht and Fair Value: accounting principles embedded in a cultural social and economic environment**

The principle of Vorsicht characterizes and underpins Accounting Rules in Germany and in all those countries whose national Accounting Standards follow the German model i.e. Austria (Helmann, 2008; Hoogervorst, 2012). The principle of Vorsicht is often translated as Prudence, translation endorsed here even if the two terms are not really equivalent. On the basis of Vorsicht, Financial Statements should present information which should not lead to overstate the financial strength of the reporting entity, in other words, the statements should not offer a ‘rosier’ picture than the reality is. This may sound as a matter of course to non accountants and to the general public persuaded that Accounting can actually provide an objective representation of the financial position of a company. Nonetheless, it is assumed here that the reader is well aware that Accounting Rules do not entail to a perfectly objective representation of anything like for example Value of Assets and Liabilities, indeed there is often a subjective assessment underpinning the final figures reported. Moving from this assumption, the principle of Vorsicht prescribes that the Accountant should be as humble as possible whenever evaluating Assets and never risk to understate the actual strength of

Liabilities. There may be a trade-off between offering an optimistic overview of the financial position of a given entity and a pessimistic one and, whenever such a trade off applies, then the Accountant should choose the second option. In other words, financial statements may provide a bleaker picture than necessary, but not a rosier one.

There is not an objectively valid reason why Accountants, when involved in a trade-off of the type described above, should follow the bleaker option. However, the prominence of the principle of *Vorsicht* can be explained on the basis of the particular characteristics of the German economy. In Germany, the relations between banks and companies are often symbiotic and long-term oriented (or tended to work this way). Banks hold often a substantial amount of shares of their client companies. The idea of the *HausBank* represents a bank offering a broad range of services to a client, ready to provide support during crisis and not acting as a rapacious entity which would eventually cancel overdrafts and enforce a quick repayment of loans. On the other side, the company-client is expected to behave responsibly. It would not sever the cooperation as soon as short-term more favourable conditions are offered by another bank. Moreover, it would offer the most honest representation of its real financial position, allowing the bank-lender (and, eventually, investor) to be able to evaluate the risk in order not to over-expose itself. The principle of *Vorsicht* is well suited to serve these needs, as its enforcement guarantees that the provider of funds (*HausBank*) would not underestimate the constraints that lending funds to a particular client (and, eventually, investee) may create to the very bank's balance and risk exposure. There is a mutually convenient business relationship based on mutual trust and respect, long-term acquaintance supposed to curb Opportunism from either side.

On the other side, traditionally, German companies are less keen (if compared with their Anglo-Saxon competitors) to search funds from impersonal financial markets. This may be also one of the reasons why the German Stock Market has a low capitalization than the UK one. The relative importance of convincing a public of short-term oriented financial investors regarding the great performances of the listed company is relatively of less importance. Hence, there is less of need to boost indicators up.

The particular characteristics of the German economy, as described above, find an explanation if one considers German Culture. The indicator of Uncertainty Avoidance is among the highest, suggesting that Germans tend to be quite conservative, refrain from changing their behavioural patterns and accepting new ones. This explains the importance of the *HausBank* as a safe harbor, the prominence of long-term oriented business relationships, the relative lower financial capitalization of the stock market in comparison with the GDP. This discussion suggests that Culture shapes the economic system which, in turn, underpins the very Accounting System's characteristics. The enforcement of the principle of *Vorsicht* is necessary in order the whole system to work smoothly, otherwise the very relation existing between *HausBank* and companies would be in jeopardy. Companies would reluctantly increase their reliance on impersonal markets because the short-term orientation of investors and their volatility would lead to Uncertainty (which Germans tend to avoid).

As for Anglo-Saxon countries, the matter is quite different (Fasan and Marcon, 2014). The level of Uncertainty Avoidance in the UK and in the US has traditionally been quite low (in spite of changes in the most recent period), suggesting that there is little fear of experiencing new patterns (Nobes and Parker, 2010). An indication comes from the worldwide orientation of the UK, which has historically colonized a certain number of territories all across the Earth. In this type of countries, there is less of a reluctance to engage in impersonal financial investment, hence the comparative weight of the Stock Market is higher than in Germany. On the other side, UK and US are characterized by a relatively higher level of Individualism. Individualism leads to accept short-term business relationships as long as these are convenient

and allows or encourages the interruption of such relationships when not convenient any longer. The very presupposition of the existence of the HausBank does not find a ground in such settings (actually the US legislation has limited for a long time the legal possibility to create universal banks). Both banks as well as companies may interrupt business cooperation as easily as they may start new ones, moreover banks do not acquire shares of clients as often as it happens in Germany. As a consequence, companies would not benefit from a strong reliance on the Principle of Prudence as much as their German competitors would do, indeed they need to present a “reasonably rosier” (leaving aside any discussion about the border between a rosier representation and an unfaithful one) picture to a public of impersonal and often short-term investors in search of financial gains. The principle of Fair Value, which allows a high margin of discretion to the reporting entity, is, indeed, better suitable to companies that need to present encouraging reports with the aim to raise funds in impersonal and volatile financial markets. Fair Value Methods of evaluating Assets have traditionally been more commonly used in the UK than in Germany.

The pages above have demonstrated that, in both of the examples provided, there is a direct link stemming from Culture to the very organizational structure of the economic system and that this latter underpins Accounting Rules. Accounting Rules do not exist in a vacuum but are devised in order to match the needs and characteristics of the local economic (and social) environment. Abandoning the principle of Vorsicht and reinforcing the importance of Prudence would probably create economic difficulties in Germany and in the UK/US, as companies would find raising funds much harder. It is also possible to argue that reality is more complex, especially with the rise in the level of Globalisation, traditional Cultural Patterns tend to soften, traditional models are under discussion. Nonetheless, the points discussed above have a general relevance (naturally, considering all possible exceptions) and are appropriate to enrich with examples the discussion about the importance of Culture as for the development of Accounting Rules.

#### **4 IFRS/IAS: can we have uniform International Rules?**

The discussion developed in the previous sections leads to a consequence: developing International Accounting Rules becomes harder in view of the fact that it is often not possible to devise rules which could match with not only different but even opposite expectations and needs of the various environments. Going back, once again, to the example described above, there is not a mechanism which could lead to the introduction of uniform Accounting Rules suitable to regulate efficiently the German and the UK economic/business sectors. A compromise would risk to be a even less appropriate solution as it would probably end up to inefficiencies in both environments. Still, a globalized economy needs to have International Accounting Rules. This is an absolute necessity as international operators need to understand and compare Financial Statements issued by companies located in different countries. The conundrum is technically unsolvable. At the moment, IFRS/IAS leaves often the possibility to choose among different options in many cases (For example IAS 2 allows the use of the FIFO or of the Weighted Average Method when accounting for inventories, according to IAS 20 a grant related to an asset may be reported as deferred income or by deducting the grant from the carrying amount). This fact is certainly not consistent with the spirit underpinning the very idea to introduce International Accounting Rules and is often explained on the basis of the weight of specific lobbying groups participating in the decisional process. Certainly, this leads to a situation not very dissimilar to the one existing before the introduction of IFRS/IAS. Nonetheless, uniform rules are, in certain cases, simply speaking not usable because these specific rules would have deleterious effects when they are not suitable to the very characteristics of the economic environment of a certain country. In turn, the patterns

underpinning economic environments depend often on the local Culture, which is hardly changeable in the short/medium term.

## **5 Conclusion**

Accounting Rules are often devised according to the characteristics of the economic environments where the rules are to be enforced. In turn, Culture affects the development of these specific characteristics and, directly or indirectly, of Accounting Rules. Culture appears as one of those factors underpinning Accounting standards at the national level. This fact may complicate the introduction of IFRS/IAS because it is often difficult (let alone possible) to devise rules which can actually be suitable to countries characterized by different cultural values (saying this in North' terms, a different informal institutional environment). There is a constant effort to find a compromise between , on the one side, Uniformity as for International Accounting Rules and, on the other side, the need to avoid to introduce standards which could undermine the development of certain economies.

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## **IFRS ADOPTION AND ITS IMPACT ON CAPITAL MARKETS IN THE NEW EU COUNTRIES: WHO ARE THE WINNERS AND LOSERS?**

*David Procházka, Jiří Pelák*

### **Abstract**

From 2005, the EU listed companies are obliged to prepare their consolidated financial statements in conformity with IFRS, which are viewed as high-quality financial standards (Leuz, 2003). To comply with the increased disclosure requirements, companies have to incur significant costs. However, the benefits from harmonised financial reporting are available only to those entities, which have serious incentives to report transparently (Daske et al., 2013). The benefits and costs following the changeover to IFRS are therefore neither unfolded equally across companies, nor countries. Empirical research (e.g. Lee et al., 2008; Christensen et al., 2013) reveals that the shortcomings in institutional setting may close off all potential benefits from harmonised accounting, which is pertinent mainly for the transition countries. The aim of this paper is to identify absolute and relative winners and losers among the new EU member states in terms of the progression of their capital market. The particular focus is put on the capital market size measured by a simple criterion “number of listed companies” and its changes in transitional and post-adoption period. The splitting of time-series into two subsets enables to eliminate the influence of different reporting incentives from the effects of change in reporting regime. As an unintended result, the paper’s empirical findings raise some doubts about the appropriateness of certain research designs for assessing the economic consequences of mandatory IFRS adoption.

*Keywords: Mandatory IFRS adoption; Capital market development; Transition economies*

JEL Classification: M41, F21, G15

## **1 INTRODUCTION**

Increasing economic globalisation and integration of capital markets push for the introduction of a single set of internationally harmonised accounting standards (Ball, 2006). Accounting harmonisation is defined as a process, which aims at increasing the compatibility of accounting practices by setting bounds to their degree of variation (Nobes & Parker, 2012). International harmonisation of financial reporting is motivated by investors who seek the best opportunities to invest their scarce economic resources. The investors look for the investments meeting their preferences on return, risk, and liquidity regardless the national boundaries. Financial statements of companies domiciled in a particular country are source of potentially useful information for all investors. However, home agents have better knowledge of local factors shaping the content of financial statements prepared in conformity with national GAAP, which may result in decision-making bias. Foreign investors, being exposed to an information risk, thus require risk premium for their investment (Gordon & Bovenberg, 1996), which increases the cost of capital of home investees. Both parties may profit from the harmonised accounting rules. On the one hand, investors are able to better assess the profitability and threads of a wider range of investment opportunities. Facing the reduced estimation risk, they are willing to accept a lower rate of return. On the other hand, the adoption of internationally accepted financial standards transmits a significant signal about the investees’ reporting incentives (Skinner, 1994; Burgstahler *et al.*, 2006). By incurring bonding costs voluntarily, they commit to prepare financial statements, which are supposed to

provide international investors with information useful for their decision-making (Dumontier & Raffournier, 1998). As remuneration, they obtain an access to cheaper capital.

The demand for internationally comparable financial statements is therefore of endogenous nature. In present, the international harmonisation of accounting is represented by worldwide adoption of the International Financial Reporting Standards (IFRS). According to the IASB's statistics, the IFRS were used in 114 jurisdictions as at the end of 2014. Regarding the EU, the process is driven by the Regulation (EC) 1606/2002 on International Accounting Standards. From 2005, companies publicly traded in the EU regulated capital markets are obliged to prepare their consolidated financial statements in conformity with IFRS. The changeover is connected with material benefits and costs, which are unfolded equally neither across companies, nor countries. The shortcomings in institutional setting may close off all potential benefits from harmonised accounting, which is pertinent mainly for the transition countries. The aim of this paper is to identify absolute and relative winners and losers among new EU member states in terms of the development of their capital market. In particular, we will assess its size measured by a fundamental criterion "number of listed companies". The paper is organised as follows: Chapter 2 reviews the literature on motivation for the IFRS adoption and its capital market consequences. Chapter 3 investigates the development of capital markets in the CEE region with reference to statistical data on number of traded securities. Chapter 4 concludes, outlines the main limitation of study, and suggests future direction of research in the field.

## **2 BACKGROUND**

The assessment of outcomes of accounting harmonisation requires the identification of the goals, which impelled policy makers to endorse the adoption of IFRS. Hope *et al.* (2006) discover that countries with a relatively weak investor protection are more likely to adopt IFRS. Imposing bonding costs, stemming from the switch to high-quality standards, on domestic entities should make capital markets more attractive for foreign investors. The study of Ramanna and Sletten (2009) concludes that strong economies are reluctant to hand the power over standard-setting to independent international authority. The authors also stress the importance of network effects, which are further elaborated in Ramanna and Sletten (2014). They found out the degree of IFRS harmonisation of a particular country increases in the perceived value of its IFRS network. High value of the network effects may result in adopting the accounting rules, which do not suit well to domestic institutions. In fact, some countries adopting IFRS may do it, even if it means the replacement of local standards of superior quality than IFRS. Political factors and dependence on imports of mineral and other resources could be another reason, why countries adopt IFRS (Alon & Dwyer, 2014).

Ramanna and Sletten (2014) explored that the European Union was the main driver of network benefits from international accounting harmonisation through IFRS. As the IFRS adoption has a wide range of economic consequences, their proper assessment requires a systematic approach. Brüggemann *et al.* (2013) propose the classification matrix with reference to the goals of the Regulation (EC). They distinguish intended and unexpected economic consequences based on whether they were assumed in the text of Regulation. According to the Regulation, the adoption of IFRS as an exclusive set of accounting standards for European listed companies is supposed to ensure a high degree of transparency and comparability of financial statements, and thus to enhance the functioning of capital markets. In the EU context, harmonised financial reporting is considered as a necessary condition for the completion of the internal market for financial services and free movement of capital. Broad, smooth-functioning and cost-efficient stock exchanges are expected to contribute to

higher economic growth and employment. A possible link “(foreign) investments – employment – growth” is analysed by Procházka & Procházková Ilinitchi (2011).

Based on the classification of Brüggemann *et al.* (2013), capital market effects are the intended consequences. Those effects are quite extensively scrutinised. The research splits up into two main categories. Firstly, a direct impact on characteristics of capital markets is explored; namely liquidity, cost of capital, bid-ask spread, and development of foreign equity and debt investments are under scrutiny. Secondly, indirect effects include e.g. informativeness of earnings announcements, the analysts’ forecast accuracy. However, the influence of IFRS adoption on quantitative features of capital markets (e.g. number of issuers; changes in composition of market segments; etc.) is rather undervalued. Furthermore, the research effort is concentrated mainly on former EU-15 countries. New member states are usually out of scope, despite IFRS adoption was expected to significantly enhance the quality of their financial reporting. There are two explanations for this inequality. Firstly, economic power of transition countries from CEE region is considerably lower in comparison with the old member states. According to the Eurostat, the old countries generates 91.8% of the EU gross domestic product, despite their population creates “only” 79.2%. Moreover, Germany, France, Great Britain, and Italy produce individually more than all 13 new EU states combined. The second reason behind the ignorance of transition countries is insufficient information coverage in databases used for empirical research (see e.g. the comment in Footnote No. 3 by Procházka (2012)). The paper focuses on publicly available data on a fundamental characteristic of capital markets, namely the number of listed companies. The main aim is to evaluate the progression of stock exchanges in new EU states compared to the development in old member states. The results of empirical analysis will be confronted against the principal goal of the Resolution (EC), which strives for the improvement of capital markets in order to attract new investment opportunities.

Economic consequences of the IFRS adoption are currently the top area in empirical accounting research. *Tab. 1* summarises the cardinal recent studies focusing on the impact of IFRS adoption on characteristics of capital markets. The researchers investigate esp. how the harmonisation of financial reporting of listed companies has affected the cost of capital and liquidity of their equity instruments. Furthermore, the influence on analysts’ forecast and their accuracy is assessed. The last major stream of research in this area deals with the changes in ownership composition, with emphasis on foreign investors.

Empirical research provides some evidence that the IFRS adoption contributed positively to progression of (EU) capital markets. However, the revealed benefits are limited to the occurrence of two concurrent conditions: (a) strong country’s enforcement regime; and (b) credible adopters’ incentives to report transparently. Despite the great contribution to our knowledge, research designs of above papers have some shortcomings, which restrict the feasibility of their generalisation. Firstly, a low number of transition countries are included in samples testing cross-country settings, e.g. three in Li (2010), Brüggemann *et al.* (2012), Florou and Pope (2012), Daske *et al.* (2013); two in Daske *et al.* (2008); and even not a single one in (Lee, Walker, & Christensen, 2008). Furthermore, the country-unique studies focusing on empirical exploration of capital market characteristics in transition countries are very rare. There is only limited evidence for Romania (Ionaşcu and Ionaşcu, 2012; Mihai *et al.*, 2012). Secondly, the research deals with changes in economic effects on companies listed in the pre-adoption compared to post-adoption period. However, the studies ignore the possibility that the positive (negative) change in financial reporting regime that followed the announced/completed IFRS adoption may have attracted IPO (i.e. new listings) or may have boosted exits from stock exchanges (i.e. delisting).

Tab. 1 – Capital market characteristics after IFRS adoption: evidence from research. Source:  
Authors’ review of the extant research

<b>Paper</b>	<b>Findings: Cost of capital and liquidity</b>
Daske <i>et al.</i> (2008)	Increase in market liquidity; decrease in cost of capital; increase in equity valuation around the IFRS adoption Positive effects only for the companies with reporting incentives for transparency and in countries with strong legal enforcement Stronger effects identified for the voluntary adopters
Lee <i>et al.</i> (2008)	Significant reduction in the cost of equity capital in countries having high-quality institutions; mixed evidence for countries with low financial reporting incentives and insufficient enforcement
Li (2010)	Once again, the reduction in cost of capital only in strongly enforcing countries Increased disclosure and enhanced information comparability are the drivers for the decrease in cost of capital
Daske <i>et al.</i> (2013)	Increase in liquidity and decline in cost of capital is present only for the “serious” adopters, but not in case of “label” adoptions
Christensen <i>et al.</i> (2013)	Capital market liquidity improved in five countries, which made substantial changes in enforcement regime simultaneously with the IFRS adoption The change in accounting regime did not affect the liquidity of capital market even in countries, who have strong regulatory and enforcement environment
<b>Paper</b>	<b>Findings: Analysts’ following and forecast accuracy</b>
Tan <i>et al.</i> (2011)	IFRS adoption attracts foreign analysts, particularly those from other countries simultaneously adopting the IFRS Mandatory IFRS adoption improves foreign analysts’ forecast accuracy, but not domestic analysts’ accuracy
Byard <i>et al.</i> (2011)	Analysts’ absolute forecast errors and forecast dispersion decrease only for mandatory IFRS adopters domiciled in countries with both strong enforcement regimes and domestic accounting standards that differ significantly from IFRS
Horton <i>et al.</i> (2013)	Quality of the information environment (including forecast accuracy) increased more for mandatory adopters relative to non-adopters and voluntary adopters
<b>Paper</b>	<b>Findings: Influence of IFRS adoption on investment allocation</b>
DeFond <i>et al.</i> (2011)	Foreign mutual fund ownership grows provided that mandatory IFRS adoption resulted in improved cross-country comparability of financial statements
Brüggemann <i>et al.</i> (2012)	Stocks experience a significant increase in trading volume, as global mandatory IFRS adoption enhances cross-border equity investments by individual investors
Florou and Pope (2012)	Institutional holdings increased for mandatory IFRS adopters; changes occur especially around the first reporting period Institutional investments are concentrated in countries with strong enforcement/reporting incentives and with relatively high differences between local GAAP and IFRS
Beneish <i>et al.</i> (2012)	IFRS adoption has a significantly greater effect on foreign debt than on foreign equity investment flows Post-adoption increases in foreign equity investment are conditioned upon high governance quality; however, growth in foreign bond investments has occurred regardless the quality of corporate governance

Therefore, we will investigate an aggregate development of regulated capital markets within the EU, with focus on transition countries. The countries from CEE region are viewed as having underdeveloped institutional framework, which influences the functioning of capital markets negatively. The switch to IFRS, which are generally considered as standards of significantly higher quality than local GAAP, may have contributed the improvement.

### 3 METHODOLOGY AND RESULTS

Based on the argumentation above, we will assess whether the adoption of IFRS have had any impact on the size of regulated capital markets in the new EU countries. The size of capital market is approximated by the number of listed companies. Tab. 2 captures the development of equity instruments listed on regulated markets of stock exchanges in EU countries from 1995 till 2012. In 1995, the European Commission published a strategy “Accounting Harmonisation: A new strategy vis-à-vis international harmonisation”, which expressed a strong EU support to the IASC activities. Five years later, “EU Financial Reporting Strategy: the way forward” communicated a commitment that issuers of securities traded on EU markets would prepare their consolidated financial statements using the same set of financial reporting standards. The Strategy was enacted by issuance of the Regulation (EC) 1606/2002 on International Accounting Standards, which mandated all companies listed on EU regulated markets to prepare their consolidated financial statements in conformity with IFRS for each accounting period starting on or after 1 January 2005.

Tab. 2 – Number of listed companies in the EU countries: 1995-2012. Source: The World Bank/World Development Indicators (row „CM.MKT.LDOM.NO“)

Country	1995	2000	2001	2002	2003	2004	2005	2006	.....	2011	2012
Austria	<b>109</b>	<b>97</b>	114	<b>91</b>	86	99	<b>92</b>	96		73	<b>70</b>
Belgium	<b>143</b>	<b>174</b>	156	<b>143</b>	250	235	<b>222</b>	153		158	<b>154</b>
Cyprus	<b>41</b>	<b>120</b>	145	<b>154</b>	152	149	<b>144</b>	141		117	<b>111</b>
Czech Rep.	<b>1,635</b>	<b>131</b>	94	<b>78</b>	63	54	<b>36</b>	29		15	<b>17</b>
Denmark	<b>213</b>	<b>225</b>	208	<b>193</b>	187	178	<b>179</b>	201		186	<b>174</b>
Estonia		<b>23</b>	17	<b>14</b>	14	13	<b>15</b>	16		15	<b>16</b>
Finland	<b>73</b>	<b>154</b>	152	<b>147</b>	142	134	<b>134</b>	134		121	<b>119</b>
France	<b>450</b>	<b>808</b>	791	<b>772</b>	934	898	<b>885</b>	717		893	<b>862</b>
G. Britain	<b>2,078</b>	<b>1,904</b>	1,923	<b>2,405</b>	2,311	2,486	<b>2,759</b>	2,913		2,001	<b>2,179</b>
Germany	<b>678</b>	<b>1,022</b>	749	<b>715</b>	684	660	<b>648</b>	656		670	<b>665</b>
Greece	<b>212</b>	<b>329</b>	338	<b>341</b>	339	340	<b>307</b>	318		275	<b>267</b>
Hungary	<b>42</b>	<b>60</b>	57	<b>48</b>	49	47	<b>44</b>	41		52	<b>51</b>
Ireland	<b>80</b>	<b>76</b>	68	<b>62</b>	55	53	<b>53</b>	57		48	<b>42</b>
Italy	<b>250</b>	<b>291</b>	288	<b>295</b>	271	269	<b>275</b>	284		287	<b>279</b>
Latvia	<b>17</b>	<b>64</b>	63	<b>62</b>	56	39	<b>45</b>	40		32	<b>31</b>
Lithuania	<b>351</b>	<b>54</b>	54	<b>51</b>	48	43	<b>43</b>	44		33	<b>33</b>
Luxemb.	<b>61</b>	<b>54</b>	46	<b>46</b>	42	42	<b>39</b>	36		31	<b>29</b>
Malta	<b>5</b>	<b>10</b>	12	<b>12</b>	13	13	<b>13</b>	14		20	<b>20</b>
Netherlands	<b>217</b>	<b>234</b>	180	<b>180</b>	268	256	<b>237</b>	226		108	<b>105</b>
Poland	<b>65</b>	<b>225</b>	230	<b>216</b>	203	225	<b>248</b>	267		757	<b>844</b>
Portugal	<b>169</b>	<b>109</b>	97	<b>63</b>	55	52	<b>48</b>	47		46	<b>46</b>
Slovakia	<b>18</b>	<b>493</b>	515	<b>354</b>	306	258	<b>209</b>	173		81	<b>69</b>
Slovenia	<b>17</b>	<b>38</b>	38	<b>35</b>	134	140	<b>116</b>	100		66	<b>61</b>
Spain	<b>362</b>	<b>1,019</b>	1,458	<b>2,986</b>	3,223	3,272	<b>3,300</b>	3,339		3,241	<b>3,167</b>
Sweden	<b>223</b>	<b>292</b>	285	<b>278</b>	262	256	<b>252</b>	321		340	<b>332</b>

Above mentioned benchmarks shaping the financial reporting of listed companies in the EU are highlighted in bold in the *Tab. 2*. In 2012, the biggest number of equity instruments was traded on the Spanish capital market. The second largest stock exchange was in the Great Britain, followed by France, Poland, and Germany. Poland is the exception among transition countries; the capital markets in new member states are quite underdeveloped (with Estonia

and the Czech Republic being the last, as far as the number of issuers concerns). However, the dynamics over presented period are of higher importance. E.g. in 1995, the second largest capital market (in terms of number of equity listings) was the Prague Stock Exchange. After next 15-20 years, the exchange is at the rear of the ranking with just a fraction of listed companies compared to the past years. The drastic drop can be explained with reference to the unique way selected for the transformation of former state companies in the communism era to a new model based on private ownership. Czech government opted extensively for the mass privatisation, which led to largely dispersed ownership of companies by millions of people. The following concentration of equity interests came about spontaneously via domestic stock exchange. The concentration turned to quite rapid delistings (from the RMS market). For the purpose of this paper, this pattern of ownership consolidation cannot be contributed to the IFRS adoption.

On the other hand, the Warszawa Stock Exchange has experienced the strongest growth; the number of issuers has risen by almost 300 % from 2002 till 2012. The success might have been a result of favourable institutional factors, including the change of financial reporting regime. These two examples motivate to analyse the development in each country in detail, because there can be relative winners and losers from the IFRS adoption on cross-country level. Similar findings are expressed by Christensen *et al.* (2007), who identified uneven cross-sectional dispersion of benefits from the IFRS adoption on company level. Using data of *Tab. 2*, we calculate the relative change in equity instruments traded in each country for two periods:

- the percentage change between years 2002 and 2005 (pre-adoption period);
- the percentage change between years 2005 and 2012 (post-adoption period).

The break-down into two subsamples follows the comments of Christensen (2012) to the Kim and Shi (2012) evidence on the voluntary adoption of IFRS. Despite EU announced its intention to mandate IFRS in 2000 and approved the Regulation (EC) in 2002 with effective date from January 2005, only an inconsiderable portion of the EU listed companies voted for quasi-voluntary application of IFRS during the transitional period 2002-2005. Moreover, the most of increase shall be attributed to the listings on Neuer Markt Börse Frankfurt (Leuz, 2003; Cuijpers and Buijink, 2005), for which issuers were supposed to submit their financial statements in compliance with IFRS or US GAAP. Christensen (2012) concludes that truly voluntary IFRS adoption was rare. Using the revealed preferences theorem (Samuelson, 1938), we assume that firms affected by Regulation (EC) were reluctant to adopt IFRS earlier than in year 2005, as they perceived the net benefits from early adoption to be negative.

Based on the reasoning above, the splitting of data into two subsets should control for two different factors determining the new listings and delistings. Firstly, the adoption of IFRS meant (a) significantly higher disclosure requirements compared to domestic standards for the majority of EU countries; and (b) relatively high administrative costs (IT systems; staff training; etc.) for the switch and compliance (ICAEW, 2007). This may impel companies to deliberate their abidance at regulated capital markets. The harmonisation of financial reporting may induce explicit and implicit cost pressing companies to exit the capital markets. The delisting is more likely to (a) companies with low reporting incentives and/or (b) countries with strong enforcement regime. These factors are relevant for delisting decisions during the transition period (i.e. between 2002 and 2005), which are mostly influenced by expected benefits and costs of remaining on the exchange.

Secondly, the separate analysis of the changes in number of listed companies in the post-adoption period allows assessing, whether the IFRS adoption has brought positive or negative effects in particular country. Companies listed before 2005 have already switched to the new

system, so there are no implementation costs. Holding enforcement, institutional, and other economic factors constant, the delisting in post-adoption era is then just the consequence of significant real costs for compliance with high quality standards, which are not accompanied by sufficient benefits. Contrariwise, if the quality of capital markets improves due to the IFRS adoption, new issuers may be attracted to enter the stock exchange with initial public offerings. The changes in size of capital markets measured by the number of traded equity instruments are presented in *Fig. 1*. To eliminate compounding time-dependent and institutional factors, we excluded Bulgaria, Romania, and Croatia from the sample, as these countries accessed the EU after 2005, when Regulation (EC) came in force.

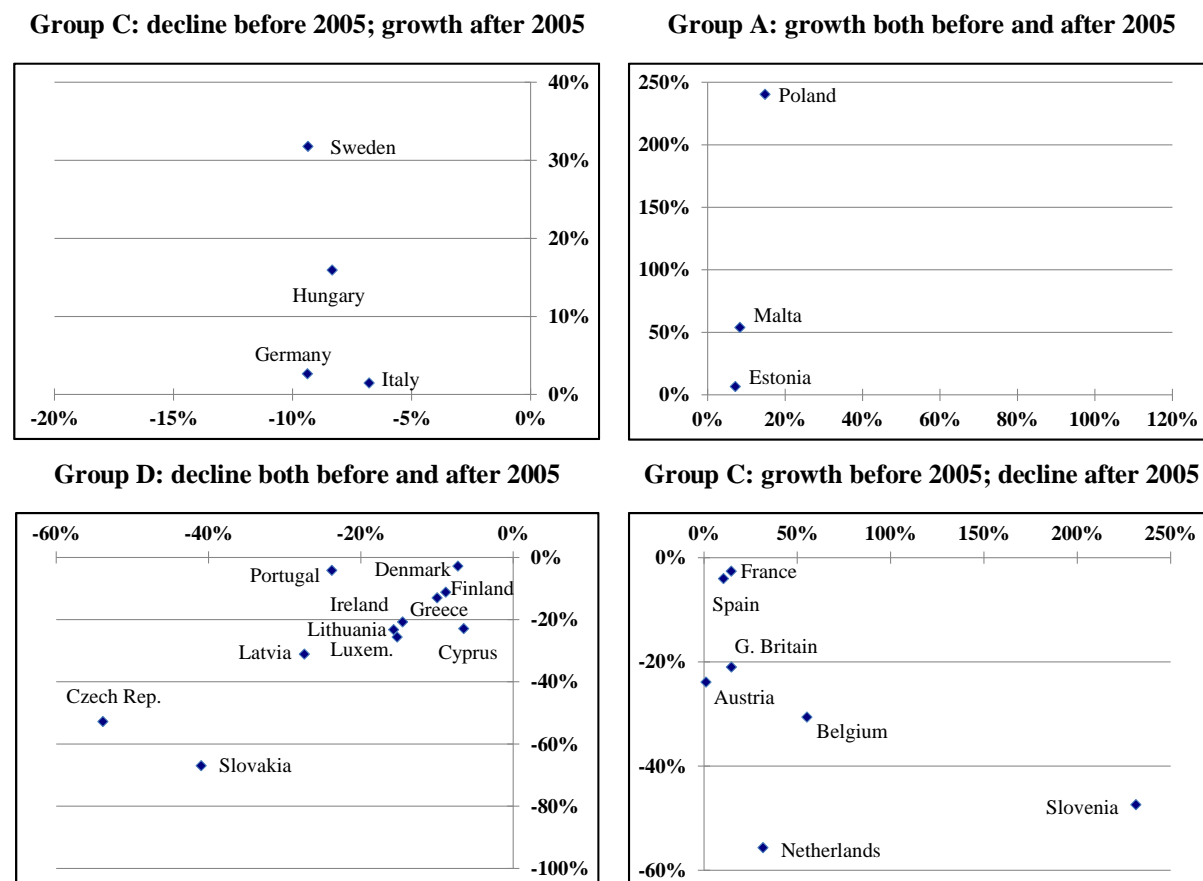


Fig. 1 – Pre- and post-adoption period changes in the number of listed companies. Source: Authors' calculation based on *Tab. 2*

Data are divided into two subgroups. The horizontal axis captures the net growth of listed companies in period 2002-2005 (i.e. pre-adoption period); the vertical axis represents the development in post-adoption period (i.e. the relative change of year 2012 to 2005). Based on the results, countries are classified into four clusters. Group A contains countries, which could be considered as absolute winners, as they experienced the net growth of listed companies both in pre- and post-adoption period. Poland is on the top of rankings as the number of issuers has risen from 216 to 844 over scrutinised time frame. Despite included in this group, there is no significant change in the size of Estonian stock exchange, as the number of issuers was very low throughout the whole period – 14 issuers (2002); 15 (2005); and 16 (2012).

The majority of transition countries from CEE region are located in the lower left cell of the matrix (i.e. in Group D), which indicates a drop in traded equity instruments in both sub-periods. The greatest exits of listed companies are documented in the Czech Republic and

Slovakia, which cannot be attributed only to economic reasons (e.g. concentration of ownership following the mass privatisation). It could be assumed that IFRS adoption in these countries brings unintended negative consequences in terms of large-scale delistings. Lithuanian and Latvian stock exchanges have experienced a slightly better, but still very negative progression, losing almost 50 % of issuers compared to year 2002.

The rest of transition economies belong to Group B and Group C. Slovenian stock exchange underwent reforms in segmentation of markets in 2002, which consequently increased number of equity instruments reported in the World Bank Database in 2003. However, these companies were already present at the capital markets, so the positive movement is a just statistical reclassification. Taking into account further development, the capital market in Slovenia has developed in the same negative way as in the companies under Group D. Mixed evidence is available for Hungary. A fall by approximately 10 % in pre-adoption period is followed by the net new listings growth (almost by 20 %) in the post-adoption era.

To conclude this elementary analysis, Poland is the only winner among new EU countries from CEE region, regarding the size and efficient functioning of capital market in the era of internationally harmonised financial reporting. The Warszawa Stock Exchange is able to attract firms seeking the financing, including foreign issuers. According to PwC (2014), Polish capital market was the European No. 1 in 2012 and No. 2 in 2013 by the number of IPOs. On the other hand, there is a large group of companies, which might be considered as denoted as the absolute losers of a battle for benefits from accounting harmonisation, as their capital markets have substantially shrunk after the approval of Resolution (EC). This group encompasses the Czech Republic, Slovakia, Slovenia, Latvia, and Lithuania. The characteristics of regulated capital markets in remaining CEE countries (i.e. in Hungary, Estonia) have not significantly changed over the examined period. Compared to situation in other transition countries, these two economies may be viewed as relative winners, as they manage to avoid a quite massive process of going private.

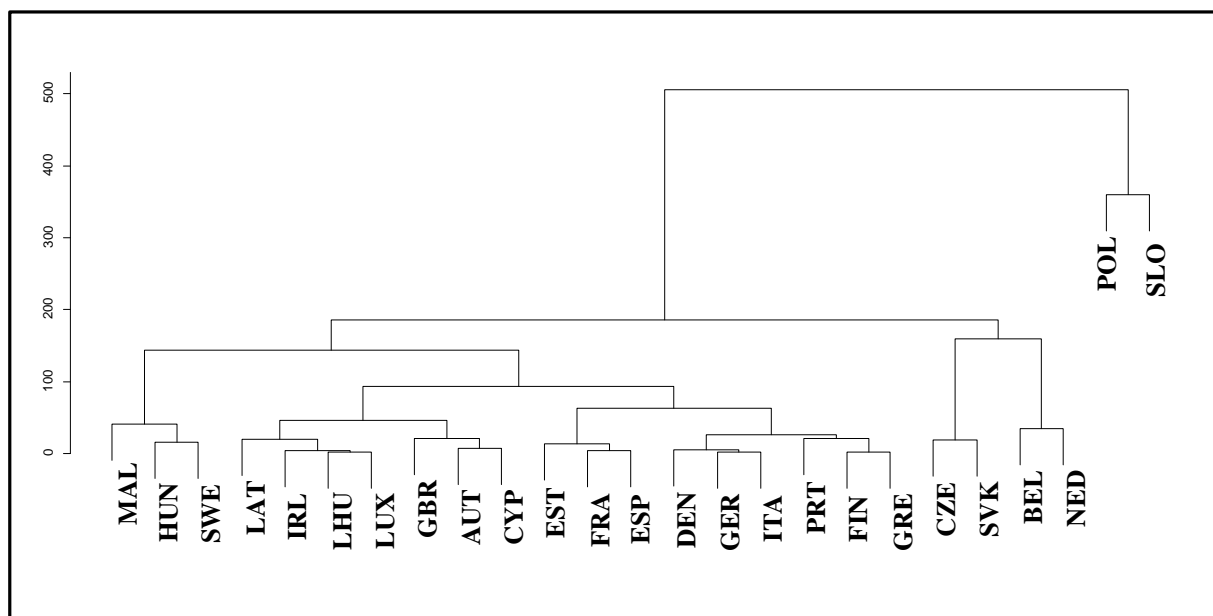


Fig. 2 – Cluster dendrogram for pre- and post-adoption period changes  
Source: Authors' calculation based on *Tab. 2*

The intuitive conclusions on absolute and relative winner, which was based on a simple idea of changes in number of listed companies, can be also confirmed by statistical inferences using the cluster analysis. We used the methods of hierarchical clustering and centroid-based



clustering. Similarly to *Fig. 1*, Poland and Slovenia are considerable outliers, as captured in cluster dendrogram (*Fig. 2*). There are several subgroups identified by the hierarchical method, which rests on the concept of Euclidean distance among variables. E.g. Malta, Hungary, and Sweden create one of the classes. Another group is composed of the Czech Republic and Slovakia, which are also located relatively extremely in the Group C at *Fig. 1*. For the same reason (i.e. a significant drop in post-adoption period), the Netherlands and Belgium are close to previous two countries, and creates a joint class on a higher level. Finally, a quite large group of countries situated in the middle of cluster dendrogram exercises relatively indiscernible differences in pattern of pre- vs. post adoption development. These countries are located around the [0;0] point in the *Fig. 1*. Alternative clustering approach is followed by centroid clustering. Its results on same data as in *Fig. 1* and *Fig. 2* are presented in *Fig. 3*. Once again, one of the classes is made up by Malta, Hungary, and Sweden; Poland and Slovenia are spotted as extreme outsiders as well. The Netherlands and Belgium form a separate group, however, not so close to the Czech Republic and Slovakia as in case of hierarchical clustering. Finally, around the [0;0] point is situated the largest class of countries, for which detailed resolution is not achievable anymore.

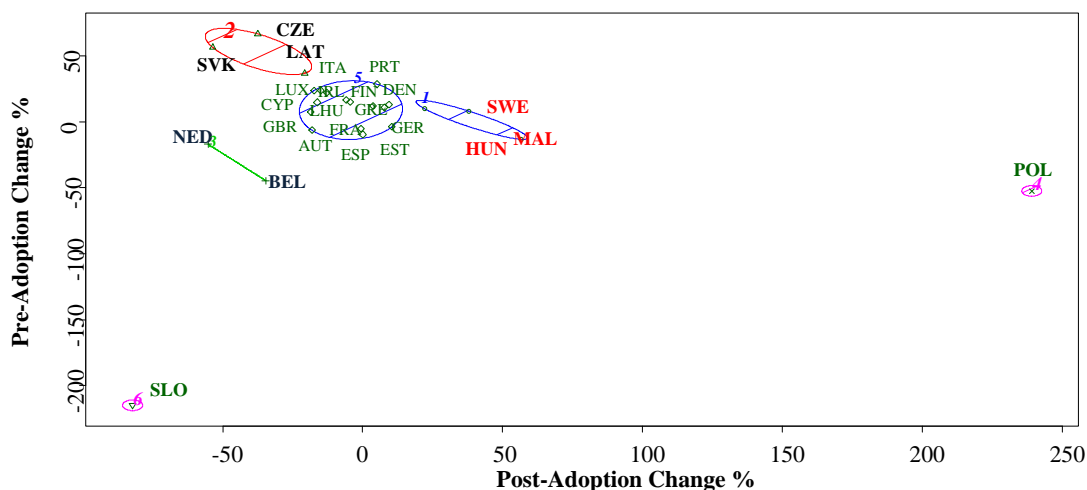


Fig. 3 – Centroid Plot for pre- and post-adoption period changes  
Source: Authors' calculation based on *Tab. 2*

## 4 CONCLUSIONS

The review of extant research, focusing on economic consequences of the IFRS adoption on capital markets characteristics across EU countries, revealed that the process is associated with relatively high benefits in some countries and relatively significant costs in other countries. The findings of archival studies investigating e.g. the change in cost of capital, liquidity, analysts' forecasts accuracy are also confirmed by the analysis of progression of capital markets in terms of their size (measured by the total number of equity instruments traded on particular national stock exchange). Despite simplicity, the measure of size allows identifying the absolute winner with a steadily and hugely increasing number of new issuers, which is Poland. Secondly, we may differentiate the relative winners, i.e. Hungary and Estonia; their stock exchanges remained relatively stable in period after the approval of Regulation (EC) in 2002. Finally, the biggest group contains absolute losers, as they experienced significant declines in number of publicly traded equity instruments during the IFRS era.

As far as the contribution to current state of art concerns, the empirical results presented in our paper partly support the findings of studies on relationship between quality of standards and quality of financial statements. For example, Skinner (1994); Ball *et al.* (2000); Ball *et al.* (2003); Burgstahler *et al.* (2006); Hail *et al.* (2010) point out that accounting quality depends on firms' reporting incentives and functional enforcement regime rather on quality of accounting standards. A widespread occurrence of benefits stemming from accounting harmonisation is therefore not guaranteed. This is highly relevant especially for those transition countries, who suffer from low quality of enforcement and insufficient incentives of domestic companies to report transparently. In addition, we provide supportive arguments for the conclusions of Christensen (2012), who argues that research tends to overestimate the benefits and undervalue the costs connected with the IFRS adoption. He concerns primarily about the empirical assessment of outcomes of voluntary IFRS adoption, but his critique may be generalised for the mandatory adoption, too.

Coherence of empirically uncovered effects of voluntary IFRS adoption is mainly restricted by self-selection bias. Voluntary adopters have strong incentives to communicate with public in a transparent manner, including the extended voluntary disclosures and timely recognition of bad news. The transparency is in turn appreciated by investors. The achievement of benefits (lower cost of capital, foreign analysts' following; etc.) by companies, which made a credible voluntary commitment to adopt high quality standards, such as IFRS, is then of endogenous nature and self-explaining. Research design must therefore incorporate certain dummy variables and employ other procedures in order to control for this self-selection bias and to get robust results. On the other hand, companies' reporting incentives are not a cardinal problem, when analysing the consequences of mandatory IFRS adoption, as all affected companies had to skip to a new reporting system compulsory and at the same time. Empirical research compares the selected characteristic in pre- and post-adoption era after controlling for concurrent events to avoid the distortion of results because of "seeming correlation". In order to avoid this distortion and/or to get more robust results, a comparative sample of non-adopting countries is used to control for other factors than the change in financial reporting standards (e.g. to control for the development of enforcement regime).

However, the inclusion of non-adopting countries as control group does not solve the main problem with the selection of affected companies in adopting countries. The transition from domestic GAAP to IFRS did not happen overnight. A relatively long transitional period (from the decision in 2002 to the effective start in 2005) provided companies with the opportunities to estimate the impacts of IFRS adoption properly and to accommodate to the changeover. Some entities decided to stay publicly traded; others selected to exit capital markets, as going private could have been the only vital solutions how to avoid expected net costs to comply with new reporting standards. Although economically rational on individual level, this kind of behaviour can have troublesome implication for research, provided that delisting is undergone by significant number of companies. Companies, which opt for delisting during the transition period, did not become mandatory adopters. Consequently, they cannot be included in the sample of companies, for which the impact from mandatory adoption was investigated. Let us suppose that a research study detected that IFRS adoption had reduced the cost of capital of companies listed on particular stock exchange. Even if the sample captured the whole population of companies listed on that exchange in the post-adoption period, the empirical results cannot be generalised by arguing that IFRS adoption has enhanced the capital market characteristics. If companies decided to go private during the transitional period because of expected negative impact from the IFRS adoption on cost of capital (e.g. lower profits may violate debt covenants, decrease dividends, etc.), then their omission in sample produces partially incorrect findings about the real effects of IFRS adoption. This remark is relevant

especially for countries clustered in Group C (including Germany, Italy) and Group D in Fig. 1.

However, there are important limitations to our study. Firstly, it deals with aggregate figures on net increase/decrease in number of listed companies. A detailed analysis would require a further break-down on new listings and delistings, which should help in identifying the individual incentives for entering/exiting the capital markets before and after IFRS adoption. Splitting-up is also necessary for resolving the methodological issue described above. Secondly, our elementary analysis assumed other factors (e.g. economic growth; strength of enforcement regime) stable over the whole period, which is not true. The influence of other factors than accounting standards on capital markets should be addressed in future research. Thirdly, more representative results require the comparison of progression in transition countries with development in EU-15 countries. Furthermore, the specifics of each country regulatory system (including the distinction of strength and credibility of reporting incentives among countries) shall be incorporated in the analysis. Finally, despite using the methods of cluster analysis, alternative research approaches (e.g. regression analysis) may yield additional/different insights into the cross-country impacts IFRS adoption on capital markets both on individual and aggregate level. Robust findings would require scrutinising other variables and their relevance (e.g. market capitalisation; trading volumes; etc.).

#### **Acknowledgement:**

This paper has been prepared within the research project „*Economic Impacts of the IFRS Adoption in Selected Transition Countries*“ (supported by the Czech Science Foundation, No. 15-01280S).

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## **IDENTIFICATION OF BREACH OF GOING CONCERN ASSUMPTION BY COMPANIES IN BANKRUPTCY**

*Monika Randáková, Jiřina Bokšová*

### **Abstract**

The Czech accounting legislation defines annual, extraordinary and interim financial statements. The main task of published financial statements is to inform properly the external users. Entities registered in the Commercial register are obliged to publish financial statements not later than the end of the following accounting period into the Collection of Documents. This obligation of publication is based on the EU legislation. The aim of publication is to protect third party, especially business partners in commercial contracts. Unlike other EU countries, the Czech companies often do not comply with the publication requirement in practice. The paper deals with research of entities that have fallen into crisis economic situation and go through insolvency proceedings and answers two basic questions. Do those entities fulfil their legal obligations regarding publication of financial statements? Is it possible to recognize that the company is not a going concern or to recognize that the company is going bankrupt before the insolvency proceedings start?

*Keywords: Financial statements; Going concern assumption; Bankruptcy; Negative equity; the Principal of prudence.*

JEL Classification: G33, M41

## **1 INTRODUCTION**

The purpose of accounting information is to satisfy information needs of different users. Accounting must provide information to financial managers continuously. Management of a company can find this information in accounting books. But at certain intervals it is necessary, both for corporate managing authorities and all other users (owners, potential investors, creditors, suppliers, employees, state authorities, competing companies), to provide cumulative information about financial situation of whole company.

## **2 PUBLICATION OF FINANCIAL STATEMENTS**

### **2.1 Financial statements regular, extraordinary, interim**

„Financial statements, in connection with property transactions, prove financial situation in terms of preserving the estate, in terms of going concern, in terms of efficiency and liquidity and they are very important to participant entities (shareholders, investors, companies). Financial statements may indicate the possibility or necessity of certain property transaction and also prove its realization. Therefore, they are often required by owners and in many cases they are commanded by legal standards.” (Vomáčková, 2009).

The difference between extraordinary and interim financial statements is especially in the fact that within extraordinary financial statements are being implemented factual inventory procedures of assets and liabilities and closing the accounting books at the same time. On the contrary during the interim financial statements the inventory is made only for purposes of

valuation, it means for creation and use of impairment and provisions. During the interim financial statements the accounting books are not closed.

In cases of changing the dispositional authorization to dispose of the assets and liabilities of an entity (the debtor's bankruptcy), it is always necessary to prepare extraordinary financial statements with its relevant formalities. In case when there is no change in dispositional authorization to dispose of the assets and liabilities (declaration of bankruptcy), the entity prepares only interim financial statements.

## **2.2 Going concern in the foreseeable future**

Going concern is one of the fundamental pillars of financial reporting. Preparation of financial statements should be based on the assumption that company will continue in its business in the near future (Kovanicová, 2002). Acceptance of this assumption has serious consequences to the entity and its financial statements:

- Economic activity of the entity is always associated with uncertainty. Therefore it is important not to raise optimistic expectations of external users through financial statements and not mislead them. However, this does not mean that financial statements should be pessimistic. Financial statements should reflect realistic view of the financial position of the entity at the given time;
- “External users are not interested just in current financial position and business performance, but also in its ability to achieve economic benefits out of the potential of its assets, in short “make money”. Necessity to satisfy this intention results in balance-sheet expressing condition of the assets, liabilities and equity at balance sheet date with an eye to the future: assets should express the amount of the expected economic benefits, liabilities expected reduction of economic benefits.” (Kovanicová, 2002).

Financial statements should reflect the real financial situation of the entity with the look to the future, Hence, there must be a series of transactions, which can be undertaken only if company continues in its business and does not intend to end its business in the foreseeable future. E.g. provisions for future expenses, reduction of business results by losses expected in the future, accruals of income and expenses etc. (Bokšová, 2013).

The going concern assumption is (therefore) crucial in the financial statements. In case, when entity expects a breach of this assumption, it is required to apply accounting methods in appropriate way. There is an obligation to state information about used method in notes to financial statements.

The going concern assumption is breach e.g. at the moment of decision on entity's bankruptcy. There is an objective situation when the company gets:

- either into significant insolvency (it is not able to pay its financial liabilities for a period of more than three months overdue and also the creditor cannot reach its satisfaction in other way - enforcement or execution);
- or the company is in over indebtedness (primary insolvency means that the sum of its liabilities exceeds the value of assets of the entity).

There is an obligation of preparing the opening balance-sheet on the effective date of insolvency court's decision on bankruptcy. On a day preceding the day the bankruptcy takes its effect, the entity is obliged to prepare an extraordinary financial statements.

The duty of the insolvency court is to decide how to resolve insolvency no later than three months since issuing a decision of debtor's bankruptcy (Maršíková, 2011; Smrčka &



Schönfeld, 2012). In some cases, it may lead to concurrence of decision on bankruptcy and decision on way of resolving insolvency (declaration of bankruptcy). The preparation of financial statements must copy important moments in ongoing proceedings. In the case, when decision on bankruptcy is also associated with a declaration of bankruptcy, only the extraordinary financial statement is compiled preceding the date of the decision. In case these decisions are not issued at the same time, entity prepares extraordinary financial statements on the date preceding the date of the decision on bankruptcy. On the day preceding the date of effectiveness of declaring bankruptcy is compiled the interim financial statements. During the bankruptcy are compiled annual financial statements in regular period.

### **2.3 Identifiers of Going Concern Problems**

The crucial question is whether business partner or other party can identify that the company may no longer be a going concern according to the annual statements. The basic identifier of going concern problem is the equity value of the company. If it states negative value, it is clear that the debt oversized all of the assets. A business partner should not be closing a contract with such a company. If the equity value is in the black numbers, however smaller than the value of registered capital, the decision is more complicated. Without a question it is possible to assume that the entity functions at the expense of equity contributions (the owner would not in this case receive even the money they originally invested into the company). In that case it is necessary to focus on the equity development in the past few years. If the equity value oscillates around the value of registered capital, it is possible to detect beginnings of going concern troubles. The usual reason which causes this trend is cumulated retained loss (Altman & Hotchkiss, 2006).

Second identifier of going concern problems is the overrated assets and possible risks connected to the business which are not taken into account (undervalued provisions). The management is in many cases trying to adjust the annual statements in order to appear healthier even for the price of falsifying the net income of the company (Strouhal et al., 2014a, 2014b).

The third identifier tends to be the rising level of indebtedness of the entity (the overdue debts are raising). That of course can be related either to the deterioration of equity or to the rise of bad debts to which there are no provisions created (Mevorach, 2009).

For external users are the annual statements the most important source of information about the entity whether it is a well prospering company or a one nearly going bankrupt. However in the Czech Republic many companies do not fulfil the legal duty to publish annual statements. According to the press release of the CRIF – Czech Credit Bureau (2015) from the October 2013, which has made an analysis of annual statements that had been published in the year 2011, 79% of all companies had not published their annual statements for 2011, and therefore broke the law. From the long term point of view the number of companies which are publishing their annual statements decreases every year (Czech Credit Bureau, a. s., 2011).

Why are managers and owners of the entities in the Czech Republic only very unwillingly publishing any information about their own companies? They probably feel that this information could be used by their competitors and so they could lose part of their advantage. As a reason of that these entities often do not obey the law and they rather pay the fine, which is in the Czech Republic insignificant (Varvařovský, 2012). In some countries of the European Union it might be even considered a crime consisting of “falsification of data about the financial state and equity of the company” committed by the management not to publish annual statements of its company. For this crime it is possible to get as much as two years in

prison or prohibition of activity. In the Czech Republic there is no system which would be able to evaluate and create a list of companies which did not publish their annual statements.

### 3 METHODOLOGY

#### 3.1 Aim of Research

The aim of this research was to identify breaches of going concern assumption in the financial statements for 2010 and 2011 for entities that have been declared bankrupt (bankruptcy decision in the period from October 2012 to December 2012).

#### 3.2 Sampling

Period from October – December 2012 was chosen due to the requirement to publish financial statements for 2012 (to date of the bankruptcy decision) no later than 31. 12. 2013. The research was conducted in the second half of 2014. In case there would be the subject of research the entities in bankruptcy from 2013 there would not be the financial statements of these entities for 2013 in the period of research (second half of 2014) in the Commercial Register available.

Tab. 1 – Justification of sampling period for research Source: own analysis

Period	2010	2011	2012	2013	2014
1st quarter					
2nd quarter					
3rd quarter					research
4th quarter			sample		research
Publication of financial statements		For 2010 till 31. 12: 2011	For 2011 till 31. 12. 2012	For 2012 till 31. 12: 2013	For 2013 till 31. 12. 2014

#### Justification of sample selection of examined entities

Within the selected period of research (IV. Quarter 2012) there were found the entities in the Insolvency Register where the bankruptcy decision was executed. From this basic sample were then selected the entities where have been declared the bankruptcy. This was the sample of 103 entities. During the research every entity from the sample of entities in bankruptcy was gradually examined and three entities were omitted due to the lack of information. In case of one entity the bankruptcy was canceled so this entity was omitted too.

Tab. 2 – Sample of entities – bankruptcy in IV. Quarter 2012 that was solved by the bankruptcy process. Source: Insolvency Register

Default sample of entities according to the Insolvency Register – The bankruptcy decision in period October/2012 – December/2012 that was solved by the bankruptcy process	<b>103</b>
Omitted entities that were not found in Commercial Register – Bankruptcy decision in period October/2012 – December/2012 was solved by the bankruptcy process (are not the subject of research)	3

Entities where the bankruptcy process was canceled (are not the subject of research)	1
<b>Number of examined entities</b>	<b>99</b>

The sample of 99 entities in period 2010, 2011 a 2012 that became bankrupt corresponds to total of 297 financial statements. These statements should be stored in Collection of Documents of Commercial register according to the law.

Tab. 3 – Sample of examined financial statements. Source: Commercial Register

Number of examined entities	Number of examined financial statements		Unpublished	Published for 2010	Published for 2011	Published to date of bankruptcy decision 2012
	Unpublished	Published				
63	Unpublished	0	189	-	-	-
17	Published just in one year from three years	17	34	15	2	0
15	Published just in two years from three years	30	15	15	15	0
4	Published in all years	12	0	4	4	4
<b>99</b>	<b>Total</b>	<b>59</b>	<b>238</b>	<b>34</b>	<b>21</b>	<b>4</b>

The Tab. 3 and Fig. 1 show that in case of 63 entities were found no financial statements in Commercial Register for specified period. The remaining 36 entities in bankruptcy process published their financial statements (of which 17 entities just one, 15 entities just two and only 4 entities fulfil its legal obligation).

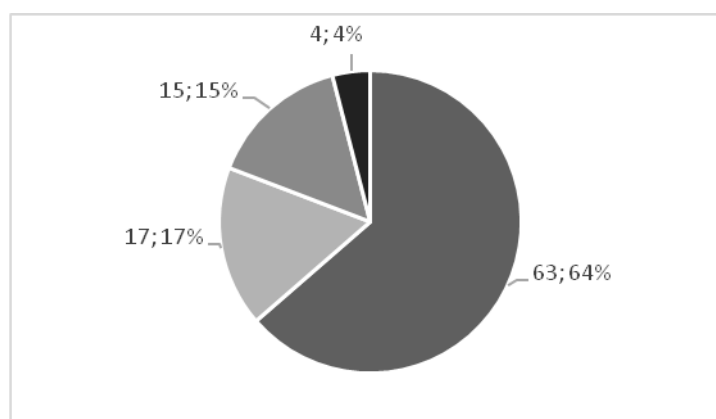


Fig. 1 – Number of examined entities in relation to the obligation to publish financial statements. Source: own analysis

The Tab. 3 and Fig. 2 and 3 shows that 99 entities should publish total 297 financial statements in period 2010, 2011 till bankruptcy in 2012. Already mentioned 36 entities published total 59 financial statements of which for 2010 it was 34 financial statements, 21 for 2012 and only 4 for 2012.

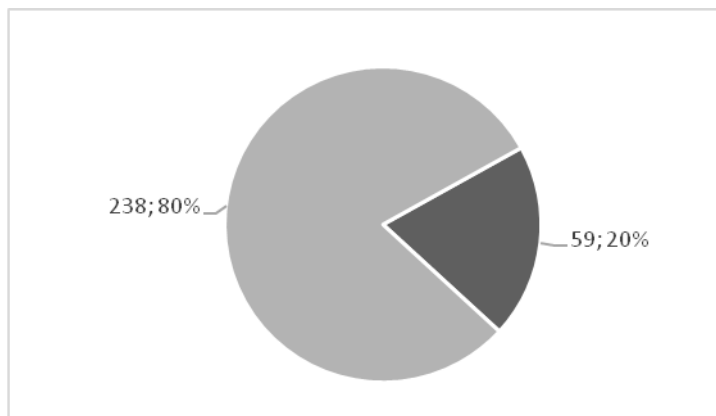


Fig. 2 – Number of published and unpublished financial statements. Source: own analysis

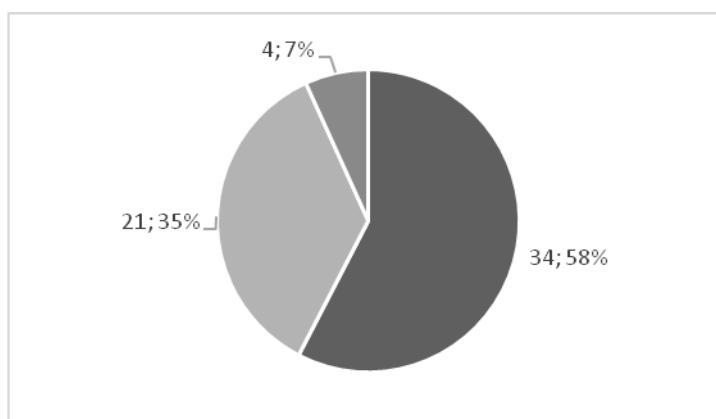


Fig. 3 – Number of published financial statements in particular years. Source: own elaboration

### **3.3 Procedure for processing information from the financial statements**

The aim of research was to find identifiers breaches going concern assumption already in 2010 in the published financial statements, i.e. almost two years before the bankruptcy decision and its bankruptcy process. Among the chosen identifiers were included in the research following criteria:

- entity does have a negative equity,
- entity does have share capital bigger than equity,
- entity shows corrections for the receivables,
- entity shows provisions,
- entity shows long-term liabilities,
- entity show its financial statements in full range (financial statements are shown in detailed distribution).

## 4 RESULTS

There were 59 published financial statements analyzed during the research, one of them was completely unreadable. The problem with identifying information, especially from a financial statement balance sheet, was that the financial statements in the Czech Republic do not have an electronic reporting format. It means that the information is inserted into public sources (Commercial register) exclusively in pdf format. Therefore not all information could be considered as high-quality based and well readable.

### 4.1 Evaluation of Results

The obtained information from research are summarized in the following Tab. 4

Tab. 4- Identifiers of going concern. Source: Commercial register

	2010		2011		2012			
	YES	NO	YES	NO	YES	NO		
Negative equity	14	19	<sup>1</sup> <sup>3)</sup>	11	9	4	0	
The share capital is higher than equity capital	<sup>1</sup> <sup>2)</sup>	20	12	<sup>1</sup> <sup>4)</sup>	14	5	4	0
Provisions for receivables	11	22		9	12	3	1	
Provisions	6	27		6	15	3	1	
Long-term liabilities	20	13		13	8	4	0	
The financial statements in its entirety	21	12		11	10	3	1	
<b>Total of financial statements</b>	<b>33<sup>1)</sup></b>		<b>21</b>		<b>4</b>			

1) one of the financial statements was unreadable

2), 4) the financial statement of government departments, it is not determined registered capital

3), 5) unreadable data

After conducted analysis of 58 financial statements it is possible to state the following conclusions:

- From 33 companies that published financial statements for the year 2010 lived 20 of them at expense of investments in registered capital. And even 14 of these companies already showed negative value of equity.
- From the total number of 33 companies, 14 companies were already in the real bankruptcy because of over-indebtedness in 2010. Act of bankruptcy was declared in the 4th quarter of 2012.
- Only 11 of 33 companies created adjustments for doubtful receivables and only 6 companies created provisions for future expenses. For all companies, it was the

undervaluation of these risks. Their aim was overvalue economic result for the current period, and thus improve the resulting value of equity and delay artificially the real decision on the company's bankruptcy (legislative act).

- From 21 companies that publish financial statements for the year 2011 was not possible to assess the trend for 3 companies. Two companies did not post financial statements in 2010. Some information from one of the financial statements (Tab. 4) could not be read.
- Only 18 companies, which posted financial statements for years 2010 and 2011, could be used in the research for trend analysis. Conclusions are that 16 companies reported deteriorating trend towards bankruptcy decision. Only with 2 companies was noted an improvement in the trend.
- Release of provisions (these transactions would lead to improvements of economic results in the current year) could have an impact on improving the trend for two companies. However, it was not confirmed. Improving trend for the two companies was mainly due to the fact, that one company did not carry any business in 2010, but in 2011 was achieved a positive economy result, which was subsequently used to reimbursed insignificant losses from previous years. In second company was reported significant loss in 2009. In the 2010, company started gradually reimburse the loss from its profit and managed to fully reimbursed in 2011. This impact was not for long, because even in these two companies had occurred the bankruptcy decision in the 4th quarter of 2012. The financial statements were not published in these two companies for year 2012 and therefore it is not possible to assess the real reason for entry into bankruptcy.

## **5 CONCLUSION**

For external users are the annual statements the most important source of information about the entity no matter whether it is a prospering company or a company on the verge of bankruptcy. Even though the entities are obliged by law to publish annual statements, only few of them actually fulfil this duty. The aim of our research was to discover, whether the companies which are entering insolvency, and are therefore under closer surveillance of courts, fulfil their legal duties and publish their annual statements. Outcomes of our research imply that in year 2010 out of 99 examined companies 66% and in year 2011 79% did not publish their annual statements according to the law. This leads us to similar conclusions as CRIF – Czech Credit Bureau from February 2013, which has analyzed all the companies in the Czech Republic.

The research shows that most of the companies prolong their entry into bankruptcy. By doing so they wait for even worse condition of the company and they try to continue doing business until one of creditors loses their patience and they propose for the company to go into insolvency. This trend is happening in the Czech Republic for a few years. Because of that in connection to the recodification of Czech law tougher legal regulations have come into force concerning the responsibility of statutory bodies for their decisions which could bring the company into bankruptcy. Along with that come financial penalties in case the statutory body knows about existing bankruptcy and they do not act accordingly.

Our research has shown that 14 companies at minimum have already in year 2010 stated negative equity and entered insolvency proceedings in the first quarter of the year 2011.

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## **PERSONAL BANKRUPTCY IN THE CAPITAL CITY REGION IN THE CZECH REPUBLIC**

*Monika Randáková, Jiřina Bořková, Mikuláš Pýcha and Ondřej Buben*

### **Abstract**

The process of debt relief through personal bankruptcies grows in importance as a way how to solve a very complicated financial situation among debtors in the Czech Republic. Personal bankruptcy is therefore one of the possible and approved ways how insolvency can be declared. In the Czech Republic we can find two ways of processing personal bankruptcy, firstly assets of the debtor can be sold and used as the repayment of the debt (partial or whole). Secondly a debtor can repay part of the debt through repayment plan depending on the amount of debtor's income. This Research aims to describe the structure of debtors from capital city of Prague in the Czech Republic from all possible aspects. Amongst these aspects we are focusing belongs gender, achieved education, their age and their total amount of debt. This Paper also describes the structure of three groups of creditors among analyzed debtors. Moreover the primary aim is to analyze what kind of person (according to age, gender, and education level) is mostly susceptible to become indebted and what extent of the total debt certain person establishes before asks for debt relief.

*Keywords: Personal bankruptcy, Debtor, Insolvency, Czech Republic, Debt relief, Creditor*

JEL Classification: G33, K35, M41

### **1 INTRODUCTION**

“Personal bankruptcy in the Czech population increases by 30% annually, and personal bankruptcy is a new approach to debt relief.” (Paseková, M., 2013)

The only eligible person that may ask for debt relief is a debtor. However there must be an approval of the creditor. One of the most important facts is that debtor must be under bankruptcy to propose debt relief. The debt relief proposal has to contain specific information as identification of the debtor, presumed income in following 5 years, past income for last 3 years, type of the debt relief and list of debtor's possessions and liabilities. When a debtor fulfills all juristic requirements for debt relief, the court shall permit it. (Maršíková, J., 2011)

There are three categories of Insolvency: lack of knowledge, inaccessibility to debt, and economic climate (Carter, R., Van Auken, H., 2006). As we may assume, people do not always have the necessary knowledge about loans they consider taking. The financial rate of literacy is not equal among the population. Therefore people can take loans even though they are not going to be able to repay it. Inaccessibility to debt we understand such a moment, when banks (financial institution) refuse to process a loan because of debtor's bad financial situation. There comes a chance for non-financial institution to fill this market gap. In the end economic climate teach people to take loans with lack of responsibility. When we connect these three aspects together, we create a great place to take loans for people that will not be able to pay them back. Then we truly need such an institution of debt relief.

This paper presents the results of the analysis of debtors from the Prague city Region in the Czech Republic who are undergoing or already went through a process of personal bankruptcy. The main aim of this research is to analyze debtors whose inability to repay their

debts are being resolved through a debt relief. The secondary aim is to get the feel of results from the Research that was processed in Moravian-Silesian region (Paseková, M., Bařinová D., Personal Bankruptcy on the Moravian-Silesian region). However it is not the aim to compare the outputs. The fig. 1 shows the development of the amount of debt relief proposals and states how many of them were approved between years 2008 and 2013. The explanation why some of debt relief proposals have not been approved was already mentioned above. It is due to failing the juristic requirements that are needful for court to approve such a proposal.

The Insolvency Act settles citizen over-indebtedness through debt relief. If the debtor fulfils conditions prescribed by the state, the debtor can after 5 years rid itself of its therefore unpaid debts. (Paseková, M., 2013)

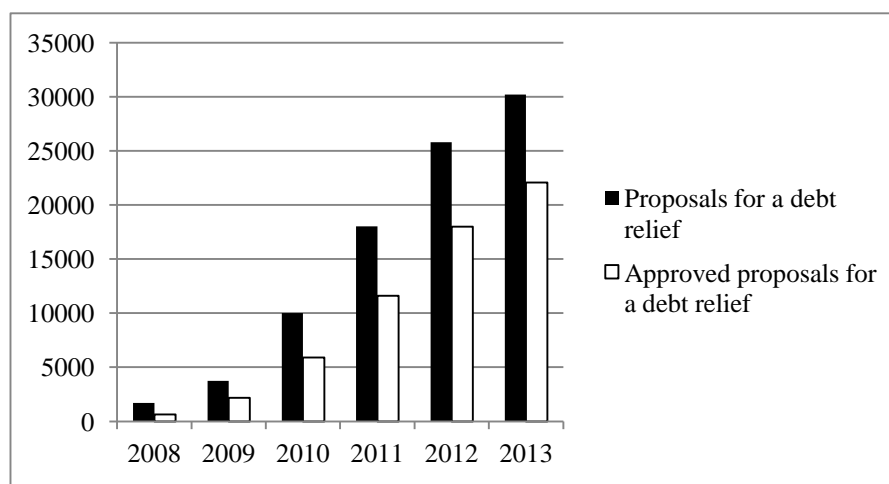


Fig. 1: The development of personal bankruptcies in the Czech Republic. Source: Ministry of Justice of the Czech Republic, 2014b

## 2 THEORETICAL BASIS

### 2.1 Debt relief

This research is focused on debt relief. But what a debt relief is and for whom it is intended? It is intended for individuals who do not have any debts out of the business, but still have more than two creditors and they are unable to pay their debts which are more than thirty days overdue (Smrčka, L., 2011). In such a case, they can submit a proposal for a debt relief and then wait for court's decision. Proposal must contain following information: *identification of the debtor, expected income of the debtor in next five years, debtor's income for the last three years, method of debt relief and the list of assets and liabilities*. The proposal also must convince the judge of debtor's honest intentions and that he is able to pay at least 30% of its debts to the creditors. If all conditions are fulfilled and local regional court will approve the proposal, the whole process of personal bankruptcy will start by assigning a bankruptcy administrator to the debtor. It is also very important to keep in mind that each person can declare personal bankruptcy only once in live without exception.

### 2.2 Methods of debt relief

Debt relief gives debtor a court protection from new fines, interest and penalties which could come from its creditors. But to have this protection, debtor should repay at least 30% of its debts and there are two ways of doing so. The first method is repayment plan through which

is possible to pay some or even all debts in next five years since the proposal for a debt relief was successful. Debtor remains with so-called subsistence minimum and everything else he gain is used to pay the creditors. Debtor is also constantly supervised by court for 5 years. Therefore applicant who has the best chance to succeed is the one with regular income. This is also the most frequently used method in the Czech Republic. The second method of debt relief (less used) is monetization of assets and using the money to pay creditors. With this method, there is a possibility of repaying creditors with monetized assets. In such a case, there is no need of supervision for 5 years.

### **2.3 Insolvency legislation in Czech Republic**

One of the most outdated parts of Czech legislation was the problematic section concerning about bankruptcies. Back to the history the Czech Republic had a long tradition in solving bankruptcy, starting in 1781 with the Josephine bankruptcy order. This order was novelized many times and in 1931 there was passed the law number 64/1931 Sb., which adjusted most of the problems at those days. This development was interrupted by the change of the regime, which did not demand such a law. The renewal of the insolvency legislation comes up after 40 years break in 1991 (law number 328/1991 Sb.). The interruption of the continual legislation development took its cost and this law evinced many imperfections.

In this point it is easier to understand that our legislation took the inspiration abroad, mostly in United States of America and in our neighboring country – Germany. In the USA, the issue of bankruptcies takes a huge importance, which is supported by the fact that the insolvency law, according to the first article of the American constitution, is adjusted by the federal law. The first new developing tendencies of insolvency laws showed up in the so called *Bankruptcy law* (Federal Judicial center, The establishment of Bankruptcy Courts), passed in 1978 in USA. This law became the foundation of insolvency laws in other countries. Moreover it influenced European law, the EU council regulation number 1346/2000 includes many principles of the mentioned law. Therefore Czech Republic is also more or less influenced by American bankruptcy legislation. Nevertheless the insolvency legislation in Czech Republic is mostly adopted from Germany and its purpose is more social than economic. In Germany the insolvency law is being divided in two parts. First is the common part, which adjusts the whole process. The second part can be called special, which adjusts the processes that differs from those that are common. Among common processes belong bankruptcy proceedings, liquidation and the distribution of proceeds. Contrarily in the special part we find solutions such as bankruptcy plan, debt relief, consumer's bankruptcy proceedings and other small proceedings (Raban, P., 2002). Insolvency law (law number 182/2006 Sb.) is still pretty new in Czech Republic and our legislation system is still getting used to it. (Frelichová, K., 2008)

## **3 METHODOLOGY**

This part of the paper describes the process used to obtain all the necessary information that was fundamental for the research itself. All the data were acquired from the Czech Insolvency Register. All of the debtors were listed in the register under the Regional Court of Prague. The time period being analyzed was from the 1<sup>st</sup> of January 2012 until the 31<sup>st</sup> of December 2013

The research is established on 100% sample. In order to ensure truthful and accurate results some adjustments had to be made. Firstly the list of debtors was shortened by duplicating individuals. If the married couples applied for personal bankruptcy together, their debts were divided in half and counted as two individual debtors and as such analyze. Most of the debtors proposed for a debt relief many times which means that their previous proposals were unsuccessful. But they are included just once in this research and it was the last proposal for a

debt relief, they made before 31st of October 2014, which was used. Among the debtors were many who had business debts as well as personal debts however the business debts could not be taken into account for the purpose of this research. The reason for having analyzed every debtor in certain region is to know exact output of the structures among debtors. This research targets debtors in the region of the capital city of Prague. Therefore we are going to use results from first two regions we have researched to determine the minimum size of a sample for other regions in Czech Republic that will guarantee statistically very qualitatively similar results as a 100% sample. This reduction will allow us to analyze every region in shorter period of the time with high quality outputs guaranteed.

As it was mentioned the research is focused on a personal bankruptcy, therefore it had to be analyzed for what form of insolvency the debtors applied for. As a result if it was debt relief proposal, it was examined in any way. Either the proposal was successful for the first time, later or not at all. If the debtor made a proposal more than once, he was analyzed for further information whether he was successful afterwards and when he applied for the last time. To ensure that data acquired from other regions in the Czech Republic will be comparable in the future, only the proposals filed as the last one, but only until 31<sup>st</sup> of October 2014 were taken into account. If the last proposal was filed after this date, data were taken from previous one which corresponded to the reference period. Income of each debtor was analyzed and divided into three groups – gross earnings, social contributions (including gift covenants) and net earnings. Gross earnings were afterwards modified onto net earnings. Further in this text only net earnings were used. Every debtor was then screened for their level of education whether they achieved any university degree or not. Each debtor was also divided into one of the six groups which were determined on the basis of debtor's age. The range of each group is comparable with commonly used standards (e.g. CBCB, as). It is also very important to analyze the structure of creditors of each debtor. The creditors were divided into three different groups – Banking Institutions, Non-Banking Financial Institutions and Other (for instance insurance companies, state institutions or individuals). Decision whether it is a banking or non-banking was made on the basis of a List of Monetary Financial Institutions in the Czech Republic administrated by the Czech National Bank.

#### **4 RESEARCH**

The long term aim of the research is to analyze the structure of debtors that undergo the process of debt relief in period 2012 - 2013 in all regions of Bohemian lands. Moreover it is the aim to compare these results from every region among each other. However the aim of this article is to give detailed description of the results in the capital city of Prague in Czech Republic. This part analyses the structure of the personal bankrupt statistics for capital city region of Czech Republic. The capital city of Czech republic is Prague, which has over 1, 2 million inhabitants. This paper is focusing on data that can explain which groups of people fall under personal bankrupt and should help improve Czech system of debt relief. All outputs for this paper are measured only for region of Prague and may also tell a different story then other Czech regions, because Prague keeps higher standards of living and also there are many related differences like higher living costs and also different social needs. The research will be sorted in few parts, where our measurements will be presented and examined.

Our plan is to analyze all regions in Czech Republic and systematically figure out who tends to have trouble with repaying loans according to data such as age, university degree, amount of income, types of creditors, total debt and whether it was the proposal approved or not. So after the region of Prague will be done, we move to another region and do the same research. The first part of the research examines the amount of approved proposals and afterwards we

take closer look on these debtors. This is basic distribution of persons that apply for debt relief and only output is a number of persons, that we actually examine as is illustrated in Tab. 1. We do not search reasons that lead toward refusal of the debt relief proposal. However as we have found out, more than 17 per cent were refused for debt relief.

Tab. 1 - amount of approved/refused proposals. Source: Insolvency register, Based on own research of authors

Number of debt relief proposals	approved	refused
2084	1724	360

All debtors, who were approved for debt relief, were examined for types of their loans, more precisely for different types of creditors. There were established three groups of creditors, that can possibly lend money. These are “Banking institutions”, “Non-Banking financial institutions” and “Other”. All licensed banks fit up in the group of banking institutions, which is very easy to examine, because banking industry is heavily regulated. Among non-banking financial institutions we can find companies that specialize in loan’s industry, but they have not a banking license. The last group “Other” are subjects that do not make their primary business on loans, such as insurance companies, state institutions, regular non-financial companies, lawyers and basically all other subject that would not fit to our first two limited groups. Each debtor can loan money from each of these groups. In Tab. 2 we examine how many debtors have taken loans from 1, 2 or 3 groups that have been mentioned above. It is clear that most of the debtors have taken loans at least from two of our groups (95, 42%) and in very rare cases they owe money only to one group of creditors.

Tab. 2 - Indebtedness towards creditors. Source: Insolvency register, Based on own research of authors

Indebted to	Absolute number of debtors	Proportional amount
Only one group of creditors	79	4, 58%
Two groups of creditors	746	43, 27%
Three groups of creditors	899	52, 15%

It is also interesting to have a look which group of creditors is being chosen most often among debtors. It is important to realize that banking institutions require stricter conditions for approving a loan than non-banking financial institutions. So those debtors who are refused from banks usually end up taking loans from non-banking financial institutions, which demand significantly higher interest, because they are burdened by a greater credit risk represented by these debtors. Results that we can see in Tab. 3 shows that over 88% of all debtors are indebted to banking institutions. The same number we can recognize with non-banking financial institutions. Basically nine out of ten debtors that ask for the debt relief have taken loans from banks and the same applies for non-banking institutions. It often might be the higher interest that non-banking financial institutions demand, that in the end drags debtors into personal bankruptcy. The least frequent group of creditors among debtors is the widest group, that we call “Other”. It is really the biggest group of these three, because it

contains all kinds of companies, but they do not lend money as their major business. Therefore we can assume that it is harder for debtor to borrow money from these companies, as it is usually connected with some goods that have not been paid for or especially in Prague it is very common that people owe money for fines in public transportation and these can rise to significant amounts that also pull people into personal bankrupt.

Tab. 3 - Indebtedness toward each group of creditors. Source: Insolvency register, Based on own research of authors

Indebted to	Absolute number of debtors	Proportional amount
Banking institutions	1529	88, 69%
Non-banking financial institutions	1510	87, 59%
Other creditors	1229	71, 29%

Another part of our research represents a proportion of approved debt reliefs depending on certain age groups. Fig. 2 presents certain dependence of debtors that announced personal bankrupt on their age. It is expectable that youngest group of debtors between 15 and 24 years of age do not have enough time to build extensive debts. Because of that they cover only slightly over 1, 6% of all analyzed debtors. Our research indicates that as people get older they become more predisposed to fall into problems with indebtedness. The age groups 25 – 29 and 30 – 34 support this fact and it peaks for the age group between ages 35 and 44, where we can find over 30% of all debtors. This age group resulted as the greatest and therefore it seems that these people are the most susceptible to go bankrupt. The other research tells very similar story that the largest group is located between 30 and 39 years (Paseková, M., 2013) In contrast the older groups weaken in susceptibility to bankrupt and the amount of debtors located in last two groups show slow falling tendency. However they are still higher than first three groups. It is important to state that the oldest group does not have the upper age limit, which makes this group more significant every year according to the fact that the population is getting older.

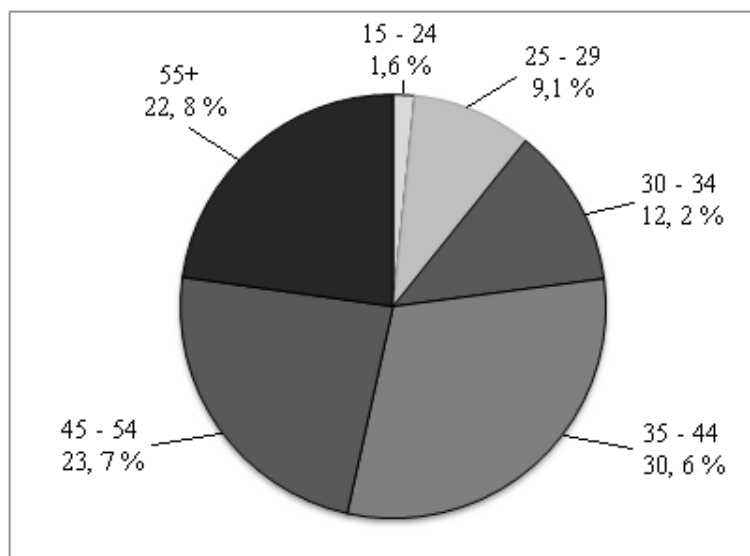


Fig. 2 - Distribution of debtors according to their age. Source: Insolvency register, Based on own research of authors

The Fig. 3 shows the distribution of people who applied for personal bankruptcy in Prague. From the starting sample of 1 724 people there were 914 females and 810 males. The differential is 4% which indicates the form of equality between the genders. One can say that in society we live males usually take more risk than females. The result of this research negates this historical based fact and says that the male and female are almost equal according to their gender. These numbers collides with results of comparing research, which stated men to have a stronger predisposition to become over-indebted. We have not found such a result in Prague region.

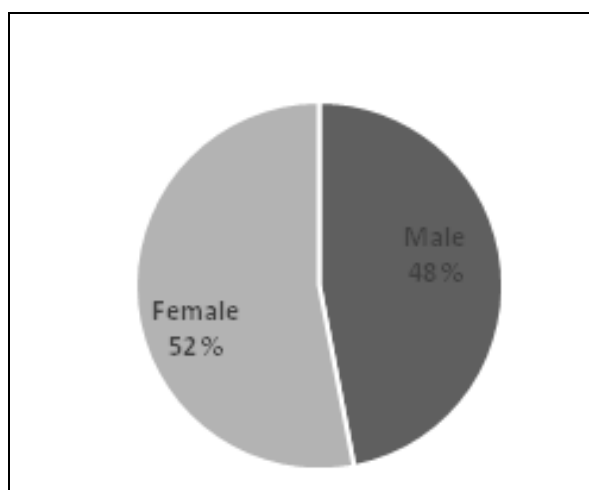


Fig. 3 - Distribution of debtors according to their gender: Source: Insolvency register, Based on own research of authors

Fig. 4 and Fig. 5 demonstrate the distribution of debtors according to the age compared to their gender. There are no significant differences between genders. These two figures are related to the Fig. 3 which says that the structure of debtors compared just to their gender is

almost same. In the city of Prague it is possible to argue that females are relatively older than male which is stated mainly in group 45 – 54.

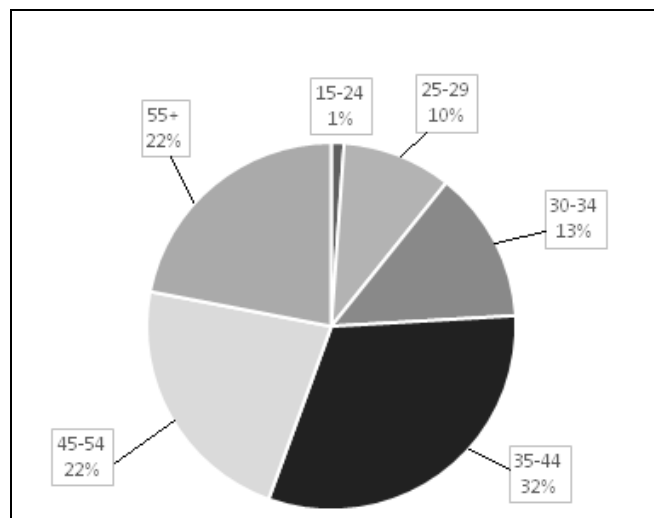


Fig. 4 - Distribution of female debtors according to their age: Source: Insolvency register, Based on own research of authors

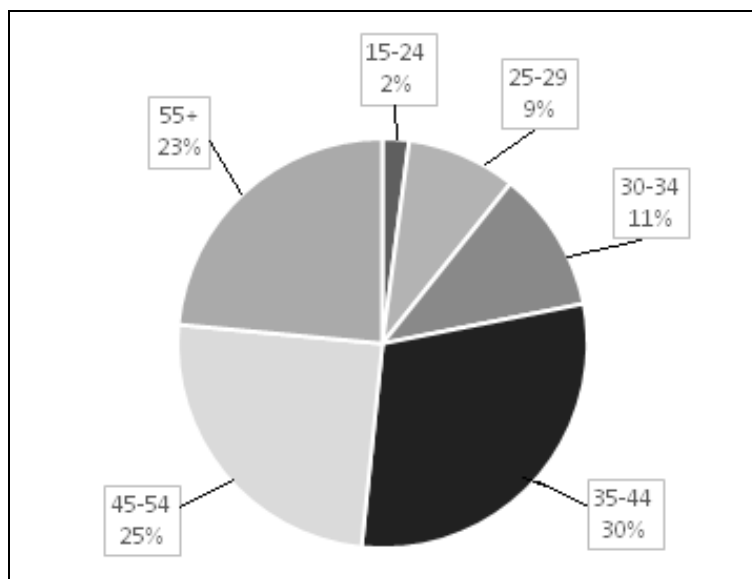


Fig. 5 - Distribution of male debtors according to their age. Source: Insolvency register, Based on own research of authors

In many articles a person can read about problems connected to indebtedness and also that personal bankruptcies do have negative effect on society. Our research uncovers that there is extreme significance between university degree and amount of debtors that have achieved such a level of “standardized intelligence”. Fig. 6 indicates this strong dependence between having a university degree and a probability of falling into personal bankrupt. Only little bit over 3% of researched debtors in Prague have achieved a university degree (at least bachelor’s degree). This number can be assumed as higher than in the rest of the country, because Prague is attractive for job opportunities and most of universities in Czech Republic



are located here. Moreover this strengthens the fact that people with the university degree are less often found under problems with repaying loans. It is also necessary to mention, that Czech Republic is one of the few countries that provide university studies for free and its quality cannot be considered significantly worse in comparison with certain universities abroad. This means that people in Czech Republic do not have to take loans for university studies as this seems absolutely common abroad, especially in western countries. Therefore this number of personal bankruptcies in western countries might reach higher figures than only few percents for university's graduates.

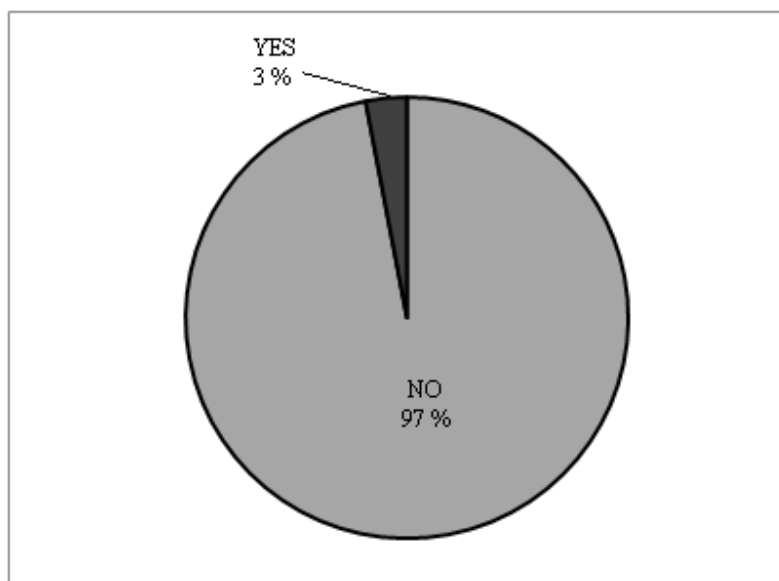


Fig. 6 - Distribution of debtors according to their level of education. Source: Insolvency register, Based on own research of authors

One of the most important things during approving the proposal for debt relief is the amount of the total debt that a person has to repay. The probability of approving a debt relief proposal is closely related to the size of the total debt. As our results in Fig. 7 implicates, there is just few approved debtors that owe more than 2 millions Czech crowns. On the other end, not many debtors have to ask for a debt relief when they owe less than 200 thousands Czech crowns. Even an under-average income should cover low debts, so the court does not often approve these low-debt proposals.

Therefore we can see that two most frequent groups of debtors that fall into troubles with indebtedness are people with total debts starting from 200 thousands CZK to 1 million CZK. This shows a little difference from research of M. Paseková, where the largest group was indebted between 300 and 600 thousands CZK. These debtors cover almost three fourths of all debtors that we have analyzed and it seems that these debts are most often considered as hardly repayable with an average income and the only possibility for these individuals to get rid of these debts is to declare personal bankrupt. We also plan to look for the relationship between the net income and the amount of total debt, where we expect that people with higher income might have a chance to indebt themselves more before they are forced to ask for debt relief approval. This will be presented in the widened part of this research.

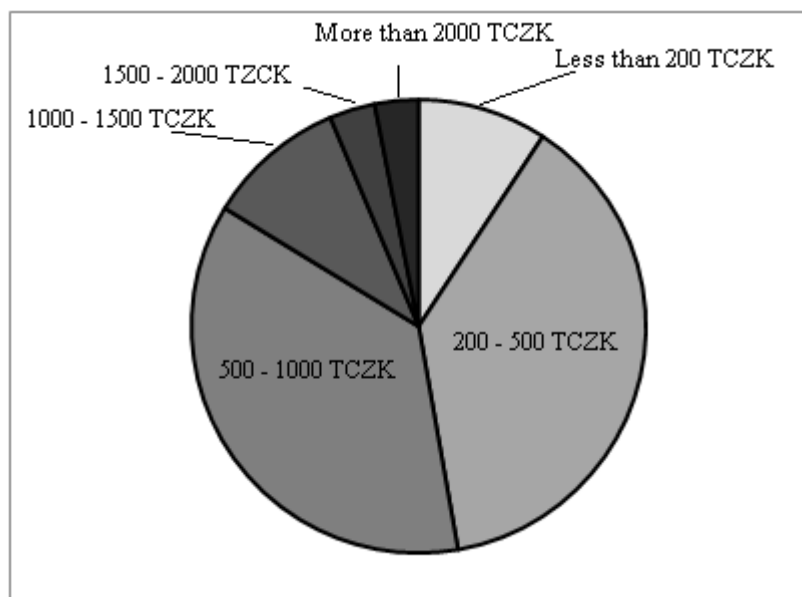


Fig. 7 - Distribution of debtors according to their amount of total debt. Source: Insolvency register, Based on own research of authors

## 5 CONCLUSION

The results of the research show many interesting outcomes. We can assume that there is often strong dependence on certain variables like age of debtors, achieving a university degree or the total amount of the debt. All these results show which groups do most often become debtors and have to be asking for debt relief through personal bankruptcy. The research indicates that not either the youngest or oldest groups become indebted in such an extent. It is the group around 40s and 50s that have troubles with repaying their loans. Also very interesting output is, that the most common debtor announce personal bankruptcy before the total debt reaches one million CZK, but it is mostly higher than 200 thousands CZK. By comparing results with the research from Moravian-Silesian region, we have discovered few differences in age distribution, gender and total debt among debtors. These differences might be caused by analyzing different region or by changes in the structure among debtors during the time. Moreover the 100% sample also guarantee higher output quality compared to the other research that analyzed only 114 persons, whereas our research have searched through more than 1700 persons. To conclude we also need to mention the groups of creditors that we have searched through and we exposed the fact that almost every debtor in Prague is indebted to more than one of these three groups.

### Acknowledgment

*This article has been written as one of the outcomes of project number F1/100/2014 with the assistance of the Internal Grant Agency of the University of Economics in Prague.*

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## **MUTUAL RELATIONSHIPS OF STOCK MARKETS: EXAMPLE FROM CENTRAL EUROPEAN STOCK MARKETS**

*Petr Sed'a, Juan Antonio Jimber del Río*

### **Abstract**

In recent years, an extensive literature has been developed on studying mutual relationships of financial markets. Recent period of global financial crisis and subsequent debt crisis caused some changes in integration of financial markets worldwide. Previous researches completed in this area were focused mainly on stock markets of new EU member countries and their integration with global markets or/and the Eurozone area. One of the most challenging problems is to analyse also integration among new EU member countries. Therefore, this paper deals with mutual interactions among stock markets of Central Europe Economies (CEE), the Euro area and global stock market in the period of 2007-2013 years. For the purpose of this paper the methods of vector autoregression and variance decomposition will be utilized. An impact of events from global market was clearly observable during the global financial crisis of 2008-2009 years. With regard to integration of CEE stock markets with leading global markets, the hypothesis that CEE stock markets are rather affected by the U.S. stock market than the Eurozone area cannot be rejected. The CEE stock markets are treated as homogeneous region during the global financial crisis period since negative shocks on one market affected development of other markets. In post-crisis period, the degree of integration rapidly decreased as proven by empirical findings.

*Keywords: global financial crisis, Granger causality, integration, VAR model, variance decomposition*

JEL Classification: F36, F65, G01, G15

### **1 INTRODUCTION**

21<sup>st</sup> century can be considered as the epoch of information (see Suchacek, Sed'a, Friedrich & Koutsky, 2014). In latest decades, the Asian financial crisis in 1997 and especially the global financial crisis of 2008-2009 years can be referred as crisis that had the deepest impact on financial markets worldwide. Subprime crisis happened in USA in 2007 first, later on it developed to overall financial crisis and permeated to the whole world. The collapse of Lehman Brothers, a sprawling global bank, in September 2008 almost brought down the world's financial system. During this period, large movements in asset prices and related volatility complicated estimation of financial models in general. These crises dramatically influenced the market stability and investors' decision making in many ways (see Sed'a, 2012).

National stock markets may be logically influenced by events in foreign markets which may lead to the spread of financial contagion from one national economy to another (see Sed'a, 2013). High rate of integration among stock markets logically contributes to higher degree of transmission of shocks. Mutual relationships of stock markets therefore plays key role concerning the overall stability of the economy, as proved especially during period of recent global financial crisis and successive debt crisis and economic stagnation.

Therefore, it is obvious that mutual interrelations among stock markets plays important role also for new EU member states in Central Europe that include Czech Republic, Hungary and

Poland. These countries belong to open economies that strongly depend on foreign capital resources. Thus, potential financial contagion may spill over relatively quickly in these economies as happened during global financial crisis of 2008-2009 years.

The studies conducted in this paper may be described as follows. Section 2 is devoted to some theoretical aspects of financial integration and literature review. In Section 3, econometric methods utilized in this paper will be described, followed by Section 4 that is devoted to data samples used for the purpose of this paper. Empirical results and discussion are provided in Section 5. First, mutual interconnections will be investigated with a help of vector autoregression model. This model is then used to explore causality in Granger sense, followed by variance decomposition approach. Section 6 concludes this paper.

## **2 SOME THEORETICAL ASPECTS OF FINANCIAL INTEGRATION**

While research on the relationship of financial integration and globalization is relatively numerous, the implications of financial integration for financial stability and vice versa remain largely unexplored and less distinct topic. Abating financial crisis has greatly increased the interest of economists and regulators in the relationship between financial integration and financial stability in depth. The question whether financial integration support financial stability or contribute to financial instability, respectively whether financial instability affects financial integration, can be considered as crucial.

Process of globalization represents a factor that significantly affected development of financial markets. Therefore, one of the consequences of globalization of the world economy can be considered the process of integration of national capital markets. Deregulation and new legislation removes barriers to flow of financial funds and thus contributes to the integration of financial markets. The benefits of integration include efficient allocation of capital, because market agents can exploit the cheapest resources and excess capital can be allocated to productive opportunities. Efficient allocation of financial resources is also linked with economic growth. To summarize, integration of markets increases competition, leads to easier access to varied financial products and supports risk diversification. On the other hand, it increases the ability of outflow of huge volume of capital from respective country in a relatively short period of time. In addition to this, it creates a risk of disease transmission of financial crises from one market to another.

Highly integrated market, on the contrary does not contribute to financial stability if the system is not sufficiently robust and flexible to shocks like contagion or systemic risk. If financial institutions get themselves into trouble, they can undoubtedly contribute to financial instability of the economy. Moreover, an extensive development of financial innovations also helped to the process of financial integration.

Considering the importance of interconnection of capital markets for the stability of the economy the European Central Bank examined possible ways how it would be possible to measure the integration of the Eurozone area markets. Baele, Ferrando, Hördahl, Krylova, and Monnet (2004) examined the degree of market integration of the Eurozone area using yield differentials, dispersions of equity indices, regression analysis and quantitative factors, being able to demonstrate that integration is gradually increasing and the introduction of the Euro currency has strengthened this trend. This methodology have also been adapted Czech National Bank (CNB) which regularly publishes analyzes of degree of economic alignment of the Czech Republic with the Eurozone area.

The problem of integration with global capital markets connotes indeed very important task for central banks, especially if respective country use own currency. CNB (2012) stressed that

degree of integration of financial markets of new EU countries and the Eurozone area exhibited growth with relatively high speed of reaction on events that happened in the Eurozone from 2004. However, the global financial crisis caused a temporarily divergence of stock markets. A little bit different results were observed by Babetskii, Komárek, and Komárková (2010) who showed that a process of integration of new EU member countries with the Eurozone market amplifies and continues even in the period of the global financial crisis.

Cappiello, Gérard, Kadareja, and Manganelli (2006) concluded that stock markets of new EU members are increasingly influenced by common factors. However, although the significance of events in Eurozone markets grows, most variability is a result of global events. They divided new EU members into two groups: those that are integrated with the Eurozone area and also with global market, and those that are integrated just with the Eurozone market. More developed markets like Czech Republic, Poland and Hungary are then strongly synchronized, both among themselves and with the Eurozone area.

Babetskii, Komárek, and Komárková (2007) investigated selected aspects of financial integration in the Czech Republic, Hungary, Poland and Slovakia. The objective of their paper was to test for the existence and analyse the dynamics of integration in the stock exchange markets using  $\beta$ -convergence and  $\gamma$ -convergence.

Égerd and Kočenda (2007) found out that mutual relationships among new EU countries and developed countries are correlated only weakly when using intraday data. Baltzer, Cappiello, De Santis, and Manganelli (2007) observed that integration of financial markets of new EU member countries and the Eurozone area grew since 2004. However, political and economic events in the USA were still more important.

Voronkova (2004) and Calin-Vlad (2011) tested rate of integration of the CEE markets with the Euro area with a help of yield differentials, dispersions of stock indices, regression analysis and also other quantitative methods. They concluded that mutual integration rapidly increased. Moreover, an introduction of the Euro currency has significantly strengthened this trend.

Chaloupka (2012) reported in his relatively detailed study that new EU countries are perceived by investors rather as separate Eastern Europe area than a part of the European Union. When the global financial crisis appeared, the CEE stock markets are in general treated as one homogeneous region because negative information from one capital market significantly affects development on other markets. To sum up, a degree of mutual relationships of stock markets of new EU member countries with global market and the Euro area market was growing. Nevertheless, in some markets there are still very important also local events.

Syllignakis and Kouretas (2011) applied in their analysis dynamic correlation model. They found that correlations among Central and Eastern European markets are closely linked to market volatility. When volatility increases correlation among markets tend to be higher so that possible benefits from diversification are diminishing. Similar methodology was used by Baumöhl and Lyócsa (2014). They concluded that integration process of CEE emerging stock markets has graduated over time.

To sum up, the review of the literature indicates the fact that results of authors often differ. It is caused because of using different sample data, different frequencies of data and different analytical methods and approaches.

The goal of this paper is to estimate, describe, compare and interpret mutual relationships among new EU member states in Central Europe, namely Czech Republic, Poland and

Hungary, global financial market represented by the U.S. stock market and British stock market, and the Eurozone stock market approximated by German stock market during the period of 2007-2012 years.

### 3 METHODOLOGY

In view of the stated goal of this paper as given in Section 2, basic research hypothesis have been formulated as follows:

$H_1$ : CEE stock markets are rather affected by the U.S. stock market than the Eurozone area.

In order to test this hypothesis, it is necessary choose the appropriate methods. Therefore, the aim of this section is to describe methods that will be utilized for econometric analysis of mutual relationships among CEE stock markets, global stock markets and the Eurozone area. It includes the methods of vector autoregression model and Granger causality testing, followed by variance decomposition.

#### 3.1 VAR model and Granger causality

Vector autoregression model (VAR) can be characterized as a kind of generalized univariate autoregression process (see Lütkepohl, 2005). The VAR approach is commonly utilized for forecasting systems of mutually related time series, and also for analysis of dynamic impact of random disturbances on a system of variables. The VAR model avoids the need for structural modeling by taking into consideration every endogenous variable in the system in terms of functions of lagged values of all endogenous variables that are included in the system. For instance, the VAR(1) model when having two variables is given by:

$$\begin{aligned} Y_{c1,t} &= \alpha_1 + \beta_1 Y_{c1,t-1} + \gamma_1 Y_{c2,t-1} + \varepsilon_{1t}, \\ Y_{c2,t} &= \alpha_2 + \beta_2 Y_{c2,t-1} + \gamma_2 Y_{c1,t-1} + \varepsilon_{2t}, \end{aligned} \quad (1)$$

where  $Y_{c1,t}$  denotes returns of country  $c1$  at time  $t$  while  $Y_{c2,t}$  represents returns of country  $c2$  at time  $t$ ,  $\varepsilon_{1t}$ ,  $\varepsilon_{2t}$  are random terms.

The VAR model also represents relatively useful tool that allows investigate causality among stationary variables using the Granger test relatively easily (see Granger, 1969). The Granger approach to the question of whether  $Y_{c1}$  causes  $Y_{c2}$  is to see how much of the current  $Y_{c2}$  can be explained by past values of  $Y_{c1}$  and then to see whether adding lagged values of  $Y_{c1}$  can improve the explanation.  $Y_{c2}$  is said to be Granger-caused by  $Y_{c1}$  if helps in the prediction of  $Y_{c2}$ , or equivalently if the coefficients on the lagged  $Y_{c1}$  are statistically significant. Note that two-way causation is frequently the case;  $Y_{c1}$  Granger causes  $Y_{c2}$  and  $Y_{c2}$  Granger causes  $Y_{c1}$ .

It is important to note that the statement " $Y_{c1}$  Granger causes  $Y_{c2}$ " does not imply that  $Y_{c2}$  is the effect or the result of  $Y_{c1}$ . Granger causality measures precedence and information content but does not by itself indicate causality in the more common use of the term.

Any lagged values of one of variables is hold in the regression model if it is significant according to  $t$ -test and the other lagged values of the variable jointly add explanatory power to the model according to  $F$ -test. Then the null hypothesis of no Granger causality is not rejected if and only if no lagged values of an explanatory variable have been hold in the regression, (see Granger, 1969).



### **3.2 Variance decomposition**

The variance decomposition is useful approach when evaluating how shocks reverberate through a system. In other words, it is useful tool to assess the pass-through of external shocks to each economic variable (see Chaloupka, 2012).

Let's explain the sense of variance decomposition more precisely. VAR models itself concentrate on shocks. The structural form of the VAR model can then be conveniently described by either the impulse response functions or the variance decomposition. While impulse response functions trace the effects of a shock to one endogenous variable on to the other variables included in the VAR model, variance decomposition separates the variation in an endogenous variable into the component shocks to the VAR model. Thus, the variance decomposition provides information about the relative importance of each random innovation in affecting the variables in the VAR model. The variance decomposition based on the Cholesky factor may change significantly if you change the ordering of the variables in the VAR model.

To sum up, the variance decomposition approach evaluates the importance of different shocks by determining the relative share of variance that each structural shock contributes to the total variance of each variable. The decomposition of variance may be used especially when we are dealing with dynamic stochastic system. Stochastic system means a random value process.

For the purpose of this paper, the variance decomposition will be displayed in the form of figures. The combined response graphs option represents the decomposition of each forecast variance as line graphs measuring the relative importance of each innovation.

## **4 DATA DESCRIPTION**

In this paper, an empirical analysis will be applied on daily data of the CEE stock markets, namely in Czech Republic, Poland and Hungary, and developed markets, in particular USA, Great Britain and Germany. We used daily data of 2007 – 2013 years. It includes total of 1735 observations. This period was chosen intentionally. Our aim is to analyse changes of equity markets relationships during time emphasizing a comparison of mutual relationships in the time during and after the global financial crisis of 2008-2009 years.

Thus, the basic testing period of 2007-2013 years was divided into two basic testing periods. The crisis period of financial instability started at the beginning of July 2007 when first problems with Lehman Brothers Holding appeared and finished by March 2009 when US stock market bounced from the minimum values. Post-crisis period, that is typical by economic stagnation and debt crisis, was defined from April 2009 to December of 2013.

For the purpose of this paper, we utilized major stock indexes of respective CEE in terms of approximation of events on national markets, namely PX for Czech Republic, WIG20 for Poland and BUX in case of Hungary. Developments of all CEE stock indexes are illustrated in Fig. 1.

As a benchmark portfolio for the Euro area was selected German index DAX30 as a representative of the biggest economy in the Eurozone region while British index FTSE100 represents events on the biggest European stock market. The development of the DJTI index was chosen as an approximation of events in global stock market. We have nearly 7 years long time series of daily closing rates of respective stock indexes.

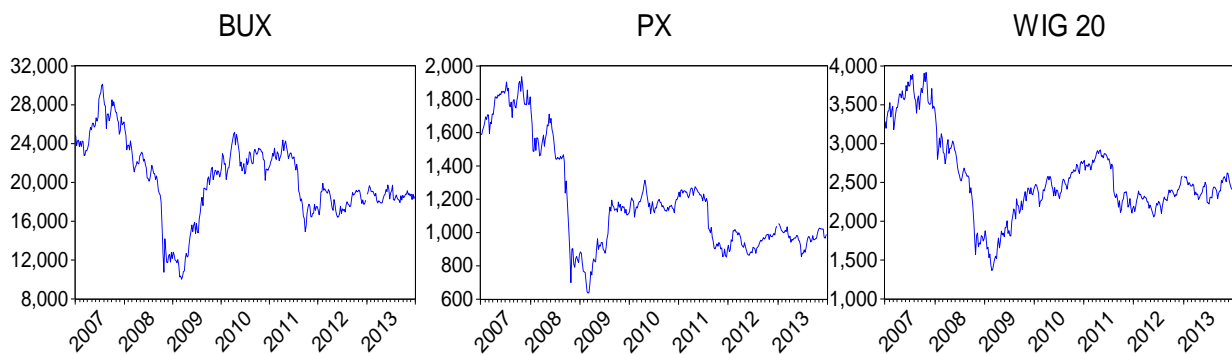


Fig. 1 – Development of BUX, PX and WIG 20 indexes. Source: own calculations in Eviews

Daily data are indeed more volatile than weekly or monthly data. For daily frequency of sampling the stylized features are well known (see Arlt & Arltová, 2003). Daily data samples contain more information that is crucial for mutual relationships among analyzed variables. In other words, some information can be lost through aggregation. Using daily data has some advantages. Firstly, financial markets are able to react to new information much faster than other markets. Secondly, daily data are observed without measurement errors and are not subject to later review.

In addition, we need to work with stationary data to be able to meet with the goals of this paper. Basic way of changing the data from non-stationary financial time series to stationary data is to create a time series of daily returns and continue using the time series of daily returns in all following calculations. The following inference into logarithmic returns confirms stationarity of the daily return time series:

$$r_t = \ln(1 + R_t) = \ln \frac{P_t}{P_{t-1}} = \ln(P_t) - \ln(P_{t-1}), \quad (2)$$

where  $r_t$  represents the absolute increment of logarithmic price and is called logarithmic return. Tab. 1 shows several descriptive statistics for all stock returns.

Tab. 1 – Descriptive statistics. Source: own calculations in Eviews

Index	Mean	Standard deviation	Skewness	Kurtosis	<i>J-B test</i>
<i>Crisis period</i>					
<i>CZ</i>	-0.00246	0.02512	-0.39388	12.10448	1492.7790
<i>POL</i>	-0.00222	0.02176	-0.21868	4.70664	55.4824
<i>HUN</i>	-0.00259	0.02325	-0.13316	10.16916	919.9856
<i>USA</i>	-0.00190	0.02239	-0.16184	7.38068	344.9002
<i>GER</i>	-0.00185	0.02059	-0.46537	9.10886	682.5470
<i>GB</i>	-0.00149	0.02064	0.05052	6.93299	276.6804
<i>Post-crisis period</i>					
<i>CZ</i>	0.00056	0.01520	-0.04394	5.70858	239.9079
<i>POL</i>	0.00057	0.01582	-0.02337	5.41427	190.4755
<i>HUN</i>	0.00081	0.01841	-0.25157	5.18019	163.5416
<i>USA</i>	0.00092	0.01352	-0.10653	6.39383	377.7391
<i>GER</i>	0.00079	0.01506	-0.14181	4.92623	123.8331
<i>GB</i>	0.00065	0.01209	-0.02877	4.66354	90.5087

The means of all sample returns are quite small, in crisis period reached only negative values while in post-crisis period are always positive. Values of standard deviations are significantly higher, especially in crisis period due to higher volatility. On the basis of the values of skewness, high kurtosis and *J-B* test of normality it can be concluded that all daily return series show mostly leptokurtic distribution with higher peak and heavy tail, compared with normal distribution.

## 5 EMPIRICAL RESULTS AND DISCUSSION

In this section, empirical results and findings will be presented and discussed. The studies will be summarized as described in the Introduction section. In other words, all the methods defined in Section 3 will be used for empirical analysis.

### 5.1 VAR model and Granger causality

Results of estimated VAR(10) model for the crisis period of 2007-2009 years are presented in Tab. 2, while estimation of VAR(6) model for the post-crisis period is shown in Tab. 3. Order of delay in VAR models was specified using the Akaike information criterion (AIC) and both VAR models were estimated with a help of Huber-White estimator (HC1). Therefore, standard errors are expected to be robust to heteroscedasticity. Because of limited extent of this paper there are presented just those parameters that are significant at least at the 10% significance level.

Tab. 2 – Estimation of VAR(10) model for the crisis period. Source: own calculations in Eviews

	<i>CZ</i>		<i>POL</i>		<i>HUN</i>	
Regres.	<i>CZ_1</i>	-0.207**	<i>CZ_2</i>	-0.132**	<i>CZ_2</i>	-0.163***
	<i>CZ_2</i>	-0.264***	<i>CZ_4</i>	-0.137***	<i>CZ_4</i>	-0.124***
	<i>CZ_3</i>	-0.207**	<i>CZ_5</i>	0.233***	<i>HUN_4</i>	0.132*
	<i>CZ_4</i>	-0.253***	<i>HUN_4</i>	0.259***	<i>HUN_6</i>	-0.146***
	<i>HUN_4</i>	0.159***	<i>HUN_7</i>	0.104*	<i>HUN_9</i>	-0.121***
	<i>HUN_7</i>	0.137***	<i>GER_4</i>	-0.146**	<i>POL_2</i>	0.250***
	<i>POL_2</i>	0.170**	<i>USA_1</i>	0.390***	<i>GER_6</i>	-0.201**
	<i>POL_3</i>	0.207***	<i>USA_9</i>	0.117*	<i>GB_1</i>	-0.333***
	<i>POL_4</i>	0.178**			<i>USA_1</i>	0.392***
	<i>GER_9</i>	-0.112***			<i>USA_3</i>	0.179*
	<i>GB_9</i>	-0.170**				
	<i>USA_1</i>	0.616***				
	<i>USA_2</i>	0.239***				
	<i>USA_3</i>	0.115**				
Adj. $R^2$	0.384		0.241		0.298	
<i>F</i> -stat.	6.691		3.399		4.545	
<i>p</i> -value	0.000		0.000		0.000	

In the period of global financial crisis, all CEE indexes are included in all equations of estimated VAR model in terms of independent variables with exception of Polish market that is affected just by Czech and Hungarian innovations. Our findings indicate quite significant coherence of CEE stock markets. German stock index DAX30 belongs to significant independent variables only in a few cases. The same is true for British index FTSE100. On

the other hand, innovations that happened in the U.S. stock market are imported to all CEE stock markets. One day lagged DJTI returns are always statistically significant. In addition to this, estimated coefficients reached the highest values. If we consider the values of adjusted  $R^2$  it can be concluded that estimated VAR(10) model can explain 38% (CZ), 24% (POL), respectively 30% (HUN) of variability of returns.

It is worth to notice that especially 2- and 4-days lagged values of Czech stock index PX plays surprisingly important role for all CEE markets. We can even say that shock from Czech Republic affects other market in Granger sense. As a possible explanation of this phenomenon one can consider the fact that investors tend to perceive group of countries in the CEE region as one entity since all CEE were hit by crisis significantly. It may be caused especially because of their pro-export oriented economies and/or big losses caused by falling of their national currencies. The fact that investors can perceive negative shocks more than positive ones may deliver another explanation.

Empirical results would confirm the hypothesis  $H_1$  that the CEE markets are rather integrated with global stock market represented by U.S. stock index DJTI. It can be also said that the CEE markets are integrated more with other CEE markets than the Eurozone area or British stock market.

Results of VAR(6) model that applied data from post-crisis period differs significantly from those achieved by VAR(10) model in crisis period. In post-crisis period, the most important independent variables were mainly the CEE lagged returns complemented by lagged values of the DJTI index. German and British markets become practically insignificant. It is worth to note that estimated parameters of returns from U.S. market reached the highest values. In addition to this, they were always positive while parameters representing DAX 30 and FTSE 100 indexes influenced all CEE markets in negative way.

Tab. 3 – Estimation of VAR(6) model for the post-crisis period. Source: own calculations in Eviews

	<i>CZ</i>		<i>POL</i>		<i>HUN</i>	
Regres.	CZ_1	-0.137**	CZ_1	-0.107**	POL_2	-0.142**
	POL_2	-0.113**	POL_2	-0.199***	HUN_6	-0.108***
	GER_2	-0.189***	POL_5	-0.137***	GB_1	-0.252**
	GB_1	-0.191**	HUN_5	0.121***	USA_1	0.308***
	USA_1	0.414***	GER_2	-0.181**	USA_2	0.281***
	USA_2	0.284***	GB_1	-0.288***		
			USA_1	0.363***		
			USA_2	0.340***		
			USA_4	0.138**		
Adj. $R^2$	0.159		0.124		0.085	
<i>F</i> -stat.	3.315		2.478		1.626	
<i>p</i> -value	0.000		0.000		0.067	

Notable is also the fact that values of adjusted  $R^2$  decreased significantly in post-crisis period comparing with previous years of financial turbulence. In post-crisis period, we can still confirm relatively high coherence of the CEE markets even though values of adjusted  $R^2$  decreased. Estimated VAR(6) model was able to explain only redundant share of variability. It seems that other factors were probably more important for development of the CEE return series.

On the basis of estimated VAR models it can be concluded that developments in other markets became more important for the development of Polish returns in crisis period since nearly 25% of the variability in returns can be explained by events on foreign markets only. On the other hand, Czech and Hungarian markets were affected also by domestic events. Moreover, the values of adjusted  $R^2$  reached higher values, namely 38%, respectively 30%.

Although we applied the HC1 estimator when estimating both VAR models, it is necessary to test residuals for autocorrelation, normality and stationarity. When testing autocorrelation, standard Ljung-Box test was used to test significance of  $k$ -th comprehensive autocorrelations. The null hypothesis of no autocorrelation in residual component cannot be rejected. Normality of residual series was tested again with a help of Jarque-Bera test. The null hypothesis of normal distribution can be clearly rejected for all residual series since  $J-B$  test statistic falls into critical field.

It is also clear that the estimated VAR models are stationary. Both inverse roots of autoregressive polynomials in both periods lie within the unit circle in the complex plane, as can be proved by Fig. 2.

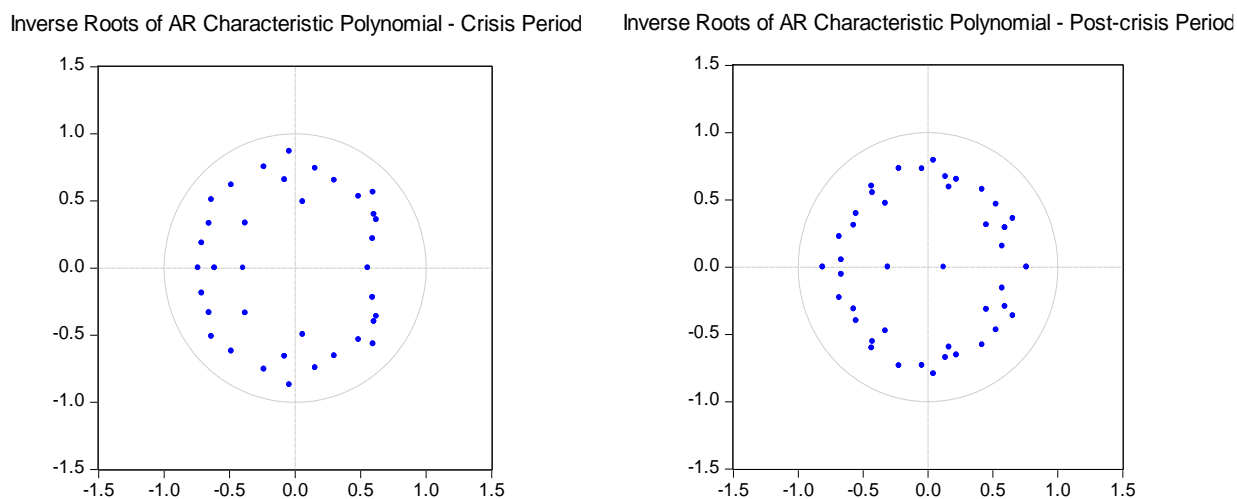


Fig. 2 – Inverse roots of VAR models. Source: own calculations in Eviews

As it has been already mentioned in subsection 3.1, estimated VAR models can be also used to test the Granger causality when using the overall  $F$ -test and partial  $t$ -tests. Results given in Tab. 2 and Tab. 3 implies that according overall values of  $F$ -test of estimated VAR models the null hypothesis of absence of Granger causality can be rejected at the 5% significance level for all CEE countries. The only exception is Hungarian market in post-crisis period. Granger causality tests were applied also separately for all pairs of indexes and both periods. We achieved entirely same results.

Empirical analysis completed in this paper suggests that the CEE stock markets were quite well synchronized in the period of global financial crisis. In other words, all CEE stock markets followed common trend during the period of financial instability. On the other hand, development of the CEE stock markets became less affected by innovations from other markets in the periods of economic stagnation after March 2009.

In the period of global financial crisis it is also worth mentioning the fact that especially development of Czech stock market played significant role for development of other CEE

stock markets comparing with other CEE markets. In other words, events in Czech market are important factor for changes in all CEE stock markets.

To conclude, our results suggest that after an outbreak of the global financial crisis we observed greater spillover of shocks across the CEE markets. This idea corresponds with an assumption of high sensitivity of investors to new information which can lead to herd behavior.

If we consider mutual relationships of the CEE markets with global stock market and the Eurozone stock markets it can be summarized that these markets are rather influenced by the US stock market than the Eurozone area instead. Innovations coming from USA played more important role than innovations coming from the Eurozone area. This fact is more significant in the period of global financial crisis but it is important also in post-crisis period so that the basic research hypothesis  $H_1$  cannot be rejected.

This finding is not surprising since USA is still the most important economy in the world, and their financial market disposes of the largest market capitalization. Therefore, it is logical to assume that negative innovations can be easily transferred to other markets as a result of globalization process.

## 5.2 Variance decomposition

When having estimated VAR model, further step of our analysis is to provide variance decomposition analysis as described in subsection 2.2. Variance decomposition is a tool that decomposes variance of endogenous variable into component shocks to the VAR model. This approach provides information about relative importance of each random innovation that affects variables in VAR model.

If we look on estimated values of coefficients of determination of VAR(6) model were very low for all indexes. That is why the variance decomposition analysis was carried out just for the data covering the period of global financial crisis. Fig. 3 shows variance decomposition for all CEE stock markets, namely PX, BUX and WIG20 indices. Results differ significantly for each investigated CEE stock market.

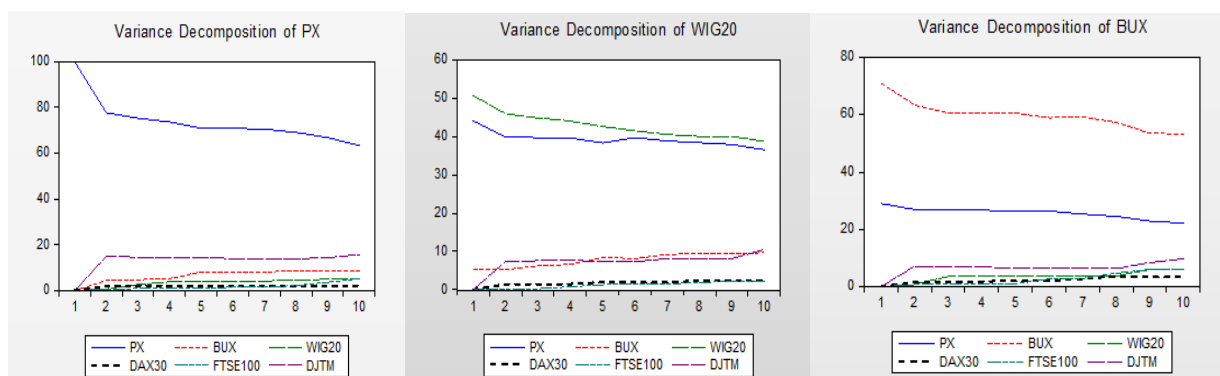


Fig. 3 – Variance decomposition for PX, BUX and WIG20 indexes (2007-2009). Source: own calculations in Eviews

Fig. 3 shows that the proportion of variability of unexpected differences in profitability of index that can be explained by new information from domestic market is about 60-75% in Czech Republic and about 55-70% in Hungary. This finding implies that local events are still crucial for development of domestic stock markets, even though transfer of information and

capital became relatively easy and fast in recent years. Interesting is also a fact that 20-30% of proportion of variability of Hungarian index can be attributed by innovations from Czech market.

The proportion of variability that can be explained by domestic factors is only about 40-50% in Poland. Nevertheless, more than half of variability can be attributed to external events which correspond to the hypothesis of high capital mobility. The highest proportion is again attributed to Czech market.

To sum up, the most important stock market that caused a relatively high proportion of variability in other CEE markets is Czech Republic. Information from other markets, including USA, Great Britain and the Eurozone area, are not so important for explanation of variability in returns of the CEE stock markets in crisis period.

## 6 CONCLUSIONS

Previous literature dealing with mutual relationships among new EU member stock markets concluded that the degree of their interdependence with the global stock market is gradually growing. The aim of this paper was to estimate, describe, compare and interpret mutual relationships among new EU member states in Central Europe, global financial market, and the Eurozone stock market during the period of 2007-2012 years. For the purpose of this paper the methods vector autoregression, Granger causality testing and variance decomposition were applied.

On the basis of empirical results it can be stated that the basic research hypothesis  $H_1$  that CEE stock markets are rather affected by the U.S. stock market than the Eurozone area cannot be rejected. Furthermore, empirical analysis completed in this paper indicated that recent period of global financial crisis of 2008-2009 years and subsequent debt crisis changed a system of mutual relationships among the CEE stock markets, the Eurozone and US stock market considerably. During term of financial instability developments of the CEE stock markets became more synchronized since events on other CEE markets played more significant role on national markets. The CEE stock markets can be treated as homogeneous region.

### Acknowledgement

*This paper was supported by the Czech Science Foundation through project No. 13-13142S and the European Social Fund within the project CZ.1.07/2.3.00/20.0296.*

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## **MEASURING THE PERFORMANCE OF CLUSTERS**

*Hana Scholleová*

### **Abstract**

This article aims at solving the problem of measurability of the success of clusters as a whole. The cluster has long been associated group of companies which have the ability to realize the benefits of this merger. The prerequisite is a combination of suitable companies that develop themselves and that are oriented cooperatively and innovatively. There are many doubts whether the clusters are a modern form groups that thanks to the support of institutions can obtain a number of subsidy program or indeed expanding form of cooperation. To dispel those doubts, it is necessary that the performance of clusters as such was measurable. The problem of measurability of performance of individual companies is handled by financial and market benchmarks, which are oriented in the short term. Similarly is also measured the performance of companies in the cluster or aggregate performance cluster. This, however, has defined a four-layer structure, and each level has a different role, objectives and thus ways to measure effectiveness. This article focuses on the hard scale and evaluation focuses mainly on the core of the cluster, because the core is the most important part of the cluster.

*Keywords: cluster, measurement of efficiency, indicators of strategic cooperation*

JEL Classification: O31, O32, M21

### **1 INTRODUCTION**

Cluster is defined as a group of the same or similar elements gathered or occurring closely together; a bunch. Business cluster was introduced and popularized by Michael Porter (1998), who saw clusters potential by increasing the productivity of the companies in the cluster, by driving innovation in the field, and by stimulating new businesses. If it all is true, that clusters are more effective in operating and also in strategic way, we can propose, that it is possible to measure the rate of efficiency. All of them effect from synergy and value of synergy is the same as the value of cluster.

Cluster can be defined as geographically close groups of interconnected companies and associated institutions in a particular field, linked by common technologies and skills. They normally exist within a geographic area where ease of communication, logistics and personal interaction is possible. Clusters are normally concentrated in regions and sometimes in a single town. (Porter, 1998) Another definition characterizes clusters as networks of production of strongly interdependent firms (including specialized suppliers), knowledge producing agents (universities, research institutes, engineering companies), bridging institutions (brokers, consultants) and customers, linked to each other in a value-adding production chain (OECD, 2009). The European Union (European Commission, 2003) defines cluster as “a mode of organization of the productive system, characterized by a geographical concentration of economic actors and other organizations, specialized in a common field of activity, developing inter-relations of a market and non-market nature, and contributing to the innovation and competitiveness of its members and the territory”. Porter means that through the interaction in a cluster the firms are able to produce goods with a higher value than average enterprises and sectors. (Porter, 1998). There is not a sharp distinction between corporate networks and strategic alliances - in both cases, this is a free enterprise

collaboration partnership (Pavelková, 2009). In enterprise networks, cooperation is usually bound in a separate agreement but it is a more equal relationship partnership.

The major external benefits for firms in the cluster (Czechinvest, 2005):

- easier availability of skilled staff,
- specialization and greater collaboration with suppliers,
- attracting customers, mutual reference,
- new and faster flow of information and innovation.

Clusters are a catalyst for the development of innovation and innovation is one of the building blocks of national competitiveness (Nečadová, 2013). Increasing the potential competitiveness is one of the reasons cluster support policies from the state.

The cluster concept is often questioned. Martin and Sunley (2003) are skeptical, because “the cluster concept should carry a public policy health warning”. Government intervention caused, that “cluster initiatives have become a ‘magic recipe’ to meet the challenges of the new economy, to the point that they have become dangerously fashionable” (Andersson et al., 2004). Ultimately, whether the cluster concept is useful, whether cluster development is possible, or whether government intervention is warranted, are matters for evaluation. It is possible to evaluate only the aspects that are measurable. There exist a number of experiments to systemize individual elements of clusters and measure their performance. At the same time the others (Solvell, Linquist and Ketels, 2003) point out that the quantitative measures often use inappropriate data, and the qualitative ones often result in ambiguous outputs. As with any investment, particularly involving public funds, there is having, or will have, net positive benefits. Unfortunately, there is a scarcity of comprehensive evaluations of clusters, and cluster benefits are still often taken for granted rather than systematically documented (Andersson et al., 2004).

### **1.1 Structure of cluster**

We can provide (Czechinvest, 2005) a well-built cluster layers: core, complement, soft infrastructure and hard infrastructure. Core consists of companies whose revenues come mostly from the external environment - outside the cluster (environment in terms of micro and macro economic conditions). Complements are the company's subsidiary, suppliers for companies in the nucleus. In relation to cluster are the so-called soft infrastructure companies which are knowledge delivering organizations, R & D and to this belongs hard infrastructure which is distributing road, telecommunications, waste management. The fourth layer in the cluster is often missing. Each layer of the cluster has specific goals and objectives, and should use specific indicators of success. Interrelations and external links of clusters on a global scale can increase the competitiveness and innovation of firms within the cluster. (Wolfe et al., 2005).

### **1.2 Preconditions success of cluster**

The basis for long-term prosperity of the cluster is at its core. Ideally compiled core of the cluster should be compact, connected, non-competitive, but cooperative, homogeneous. The work of nuclei can be continuously measured and improved. Ways to improve are two - internally can be improved relationships between companies and externally can expand the cluster of other companies, which will improve its core.

### 1.3 Life cycle of cluster

Similarly to companies, even clusters possess a life-cycle. Cassidy et al. (2005) classifies individual phases of development depending on the rate of cluster activity as latent, developing, established and transformational (see fig. 1).

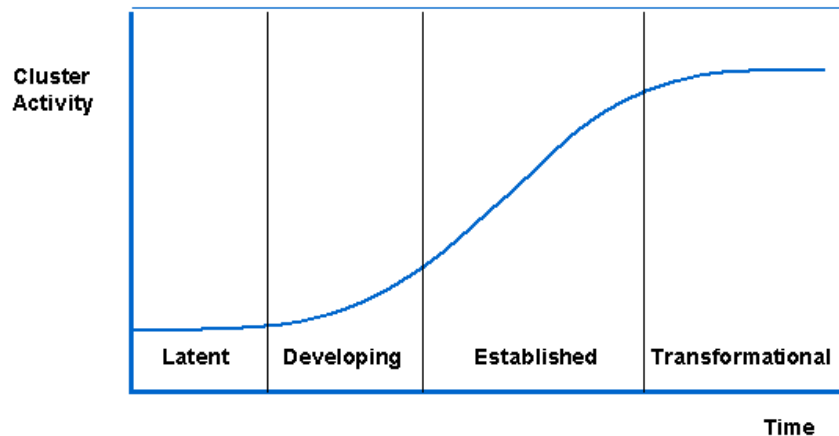


Fig. 1 – Cluster Lifecycle. Source: Cassidy et al. (2005)

## 2 MEASUREMENT OF CLUSTER EFFICIENCY

Tools that measure the efficiency of clusters are difficult to apply or are not sufficiently developed. The aim of this paper is to create appropriate indicators for evaluating the success of the cluster. We show problems and evaluate the effectiveness of a particular cluster. For creating efficiency indicators will be used basic methodology for financial analysis. To evaluate the homogeneity of the cluster will use statistical tool. Net benefit of the cluster will be evaluated by an index, which will be formulated based on the correction of composite indices of growth of aggregate inputs.

### 2.1 Factors of cluster's success and its criteria

The question was: When companies improve over time and are also better than the average company in the industry, does that mean the cluster is successful? And how successful is it?

The success of the cluster, can be measured with these indicators

- hard
  - financial - financial indicators such as profit, ROE, EVA, Assets Turnover, growth of revenues...
  - non-financial - market shares, the share of innovative products, the number of patent ...
- soft
  - quality of products, environment indicators – they are harder to measure, but oriented in the long term.

Success can be measured in several layers

- The success of individual companies

- The success of the cluster where it is inappropriate to treat businesses layers
  - the core layer
  - the closely cooperating entities - suppliers in B2B customers, complements,
  - and other companies.

## **2.2 Efficiency measurement for supported clusters**

Andersen et al. (2006) define four steps to cluster evaluation in case of supported clusters:

(1) Identify and measure key economic outcome

(2) Identify drivers of outcome

We take at first the four growth drivers developed by OECD (2001): human resources, knowledge building and entrepreneurship. Some indicators of cluster performance can be derived from hard data (statistics). Other indicators of cluster performance can only be examined with more qualitative data collection methods such as surveys.

(3) Identify the framework conditions which have an impact on cluster performance and cluster outcome

Understanding the conditions that drive cluster performance will help policy - makers in formulating more effective measures supporting clusters to innovate.

4) Examine 'top performing cases' in detail

A sufficient level of knowledge of political instruments can only be determined through in-depth peer reviews of particular policy areas of the best-performing clusters to understand how and why particular policy instruments work.

## **3 MEASUREMENT ACCORDING TO STAGE OF THE LIFE CYCLE OF CLUSTER**

Experts say (Pavelkova et al., 2013) that clusters are going through life stages and therefore the ways of measuring success is good to develop depending on the stage, in which the cluster is located. At all stages is to evaluate companies as to individual subjects. But it is also good to distinguish effects that bring its own involvement in the cluster.

This article focuses on the evaluation of the core of cluster.

### **3.1 Measures for beginning phases – latent and developing**

In the first phase of the lifecycle of the cluster can then be quantified for each important indicator of corporate Net Cluster Efficiency (abbreviated NCE). NCE can be applied to various indicators of business success. The advantage is that each company can compute cluster NCE just for these indicators that are important to it.

We can use some indices of growth indicators, which is important for the development of the company, such as sales growth (Sales Index), but it can be also used for relative indicators also (for example for ROE). The growth of the cluster development involved the macroeconomic situation, the industry, but also the position of firms in the sector, and finally a synergistic effect of the cluster.

If X is an indicator of success, then we denote that for the cluster (for the core) in the case of successful development should be

$$\frac{X_{CB}}{X_{BB}} \leq \frac{X_{CN}}{X_{BN}}, \quad (1)$$

where  $X_{CB}$  is value of indicator  $X$  for cluster, but before it enters to cluster,

$X_{BB}$  - value of indicator  $X$  for branch in this same year as  $X_{CB}$ ,

$X_{CN}$  - value of indicator  $X$  for cluster now (in this year),

$X_{BN}$  - value of indicator  $X$  for branch now (in this year).

We can also write that 
$$\frac{X_{CN}}{X_{BN}} = NCE_X \cdot \frac{X_{CB}}{X_{BB}}, \quad (2)$$

where  $NCE_X$  is Net Cluster Efficiency in indicator  $X$ ,

$X_{CB}$  and others – as seen above.

Then we can write, then the Net Cluster Efficiency (NCE) can be calculated as

$$NCE_X = \frac{\frac{X_{CN}}{X_{BB}}}{\frac{X_{CB}}{X_{BN}}} \quad (3)$$

What does the indicator  $NCE_X$  correctly say?

The  $NCE_X$  eliminates the success that is not the result of any collaboration in the cluster and measures, how the growth in  $X$  has caused the cluster efficiency.

In case, that  $X$  is indicator, for them is optimal maximization:

If  $NCE_X > 1$ , that means, the cluster position in sector is better than when they were separate companies, cluster efficiency is better, if  $NCE_X$  is higher,

If  $NCE_X = 1$ , that means, the cluster position in sector is the same as when they were separate companies, activity of cluster is probably weak,

If  $NCE_X < 1$ , that means, the cluster position in sector is worse than when they were separate companies.

The indicator  $NCE$  can be calculated in the same way for any maximization economic indicator, including growth indices. In the case of minimizing indicator, calculation is similar; one just has to replace the fraction in the formula (3). Therefore, if the  $Y$  is indicator, which has minimum in the optimal value, then

$$NCE_Y = \frac{\frac{Y_{CB}}{Y_{BB}}}{\frac{Y_{CN}}{Y_{BN}}} \quad (4)$$

Meaning that applications  $NCE_Y$  are exactly the same.  $NCE$  indicators can be used to assess the significance of the cluster in the sector but also to assess core companies in the cluster.

$NCE$  is a good benchmark for companies, for which it is participation in the cluster core and the effects should be visible. For companies of third- and fourth-layer cluster, which have other objectives (research centers) or elsewhere (logistic company for which firms in the

cluster is only an insignificant part of the effect of development) does not provide the desired pointer evaluation.

### **3.2 Homogeneity of cluster**

One of the prerequisites for a successful existence cluster is composed of a core in terms of mutual cooperation among companies, which should be based on a win-win strategy. One of the hypotheses beginning of this type of cooperation is somewhat equal status companies (ie. companies of approximately the same size, life cycle phase, market status and performance).

Before we begin it is important that the core is formed by companies, which can be seen as a homogeneous group.

Homogeneity can again be measured in any, for the functioning of the significant indicators for the cluster core businesses. This may be an indicator of absolute, relative, financial and non-financial - the only requirement is measurability and computability.

Homogeneity is measured by using a coefficient of variation ( $V_{coef}$ ) for indicator X:

$$V_{coef}(X) = \frac{\sigma(X)}{E(X)}, \quad (5)$$

where  $\sigma(X)$  is standard deviation on X,

$E(X)$  - mean of X.

If  $V_{coef}(X)$  is less than 50%, the cluster can be considered as a homogeneous set in key indicator X. (Synek et al., 2009)

Rating homogeneity is appropriate to do both before the establishment of the cluster, and during his life. Homogeneity of key indicators should not be reduce, the core foundation of success and the success of the core is the foundation of the success of the entire cluster.

There are two ways to work with good homogeneity:

- Intensive, in which the existing cluster firms converge in results (ideally improving)
- Extensive, in which the homogeneity reduces the company's newly involved in the activity of the cluster.

The above two indicators (NCE and homogeneity) can be used, in conjunction with and in the first stage of life indicator cluster evaluate homogeneity NCE.

Then we can dynamically evaluate the uniformity of development in the cluster - if the NCE of the firms in the cluster core is significantly different, it does not indicate good functioning of the cluster.

### **3.3 The criteria for the growing life-cycle phase (established)**

Due to changing conditions we can no longer (after some time) compare the success of companies in the cluster with success before joining the cluster, because the company already had another factory sector and I could pass key changes. Therefore, it is necessary for the growth phase to define other scales.

We recall that the foundation is still measuring Key Performance Indicators (KPI) – there are the indicators relevant to the evaluation of companies of the sector.

Let X be the key indicator.

Then, each company is successful in the cluster, if this is true:

$$X_F \geq X_C \geq X_B,$$

where  $X_F$  – value of indicator  $X$  for firm,

$X_C$  – value of indicator  $X$  for cluster,

$X_B$  – value of indicator  $X$  for branch.

When we talk about the cluster, we mean its core. For the evaluation of the success of the cluster core can be evaluated

- KPIs core aggregated values and compared with the values for the branch,
- homogeneity in the core KPIs and monitoring its development.

In the following text will be developed two methods, whose basis is used for multicriteria evaluation of alternatives, or are used for intercompany comparison (Synek et al., 2009).

### **3.4 Method standard deviations of normalized variables**

In order to expand options of homogeneity assessment we work with a group of KPIs by standard deviations of normalized variables.

When applying the method it is possible to proceed as follows:

- 1) Find the companies from core of cluster.
- 2) Define the key indicators indicative of the success of the company.
- 3) Minimizing indicators convert to maximizing.
- 4) For a set of corporate data for each indicator to determine the mean and variance.
- 5) Convert the pointer value  $X_{ij}$  on normalized values  $X_{jn}$  using the formula

$$X_{jn} = \frac{X_i - E(X_{ij})}{\sigma(X_{ij})}, \quad (6)$$

where  $X_{ij}$  is value of indicator  $X_j$  for company  $i$ ,

$E(X_{ij})$ , - mean of  $X_j$ ,

$\sigma(X_{ij})$  is standard deviation on  $X_j$ ,

- 6) For each company to calculate the average of normalized values of all indicators.
- 7) Calculate the indicator of homogeneity of these values as standard deviation of values for all companies.

The standard deviation in ideal case is increase in the time line.

### **3.5 Method standard deviations of distance from the fictional ideal company**

Advanced method for evaluating homogeneity in the development of the core is another application of the method distance from the fictional ideal company.

When applying the method it is possible to proceed as follows:

- 1) to the point 6, as in the previous case,
- 2) establish the so-called ideal fictional company, ie., one that in all monitored indicators achieves the best scores,



3) for each monitored subject (company) to calculate the distance from a fictional company using the Euclidean distance, ie.

$$d_i = \sqrt{\sum_j^m (X_{ijn} - X_{jf})^2}, \quad (7)$$

where

$d_i$  – distance company i from ideal company,

$X_{ijn}$  – normalized indicator j for company i,

$X_{jf}$  – normalized indicator j for ideal company,

m – number of indicators.

If the cluster benefits all firms in the core, the average distance from a fictitious company should not grow. It is also possible to evaluate the homogeneity of variance using the distances, it would also not grow.

For homogeneity in the development would be possible to use some of the bankruptcy or credibility models, which are also composed of indicators, standardization is here replaced with weights, but you need to pay attention to their weaknesses, which are described (Čámská, 2014). Furthermore the use of the standard model does not change the indicators used by specific clusters.

## **4 VERIFICATION OF METHODS IN APPLICATION**

The above-described methods were applied to the example of two clusters in the early stages of development and one already in the growth stage. First reference set of companies are companies in the Cluster Nutripol, for the second stage and demonstrating indicators was selected Plastic cluster.

### **4.1 NCE – Nutripol**

Nutripol Cluster is an interest association of legal entities with focus on the CZ NACE 72 190 Other research and experimental development of natural sciences and engineering. But firms in core of cluster are in CZ NACE 10.6 Flour and starch industry and 10.7 Bakery and Bakery and Confectionery, benchmarking is made with them.

Cluster Nutripol's declared aim is to strengthen the competitiveness of its members in the main directions: increase capacity for innovation by joint development of technological processes that can be used by more cluster members, the common procedure of verification and certification of the product or in the direction of the cluster allergenic security – offer of services to third parties in determining the allergenicity of their products and common procedure in marketing and by the realization of research and experiments for the health claim, which significantly increases the effectiveness of communication with customers and defines the product being offered. (Nutripol, 2012). The cluster was founded in 2009 and operates throughout the country. The cluster now has only few companies in the core and very many companies in soft infrastructure.

Chosen for benchmarking data (Czech Ministry of Agriculture, 2011) as a key indicator of the growth index of sales and will be compared to the period before the cluster and then in the cluster. Table 1 shows that although the cluster is better than the industry growth rate and its sales are increasing, the position has worsened - as 10.6, and also as 10.7 (NCE indicator is less 1). That means, the cluster effect is not positive at this time.

Tab. 1 – Indicator Sale index and his NCE indicator for Nutripol Source: own processing

Sale index	2009/08 (befor cluster)	2010/2009 (in cluster)
NACE 10.6	0.725	0.924
NACE 10.7	0.887	0.958
Nutripol (nucleus)	1.016	1.078
NCE (10.6)	0.833	
NCE (10.7)	0.982	

## 4.2 Homogeneity

We can also calculate cluster variation coefficient, which can say anything about homogeneity, key indicator for this measure - Sales, Assets, Profit and Assets Turnover (AT). Tab. 2 shows low homogeneity in absolute but also in relative indicators of firms in core of cluster.

Tab. 2 – Homogeneity – measured with variation coefficient (in %) Source: own processing

Key indicator (index)	2008	2009	2010	2011
Sales	71	64	62	72
Assets	79	65	81	93
EAT	162	164	128	174
AT	36	44	89	51

We can see that in the core businesses have low homogeneity, all indicators are very high.

## 4.3 The criteria for growing phase – Plastic Cluster

The plastics cluster was established in February 2006 as an Interest Association of Legal Entities with the aim to create a communication platform for its members – plastic product manufacturers. The main reason for cluster establishment was especially strong position of the plastics industry in the Zlín Region (together with rubber industry it represents the most productive sector of the region). Another reason is a shortage of qualified working labour force, missing research and development background for plastic product manufacturers, need of an appropriate negotiation position for services and products and effective enforcement of the sector interests. Cluster has enough companies in the nucleus, these were included and evaluated by the methods described above.

For the application of multi-criteria evaluation was selected the routine monitoring criteria of successful companies:

ROE = EAT/Equity

ROA = EBIT/Assets

AT = Revenues/Assets

L1 = (Current assets/Short term liabilities),

L2 = (Current assets – Inventories)/ Short term liabilities

Coefficient of selffinancing = Equity/Assets

The evaluation of cluster development is carried out in the period from 2008-2013, the nucleus included 25 companies meeting the conditions of the core of business, all companies are part of the group 22 - Manufacture of rubber and plastic products by CZ NACE, thus the values are compared with the results in this sector.

In subsequent years the above indicators were calculated aggregately over the entire core. The tab. 3 shows the evaluation of the cluster in terms of trends in the cluster. It can be stated that the core of the cluster has a growing trend; weakness is the development trend indicators Assets Turnover.

Tab. 3 – Indicators in Core of cluster. Source: own processing

	ROA	Trend	ROE	Trend	AT	Trend	L1	Trend	L2	Trend	E/A	Trend
2008	0,10		0,12		1,18		1,36		0,90		0,57	
2009	0,11	OK	0,14	OK	1,10		1,58	OK	1,07	OK	0,62	OK
2010	0,11	OK	0,15	OK	1,10		1,68	OK	1,15	OK	0,65	OK
2011	0,12	OK	0,15	OK	1,18	OK	1,68	OK	1,10		0,65	OK
2012	0,12	OK	0,16	OK	1,18	OK	1,63		1,06		0,63	
2013	0,22	OK	0,30	OK	1,07		2,02	OK	1,48	OK	0,66	OK
change		223%		252%		90%		149%		165%		223%

The obtained values of cluster cores are then compared with the industry according to NACE CZ (see Table 4, where PC values Plastic Cluster and PB values Plastic Branch).

Tab. 4 – Key indicators for core of cluster and for branche. Source: own processing.

	ROA	ROA	ROE	ROE	AT	TA	L1	L1	L2	L2	E/A	E/A
	PC	PB	PC	PB	PC	PB	PC	PB	PC	PB	PC	PB
2008	0,10	0,15	0,12	0,10	1,18	1,69	1,36	1,37	0,90	0,93	0,57	0,58
2009	0,11	0,15	0,14	0,11	1,10	1,47	1,58	1,92	1,07	1,49	0,62	0,58
2010	0,11	0,17	0,15	0,22	1,10	1,57	1,68	2,08	1,15	1,59	0,65	0,60
2011	0,12	0,18	0,15	0,22	1,18	1,66	1,68	2,14	1,10	1,66	0,65	0,61
2012	0,12	0,21	0,16	0,36	1,18	2,06	1,63	2,50	1,06	1,95	0,63	0,66
2013	0,22	0,19	0,30	0,34	1,07	1,92	2,02	2,53	1,48	2,00	0,66	0,65
Δ	0,12	0,04	0,18	0,24	-0,11	0,23	0,66	1,16	0,58	1,07	0,09	0,07

In addition to ROA, the growth in all sectors of the selected indices was higher than the growth of the cluster core. In particular, the relationship between ROE and ROA shows a possible cause is not so much the underperformance of the cluster as a greater fear of financial risk, where accumulation and retention of profits in unproductive assets may be one of the causes of limited growth of AT.

Evaluating homogeneity will be assessed by methods described in chapter 4.4 and 4.5, the same indicators are used, as we have defined above (ROA, ROE, AT, L1, L2, E/A).

The results of method deviation of normalized variables and also methods of distance normalized variables from a fictitious company are in Tab. 5.

Tab. 5 – Homogeneity of core of Plastic cluster in time line. Source: own processing

	Method of normalized variables	Method of distance		
	var (averagea norm X)	E(d)	Stdeva(d)	var (d)
2008	44%	9,02	0,64	7%
2009	46%	8,39	0,95	11%
2010	56%	7,01	1,07	15%
2011	48%	7,84	1,10	14%
2012	57%	6,50	1,21	19%
2013	66%	7,22	1,22	17%

Unfortunately, we see that both methods show a decreasing level of homogeneity core cluster's homogeneity. Although both indicators alone, as compared to the industry cluster can be assessed positively (and certainly other indicators could be selected that would reflect even better in light of its positive aspects), it can be seen that the homogeneity of the core, which is one of the prerequisites for long-term prosperity worsens the cluster.

## 5 DISCUSSION

The aim of the article was to create a set of measures based on logical deduction. It would be very interesting to create actual statistical investigation and verify established benchmarks. Unfortunately, there is not sufficient statistical data for us to receive general conclusions.

The Czech Republic currently contains 79 active clusters (Czechinvest, 2013). The very first cluster was formed in 2003, 53% of clusters are supported by data of less than a five years history (established 2009 or later). Most clusters were formed in 2006 (as well as Plastic cluster) and 2009 (like Nutripol). A greater rate of cluster formation in certain years is also influenced by the support of the state. According to the investigation of an international benchmarking, carried out by the German consultant company VDI/VDE Innovation + Technik GmbH (Czechinvest, 2015), 67% of Czech clusters are sufficient in size. Clusters are spread in almost all sectors according to CZ NACE. No industry contains more than 6 clusters. The aforementioned facts support the idea, that statistical significance of monitoring benchmarks in proportion to size, age or the sector of the cluster is impossible to track in the Czech Republic - the reason being insufficient relevant data. The aforementioned data for two clusters are not a statistical research of substantiation of benchmarks, but just a test for their actual usability. The homogeneity of the nucleus is a measure realistically applicable even for

the advanced part of the life cycle. Evaluation requires the homogeneity of the core not to be reduced, but it is impossible to predict, that it will further increase, because a certain amount of inhomogeneity testifies that we evaluate a cluster that includes multiple firms, not just one big one.

## **6 CONCLUSION**

The aim of the article was to create benchmarks for measuring the success of clusters and determine their suitability depending on the life cycle of the cluster. The article highlights the principles of how to evaluate the functionality of cluster worth as a whole, without neglecting the interests of individual companies. It is also taken into account that the cluster is part of the sector. Defined criteria are developed with respect to business results depending on the macroeconomic situation. It should not be used to measure impact. It is also possible to change the used key indicators - both their amount and their structure. Our proposed method was demonstrated on two clusters, which at the first observation had to be successful clusters - their results are improving. In both cases, they subsequently prove weaknesses – the growth sector is less than or decreasing in homogeneity in the cluster. The benchmarks suggested in the article show their usability and are based on the assumption, that the core of the cluster is the most important and cluster should support all firms in the core. If the homogeneity of the core decreases, it means the development of firms is irregular, which can result in the cluster being isolated by certain firms. The article shows benchmarking timeline for one cluster at a time in comparison to given sector. Given certain circumstances, it would be possible to use benchmarks for comparing multiple clusters at once. It would be useful to compare clusters of comparable size, lifetime, and sector - which is not yet possible, as discussed. If we compare different clusters it would be used same primary indicators. These indicators should have a clear optimum, the same for all companies (maximization and minimization). It is questionable whether they could be better chosen KPIs, such as objectively measurable, but non-financial indicators, those would also better fit the goals of the cluster. Our derived methods allow the use of any quantifiable indicators, so each cluster can be selected according to your goals.

### **Acknowledgement**

*This paper has been published as a part of the research with financial support of TACR within the project TD020325.*

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## **IMPACT OF COMPETITION ON RETAILING IN THE PERIOD OF ECONOMIC CRISIS AS PERCEIVED BY THE CZECH CLOTHING RETAILERS**

*Jozefína Simová*

### **Abstract**

This paper attempts to explore perceptions of clothing retailers in the Czech Republic in relation to the impact of competition on retailing in the period of economic crisis. It presents the findings of the research conducted in 2014. The research was designed to investigate the impact of market environment on competition in clothing retailing in the Czech Republic at two levels: external (clothing retail managers' perceptions of competition and its impact on company performance) and internal (quantitative changes in company's turnover, if any). The first part of the study explores the impact of competition on company's turnover. The second part examines the extent to which competition influenced performance of the Czech clothing retailers, the most frequent changes in competition and the most common competitive responses of clothing retailers to changes in the competitive market.

*Keywords: Clothing, retailing, competition, Czech Republic, turnover, changes, economic crisis*

JEL Classification: M31

### **1 INTRODUCTION**

The business environment of the last few years has become more turbulent. Rapid changes in the market caused mainly by the global economic crisis in 2007-2012 have brought considerable challenge as well as new possibilities and opportunities to companies (Antonová & Zapletalová, 2014). Significant changes have arisen in the retailing sector, as well. The battle for customers has become very intense. Retailers have been forced to respond to changes in consumer behaviour and demand, to increasing and also changing competition, to adapt new technology and look for new management practices and market opportunities.

The impact of the global economic crisis on company management and performance is evident and has been described by many academics and practitioners (Hájek & Režný, 2014; Kraft, Bednářová, Lungová, Nedomelová, & Sojková, 2010; Kraft, Bednářová, Lungová, Nedomelová, & Sojková 2011; Švihlíková, 2010; Kislíngerová, 2010; Kohout, 2009). The new market conditions force managers to develop new strategies, build sustainable competitive advantages and expand their product portfolio and market segments in order to survive, to ensure sufficient company performance and become competitive (Antonová & Zapletalová, 2014; Dědková & Blažková, 2014).

There have been a few attempts made to define company performance in the literature. Knapková, Pavelková and Šteker (2013, p. 149) state that company performance is related to all company activities needed to make a company functioning and prospering in a long-term perspective. The others understand company performance as a well-planned creation of prerequisites for a company long-term survival and a value creation for continuous and sustainable existence of the company. Wagner (2009, p. 18) specifies two basic dimensions of company's performance - the need to do the right things and to do the things right. Basically, most of company performance definitions are associated with the objective achievements,



changes in financial indicators of the company including return on investment and the ways how company runs its business activities (Štamfesová, 2014, p. 522; Carton & Hofer, 2006, p. 2-3; Lebas, 1995, p. 23).

It is important to note that the definitions of company performance are mainly company focused. They do not reflect the market environment and the impact of external factors on company performance, such as competition. The objective of the paper is to explore perceptions of clothing retailers in the Czech Republic in relation to the impact of competition on company performance measured by turnover in the period of the economic crisis. It presents the findings of the research conducted in 2014. The research was designed to investigate the impact of market environment on competition in clothing retailing in the Czech Republic at two levels: external (clothing retail managers' perceptions of competition and its impact on company turnover) and internal (quantitative changes in company's turnover, if any). The first part of the study explores the impact of competition on company's turnover and its correlations with changes in competitive behaviour of clothing retailers. The second part examines the extent to which competition influenced turnover and activities of the Czech clothing retailers, the most frequent changes in competition and the most common competitive responses of clothing retailers to changes in the competitive market.

## **2 COMPETITION AND CONFLICT-BASED THEORY**

Conflict-based theoretical concepts have attracted moderately little academic attention. However, some authors (Gist, 1968; Stern & El-Ansary, 1977; Markin & Duncan, 1981; Brown, 1987a, Brown, 1987b, Brown 1988a) made their contributions. Some of these theories concentrate upon behaviour and reaction of the established retailing institutions to the threat of competition coming from new institutional retail formats (Brown, 1987a). They explain the inter-institutional competition that occurs when new retail institutions enter the market as the dynamic interaction between the old and the new retail establishments (Markin & Duncan, 1981; Brown, 1987b).

Other theoretical concepts focus on retail innovations representing some competitive advantages that threaten conventional retailers and force them to respond or adapt to the competitive challenge. Retailers may respond in many different ways. Usually, retailers with the innovations are at first maligned, boycotted, accused of unfair selling practices or at least, subjects to attempts to stifle their success (Brown, 1987a, Brown 1988). Basically, threatened retailers can respond in the following ways. They either strive to avoid direct competition by differentiating the threatened institution from its challengers or they try to adapt the best features of the new system and thereby negate some of its competitive advantages. The specific example of the first type was the response of traditional stores to the threat of low price policy offered by discount stores. Many traditional stores moved further upmarket and relinquish the merchandise sold by discounters. Other stores applying the imitative response to the threat of discount stores established their own chains of discounters, cut prices and services to match those of the discount stores. In this way, they not only reduced a perceived threat but also assumed the operation of the discounters.

The models to mention are dialectical model (most notably, Gist (1968) and the crisis-response model (Stern & El-Ansary, 1977).

**The dialectical model** describes dynamic interaction (action, reaction and assimilation sequence) and competitive conflicts between retailers (old and new retail formats) as a series of stages, each of which represents a rejection of a prior institutional format (Mason & Mayer, 1978; Brown, 1991). It states that a retail institution (in this case a "thesis") develops. After a while, a position apposed to the thesis - antithesis will likely develop. The thesis and

antithesis have opposite characteristics. Nevertheless, they do not necessarily represent complete opposites. The existing thesis is threatened by its antithesis. As a result of their competitive strife, they “melt” in the synthesis - an institution between the original thesis and the antithesis. With a time, the synthesis becomes the thesis for a new round of negation and assimilation, so the dialectical process continues. According to the dialectical theory, therefore, inter-institutional competition inevitably leads to a diverse retail structure and completely new retail formats may appear (Gist, 1968; Brown, 1988).

A good example of this process can be identified in the self-service grocery store that represents a synthesis of the traditional counter-service grocery store (thesis) and the supermarket (its antithesis) (Brown, 1987b).

**The crisis-response model** of competitive conflict distinguishes four stages from the emergence of a threat caused by innovation or new retail institution to the resolution of the inter-institutional conflict: shock, defensive retreat, acknowledgement and adaptation (Stern & El-Ansary, 1977; Brown, 1991). The first phase is associated with a shock caused by appearance of innovative retail activities that are perceived as a threat for some companies. At this stage, the threatened companies often refuse to recognize the extent of such threat. In the second phase of defensive retreat, the companies start to react to their challenger. They may attempt to discredit, control or generally impede the innovator. The third phase – acknowledgement is related to the situation when threatened retailers realize that the innovator is likely to remain and that they need to apply some positive countermeasures. In the final, adaptive phase, conflict is resolved and a new competitive power balance is created in the market. This, however, may initiate a competitive threat to other companies and conflict breaks out once again. What is more, not only threatened institutions have to respond to a challenge but also the attacker is sometime forced to react to the rejoinder of the retail establishment (Brown, 1987b; Brown, 1988).

The concept of the crisis-response model can be found in another theory that argues that a dominant group of competitors in any sector of the economy is counterbalanced by the appearance of another equally powerful opposing force. Whenever some companies are threatened by a concentration of power elsewhere in the system, they will counteract. This concept of countervailing power was first noted by Galbraith (1956) and later, further developed by Izraeli (1970) (quoted in Brown, 1987b).

### **3 METHODOLOGY**

The findings presented in this paper are based on the research focused on analysis of competition and competitive behaviour of clothing retailers in the period of the economic crisis determined by retailers themselves, in particular the inter (competition between different retail formats) and intra-type competition (competition among the same type of retail formats). It was an exploratory research expanding into the qualitative area trying to identify competitive factors affecting retailing based on the perception of clothing retailers.

The research included different formats of clothing shops regardless their location. It included clothing shops located in small and large towns, in town centre and in shopping centres built in or in the outskirts of towns. The study focused on five different formats (quotas) of clothing retailers – department store, mid-range clothing store, boutique, discount and second-hand stores since they represent a significant proportion in the market structure. The mid-range stores represented a category including clothing stores that could be positioned as a store between a boutique and a discount store (somewhere in the middle of the price and quality continua). This category of clothing stores comprises both multiple and small independent clothing retailers of the same price-quality market position.

Non-probability sampling strategy, particularly quota sampling was applied in the research. Structured interviews using a questionnaire were used to collect the data. In designing the questionnaire, the present knowledge on conflict-based theory was considered. To measure the extent of the influence of competition on changes in company performance, a five point rating scale was used. The ordinal scale was used to measure the most frequent changes in competition and retailers' competitive responses to those changes in the period of the economic crisis. The data on a company such as the name of the company, the year of establishment, the number of years present within the Czech market, type (independent, multiple retailer) and format of retailer (department store, discount store, boutique and the like), ownership, number of employees, assortment and turnover, changes in turnover were placed at the end of the questionnaire.

Descriptive analysis using mainly percentage cross-tabulation and arithmetic means was used to summarize the data and understand the nature of the relationships by making relative comparisons. Ranking was used to identify the main (most important) factors associated with the most frequent competitive behaviour as perceived by clothing retailers. To explore the differences in retailers' perceptions of the impact of mentioned factors on company performance in clothing retailing by retail formats, the size of population (town categories) and changes in retailers' turnover, an analysis of contingency tables (categorical data) was applied. The relationship between independent variables (retail formats, town categories, changes in competitive behaviour) and the dependent variables (turnover change categories) was measured by Pearson Chi-Square test and one-way ANOVA test.

#### **4 PROFILE OF RESPONDENTS**

Around 500 retailers were contacted in judiciously selected towns representing all five town population categories (less than 10,000 inhabitants, 10,000-19,999 inhabitants, 20,000-49,999 inhabitants, 50,000-99,999 inhabitants and more than 100,000 inhabitants) in different regions of the Czech Republic.

The sample consisted of 409 responses. The largest proportion of clothing retailers (45 percent) was interviewed in the towns with more than 100,000 inhabitants and the towns with 50,000-99,999 inhabitants. The sample included 31 percent of mid-range clothing stores, 29 percent of boutiques, 28 percent of department stores and hypermarkets selling clothes, and 12 percent of discount and second-hand stores.

Approximately one third (32 percent) of them stated the year of their founding in the period 1991-2000. Most of the interviewed retailers were established after the year 2000 (67 percent). About 55 percent of respondents have been operating within the Czech Republic for less than 10 years. Regarding the size of the interviewed clothing retailers in terms of their turnover, 13 percent did not state their turnover category at all. From those who indicated their turnovers, about 37 percent were small clothing retailers with a turnover of less than CZK 2 million per year, almost 19 percent of the retailers achieved a turnover of CZK 2-5 million per year, 8 percent of clothing retailers stated a turnover of CZK 5-10 million per year and 36 percent of retailers belonged to the category with more than CZK 10 million per year.

Analyzing the sample structure in relation to the number of employees, about 71 percent of selected clothing retailers were companies employing fewer than 10 people, 12 percent of them employed 11-25 people, 3 percent employed 26-50 people, 3 percent employed 51-100 and about 11 percent employed more than 100 employees.

## **5 THE INFLUENCE OF COMPETITION ON CHANGES IN RETAILING AS PERCEIVED BY CZECH CLOTHING RETAILERS**

The economic crisis in the Czech Republic, primarily in its early stage in 2008, accompanied by the GDP decline, the slump of the Czech currency and a rapid decline of the retail turnover generated problems not only for companies involved in exports and imports but for retailers as well (Antonová & Zapletalová, 2014). The annual decline of the non-food retail turnover reached 10.2 percent in January 2009 (Český statistický úřad, 2015). Many companies struggled and competition got more intense.

This chapter explores how clothing retailers perceived the impact of competition on their business performance in relation to intra-institutional (competition among the same type of retail formats), inter-institutional (competition between different retail formats), domestic (Czech) and foreign (foreign retailers operating in the Czech market) competition. The impact of competition on clothing retailing was measured quantitatively by changes in their turnover, and qualitatively by retailers' perceptions and reactions to competitive activities in the period of economic crisis.

### **5.1 Retail turnover development in the period of economic crisis in the Czech Republic as perceived by clothing retailers**

Clothing retailers were requested to state trends in their company performance measured by changes (if any) in their turnover. Particularly, they were asked to indicate whether their turnover had increased, remained rather stable or declined in the period of economic crisis. The findings gathered out of those who responded the question (about 88 percent of all respondents) show that 23 percent declared a growth in their turnover, 37 percent of interviewed clothing retailers expressed no changes in their turnover and 40 percent of them stated that their turnover had declined.

Based on the results gained from those whose turnover increased, 58 percent of retail companies achieved turnover increase up to 5 percent, 32 percent of interviewed clothing retailers achieved increase between 6 to 15 percent and about 10 percent of clothing retailers stated an increase in their turnover by more than 15 percent.

Clothing retailers that admitted decline in their turnovers experienced decline from up to 5 percent (47 percent of them) to more than 20 percent of their turnover (19 percent of them). Approximately 34 percent of them expressed a decline in their turnover by 6 to 15 percent. The largest decline in retailers' turnovers in the period of economic crisis in range from 40 to 70 percent was declared by 6 percent of clothing retailers.

The characteristics of clothing retailers that stated an increase, no change or a decline in their turnovers are shown in the table 1.

Tab. 1 – Characteristics of clothing retailers by turnover changes

<b>Characteristics of clothing retailers</b>	<b>Growth (%)</b>	<b>Stability (%)</b>	<b>Decline (%)</b>	<b>Pearson Chi-Square</b>	<b>Sig.</b>
<b>Towns up to 10,000 inhabitants</b>	22	20	58	19.630	0.012
<b>10,000 – 19,999 inhabitants</b>	20	31	49		
<b>20,000 – 49,999 inhabitants</b>	19	41	41		
<b>50,000 – 99,999 inhabitants</b>	34	47	19		
<b>Over 100,000 inhabitants</b>	24	43	33		
<b>Small independent stores</b>	16	35	49	16.021	0.042
<b>Multiple retailers</b>	28	39	33	23.138	0.001
<b>Private ownership</b>	17	32	51		
<b>Limited reliability company</b>	24	38	37		
<b>Foreign company</b>	34	47	20	38.613	0.000
<b>Turnover up to CZK 2 mill.</b>	10	37	57		
<b>CZK 2 – 5 mill.</b>	43	34	23		
<b>CZK 5 – 10 mill.</b>	28	41	31		
<b>More than 10 mill.</b>	25	46	30		

Clothing retailers experiencing a growth in their turnovers during the period of crisis were located mostly in large towns with more than 50,000 inhabitants. In terms of their size, they were multiple retailers owned by a foreign company with annual turnover of CZK 2 – 5 million.

Most clothing retailers reporting a turnover decline were located in smaller towns up to 50,000 inhabitants. They were privately owned by small independents with annual turnover up to CZK 2 million.

No statistically significant differences in company performance of clothing retailers in terms of turnover were found by retail formats (Pearson Chi-Square=8.163, p=0.416) and the number of employees (Pearson Chi-Square=10.324, p=0.243).

Differences in clothing retailers' perceptions of changes in competition and their responses to the changes were examined in relation to changes in their turnover, as well. No statistically significant differences were found in responses of clothing retailers to competitive threats in relation to the changes in their turnover. However, perception of competitive activities by clothing retailers in terms of price and in-store ambience differed significantly as shown in the table 2.

Tab. 2 – Clothing retailers' perception of competitive activities by turnover changes

<b>Retailers' perceptions of competitive activities</b>	<b>Growth (%)</b>	<b>Stability (%)</b>	<b>Decline (%)</b>	<b>Pearson Chi-Square</b>	<b>Sig.</b>
<b>Price ranked the 1<sup>st</sup></b>	17	35	48	20.824	0.053
<b>Price ranked the 2<sup>nd</sup></b>	18	33	48		
<b>Price ranked the 3<sup>rd</sup></b>	25	44	31		
<b>Store ambience ranked 5<sup>th</sup></b>	15	32	53	26.759	0.021
<b>Store ambience ranked 6<sup>th</sup></b>	25	35	40		
<b>Store ambience ranked 7<sup>th</sup></b>	25	31	43		

Clothing retailers that indicated a decline in their turnover perceived competitive activities in terms of lower price, discounts and sales to be more frequent and important than the retailers that experienced a growth of turnover. On the other hand, clothing retailers with a turnover decline considered competitive activities of clothing retailers associated with in-store ambience to be significantly less frequent and important in comparison to the retailers that stated a growth.

### **5.2 Clothing retailers' perceptions of changes in competition in the period of economic crisis in the Czech Republic**

This part of the study explores the impact of different types of competition, i.e. intra-institutional (competition among the same type of retail formats), inter-institutional (competition between different retail formats), domestic (Czech) and foreign (foreign retailers operating in the Czech market) competition on retail turnover and activities in the period of economic crisis. It describes changes in competitive behaviour in clothing retailing as perceived by clothing retailers as well as responses of clothing retailers to competitive changes. The impact of competition was evaluated using a five point scale where 1 meant very weak (almost no) competition and 5 meant very strong competition.

Approximately three quarters of interviewed clothing retailers in the Czech Republic stated that intra-institutional competition (competition among the same types of retailers) and inter-institutional competition (competition among different types of clothing retailers) had influenced the performance of their companies in the period of the economic crisis considerably. In terms of the Czech and foreign competitors, the Czech competition was perceived to have slightly higher impact on company performance.

The extent of the impact of competition on clothing retailing as perceived by different types (retail formats) of clothing retailers is shown in the table 3.

Tab. 3 - The impact of competition on company performance in clothing retailing as perceived by different retail formats

Retail format	Competition							
	Intra-institutional		Inter-institutional		Domestic (Czech)		Foreign	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
<b>DS, hypermarket</b>	3.55	<b>1</b>	3.06	<b>3</b>	3.00	<b>4</b>	3.35	<b>2</b>
<b>Mid-range store</b>	3.06	<b>3</b>	3.19	<b>1</b>	2.65	<b>4</b>	3.11	<b>2</b>
<b>Boutique</b>	3.11	<b>1</b>	2.89	<b>3</b>	2.93	<b>2</b>	2.51	<b>4</b>
<b>Discount store</b>	3.72	<b>1</b>	3.23	<b>2</b>	3.08	<b>4</b>	3.14	<b>3</b>
<b>Second hand store</b>	3.19	<b>1</b>	2.69	<b>3</b>	2.81	<b>2</b>	2.44	<b>4</b>
<b>Total</b>	3.30	<b>1</b>	3.08	<b>2</b>	2.89	<b>4</b>	2.93	<b>3</b>
Test characteristics	6.151		2.448		3.014		6.003	
Asym. significance	0.000		0.046		0.018		0.000	

**Legend:** DS .... Department store  
1 ..... Very small impact on changes in clothing retailing (weak competition)  
5 ..... Very high impact on changes in clothing retailing (strong competition)

Rank of competition by their impact on company performance in clothing retailing as perceived by different retail formats of clothing retailers:

1 .... The highest impact on changes in clothing retailing  
4..... The lowest impact on changes in clothing retailing

Most retail formats (department stores and hypermarkets, boutiques, discount stores and second hand stores) perceived intra-institutional competition (competition from the same formats) to have the highest impact on company performance in clothing retailing. Mid-range stores perceived themselves to be threatened by inter-institutional competition – competition from other retail formats.

The finding of the one-way ANOVA test shows significant differences in retailers' perceptions of competition and its impact on their turnover. Discount stores, hypermarkets and department stores considered competition from the same retail formats significantly more threatening than from the other ones. Discount stores, hypermarkets and department stores felt to be influenced by competition from other retail formats, and by the domestic and foreign competition to a greater extent than other retailers. Boutiques and second hand stores apprehend themselves as rather differentiated retail institutions that were influenced mainly by the same type of Czech clothing retailers. The biggest competitive threat that they perceived was from the clothing retailers of the same retail format.

As perceived by retailers, company performance of clothing retailers was influenced mainly by competition among the same types of retail institutions. Significantly greater impact ( $F=4.713$ ,  $p=0.001$ ) of this type of competition was perceived by retailers in the largest towns with more than 100,000 inhabitants.

The research also attempted to explore the type of competitive behaviour of clothing retailers in the Czech Republic throughout the period of economic crisis. The most frequent changes in

competition as well as competitive responses of clothing retailers to these changes in competitive practices were examined in more detailed way. In both cases respondents were asked to choose and rank factors from the most frequent/important (ranked 1) to the least frequent/important (ranked 7) or add other factors.

The rankings for the four most frequent competitive behaviour that clothing retailers faced in the market are shown in the table 4.

Tab. 4 The most frequent competitive activities in clothing retailing as ranked by clothing retailers

Competitive activities	Ranked (%)				
	1st	2nd	3rd	4th	Top 4 rankings
<b>Lower prices, discounts, sales</b>	45	21	11	10	86
<b>Wider assortment, more brands</b>	14	22	22	17	75
<b>More advertising, promotion</b>	11	20	17	15	63
<b>More competitors</b>	13	16	17	15	61
<b>Services</b>	6	10	18	20	55
<b>Greater concern for customer satisfaction</b>	6	7	9	16	38
<b>More pleasant in-store ambience, staff</b>	5	5	6	5	21

*Legend:* 1 ... the most frequent competitive behaviour  
7 ... the least frequent competitive behaviour

Lower prices and wider assortment were ranked as the most frequent type of competitive behaviour of clothing retailers in the economic crisis. About 86 percent of the interviewed clothing retailers ranked lower competitive prices on the first four the most frequent positions of retailers' competitive behaviour. Similarly, approximately 75 percent of clothing retailers ranked wide assortment and more brands on the first four the most frequent positions of retailers' competitive behaviour.

The least frequent competitive activities used by clothing retailers in the period of economic crisis were services, marketing activities focused on greater concern for customer satisfaction, more pleasant in-store ambience and personnel.

Changes in the competitive behaviour of clothing retailers were also analyzed by perceptions of different types of clothing retailers. The aim was to explore how different retail formats competed in the market and what competitive activities they considered to be the factors that influenced their businesses to the greatest extent. The means of competitive activities, ranked from the most often occurred (signed 1) to seldom occurred (signed 7), for each type of interviewed clothing retailer are presented in the table 5 below.



Tab. 5 - The most frequent competitive activities as ranked by different retail formats

Competitive behaviour	Retail format									
	DS, HPM		Mid-range store		Boutique		Discount store		Second hand store	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
<b>More competitors</b>	3.66	4	4.08	4	4.09	4	4.19	5	3.40	3
<b>Wider assortment, more brands</b>	3.47	3	3.31	2	3.35	2	3.55	2	3.07	2
<b>Lower prices, discounts, sales</b>	2.50	1	2.55	1	2.16	1	2.32	1	2.80	1
<b>Services</b>	4.33	5	4.17	5	4.20	5	3.87	4	4.40	5
<b>More advertising, promotion</b>	3.43	2	3.87	3	3.93	3	3.65	3	3.93	4
<b>Concern for customer satisfaction</b>	4.86	6	4.61	6	4.73	6	4.94	6	5.67	7
<b>More pleasant in-store ambience, staff</b>	5.87	7	5.43	7	5.58	7	5.55	7	5.59	6

*Legend: DS ... Department store, HPM ... Hypermarket*

*1 ..... The most frequent way of competitive behaviour*

*7 ..... Infrequent way of competitive behaviour*

*Rank of competitive behaviour by its frequency as perceived by different types of clothing retailers:*

*1 ..... The most frequent way of competitive behaviour*

*7 ..... Infrequent way of competitive behaviour*

It is apparent that the price was the factor that played an important role in competitive strategies and company performance of all five formats of clothing retailing. Clothing retailers perceived wider assortment and more advertising and promotional activities of their competitors as the next most frequently used activities. Less attention was certainly devoted to competitive strife by services, greater concern for customer satisfaction, in-store ambience and personnel.

The significance of differences in perception of competitive activities among different retail formats was examined by Pearson Chi-Square test. The results show that statistically significant differences in perception of competitive activities by the selected retail formats were found in lower prices and discounts (Chi-Square=44.816, p=0.006) and retailer's concern for customer satisfaction (Chi-Square=41.707, p=0.046).

Lower prices and discounts were competitive activities perceived to appear in the market more often by boutiques. Second hand stores, mid-range stores, department stores and hypermarkets also perceived lower prices and discounts to be the competitive strategy most often used by retailers, however to a significantly lower extent than boutiques.

Retailers' concern for customer satisfaction was perceived to be less often used activity in general. Nevertheless, mid-range stores and boutiques perceived marketing activities of their competitors oriented on greater customer satisfaction to be more frequent than other retail formats.

Significant differences in retailers' perceptions of competitive activities in terms of lower prices and discounts were found among clothing retailers in towns by population size (Pearson Chi-Square=36.986, p=0.044). Stronger price competition was perceived by retailers in smaller towns. Clothing retailers in towns up to 10,000 inhabitants perceived competitive activities associated with low price and discounts significantly more important in their retail operations than retailers in larger towns.

Significantly different competitive behaviour also appeared between small independent clothing retailers and multiple clothing retailers in terms of advertising and promotion (Chi-Square=17.537, p=0.007). Multiple retailers were aware of competitive threats from advertising and promotion to be more frequent rather than small independents. The perception of other competitive activities did not vary significantly in towns with a different size of population and between small independent and multiple clothing retailers. However, clothing retailers in smaller towns (up to 50,000 inhabitants) evaluated competitive activities in terms of increasing number of competitors, their wide assortments and low prices to be more intensive than the activities of clothing retailers in large towns. On the other hand, clothing retailers in larger towns (over 50,000 inhabitants) evaluated competitive activities associated with services, advertising, concern for consumer satisfaction and pleasant in-store ambience as a whole (expressed by the total means) as more intensive.

To explore the impact of competitive activities on changes in company performance of clothing retailers, the responses of clothing retailers to competition in the market were examined as well. The responses of clothing retailers to the changing competitive practices are shown in the table 6.

Tab. 6 - The Most Frequent Responses of Clothing Retailers to Competitive Activities in the Market

Retailers' responses to competition	Ranked (%)				
	1st	2nd	3rd	4th	Top 4 rankings
<b>Lower prices, discounts, sales</b>	47	17	10	8	82
<b>Wider assortment</b>	17	28	24	20	89
<b>Greater concern for consumer satisfaction</b>	18	16	17	22	72
<b>More services</b>	9	12	28	28	78
<b>More advertising, promotion</b>	8	22	12	15	57
<b>Extended opening hours</b>	1	4	8	8	21

**Legend:** 1 ... the most frequent competitive behaviour  
7 ... the least frequent competitive behaviour

Clothing retailers most frequently responded to changing competitive activities by lowering price (receiving 47 percent of the rankings in the first category). However, a greater concern for consumer satisfaction (18 percent of responses ranked in the first position) and a wider assortment (17 percent of the first rankings) was already apparent. Other activities concerning clothing retailers' responses to the changes in competition including more services (9 percent

of the first rankings), advertising and promotion (8 percent of the first rankings) were stated by clothing retailers as rarely used responses to competition in the market.

The responses of different types of clothing retailers to their competition are presented in the table 7.

Tab. 7 - The most frequent responses to competition by retail formats

Retailers' responses to competition	Retail format									
	DS, HPM		Mid-range store		Boutique		Discount store		Second hand store	
	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank	Mean	Rank
<b>Wider assortment</b>	2.76	2	2.62	2	2.98	3	2.76	2	2.13	1
<b>Services</b>	3.16	3	3.82	5	3.31	4	3.72	5	3.50	3
<b>Lower prices, discounts, sales</b>	2.52	1	2.07	1	2.62	1	1.97	1	2.94	2
<b>More advertising, promotion</b>	3.73	5	3.69	4	3.89	5	3.62	4	4.75	5
<b>Concern for consumer satisfaction</b>	3.20	4	3.62	3	2.96	2	3.52	3	3.87	4
<b>Extended opening hours</b>	5.43	6	5.18	6	5.38	6	5.45	6	5.28	6

*Legend: DS ... Department store, HPM ... Hypermarket*

*1 ..... The most frequent way of response to competition*

*6 ..... Infrequent way of response to competition*

*Rank of competitive behaviour by its frequency as perceived by different types of clothing retailers:*

*1 ..... The most frequent way of response to competition*

*6 ..... Infrequent way of response to competition*

Based on the findings of the analysis of retailers' responses to the threat of competition, it was evident that retailers did not adopt simple reactions that would correspond to the strategy associated with a particular retail format. They responded with a combination of a few different activities instead. However, low price, discounts and sales were dominating activities for all selected retail formats except of second hand stores. Second hand stores focused on widening clothing assortment accompanied by low price and services. Boutiques responding to the economic situation by lower prices focused on greater concern for consumer satisfaction, wider assortment, and eventually services in their competitive strategies. Discount stores and mid-range stores responded to competitors' activities by lower prices as well as by widening assortment, greater concern for customer satisfaction and adding more advertising and promotion activities.

To identify differences in the reactions of clothing retailers to their competitors, the statistical significance of differences in retailers' responses to competitive activities was examined by Pearson Chi-Square test.

Statistically significant differences in retailers' responses to competitive activities by retail formats were found only in retailers' approach to advertising (Pearson Chi-Square=33.725, p=0.028). Advertising and promotion were regarded to be more important for discount stores

and mid-range stores, whereas boutiques and second-hand stores represented the opposite end of retailers that used promotion activities to a lower extent.

When analyzing responses of clothing retailers to changes in competitive activities in towns by their population, significant differences were identified in advertising (Pearson Chi-Square=33.255,  $p=0.032$ ) and retailer concern for customer satisfaction (Pearson Chi-Square=36.720,  $p=0.047$ ). Clothing retailers in towns with more than 100,000 inhabitants and in small towns up to 20,000 inhabitants responded to competition with a greater concern for consumer satisfaction than the retailers in other towns. Clothing retailers in large towns with more than 100,000 inhabitants used advertising and promotion to a greater extent than retailers in other towns. Differences in retailers' responses to competition in terms of advertising and promotion were also found between small independent and multiple clothing retailers (Pearson Chi-Square=41.789,  $p=0.000$ ). Multiple clothing retailers responded to competitive threats by more advertising and promotion to a greater extent than small independent retailers that focused more on widening assortment (Pearson Chi-Square=11.214,  $p=0.047$ ).

## **6 CONCLUSION**

The paper explores perceptions of clothing retailers towards the impact of competition on retail turnover and business activities in the period of economic crisis in the Czech Republic. It was found that competition had a considerable impact on most clothing retailers.

Evaluating the impact of competition and economic crisis on clothing retail companies, it was found that turnover of a large proportion of clothing retailers (40 percent) declined or remained the same (37 percent). Growth of turnover was declared by one quarter of interviewed retailers only. It is obvious that there were many factors that had contributed to this situation, be they external and/or internal to the business itself. Whereas the impact of the external factors (competition) on changes in retail turnover in the period of economic crisis was approved, the impact of internal factors in terms of managers' perception of competitive activities and their decision making process in responses to competitive treats were not approved. There were neither any statistically significant differences in clothing retailers responses to competitive activities, nor any correlations found between the responses and trends in turnover changes. The question that arises is whether responses to competitive activities and strategies of clothing retailers in economic crisis were appropriate to the market situation.

Competition among the same types of retail formats of clothing stores located in large towns (with more than 100,000 inhabitants) was considered to influence retail turnover to a greater extent than elsewhere. The strongest impact of competition on turnover was perceived by discount stores followed by hypermarkets and department stores. Other retail formats (boutiques, mid-rang stores and second hand stores) felt to be less influenced by competition. Lower prices, wider assortment, more advertising and promotion were competitive activities applied by clothing retailers most often. These activities generated similar responses from clothing retailers, although some retailers attempted to compete by increasing concern for customers' satisfaction (mainly in large towns and the smallest towns with less than 10,000 inhabitants).

Clothing retailers in smaller towns (up to 50,000 inhabitants) evaluated competitive activities in terms of increasing number of competitors, their wide assortments and low prices to be more intensive than the activities of clothing retailers in large towns. On the other hand, clothing retailers in larger towns (over 50,000 inhabitants) evaluated competitive activities associated with services, advertising, concern for consumer satisfaction and pleasant in-store

ambience as a whole (the total means) as more intensive. This can be seen as a tendency of clothing retailers in smaller towns to focus on functional aspects of their competitive strategy defined by the rational and economic attributes including the quality of the product and service, whereas clothing retailers in larger towns seemed to focus on affective aspects of their strategy that included emotional (relating to feelings and internal emotions) and social (related to the social impact of the purchase) aspects of the individuals.

The research found out that all examined retail formats of clothing stores in the economic crisis competed in the same way – by lower prices. For some reasons they ignored competitive strategies associated with their retail formats. Competition by price is common for discount and second hand stores that focus on low cost – low price strategy. However, boutiques and mid-range stores focusing on customer satisfaction through services and customer care to differentiate from others lowered their prices and used price as a competitive advantage, as well. For this reason, there were no statistically significant differences in responses to competitive activities in the market found among different retail formats. When exploring reactions of clothing retailers to a competitive threat, there was hardly any sign of avoiding direct competition by differentiating. Primarily, all retail formats adapted strategy of competitors in order to negate their competitive advantage, i.e. to compete by lower prices. Statistically significant differences in responses of clothing retailers to competition were found in the use of advertising and promotional activities. Discount stores, department stores and hypermarkets, mostly as multiple retailers with higher turnover located in large towns used advertising and promotion to communicate their sales and low-price offers to customers to a greater extent than other clothing retailers.

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## **GOVERNMENT DEBT AND ECONOMIC GROWTH: A GRANGER CAUSALITY ANALYSIS OF PANEL DATA EVIDENCE**

*Sinh Vo The, Hieu Le Minh, Phung Tran Thi Phi*

### **Abstract**

This study examines the causal relationship between Economic Growth and Government Debt using a panel Granger causality test. The empirical results based on 159 countries show that the relationship between these two variables differs depending on the income cohort to which a country belongs. The findings also suggest that differences exist in the long run and short run causality patterns between growth and debt. In short term, the results reveal that there is unidirectional causality running from economic growth to public debt at all income levels. However, when we test the long run equilibrium relationship by VEC model, there are three distinct outcomes for each different income group. First, the model shows that an increase in government debt will lead to an acceleration in economic growth for low income countries. Moreover, Granger causality analysis for the middle income level investigates the long-run co-movements and interaction between growth and debt. While it explores the unpotential contribution growth-debt and vice versa in high income countries.

*Keywords: Government Debt, Economic Growth, Panel Data, Granger, Causality Test*

JEL Classification: C32, H30, H63, O40, O57

### **1 INTRODUCTION**

Sovereign debt has been shooting up as a grave consequence of the recent global financial crisis in 2008. This should not be surprising, given the experience of earlier severe financial crises (Reinhart and Rogoff, 2010). Sovereign debt crisis erupted and has been rigorously distressing many countries in the European Union (EU), threatening the charisma of the euro and even the EU itself. The contemporary public crisis with its epicenter in the euro area has forcefully revitalized the academic and policy discussions on the economic effects of government debt levels (Baum, Checherita-Westphal, and Rother, 2012).

Market concerns about fiscal volatility in defenseless countries may be increasing and spreading to other countries, raising the anxiety that high government debt may damage economic growth. Furthermore, the Maastricht Treaty (The treaty led to the creation of the euro) has distinctively pointed out government debt as major criteria. It was crucially mentioned in the Treaty that high debt levels could be inflationary and obstruct growth. In addition, most market economists have been concerned for a long time about the possibility that excessive government spending could badly impede growth and be inflationary (Taghavi, 2000).

Against this background, empirical studies have started to focus on possible correlations within the growth-debt nexus, with specific attention given to large public debt. However, the earlier researches of the relationship among all of two variables GDP and debt are extraordinarily rare. Until now there have been merely two researches, one of Reinhart and Rogoff (2010) and another one of Taghavi (2000), concentrating on this causality. Surprisingly, Taghavi (2000) was the only one at the time paying attention to the European zone, though it is a dynamic economic area and the current core of the sovereign debt crisis. His was the only study using the Vector Auto-regression Model (VAR) to check the debt-growth relationship. For this reason, it is suggested that more studies on this topic should be carried out.

The purpose of this paper is to figure out some additional empirical evidences of the relationship among gross domestic product growth per capita (GDP), and gross government debt (DEBT) based on the 15-year period from 2000 to 2014. The 159-country sample was divided into 3 groups consisting of high income, middle income and low income countries, of which many are presently confronted by

government and financial crises. The stationarity of GDP and government debt were tested by Augmented Dickey–Fuller test (ADF test) for unit root hypothesis. The causal relationship between GDP and government debt was later investigated by VAR ( Vector autoregression model, VECM (Vector error Correlation) model and Granger causality testing.

### **1.1 Research objectives and contributions**

According to the research background and motivation mentioned earlier, the major contribution of this paper is to examine the causal relationship between economic growth and government debt since there have been few studies conducted under the same framework in these two advance economy areas. The following are the research objectives of this study. First, we study the causality relationship between GDP and government in 159 countries. Second, we classify levels of countries in High, Middle and Low income and compare the relationship between GDP and government.

As mentioned above, the preceding researches usually focused on the marginal effect between pairs of variables instead of three. Studies on the correlation among all two variables GDP and debt are very rare with barely two researches, one of Reinhart and Rogoff (2010) and another one of Taghavi (2000). Furthermore, Taghavi (2000), was the only one focusing on the European zone, and the only one using the VAR and VEAM methodology to examine the causality. Although VAR and VEAM methodology was applied in this study, it was pure VAR Granger Causality, which is different from pair-wise VAR and VEAM Granger Causality exploited in Taghavi (2000). Therefore, this paper is the only one to discuss both pure VAR and VEAM Granger Causality of GDP and debt in 159 countries. Moreover, this is also the first paper using panel data of 159 countries in over the world with dividing into three main groups: high, middle and low income.

### **1.2 Scope of the study and research procedure**

The time series data of two variables applied in this study cover historical data period from 2000 to 2014 on annual basis which conducted by the World Economic Outlook Database (International Monetary Fund) updated on December 2014 for Gross Domestic Product Growth per capital (US dollar, Current price,) and Gross Government Debt (Percent of GDP).

To analyze the data, time series methods are employed in this research include ADF unit root test, Johansen's multivariate co-integration test, Vector Auto-regression (VAR), Vector Error Correlation (VEC) and Granger Causality test.

## **2 LITERATURE REVIEW**

The empirical literature on the relationship between government debt and economic growth, despite its importance, is scarce (for example, (Schclarek, 2004); (Reinhart and Rogoff, 2010); (Kumar and Woo, 2010); (Checherita –Westphal and Rother, 2010, 2012), (Checherita-Westphal and Rother, 2012)).

Some literatures point out the uncertain relationship between government debt and GDP. Taghavi (2000) investigated whether debt hampers growth by using the hybrid techniques of co-integration and vector autoregressive model (VAR) employing data on real GDP growth and real debt ratio in the four economies (France, Italy, Germany, UK) throughout the period 1970-1997. The results implied that debt's effect on growth was ambiguous. They concluded that the short run impact of debt on growth diverged quite considerably from one country to another. While in France and UK a one percent debt increase led to nearly 0.4% growth in the short run, Germany and Italy experienced negative short run growth rates of around 0.65%. Similarly, as the cumulative figures suggested, even as Italy experienced a significant plummet in its growth of about 2.2%, the UK gained a significant improvement in growth of around 1.2%. On the other hand, the cumulative impact of debt on growth was inclined to support the view that could induce growth in each of the four countries and the EU in the longer term. It meant growth was slightly and insignificantly enhanced by changes in debt in the long run, but gave no clear result in the short run.



Schclarek (2004) inspected this topic in a broad view including the role of external debt in both emerging and advanced economies. No strong evidence of a statistically significant connection was found for a sample of 24 industrial countries with data averaged over seven 5-year periods between 1970 and 2002.

On the same token, some other findings specified the relationships of those two variables. The theoretical literature had tendency to point to a negative link between the public -to-GDP ratio and the steady-state growth rate of GDP (for instance, (Saint-Paul, 1992); (Aizenman, Kletzer, and Pinto, 2007)). Some growth models showed that a positive impact might be possible in the transition stage to steady-state, depending on the type of public goods financed out of (Aizenman et al., 2007) or up to certain limits when was used to finance productive public capital (Aschauer, 2000).

More obviously, there are a small number of researches using a non-linear impact approach. The empirical evidence on the relationship between government debt and economic growth have recently been pointing at the role of external debt in developing countries (for instance, (Smyth and Hsing, 1995), (Cohen, 1997), (Pattillo, Poirson, and Ricci, 2002), (Clements et al., 2003), (Schclarek, 2004)), while analyses across developed countries, particularly in the euro area, have been barely considered.

A recent study by Reinhart and Rogoff (2010) analyzed (through simple correlation statistics) the developments of public gross government debt and the long-term real GDP growth rate in a sample of 20 developed countries over a period spanning about two centuries (1790–2009), discovered that: (i) the correlation between government debt and long-term growth was fragile for /GDP ratios below a threshold of 90% of GDP and (ii) above this threshold, the median growth rate went down by one percent point and the average by considerably more (about 4 percentage points).

In another recent study, Kumar and Woo (2010) explored a linear inverse relationship between initial and subsequent growth in a sample of emerging and advanced economies, with the impact being somewhat smaller in the latter group. Nevertheless, they also uncover some evidence of nonlinearity. For example, only high levels of debt (above 90 percent of GDP) had a significant negative effect on growth for the sample of emerging and developed countries.

While the study of Checherita-Westphal and Rother (2012) was similar to Schclarek (2004) and (Kumar and Woo, 2010) by proposing the same empirical question, it differed in several respects. They focused only on the euro area countries, with an aim at providing probably more relevant evidences for the current sovereign debt crisis. In consequence, their implication were more readily applicable in the current circumstance given that euro area members presented specific policy characteristics not found in other advanced economies. They did not find a statistically significant linear impact of debt on growth. Their main focus was to investigate a non-linear impact of debt on growth and to determine this threshold endogenously. Last but not least, similar to previous research (Checherita-Westphal and Rother, 2010), Checherita and Rother (2012) again employed a quadratic functional form for the growth-debt estimation equation and checked the robustness of results with other polynomial functions. Besides, Checherita and Rother (2012) also analyzed empirically the channels through which public debt might potentially affect economic growth. For the euro area countries, they found some evidence that the channels through which public is likely to have a non-linear impact on economic growth rate were private saving, public investment and total factor productivity.

The papers worked by Chang and Chiang (2009) and Cecchetti et al. (2011) were both employed the threshold methodology for non-dynamic panels. Chang and Chiang (2009) analyzed a sample of 15 OECD countries and used yearly observations for the period 1990–2004. They found two threshold values in a regression of GDP per capita growth on the debt-to-GDP ratio. Using two control variables (unemployment and gross fixed capital formation), they indicated that debt-to-GDP threshold values of 32.3% and 66.25%. Specifically, the impact of the debt ratio was positive and significant in all three regimes, higher in the middle regime and lower in the two outer regimes. Cecchetti et al. (2011) applied a sample of 18 OECD countries for the period 1980–2010 and achieved a threshold for government debt at 85% of GDP. In contrast to Chang and Chiang (2009), they explored a negative impact on growth in the high regime.

The recent paper that relates more closely to the non-linear panel threshold methodology employed in Chang and Chiang (2009) and Cecchetti et al. (2011) is Baum et al. (2012). A dynamic threshold panel methodology was used to inspect the non-linear impact of public debt on GDP growth. Their empirical

results proposed that the short run impact of debt on GDP growth was positive and highly significant. But when it decreased to around zero, it lost significance beyond public debt-to-GDP ratios of around 67%. An additional to the high amount (above 95%) had a negative impact on economic activity.

The latest research, Afonso and Jalles (2012), utilized a panel of 155 countries to assess the linkage between growth and government debt. They confirmed a negative effect of the government ratio for the full sample; a quadratic term was not statistically significant; and for the OECD, the longer the average maturity, the higher the economic growth.

### 3 SAMPLE SELECTION, RESEARCH METHODOLOGY

#### 3.1 Sample selection

Based on popular patent databases is currently available, the time series data of two variables applied in this study cover historical statistics for the period from 2000 to 2014, conducted by the World Economic Outlook Database (International Monetary Fund) updated on December 2014 for Gross Domestic Product Growth per capital (US dollar, Current price,) and Gross Government Debt (Percent of GDP). The data length was determined based on the availability of the data values at the time of this research began. Both variables are conducted in annual basis and expressed in their natural logarithms to capture growth effects where GDP is measured in current U.S. dollars and DEBT is measured as a percentage of GDP.

#### 3.2 Research methodology

Unlike previous research that used panel data analysis, this study employs a more advanced Granger causality technique for fixed coefficient panels that was developed by Hurlin and Venet (2001) and Hurlin (2004). In order to examine the causal relationship between GDP and DEBT empirically, the Granger causality was used with two controlled variables to test for the impact of Gross Government Debt to Economic Growth and vice versa. Granger causality becomes a powerful tool to investigate the causal effect and functional relation from numerous temporal data (Luo, Ge, & Feng, 2011).

##### 3.2.1 Granger Causality test

We specified the following bi-variate vector error correlation and vector auto-regression system of order  $p$  for the pair of the two variables GDP and DEBT. Such VEC, VAR system were recommended as it provides more robust estimates. In this study, the following hypotheses are considered to examine relationship between Economic Growth and Government Debt by using Johansen test and Granger-causality test (Kim, Chen, & Jang, 2006):

$$GDP_t = \mu_1 + \sum_{i=1}^p \alpha_i GDP_{t-i} + \sum_{j=1}^q \beta_j DEBT_{t-j} + \varepsilon_{1t} \quad (1) \quad DEBT_t = \mu_2 + \sum_{k=1}^p \alpha_j GDP_{t-k} + \sum_{i=1}^q \beta_i DEBT_{t-i} + \varepsilon_{2t} \quad (2)$$

Where:  $\mu$  is intercept;  $t$  is time trend;  $\alpha$ ,  $\beta$  are coefficients;  $p, q$  is optimal lag length and  $\varepsilon_t$  is residual.

The null hypothesis of “DEBT does not Granger cause GDP (DEBT  $\neq$  >GDP)” was tested by using a standard Johansen test and Granger causality test of the Joint Hypothesis

$$H_0 : \beta_{11} = \beta_{21} = \dots = \beta_{p1} = 0$$

DEBT was said to cause GDP in the Granger sense if the above null hypothesis was rejected (that is, at least one of the  $\beta_j$  s for  $i = 1, \dots, p$  was statistically significant). Similarly, the null hypothesis of ‘GDP does not Granger cause DEBT (GDP  $\neq$  >DEBT)’ was tested by defining the null hypothesis.

$$H_0 : \alpha_{11} = \alpha_{21} = \dots = \alpha_{p1} = 0$$

GDP was said to cause DEBT in the Granger sense if the null hypothesis was rejected.

For the above hypotheses testing, it was assumed that the time series of GDP and DEBT involved in Equations (1) and (2) are stationary. If the time series are non-stationary, then we could use the stationary differenced form of the time series. Sims (1980) recommended against differencing, even if the time series are non-stationary. They argue that the goal of VAR and VEC analysis is to determine the interrelationships among the variables, not the parameter estimates (Enders, 1995). However, if the two time series GDP and DEBT are non-stationary (or contain a unit root), it is important to test whether they are co-integrated, as this affects the causality test results such as Engle and Granger (1987), Sims C. A (1994), Mosconi and Giannini (1992), Toda and Phillips (1993).

### 3.2.2 Co-integration test

Co-integration method has been developed by Granger (1969) as a tool in order to investigate a long-term relationships among variables. Later on, Engle and Granger (1987) formed a linear combination of two or more non-stationary series that might be stationary. When such a stationary linear combination endures, the series are regarded as be co-integrated and long-term relationships among them exist. Because of the existence of co-integration, although the series are originally independent in their motion, they cannot advance away from each other in the long run. Co-integration entails stationarity.

Engle and Granger (1987) explained that if co-integration exists between two variables in the long run, and then there must be either unidirectional or bi-directional Granger Causality between these two variables. As mentioned earlier, if they have one unit root and are co-integrated, then the bivariate VECM is specified and estimated. The Granger causality test is then conducted in the context of the VECM. If the two series have one unit root and are not co-integrated, then the bivariate VAR is specified and estimated.

### 3.2.3 Unit root test

We then formally tested co-integration of DEBT and GDP variables by employing the Engle and Granger (1987) procedure, which is based on testing for a unit root in the residual series of the estimated equilibrium relationship by employing the Dickey–Fuller test. It is recommended to examine the stationary of the variables. Stationary means that the mean and variance of the series are constant through time and the auto covariance of the series is not time varying. In this study, each series is tested for unit roots on the levels and first-order differences of them by using the Augmented Dickey-Fuller (ADF) tests presented by Dickey and Fuller (1979). Both the Akaike Information Criterion (AIC) and Schwartz Bayesian Criterion (SBC) are used to select appropriate an optimal lag lengths. The ADF test practices the following regression,

The Augmented Dickey-Fuller (ADF) (Dickey & Fuller, 1979) unit root tests are generally used in most researches.

According to Greene (2003), the hypothesis to be examined with unit root test is presented below:

$H_0$ : There is a unit root (data series are non-stationary)

$H_1$ : There is no unit root (data series are stationary)

Three different assumptions regarding stationarity of time series of the ADF test are examined as follows.

Model I: Trend and drift (Trend  $T$  and drift  $\mu$  are included in the model)

$$\Delta Y_t = \mu + \rho_0 Y_{t-1} + \eta T + \sum_{i=1}^p \rho_i \Delta Y_{t-i} + \varepsilon_t$$

Model II: Drift (Only a drift  $\mu$  is included in the model)

$$\Delta Y_t = \mu + \rho_0 Y_{t-1} + \sum_{i=1}^p \rho_i \Delta Y_{t-i} + \varepsilon_t$$

Model III: Neither trend nor drift (Neither trend  $T$  nor drift  $\mu$  are included in the model)

$$\Delta Y_t = \rho_0 Y_{t-1} + \sum_{i=1}^p \rho_i \Delta Y_{t-i} + \varepsilon_t$$

Where  $Y_t$  is the observation of the data series. In our case,  $Y_t$  may represent GDP or DEBT;  $\Delta Y_t$  is the first difference of the variable  $Y_t$ ;  $\mu$  is intercept;  $t$  is trend;  $\rho_0$  and  $\rho_t$  are coefficients;  $p$  is optimal lag length and  $\varepsilon_t$  is residual.

According to Enders (1995) unless the researcher knows the actual data generating operation, it is unclear whether it is most appropriate to include a constant term and a trend factor in the unit root process. It might seem reasonable to test the existence of a unit root in the series using the most general of the models.

### 3.2.4 Optimal lag length

A significant note about Granger causality test is that the results depend on the lag length. Thus, it is assumed that the lag length is long enough to reflect the effects of the past values of these time series on the current value. For robust estimation of VAR or VECM, optimal lag length is compulsory to capture autoregressive correlation in residuals of the estimated model (Schwert, 1987). The proper optimal lag length should be determined in order to avoid the error as much as possible since Lütkepohl, (1993) explained that over fitting (selecting a higher order lag length than the true lag length) causes an increase in the mean-square forecast errors as well as under fitting the lag length often generates auto correlated errors.

The number of lagged terms is chosen to ensure that the errors are uncorrelated. The number of lags is crucial. If not enough lags are included in the model, the model could contain serial correlation and it would provide biased estimators.

To determine the suitable optimum lag length: the Akaike's information criterion (AIC), Schwarz information criterion (SIC) or Bayesian Information Criterion (BIC), log-likelihood ratio test (LR) Criterion, and the Hannan-Quin information criterion (HQC) may be employed. However, two most popular methods are AIC and SIC. Their rationales are similar. VAR or VECM with the optimal lag length will make the estimated model have higher explanatory power than using the other lag lengths. The smallest AIC and SIC are can be applied for choosing the most efficient and accurate optimal lag length. Hence, this research determines optimum lag length by employing these two criteria AIC and SIC.

According to Greene(2003), AIC and SIC measures are presented as below:

$$AIC = \ln|\tilde{\Sigma}| + \frac{2}{T}$$

$$SIC = \ln|\tilde{\Sigma}| + \frac{\ln T}{T}$$

Where  $\tilde{\Sigma}$  : the estimated covariance matrix and T is is the number of parameters

## 4 EMPIRICAL RESULTS

### 4.1 Descriptive analysis

The most frequently adapted methodology is that which starts with a descriptive statistics of the two variables. So we will start this methodology by descriptive statistics (See Table.1). After that we pass to apply unit root analysis, cointegration analysis, causality analysis. The mean, standard deviation, minimum values and maximum values of the debt and GDP variables are given in Table (1) below:

Table 1 – Descriptive Statistic			
	High income	Middle Income	Low income
ln(GDP)			

Mean	9.81	7.76	6.23
Std. Deviation	0.85	0.76	0.85
Minimum	7.42	5.66	4.69
Maximum	11.66	9.26	10.27
ln(DEBT)			
Mean	3.64	3.70	4.05
Std. Deviation	0.71	0.78	0.71
Minimum	-0.60	0.88	2.48
Maximum	5.50	11.29	6.68

List of countries:

**High income:** Luxembourg, Norway, Qatar, Switzerland, Australia, Denmark, Sweden, Singapore, United States, Canada, Netherlands, Finland, Austria, Ireland, Belgium, Iceland, Kuwait, Germany, United Arab Emirates, France, New Zealand, Brunei Darussalam, United Kingdom, Japan, Hong Kong SAR, Israel, Italy, Spain, Bahrain, Saudi Arabia, Cyprus, The Bahamas, Slovenia, Malta, Greece, Oman, Portugal, Taiwan Province of China, Trinidad and Tobago, Equatorial Guinea, Czech Republic, Estonia, Slovak Republic, Uruguay, Chile, Lithuania, Latvia, Barbados, Seychelles, Argentina, Russia, Antigua and Barbuda, Poland, Hungary, Gabon, Brazil, Panama, Turkey, Libya, Mexico, Costa Rica, Malaysia, Lebanon, Suriname, Mauritius, Romania.

**Middle income:** Colombia, Azerbaijan, St. Lucia, Grenada, Venezuela, Bulgaria, Turkmenistan, Botswana, Dominica, China, Maldives, South Africa, St. Vincent and the Grenadines, Peru, Angola, Ecuador, Serbia, Dominican Republic, Thailand, Namibia, Algeria, Jordan, Jamaica, FYR Macedonia, Islamic Republic of Iran, Bosnia and Herzegovina, Belize, Fiji, Albania, Tunisia, Paraguay, Ukraine, El Salvador, Guyana, Indonesia, Guatemala, Swaziland, Republic of Congo, Sri Lanka, Armenia, Morocco, Nigeria, Vanuatu, Bolivia, Philippines, Bhutan, Honduras, Moldova, Papua New Guinea, Sudan, Vietnam, Uzbekistan, Nicaragua, Ghana, Zambia, Lao P.D.R., Djibouti, Yemen, India, Côte d'Ivoire, Cameroon.

**Low income:** Kenya, Kyrgyz Republic, Pakistan, Chad, Lesotho, Mauritania, Senegal, Tajikistan, Cambodia, Comoros, Haiti, Benin, Sierra Leone, Tanzania, Rwanda, Nepal, Mali, Togo, Uganda, Mozambique, Korea, Guinea, Eritrea, Ethiopia, Guinea-Bissau, Madagascar, Liberia, The Gambia, Niger, Democratic Republic of Congo, Central African Republic, Burundi.

Table 1 shows the descriptive statistics of GDP per capital and Gross Government or three different income groups. The statistic clearly indicates that GDP are substantially higher in high income countries than in middle income countries and low income countries. On the contrary, the mean of Gross Government Debt in countries has a tendency small in high income, larger in middle countries and the highest in low income countries.

#### 4.2 Non-stationary and Stationary Tests

We begin with examining the stationary properties of the variables employing the Augmented Dickey Fuller (ADF) unit root test determining the maximum order of integration of the variables. The findings that all variables have a different order of integration allowed us to directly test VEAM Granger causality in 159 countries because of same order of integration. Using significant at 10%; \*\*: significant at 5%; \*\*\*: significant at 1%;

Table 2 – Unit root test for panel data

Variables	GDP per capital (2000-2014)				Gross Government (2000-2014)			
	t- statistic with no intercep t	Critical (5%) with no intercept	t- statistic with intercep t	Critical (5%) with intercep t	t- statistic with no intercep t	Critical (5%) with no intercep t	t- statistic with intercep t	Critical (5%) with intercep t
Overall sample (N= 159)								
<i>Level</i>								
High income (N=66)	-0.13	-1.94	-2.56	-2.86	-1.56	-1.94	7.05	-2.86
Middle income level (N=61)	-0.48	-1.94	-2.01	-2.86	-1.50	-1.94	-8.89	-2.86
Low income (N= 32)	-0.48	-1.94	-4.98	-2.87	-0.51	-1.94	-7.35	-2.87
<i>First difference</i>								
High income (N=66)	-8.38	-1.94	-8.37	-2.86	-28.89	-1.94	-28.88	-2.86
Middle income level (N=61)	-9.50	-1.94	-9.50	-2.86	-27.70	-1.94	-27.69	-2.86
Low income (N= 32)	-21.56	-1.94	-21.54	-2.87	-6.90	-1.94	-6.89	-2.87

This table uses Augmented Dickey–Fuller test to analysis the stationary of time series. Null hypothesis is  $H_0$ : data has unit root with  $H_0$  indicate Gross Domestic Growth (GDP) or Gross Government Debt (DEBT). If the test statistic (p value) is less than the critical value, then the null hypothesis is rejected and no unit root is present. The time series are stationary. If  $H_0$  is non-significant, time series have unit root. Where notes \*, \*\*, \*\*\* show significant at 10%, 5% and 1% respectively.

Table 2 reports the results of the panel data unit root test by Dickey and Fuller (1979) for Gross Domestic Product per capita and Gross Government . The test is conducted for sub-income groups countries. The panel unit root of GDP per capita results indicate that all t-bar statistics successfully reject the null hypothesis of non-stationarity at level for being constant with intercept models. Moreover, the t-bar statistics of DEBT variables could be rejected at the 5% significance level when estimating level. Overall, the panel unit root test results reveal the absence of any unit root at the level. Hence, The panel data series are stationary at level or generated by an I(0) process.

### 4.3 Optimal lag length

A The unit root tests are sensitive to differences in the model lag structure. The optimal lag length model must be determined to capture autoregressive time series and a residual in the process of ADF unit root test (Schwert, 1987). In this paper, the optimal lag length test is a compulsory step to identify autoregressive time series and residuals for VAR Granger causality. Akaike information criterion (AIC), Schwarz information criterion (SC), Hannan-Quinn criterion (HQ), Final prediction error (FPE) and likelihood ratio test (LR) are frequently in use to decide the appropriate lag length. As mentioned above, only AIC and SIC criterion were employed to choose the optimal lag length in the study. The lowest value of AIC and SC will be preferred.

Table 3 – Optimal lag length for group of income countries

Countries	Lag	AIC	SC	HQ
High Income	0	5.19	5.2	5.19
	1	1.28	1.30*	1.29
	2	1.26*	1.31	1.28*
	3	1.27	1.34	1.29
	4	1.27	1.36	1.31
Middle Income	0	4.57	4.58	4.58
	1	2.17	2.2	2.18
	2	2.1	2.15*	2.12*
	3	2.10*	2.18	2.13

	4	2.11	2.2	2.14
	0	4.42	4.44	4.43
	1	1.32	1.36*	1.33*
<b>Low Income</b>	2	1.31*	1.4	1.35
	3	1.32	1.44	1.37
	4	1.32	1.48	1.38

\* indicates lag order selected by the criterion

AIC: Akaike's information criterion

SIC: Schwarz information criterion

HIQ: Hannan-Quin information criterion

Table 3 presents different results of optimal lag length for sub- income groups data sets.

In related to the high income countries, AIC has the smallest number at lag 2 equal to 1.26, while SIC has the smallest figure at lag 1 equal to 1.30. Moreover, due to the conflict of the results between AIC and SIC, further criterion to choose optimal lag length was taken into consideration. Result of SIC is chosen because it is more accurate than that from AIC based on the principal parsimony. In other words, lag 1 is the best choice for group of high income countries. As in the previous case, lag 2 and lag 1 are fixed to middle and low income groups respectively.

#### 4.4 Co-integration test

The second test of multivariate co-integration was applied to examine whether GDP and DEBT interact, or the long-run relationship between the GDP and DEBT was estimated of the same order one I(1). The multivariate co-integration test was employed with five different models. Specifically, when the series do not have co-integration and no long-run equilibrium relation among time series, Vector Auto-Regression (VAR) model is applied to measure Granger causality effect. On the contrary, if there is interrelation among the time series, a Vector Error Correlation model is used to examine Granger causality.

The procedures described above are only able to indicate whether or not the variables are co-integrated. We proceed to examine whether there exists any long-term equilibrium relationship between the variables under investigation. For this purpose, we resort to Pedroni; 1999, 2001, 2004; Kao, 1999) for co-integration tests, Two or more variables are said to be co-integrated, if the share a common trend and are linked with long-run relationship i.e exhibit the same stochastic trend.

In this paper, to strongly explore whether DEBT and GDP have co-integrated to test the long run relationship or not, the results in Table (4) below:

Table 4.1 – Co-integration Tests based on the Johansen Approach between GDP and DEBT in High income country

<b>Rank Test (Trace)</b>										
	<b>Model 1</b>		<b>Model 2</b>		<b>Model 3</b>		<b>Model 4</b>		<b>Model 5</b>	
	Trace	0.05	Trace	0.05	Trace	0.05	Trace	0.05	Trace	0.05
	Statistic	Critical Value	Statistic	Critical Value	Statistic	Critical Value	Statistic	Critical Value	Statistic	Critical Value
R=0	61.64	12.32	98.39	20.26	98.33	15.49	136.73	25.87	136.26	18.40
R≤1	0.06	4.13	36.24	9.16	36.18	3.84	50.99	12.52	50.52	3.84
<b>Rank Test (Maximum Eigenvalue)</b>										
	Max-Eigen	0.05	Max-Eigen	0.05	Max-Eigen	0.05	Max-Eigen	0.05	Max-Eigen	0.05
	Statistic	Critical Value	Statistic	Critical Value	Statistic	Critical Value	Statistic	Critical Value	Statistic	Critical Value
R=0	61.58	11.22	62.15	15.89	62.15	14.26	85.74	19.39	85.74	17.15
R≤1	0.06	4.13	36.24	9.16	36.18	3.84	50.99	12.52	50.52	3.84

Table 4.2 – Co-integration Tests based on the Johansen Approach between GDP and DEBT in Middle income country

<b>Rank Test (Trace)</b>										
	<b>Model 1</b>		<b>Model 2</b>		<b>Model 3</b>		<b>Model 4</b>		<b>Model 5</b>	
	Trace	0.05	Trace	0.05	Trace	0.05	Trace	0.05	Trace	0.05
	Statistic	Critical Value	Statistic	Critical Value	Statistic	Critical Value	Statistic	Critical Value	Statistic	Critical Value
R=0	78.19	12.32	127.45	20.26	127.43	15.49	235.00	25.87	234.98	18.40
R≤1	0.37	4.13	48.89	9.16	48.88	3.84	59.35	12.52	59.33	3.84
<b>Rank Test (Maximum Eigenvalue)</b>										
	Max-Eigen	0.05	Max-Eigen	0.05	Max-Eigen	0.05	Max-Eigen	0.05	Max-Eigen	0.05
	Statistic	Critical Value	Statistic	Critical Value	Statistic	Critical Value	Statistic	Critical Value	Statistic	Critical Value
R=0	77.82	11.22	78.55	15.89	78.55	14.26	175.65	19.39	175.65	17.15
R≤1	0.37	4.13	48.89	9.16	48.88	3.84	59.35	12.52	59.33	3.84

Table 4.3 – Co-integration Tests based on the Johansen Approach between GDP and DEBT in Low income country

<b>Rank Test (Trace)</b>										
	<b>Model 1</b>		<b>Model 2</b>		<b>Model 3</b>		<b>Model 4</b>		<b>Model 5</b>	
	Trace	0.05	Trace	0.05	Trace	0.05	Trace	0.05	Trace	0.05
	Statistic	Critical Value	Statistic	Critical Value	Statistic	Critical Value	Statistic	Critical Value	Statistic	Critical Value
R=0	42.83	12.32	68.00	20.26	67.98	15.49	73.17	25.87	72.78	18.40
R≤1	0.05	4.13	20.63	9.16	20.61	3.84	23.33	12.52	22.98	3.84
<b>Rank Test (Maximum Eigenvalue)</b>										
	Max-Eigen	0.05	Max-Eigen	0.05	Max-Eigen	0.05	Max-Eigen	0.05	Max-Eigen	0.05
	Statistic	Critical Value	Statistic	Critical Value	Statistic	Critical Value	Statistic	Critical Value	Statistic	Critical Value
R=0	42.78	11.22	47.37	15.89	47.37	14.26	49.84	19.39	49.80	17.15
R≤1	0.05	4.13	20.63	9.16	20.61	3.84	23.33	12.52	22.98	3.84

The results in Table(4.1, 4.2 and 4.3) show that the null hypothesis of no co-integration ( $r=0$ ) on both trace test and maximum eigenvalue test between DEBT and GDP can not be rejected at 5%, However, the null hypothesis of no co-integration ( $r\leq 1$ ) could be rejected at 5% meaning that there is only one co-integration vector.

#### 4.5 Granger causality testing procedure for causality

The causality between GDP and DEBT was enhanced by using the recently developed Granger causality testing procedure for causality (1988) for testing that if two series are co-integrated, and then there must be Granger-causation for at least one direction. Basically, the idea is that if changes in X precede changes in Y, then X could be a cause of Y or vice versa. Because the co-integration test indicates that the time series are co-integrated, the causality relationship can be controlled out. Hence, checking of the causal relationships as well as directions of the series could be done directly through Granger causality test. Because all of these variables are integrated of order  $I(0)$ , their levels are used in the Granger-causality test which requires the use of a stationary process.



In this paper, we wish to test granger causality between GDP and DEBT in both long run and short run in order to find out the differences results between each group of countries in short term and long term. Moreover, we carried out comparison among sub- groups.

Table 5 – Granger causality relationship between DEBT and GDP time series in sub-countries in short run

<b>Sub-income</b>	<b>Lag</b>	<b>Null Hypothesis</b>	<b>Probability</b>	<b>Conclusion (Hypothesis)</b>
High Income	1	GDP does not cause DEBT	0.0021	Reject
		DEBT does not cause GDP	0.1074	Accept
Middle Income	2	GDP does not cause DEBT	0.0159	Reject
		DEBT does not cause GDP	0.6965	Accept
Low Income	1	GDP does not cause DEBT	0.0784	Reject
		DEBT does not cause GDP	0.6425	Accept

This table illustrates Granger causality test between GDP and DEBT. The test is performed for the whole sample period. For each GDP measure, we first test the null hypothesis that GDP does not Granger cause the DEBT in short run. We report probability for each test. We choose optimal lag length 1 or 2 for each income group to prove strong causal relation results and denote a rejection of the null hypothesis with note: \*, \*\* and \*\*\* indicate statistical significance at 10%, 5% and 1% levels, respectively.

Consistent with our prediction and previous results, this table demonstrates the mutual impacts among the data variables of chosen countries. It is obvious that the result of Granger testing may be summarized as follows: There was a positive short run causality relationship running from GDP to DEBT in all groups of countries. It presents strong evidence to convince that movement of GDP will affect fluctuations of DEBT. The direction of causation also runs from GDP to DEBT in groups of high income, middle income and low income countries with p-value 0.0021, 0.0159 and 0.0784 respectively.

Table 6 – Granger causality relationship between DEBT and GDP time series in sub-countries in long run

<b>Sub-income</b>	<b>Lag</b>	<b>Null Hypothesis</b>	<b>Probability</b>	<b>Conclusion (Hypothesis)</b>
High Income	1	GDP does not cause DEBT	0.1257	Accept
		DEBT does not cause GDP	0.2123	Accept
Middle Income	2	GDP does not cause DEBT	0.011	Reject
		DEBT does not cause GDP	0.0397	Reject
Low Income	1	GDP does not cause DEBT	0.9347	Accept
		DEBT does not cause GDP	0.023	Reject

When we tested the Granger causality relationship between Economic growth and Government Debt in the long term, the result of Table 6 above indicated that there was no causality relationship running from either inflation or government debt to GDP in group of high income countries because p-values (0.13 and 0.21 respectively) were not significant and bigger than 10 percent. Importantly, in case of middle income countries, there was a bidirectional causality running from GDP to government debt since p-values for Granger causality tests were all significant under 5 percent (0.01 and 0.04 correspondingly). The above evidence also implies that government debt had an impact on economic growth in the low income countries with p-value lower than 5 percent.

It is clearly seen that the outcome case was not entirely satisfactory due to the fact that it has not absolutely supported the findings cited in the literature review. As mentioned above, the former studies verified the unidirectional relationship from debt to GDP, along with the bidirectional correlation between DEBT and GDP. However, the result only indicated a unidirectional relationship between DEBT and GDP. More to the point, it confirmed the reversed correlations running from GDP to DEBT as compared to those in the literature review. This might be a remarkable finding because there has yet been no proof of the existence of the influence of GDP on government debt. It could be put into consideration for further studies.

## 5 CONCLUSION

This study analyses empirically the causal relation between economic growth and debt in various sub-groups of countries which are based on the level of per-capita income of these countries in long run and short run over the 2000 – 2014.

Public debt has become an increasing serious problems for various countries in the world. It is due to unexamined public expenditures, bureaucracy, tax evasion and corruption. In order to classify whether government debt cause economic growth or vice versa, an auto regression model is developed in short run and a vector error correlation model is built in long run.

The results showed that there was at least one co-integration relationship among the variables in the VEC model. The evidence of multivariate co-integration testing results suggest that debt and economic growth are co-integrated. That is, these variables move together in the long run.

In the long term, we found that there were different results among the three income groups. High income countries' results implied that there was no causality relationship between economic growth and government debt as p-value significant a higher than 5 percent. On the contrary, the result of middle income countries is totally opposite. The increasing or decreasing trends of economic growth will strongly affect public debt and vice versa. We also found out the potential contribution of debt to growth.

In relation to short term analysis, the presence of a causal link between growth and debt has implications of great importance on development strategies for developing countries. Our findings provide evidence to support the growth-led debt hypothesis in all groups of countries.

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## **CLASSIFICATION OF BUSINESS MODELS**

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### **Abstract**

Business model shows and explains the logic and principles of the operation of a company. In business practice several dozen real operating models naturally evolved. The article describes these models and tries to create a primary typology, which would arrange the models in a systematic whole. The purpose of the typology is not only to clarify untidy set of models, but also to explain the principles of their operation, the sources of earnings and lay the foundation for their further innovative development.

*Keywords: business model, visualization of business models, typology of business models, products and solutions, resources and processes, business, communities, prices and payments, sources of earnings*

JEL Classification: M10, M21

## **1 INTRODUCTION**

The business model is a conceptual and economic notion of how the enterprise works and how it makes money. It is simplistic, but principal image of a company that contains resources and processes to convert them into value for the customer and way of appropriation of a part of produced value. Joan Magretta (Magretta, 2002) considers the business model in its deepest essence for a story that explains how business works. Good business model according to its view answers to the old question of the entrepreneur: Who is the customer? What the customer considers valuable and useful? How to make money in the given business? What is the economic logic that explains how to bring value to customers (benefit) at a reasonable cost? John Mullins and Randy Komisar (Mullins, Komisar, 2010) approach the topic specifically from the positions of business economics and the achievement of earnings. They think under the business model some structure of economic activities – a cash flowing in and out of the business for various purposes and timing, which dictates the acquisition or loss of money and the ability to offer attractive returns to investors. In short, the business model is the economic underpinning of the company in all its aspects. Mark Johnson, Clayton Christensen and Henning Kagerman (Johnson, Christensen, Kagerman, 2008) do not strive for too explicit definition of the business model, but they take a view that every successful company works according to an effective business model. If its essential parts are systematically identified, then the highest managers understand how the model addresses (offers) to meet the needs on a profitable basis, while it uses the key resources and key processes for this purpose. With this understanding they can assess whether the original model could be used to meet the radically different needs and what they would need to do to build a new model to make money on new opportunities.

## **2 REASONS FOR THE CREATION AND VISUALIZATION OF BUSINESS MODELS**

Drivers of growing interest in business models have been the emergence of the knowledge economy, the expansion of the Internet and electronic commerce, outsourcing and the off-shoring of many business activities and the global restructuring of financial services. A way

how companies are at this time earning money differs from industrial era, for which a volume of production was important and realization of value was relatively simple. Enterprise simply put its technology and intellectual property in a product that sold as a single item or a more complex whole. Driving forces such as globalization, deregulation and technological progress (and these are just some) have got their contribution to the development of this theme too. They deeply affect to the rules and usages of competing. The fastest growing companies in rapidly changing environment are those that use the structural changes to upgrade their business models to compete otherwise.

Visual and functional display of the business model is a good tool for a better understanding of company operation, it is also a means to formulate its purpose and the conditions of its existence. It is a transparent scheme which displays essential characteristics of the business on the small space. It provides a platform for the identification of vulnerabilities, therefore those with poor effectiveness and efficiency, while ensuring to look for exceptional elements and links. Visualization can be used for innovation, experimentation, stimulating creativity, creating hypotheses and variations of the business model.

Alexander Osterwalder and Yves Pigneur (Osterwalder, Pigneur, 2009, pp. 15-44), along with other collaborators have created a more complex concept of the business model (Fig. 1) called Canvas. At the core of this business model there are customers, customer value proposition, infrastructure and financial viability. It is the most comprehensive among the described models. It captures the economics side of the business through streams of incomes and expenditures, it records the places where costs are consumed and revenues are generated. It describes the value that a firm makes to the customer. Model, however, does not serve only for the description of business, but it is also an instrument for its innovation. The method used for imaging allows to study concrete businesses efficiently, to formulate specific business model and can be the basis for a more general typologies of real business models. The main parts of the model are shown in fig. 1.

Key partners	Key activities	Customer value propositions	Customer relationships	Customer segments
	Key resources		Channels	
Cost structure			Revenue streams	

Fig. 1 – Scheme of the business model Canvas. Source: Osterwalder, Pigneur, 2009

### **3 PURPOSE AND METHODS OF RESEARCH**

Imaging method and the actual, real models are not identical. Imaging method shows different real models in the same way. Imagining method is general, does not substitute a real model, because model is concrete, and it can be unique and original moreover. Goal of the paper is to create a systematic and ordered conception on varied types of business models. Typology of real business models is used for clear grouping of large volume of various models into a small number of types that will represent the predominant characteristics of the respective group. Typology will bring clarifying and organizing similar and different models, and thus provides orientation in a complex set of models, generalizes perception of models and explains their different functionality in particular groups. Classification of business models into groups (classes) and possibly subgroups is also the starting point for their innovation, or the formation of entirely new models.

Sources of knowledge about business models were the examples given in the books of professional literature and scientific journals. Another source of examples of models was professional journals and observation through questionnaire research, which has been carried out in 208 companies (Slávik, Bednár, 2014). Groundbreaking piece of work by Osterwalder a Pigneur (Osterwalder, Pigneur, 2010) deals with visualization instrument (Canvas) particularly, with structuring a model and its use in business practice. It introduces a few patterns of models, which illustrate visualization method, but they are not a systematic typology (unbundling business model, the long tail, multi-sided platforms, free as a business model, open business models). One the first books on business models by Debelak (Debelak, 2006) addresses to framing a business model. It shows some case studies, which are illustrations only again and they do not create a typology (case studies on retail businesses, service oriented, product oriented, personal service, distribution companies, Internet company). Afuah (Afuah, 2014) studies innovations of five kinds of business models (the long tail, crowdsourcing, social media, less-is-more innovations, disruptive technologies), but he does not look for and not formulate any links and connection among them. Kaplan (Kaplan, 2012) describes in very detail innovations of business models, but without picturing a system of models, which would be delineate innovation scope, or potentially white spaces for origin of new models. Casadesus-Masanell a Ricart (Cassadesus-Masanell, Ricart, 2011) write about features of the right business model (Is it aligned with company goals? Is it self-reinforcing? Is it robust?), but they do not try to make a clasification of models into some groups, they introduce an individual and generalizing feature of business model only. Johnson formulated three business models archetypes: solution shop, value-adding process business, facilitated network (Johnson, 2010, p. 84) a nineteen business model analogies (Johnson, 2010, p. 131), which are submitted in shape of list without classification and structure. Muehlhausen (Muehlhausen, 2014, p. 38) presents twenty four examples of business models, however without any attempt to systematize. Gassmann, Frankenberger, Csik (Gassmann, Frankenberger, Csik, 2014) provide with the largest so far published list of fifty five kinds of models, but again without studying similarities and effort to establish a transparent system, which would enable to understand better principal operation of models. It is a pity, because facto-graphic material is very large and models are described in detail enough. Concrete business models coming from quoted authors and their publications are enumerated only, they do not have a unifying content and formal base, although they are interesting and challenging. There are some lists only without explicit internal connections. After a thorough study of relevant literature there was not recorded any case of a coherent or partial typology, with the exception of business models tied exclusively to the Internet (Wirtz, Schilke, Ulrich, 2010).

For clustering models to groups there was used the concept of vertical integration, and then particularly the concept of aggregation of single models according to their main or dominant characters. Groups of models are distinguished by whether their centre of gravity and essence is the product (solution for the customer), resources and processes, trade activities, consumer communities and pricing together with methods of paying for the product (service). For each of groups there are identified financial-economic manifestations and consequences.

#### **4 CLASSIFICATION OF BUSINESS MODELS**

Multi-level typology describes business models that express the essence of enterprise and entrepreneurship since the inception of the primary product (raw materials) to the delivery of the final product or personal service to the final consumer. Typology follows the line of vertical integration with some relatively closed models at the stages of raw material mining and quarrying, manufacturing, trade, services.

The structure of the model will be determined by the extent of vertical integration, which is bounded by partial integration and full integration. The essence of the model in mining and quarrying of raw materials is to find a way to extract the raw material, re-elaborate it into the necessary purity, concentration and shape. Business model in production is mainly engaged in the decision to produce or buy the relevant part of the product, respectively decision on the extent of outsourcing or insourcing. The business model in trade industry determines a method of sale and delivery of the finished product, possibly modifying its size, weight and packaging to another trader or to the final consumer. The space between the finished product and the final consumer fills model of wholesale and retail. Business models of services represent a way how to compile and provide added value in the form of standardized (postal forwarding, voice mobile services), customized (warranty on software, a personal trainer in the fitness centre) and unique (legal action, surgery intervention) solution of customer needs.

Cluster typology divides and classifies real business models on the base of retaining cores (clusters), which are typical for models, dominant and distinguish them from other models. It was formed five groups (clusters) models. Target of study and clustering were real models described in the literature or identified in own research observations. These clusters were subsequently aligned with imaging method Canvas:

A. Products and/versus solutions. An equivalent in the Canvas method is the value that the firm provides to customers. Centre of the business model are products that act more as a way of solving customer problems, rather than as material things, or are necessarily composed of several related products that only jointly and in cooperation can satisfy customer needs, or were previously unavailable because, e. g. they were expensive and in small quantities inaccessible and become available only in the restricted range and large quantities. Examples include the following specific models:

**Sale of solutions** (Johnson, 2010, p.84): Experts use their skills in intuition and solving problems and then they recommend solutions. The model is extended at system integrators, law and corporate consulting firms and advertising agencies. It may be called a consultative model too. Instead of selling a complete product is sold benefit offered by the product. A simple example is: "If it is necessary to construct a hole, it is not necessary to buy a drill and drill machine. Another solution is to order the work of a skilled craftsman."

**Multi-component system/model with a basic product** (Wheelen, Hunger, 2008, p. 110): Gillette invented this classic model to sell razor holders at prices on the level of the break-even point, then that made money on the blade with a higher margin. Hewlett-Packard does the same with printers and print cartridges when it offers the cheap printer and expensive toner. The product is therefore a system, not just one product with one component providing the most profit. This model of a complementary product has got a reverse variant, which uses, for example iPod/iTunes and Amazon Kindle when offering expensive player and cheap music or a book.

Financial-economic manifestations and consequences of this type of model are:

- higher unit margin for more effective (quality) way of solving problems and needs of the customer,
- unit margin, which is the sum of the margins of complementary products. Due to functionally necessary complementariness it is possible to increase margins of complementary products to such an extent as it would not be possible with independently functioning product,
- revenues from products that were previously unavailable.

B. Resources and processes. Equivalents in the Canvas method are key activities, key resources. Centre of business model are the resources and processes that are for the purpose of their better functioning, production and implementation of value allocated out of the company (outsourcing), incorporated into company (insourcing), exchanged with other companies, used in comparison of competitors faster, mixed in a different sequence and other quality in the value chain structure, or disseminated (transferred) to another business. Representatives of this kind of models are, e.g.:

**Unbundling business model** (Osterwalder, Pigneur, 2009, p.46): The company is comprised of three very different types of business with different economic, competitive and cultural essence. Customer relationships, product innovation and infrastructure usually coexist in an enterprise, but it is ideally "untie" into separate entities in order to avoid conflicts or undesirable compromise. For example, the unbundling occurred in the gas industry, when the transit of gas has been separated from the wholesale and then the retail separated again from the wholesale and distribution of electricity, when the retail stores have been separated from the wholesale.

**Bundling business model** (Johnson, 2010, p.131): Simple and more complete shopping through grouping related products, for example a meal from fast food as a combination of a few simple meals and beverages in one package, offering music and player in one whole of iPod / iTunes.

Financial-economic manifestations and consequences of this type of model are:

- cost savings as a result of a suitable combination of external and internal location of the sources and processes, that is, where it is the lowest cost,
- exchange and replenish of resources through cooperation and alliance that enhance the performance and efficiency of the use of combined resources, and resources can be obtained and used without imposing own particularly long-term funds,
- cost savings due to faster turn of resources which is generated by faster processes,
- rapid processes that enable advance and market leadership and earning high profits in the early stages of industry development,
- cost savings due to the use of a single source for multiple uses.

C. Trade. Equivalents in the Canvas method are relationships with customers, distribution channels. Centre of the business model are intermediate platforms and networks mainly based on information and communication technologies and the Internet, variations of free sale and simplifying of sale and diversification of goods sold. Specific business models e.g.:

**Model of multi-sided platforms** (Osterwalder, Pigneur, 2009, p.76): Multilateral platform, or even multilateral markets are known for longer time, but they were extended until the advent of information technology. These are platforms that put together two or more clearly distinct but interdependent groups of customers. Credit cards, for example associate traders with cardholders, newspapers associate readers and purchasers of advertisement, computer operating systems combine hardware manufacturers, software developers and computer users. It is essential that the platform must attract and serve all the groups simultaneously in order to create value.

**Free as a business model** (Osterwalder, Pigneur, 2009, p.88): At least one major customer segment is able to continually draw benefit from free offers. Non-paying customers are financed another part of the business model or other customer segments. The onset of free offers is closely associated with very different economics of digital products and services.



Financial-economic manifestations and consequences of this type of model are:

- higher revenues on the electronic marketplace, which creates favourable conditions for matching supply and demand, simple and convenient process of trade exchange, the possibility of reconciling supply and demand for the rare goods and services,
- revenues that are obtained later after tying customer with free merchandise or service, or it is being paid for additional services and additional product, or it is not being paid for the benefit at all because income comes from sponging off-product, which is advertising most frequently,
- higher revenues is achieved by the discount retailing.

D. Communities. Equivalents in the Canvas method are key partners, customer segments. Centre of the business model are communities of consumers, the shareholders, contributors and users who by participating in the community or in a group receive a benefit that is otherwise unavailable. Some examples of community-based models are:

**Communities of owners:** Users possess a part of the product, but they may take many benefits of full ownership at a fraction of the total price, for example condominiums of recreation facilities whose owners in a reality buy a time share on the use of real estate, or NetJets, where owners can buy flying hours of a small jet airplane.

**Communities of users:** Granting access to the network, generating revenue through membership fees and advertising, for example Angie's List, which is a web portal that collects reliable information and recommendations on companies and medical specialists with high quality of services.

Financial-economic manifestations and consequences of this type of model are:

- revenue comes from payments for a share of the use or consumption of products from a customer who is a member of the community. If the customer was not a member of the community, or the product was not divided into shares, the revenue would not ever arise.
- reducing the unit cost of operation due to the increasing number of community members,
- community has greater bargaining power than individual (customer or company) and can
- negotiate lower purchase prices.

E. Prices and payments. Equivalents in the Canvas method are revenue streams, cost structure. Centre business model is a discrepancy between the time of sale and use of the product and payment for the product, payment of partial price, floating price, interconnected prices of several products, change or substitution of sources of income. Some good examples are the following models:

**Inverse payment cycle:** Generating high profits through maintaining low inventory and customers who pre-pay for a product or service to be delivered in the future, for example Amazon.

**Combined price lists:** Sale of service through multiple price lists that contain price ranges depend on the different degrees of usage and number of services purchased, for example Orange, Telecom, Telefonica O2.

Financial-economic manifestations and consequences of this type of model are:

- generation of high profits by maintaining low inventory and customers who pre-pay for a product or service to be delivered in the future, for example Amazon,
- charging subscription or deposit and gaining access to the product or service, for example journals, music service (Spotify). Cash ever comes up in a few month lead time before the delivery of benefits.
- products with high margins and high operating costs, which are available for customers to rent rather than to buy, for example complex and expensive technologies, luxury cars, aircraft engines (Rolls-Royce). Revenues are fees for leasing, without the possibility of rental, the revenues from the sale of finished products were lower.
- customer pays for services as measured by their actual use, for example phone calls, data transmission, consumption of electricity, water and gas, selling music to songs (iTunes). Minimum income can be achieved by fixed payments independent of actual consumption.
- sale of services through multiple price lists that contain price ranges dependent on the varying degrees of usage and number of services purchased, for example Orange, Telecom, Telefonica O2. Revenues can be increased by the disproportionate decrease of unit price and increase of total sale.
- diversification of revenue sources, for example traditional revenues source of banks are income interests. Due to changing markets, technologies and state regulation this source of revenue is weakening and banks are looking for new sources of revenue in fees for banking services. Currently, object of regulation become fees, and therefore banks are faced with the task of inventing a new business model. Similarly, manufacturing companies add to products more services, which are a source of additional revenue. Slovnaft (oil refinery) will adjust production to what makes the most of money (Haluza, 2012). This company will monitor the correlation between the prices of crude oil and petroleum products and production executives will receive instructions to rapidly change the assortment in favor of more attractive range of products.

## **5 DISCUSSION**

Functionality and diversity of **A. model** (Products and/versus solutions) reside in the product which features, specifications, design serve for satisfying customer needs. Meeting a need means to solve a task, problem, or situation in which a customer is found. If the available solutions are expensive, cumbersome, lengthy, uncomfortable or put various other unacceptable demands on a customer, then cheaper, easier, faster and convenient solution of the problem is the task for this kind of model. The product is matter-of-fact bearer of utility attributes only, and therefore matter-of-fact, material aspect is secondary if compared with primacy of utility attributes of the product, because product features solve customer problem only. The product may be in the process exceptional and usually expensive or vice versa ordinary and cheap, but it can provide the basic functionality of the same quality, for example. wristwatches. The product can be decomposed even into several parts and provides a solution only in coordination of all elements. It may not just be a notorious model of holder and razor, it is also a model of cheap cars and expensive spare parts and service work, the model of the teaching process and textbooks, iPod player and iTunes e-music store and the like. Another version of the disassembled product is a furniture of brand IKEA, which is assembled by a customer, because in fact a semi-finished product is being bought. Source of inventiveness in this model is far from being technological development only. New or higher value of the

product is achieved by a combination and variation of existing products or their introduction in new contexts, it is not only technical, but also entrepreneurial innovation. E.g. it is noteworthy, as a model of hotel has been gradually developed. The original accommodation capacity has been added with variable congressional background for up to 450 guests, a lot of sport, recreation and regeneration equipment from squash to own riding school and a number of related services. New apartments were added up, the car parks were extended (Trend No 12/2012).

**B. Model** (Resources and processes) is based on the addition or removal of resources and processes involved in the formation of the product. Creating such a combination of resources and processes that are the most effective for a given enterprise, although not sufficient to form the finished product, and are therefore supplemented from outside in the form of cooperation or exchange with other companies. Value chains arise with original and new combinations of resources or with a faster transformation of resources. Some types of resources can be scattered and used in other than the original business, so they are multiply valorised. Specific way of multi-use of resources is sponging on the resources of related business. E.g. model of tabloid is virtually dependent on the content of TV program. This newspaper does not almost open own themes about politics or criminal cases, relies on the flow of news about television formats and their performers, because writing about real causes and paparazziing are expensive. This TV model is a way how to work well and cheaply in a small market (Trend No 6/2012). Unsuitable combination of resources and processes is a common reason for failure of the model, because excellently designed product or solution for the customer are realized with the expensive resources, processes are lengthy or fault, possibly they fail to produce or provide the product or service with expected useful parameters for the accepted market price. An example, how to save resources while maintaining quality of service, is the booking internet portal, respectively call centre, in which twenty people were sitting in the room and handled orders. After the new arrangement people are doing the same thing from their houses, which are often hundreds of kilometers away from the headquarters of the company. Company saves on renting premises and wages corresponding conditions in the capital, and thus saves up to a quarter of the cost (Horváthová, 2012).

**C. Model** (Trade) was developed mainly under the influence of the internet, which enabled electronic commerce, the emergence of virtual market platforms and virtual auction halls. Fundamental change of business model was the emergence of a supermarket in the 30s of the last century and the next trade forms that developed this concept. Ingenuity of trade models residue on such a combination of supply and demand, which would be impossible to carry out without electronic support at all or only clumsily and without proper effects. Another powerful concept tries to attract customer through free or very cheap buying. It is believed that after creating addiction to the product the customer will be willing to pay for the next purchase, or pay for a higher version of the product. Model must substitute the losses (costs) for providing the free of charge products with takings of other products. Supermarket model and its other versions almost removed from stores sales personnel, retail chain Lidl uses standardized building according to a pattern of industrial buildings, goods are not unloaded on a shelf but mostly remains in pallets, so shop recalls a warehouse, an assortment is dominated by private or non-premium brands. Who does not mind, makes a cheaper purchase, though perhaps with less comfort than in other stores. The antipole of simplifying are the shopping malls, trade centres and shopping palaces, which have impressive architecture and a relaxed atmosphere. Synergistic effect is a consequence of the grouping of stores, bank branches, restaurant services, entertainment, fitness and wellness services in one building unit. Sometimes just only a partial change in the business model is enough and the difference from competitors is obvious.

**D. Model** (Communities) is formally similar to the market platforms from the previous model, but does not link the supply and demand as an intermediary platform. Earnings are from paying membership fees, for placing ads on the website of the community, for making available data on the community to other businesses or community does not earn, but provides members with a benefit from joint ownership which is adequate to their share of the common property. Community is autonomous and its activities are almost exclusively oriented inwards. Community is stronger, more powerful and more efficient than an individual. Community cooperates mainly internally, but can share or exchanges results of its work with other communities. Community but primarily brings some benefit to its members.

The purpose of the **E. model** (Price and payment) is not only to achieve a payment of the price, but make this process attractive, convenient and tailored to the needs and possibilities for both the customer and the provider of goods and services. Therefore, it does not address only the technical and organizational aspects of the process of determining the price and method of payment, but tries to find in this process a source of competitive advantage for the company and comfort for the customer as well. If the customer can not afford or is not convenient for him to pay the full price at once, he/she can pay in instalments, for rental, or for a specific consumption. For provider there are preferred models, if the customer pays the full price in advance, e. g. for travelling check, trip, tuition, rent, journal subscriptions, or at least an advance, e. g. for a material or provides a guarantee of payment, e. g. credit card, escrow deposits. For the customer there are attractive a deferred payment, especially deferred instalment during the initial use of the product, purchases at a discount and the possibility to achieve a lower price by choosing a variable product with less number or features or a set of products whose prices are linked, and therefore the price of product in the package of products is less than the price separately purchased product. If the customer is sufficiently attached to the company, model may focus on achieving higher payments for repeated purchases or expand revenue sources and therefore payments.

Typological boundedness does not mean easy mastering the business model. Significant differences between companies are already based in the selection of an appropriate business model. The business model is typically several times being varied until the right kind is found, and then there are significant differences in the speed, perfection and source possibilities for its implementation. Classification of business models into five classes highlights the essence and principled characteristics of business models and creates a transparent basis for the variations between them, which greatly extend the set of business models, with the proviso that the variations are internally logically and functionally consistent. The greatest variability and differentiation can be expected in models dominated by products/solutions and resources with processes. These two classes will be more resistant to imitation as models, which have the main topics of trade, communities, prices and payments, although fundamentally new models can be probably expected in these topics.

## **6 CONCLUSION**

Outlined typology is trying to present a coherent and consistent concept of the real business models in operation. Explains under what tenet these models work, what are their main characteristics, and what stage or type of business are generally suitable for. The proposed typology support to innovate business models, because class of models are also centres of innovation space from which they can spread more simple or more difficult variations and innovations based on the principle of operation of the respective class of models. With the support of visualization schemes, identified typology can become a platform for the

construction of new models or although just models that are consistent with the terms of the relevant business very well.

Financial and economic implications of business models undergo metamorphosis, which tracks the development of the essence of the business model since the inception of the product through the process of its realization, finding appropriate forms of sale, formation of exclusive communities of customers to sophisticated forms of product monetization. It is obvious that this is a process that progresses usually if its initial or any subsequent stage has got exhausted the revenues and innovations. Recapitulation of this sequence is as follows:

A. Model, in which the source of effect (earnings) is a new and improved product with better utility parameters or instead of the product there is sold a solution of problem, thus the utility parameters are not tied to a single product. Solution can be a joint use of a few products or a use of accompanying service increasing the full benefit of the product, or their combination. The result is more profit as a result of greater added value and revenues.

B. Model, in which the source of effect is economical source or efficient or faster process. Results are cost savings and higher returns.

C. Model, in which the source of the effect is the sale process of a product or service. Results are higher revenues from greater sale volume.

D. Model, in which the source of the effect is a community whose members pay for a share of the consumption or use of the product. The bigger community, the greater revenues and lower costs.

E. Model, in which the source of the effect are the price to stimulate the customer to a larger purchase, payment in advance (effect of time value of money), fees for rental, fixed payments regardless of consumption, sale of product and service according to currently the highest prices, which are stimulated by currently increasing demand. Results are higher revenues.

Models and their effects can be complementary. New product may require new ways of implementation (resources and processes), a new way of selling, the new environment for a sale (community) and new pricing and method of payment. Innovation of business model applied to the model Canvas can be carried out in one or more modules and the model is a result of a change of one type or a combination of several types of models. Similarly, effects occur in one module, or are formed by cluster, or at better case they are multiplication of several effects of several modules and models.

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## **THE HIDDEN COSTS OF “HOW” COMPANIES**

*Karel Slinták, Zuzana Jurigová*

### **Abstract**

The article deals with the issue of hidden costs that arise from the traditional management model. With respect to this article, two techniques were used, namely quantitative research and literature analysis. Consequently, from the research, it can be predicted that most companies prefer a management principle which inclines more towards efficiency than to performance. This principle is a part of the traditional management system through which the organizational culture of “HOW” is implemented. The relevance of this culture directly increases with increasing organizational size. Nowadays, most large organizations employ a management system that suppresses human potential. This system is based on rules, orders and controls. Thus, the hidden costs of this model are apathetic staff, lost revenues and mainly work-related stress. These factors, which cause a lack of participation in the workplace, similarly lead to poor performance capacity on the part of companies. They negatively affect the overall productivity of the economy and cause considerable social costs. Therefore, a new management system based on the WHY culture will be suggested as an alternative to the traditional management system. This system, which releases initiative, creativity and enthusiasm, was investigated in the Toyota and FAVI companies. Its aim is to eliminate the negative consequences of the traditional management model. The key features of this model are autonomy, freedom and responsibility, all three of which enrich the system with the ability to learn iteratively from one’s own mistakes.

*Keywords: bureaucracy, freedom, leadership, management innovation, opportunity costs, organization culture, performance.*

JEL Classification: M12, M14, L25

### **1 INTRODUCTION**

The stimulus for writing this article was a research report by Towers Perrin (2007-2008). The aim of this study was to conduct a survey looking at employee satisfaction in eighteen countries in the world. The researchers succeeded in addressing 90,000 respondents. Subsequently, extremely surprising conclusions arose from the research. Firstly, only one fifth of employees were fully engaged, in the sense that they were willing to fulfil work tasks beyond their duties. Secondly, two-fifths of employees were totally unengaged while committing work tasks. The remaining respondents were included in the category characterized by formal obedience.

The question which arose while reading this report was: what causes such low involvement of people in the workplace? Looking at the prevailing management ideology, where profit is the only or main priority, the answer was offered directly. Companies often deal with an inability to define actual performance and to identify the factors that affect it. Most managers do not realize the connection between involvement and performance. However, there are several studies which clearly demonstrate such a connection (see Towers Perrin 2006, 2007 - 2008; Sisodia, Wolfe and Sheth 2007).

This article will extend the knowledge already revealed in previous studies. Therefore, it will address the question of efficiency and performance and subsequently uncover the

management model which is taken as a consequence of the ideology of classical management. Moreover, it will attempt to map the hidden costs that this model involves. It will also propose an alternative model of management and governance that should mean a radical cultural change in the conception of the human in the workplace.

## 2 OBJECTIVES AND METHODS

The purpose of this article is to reveal the hidden costs of the management model known as the “HOW” company management model and to propose an alternative management model that will be able to eliminate these costs. This requires us to focus on the following research questions: 1. What does the concept of a “HOW” company mean? 2. What are the social and economic consequences of a “HOW” company? 3. Is there any alternative to a “HOW” company which is able to eliminate the hidden costs? The first two research questions fit into the area of performance measurement and management. The last research question deals with innovations in the management system. The effectiveness of the studied organizational model (called a “HOW” company) will be evaluated according to the performance capacity that companies can achieve by using rare resources (the intellectual and creative abilities of human beings).

The article will be supported by data gathered from quantitative research. Descriptive statistics will be used as the method for processing the relevant data. Table 1 shows the details of this research. In addition to own questionnaire survey, the authors will also refer to studies completed by other teams of authors; they will also evaluate case studies of two companies, namely Toyota and FAVI.

Tab. 1 – Characteristics of quantitative research. Source: own processing.

<b>Statistical sample:</b>	About 850 organizations were approached; fifty-six completed questionnaires were returned. The frequency of organizations by size: <ul style="list-style-type: none"> <li>• 20 % large enterprises, 43 % medium-sized enterprises, 21 % small enterprises, 16 % microenterprises.</li> <li>• The survey return was 6.6%.</li> </ul>
<b>Characteristics of the respondent:</b>	The respondents were employees at the level of middle and upper management.
<b>Evaluation and form processing:</b>	Data were organized into absolute and relative frequencies. Inductive statistics were not used because of the small size of the statistical sample and the low return of questionnaires.
<b>Data collection techniques:</b>	Interactive questionnaire

## 3 DISCUSSION

### 3.1 Efficiency and/or performance?

Most of today’s companies prefer the term “to manage” than “to lead”. As Fig.1 shows, the relationship between leadership and management is characterised by the ratio of 1:2 in favour of management. The fact that most companies prefer management is not strongly dependent on the size of the company (as Fig 1 shows, managing and leading only closely approach each other in micro-enterprises). Managing is related to the concept of management as a discipline strictly focused on the results of measurement and thus it is more oriented on the results needed for the evaluation of its own performance. In terms of time, management examines factors that are bounded by a short-term perspective. This characterizes the lower limit of performance. On the other hand, the principle of leadership focuses on areas that are typical for the upper limit of performance. It contributes to the formation of results that fit into a



long-term perspective. By using the words of Peter Drucker (2002) and Warren Bennis (1994), “to manage means to do things right, to lead means to do right things.”

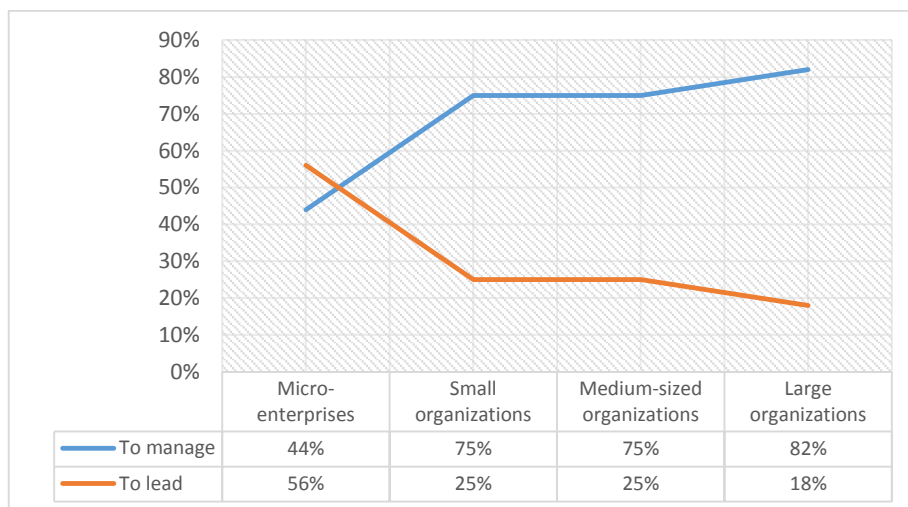


Fig. 1 – The attitude toward management and leadership. Source: own research (n = 56).

The performance of individuals, businesses, and society as a whole is directly affected by these two principles. Covey (2010) explains the importance of these two principles and their application in the context of a story about a group of people placed on a mysterious island. These people want to get to a particular destination. The planners attempt to create a plan and devise a strategy according to an old map. They measure time by a stopwatch and, with the help of organizers and supervisors, they watch over the ordinary workers using machetes in order to hack a way through the vegetation fast enough and in the desired direction. If they work according to the plan, they are rewarded appropriately; however, if not, they are punished accordingly. In this group, there are also people with leadership abilities. One of them climbs the tallest tree, looks around, and shouts: “We are on the wrong island!” The whole group is so busy with operative work that they do not hear him. The man continues to scream and therefore the managers (namely, the planners, organizers, supervisors) silence him since they are too engaged in their management procedures to listen. “Be silent,” they say. “We are still moving forward.” This metaphor does not involve only the diversity of the central principles of management but also touches on the principal foundation of performance, its concept and importance. Therefore, if the concept and meaning of performance change according to the approach to management, we can, according to Kouzes and Posner (2003), see two basic levels of performance in the meaning of the two rooted words, i.e. management and leadership. These two basic levels of performance are namely to manage things (in other words, to achieve the realization of things) and to get to certain point (or to focus).

### 3.2 “HOW” Culture: How to do things right

Most large companies are organized on the basis of bureaucracy. This assumption is confirmed by research, according to which eight out of ten large organizations operate on the basis of bureaucratic structures (see the graph below). In this context, Zobrist talks about “HOW” companies (Morel 2007). A “HOW” company is characterized as a bureaucratic institution in which people have to follow many regulations. The coherence of these companies is ensured by a dense network of commands and controls. The original assumption of this model is based on the unwillingness of people to work. Therefore, the aim of management is to tell people how to do their work (lead) and constantly check their activities

(manipulate). This model was created at a time when the world gave birth to the first modern business organization, i.e. in the middle of nineteenth century (Drucker 2002). For businesses at that time, this step meant an enormous increase in the productivity of manual workers and an enormous increase in their performance (Drucker 2001, 2002, 2004). Subsequently, this increase in performance economically transformed the whole of western society. According to Angus Madison (1991), from 1820 to 2001 gross income per capita in western countries increased about twenty times.

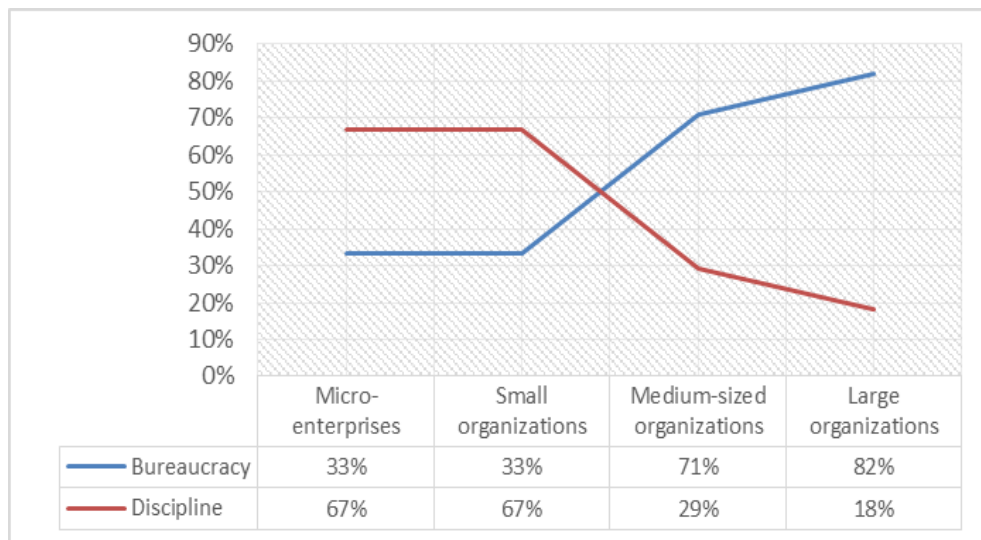


Fig. 2 – The prevailing organizational structure. Source: own research (n=56).

However, performance was primarily understood in terms of economic growth. A “HOW” company identifies itself with industrial age. According to this equation, profit is always in first place followed by people (Hamel 2013). Working conditions prevailing in “modern” companies at the height of the industrial revolution were very similar to the working conditions that prevail in manufacturing plants today – and not only in the developing world, with its “sweat shops” and child labour (Carney and Getz, 2013). In both cases, the same management model is implied. In this model, there are people who have the right to dictate (to give precedence) and people who have a duty to listen and obey (to conform).

### 3.3 Hidden costs of the “HOW” culture

Nowadays, the topic of managing for “three percent” is becoming an increasingly discussed problem (Carney and Getz, 2013). These managers should introduce new rules that limit undesirable behaviour in 3% of employees. However, these rules have a subsequent negative effect on the remaining 97% of employees. We cannot be surprised by the traditional manager’s thinking when talking for instance about the problem of theft in the workplace. In this case, the manager’s suggestion might be to introduce measures to search all employees even though the problem is related to only a very small minority. The hidden social costs of this precaution would be the dampening of the initiative and involvement of all employees who were affected by this decision. And the fact that this is not unusual is demonstrated in research by Towers Perrin (2007 - 2008), which revealed that only 21% of employees were truly engaged (see also Hamel 2013). Research by the same company two years later revealed that only about 14% of employees felt engaged in their work (Tower Perrin, 2006; Hamel and Breen 2008). In the case of involvement while meeting corporate goals, the initiative of employees is even weaker, as shown in research by Haris Interactive. S. Covey (2010) makes reference to this research in his book *The 8th Habit* (see the table below).

Tab. 2 The involvement of workers while meeting targets. Source: Covey (2010).

<b>Questionnaire survey (n = 23 000)</b>	<b>Frequency of positive answers</b>
Do employees realize their organizational goals with engaged passion?	9 %

Low interest among employees indubitably leads to lost income. These kinds of costs arise from low performance capacity – employees simply do not perform extra tasks. The level of commitment among employees does not only affect the internal operations of the company. As illustrated in one study, 73% of customers went to a competitor due to the insufficient engagement of the company or its employees (Carney and Getz, 2013). Thus, when looking at the ability of companies to make a profit through the prism of engagement, we can observe interesting results. According to one survey (Tower Perrin, 2007), it is proven that companies with involved employees can increase their profits in the long-term (in the monitored companies, the average operating profit increased by 3.7% over a period of 3 years). However, the companies with uninvolved employees had reduced profits (in the same period, profits decreased by an average of 2%).

Parkinson’s First Law, which affects all organizations, increases with the size of the organization. As companies increase in size, they not only have to deal with bureaucracy (see Fig.2) but, moreover, also need to reflect on two related problems. The first problem is called creeping inefficiency. For a small company, the ratio of managers to other employees is typically 1:10 (9% of employees are managers); one superordinate is in charge of 10 subordinates. For an organization with 10 000 employees, due to Parkinson’s First Law, the number of leading employees and managers may increase up to 1 250 employees and, therefore, the ratio of managers to other employees is reduced to 1:8 (11% of employees are managers). Supposing that the manager’s salary is three times higher than that of his subordinates, it can be quantified that the salaries of the managers represents 38% of the total wage costs. In the first example with small companies, the salaries of the managers represent 27% of total wages. The second problem is related to the oppressive atmosphere that “HOW” companies create. Our own research shows that, in general, the so-called motivation pressure system predominates in companies, a structure which significantly contributes to a culture of fear and mistrust (see table 3 and figure 3 below).

Tab. 3 – The prevailing motivation in practice: Source: own research (n = 56).

<b><i>How do you motivate your employees?</i></b>	<b><i>Relative frequency</i></b>
Force factors (these factors comprise the survival factor, the fear factor and the money factor)	61 %
Inspirational factors (these factors comprise the enjoyment of work, praise, and self-realization)	39 %

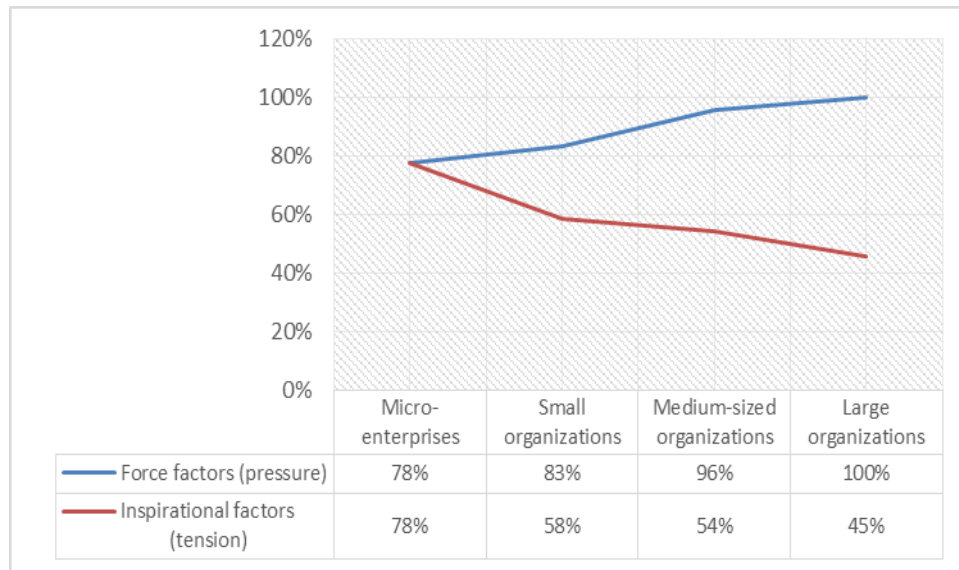


Fig. 3 – Factors of motivation in practice. Source: own research (n = 56).

The result of this atmosphere is so-called work-related stress (Atkinson 2000; Cartwright and Cooper 1997; Cortina et al. 2001; Wojcik 2001). Stress is activated by so-called stressors that cause a feeling of physical and psychological threat. Stressors can be personal conflicts, unrealistic goals, psychological bullying (being mocked or isolated, for example), a feeling of injustice, or various forms of force motivation (see Neuman, 2004). Stress may also appear in situations in which employees lose control over their work. Work becomes even more stressful when employees do not have sufficient freedom and space to make their own decisions. A sense of hopelessness emerges afterwards. In most cases, growing emotional stress leads to the collapse of goals and corporate vision. However, work-related stress affects not only large organizations. It is an unintended consequence of the “HOW” organizational culture, which can be applied in any organization regardless of its size. This culture prefers obedience before initiative. It appreciates uniformity (and agreement) instead of originality (and disagreement). Animals react to stress by escaping. People react to it simply by avoiding other people or demanding situations that cause stress. Therefore, it can be assumed that apathy at work is influenced by stress. According to The National Institute for Occupational Safety and Health, 40% of US employees are subject to stress at work (comparison with the motivation survey is essential and its results are shown in the table below). In light of this, there exists a legitimate suspicion that work-related stress causes so-called civilization diseases such as headaches, anxiety, stomach cramps, loss of energy, and many others. Therefore, it is not surprising that stress at work is the reason for approximately 80% of visits to general practitioners (Carney and Gets, 2013). What is then the total cost of work-related stress to the economy? In the case of the UK, it is estimated that, due to stress, the economy loses 40 million working days per year and seven billion pounds spent on health care (Handy, 1999). According to Gallup research in 2006, unconcerned behaviour and disengagement caused by stress creates an annual loss of productivity to the US economy amounting to 328 billion dollars.

### 3.4 A new alternative: the “WHY” company

Work-related stress is the most important source of hidden costs with respect to the traditional management model. Not only companies but also individual states have to deal with it. According to the US Bureau of Labour Statistics, the annual costs associated with work-related stress are 10 000 dollars for each individual employee. The study of work-related stress is closely related to the subjective feeling of the loss of control over a certain situation.

So what does it actually mean in terms of the prevailing management system? “HOW” companies apply the technology of traditional management. It is based on the assumption that people are naturally lazy and do not want to work. Therefore, this model uses techniques that are intended to stimulate (activate) human beings to work. The backbones of this model are commands and controls that restrain the feeling of freedom (and responsibility). The “HOW” culture deliberately deprives its employees of the possibility to choose and thus increases the tendency of workers to experience stress. Companies that apply the traditional management model to the imaginary hierarchy of human capabilities, try to put an emphasis on obedience, diligence and intellect (see Fig. 4).

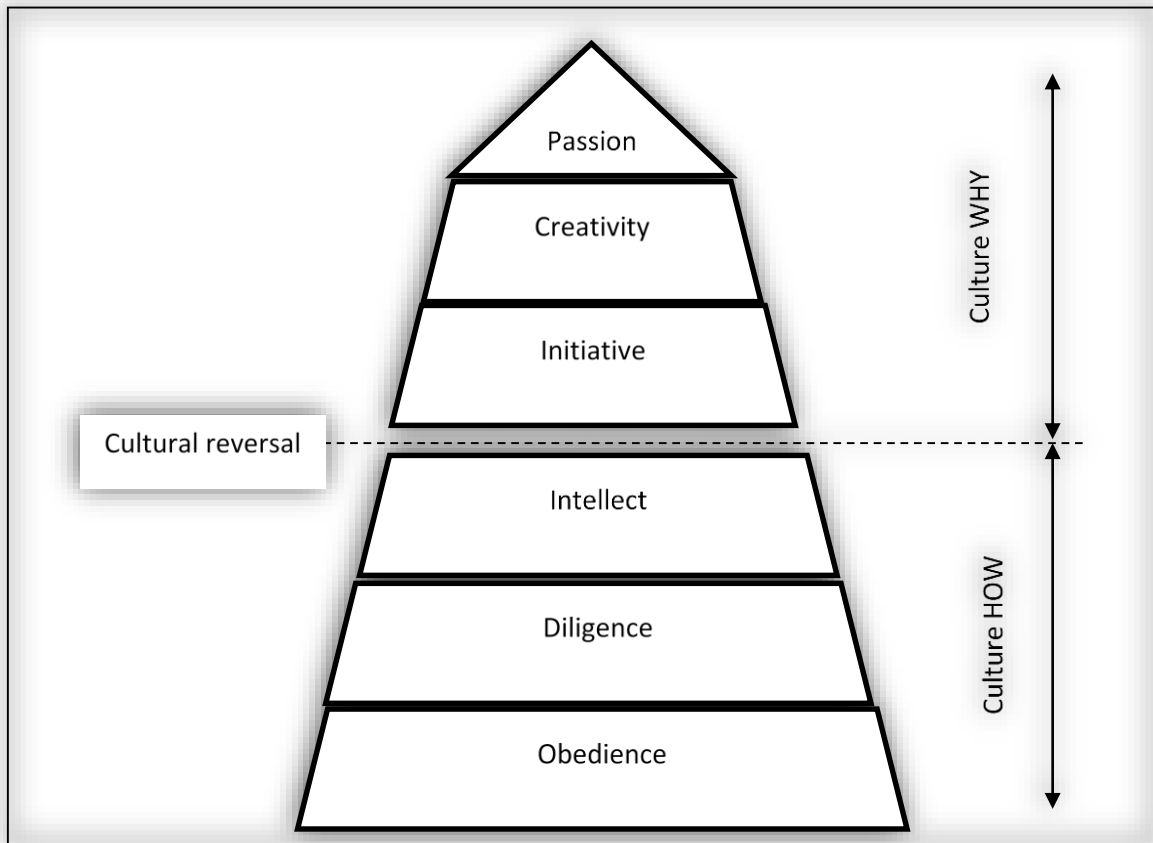


Fig. 4 – The human capabilities in context of culture Why. Source: own processing.

The hierarchy of human capabilities is similar to Maslow’s pyramid of needs. For human beings, higher order needs are combined with greater motivation and satisfaction. For companies, human abilities are assessed according to the benefits of individuals to the whole group (personal performance). In the workplace, people can present themselves by various abilities as indicated in Fig. 3. When analysing the hierarchy of human capabilities, one question arises and that is whether, in addition to the tradition model, an alternative model of governance can coexist. This alternative model is capable of placing human abilities above the level of obedience, diligence and intellect. In this imaginary model, words such as vanity or misappropriation would lose their meaning. Its aim is to humanize the organizational environment. Yet, an important question remains unanswered: are there any companies in the business environment that could become prototypes of companies applying the “WHY” culture?

## **Cultural reversal**

When searching for a prototype of the “WHY” company, we can start with a brief analysis of Toyota. This company, straddling the border of both cultures, has an undoubtedly bureaucratic structure. All processes are planned to the smallest detail. Each employee is governed by predefined working procedures in order to complete a given task in the most efficient way. Consequently, very strong standardization is obvious. The central principle of the company is efficiency, which is ensured by a management technique known as management through procedures. All processes must be measured and controlled. What makes this company different from other similarly bureaucratic companies is its approach to ordinary employees. These ordinary employees are governed by procedures which are not constructed by executives but by the employees themselves. They have only one aim, which is perfection. Everyone is governed by the procedure only until he/she discovers a new and better procedure. Therefore, procedures are not enforced by the head of a certain department. Meeting the goals of procedures is dependent on the employees themselves. In the case of Toyota, effectiveness as a central value is accomplished by autonomy. This autonomy is used by employees and teams in order to adjust their working environment. Toyota believes in people’s willingness to learn and this is the clear difference in contrast to other bureaucracies. Only through this idea is Toyota able to strengthen the authority of ordinary employees and create a cultural environment that values initiative.

An even more interesting example of the transition from the industrial model to a model of the WHY culture can be seen in FAVI. Originally it was a brass foundry which was typical of the industrial era until J.F. Zobrist became its director. After he joined the company he realized that a huge difference exists between the real economy (which includes opportunity costs) and the corporate economy (which works only with the explicit costs). He was inspired by an experience with one of his employees who wanted to change his old gloves for new ones. Zobrist found out that this exchange took place according to a clearly defined procedure. If a worker had damaged gloves, he had to show them to his manager, who would, in turn, furnish the worker with an order form for new gloves. Subsequently, the worker had to visit the store, where, on the basis of a correctly submitted application form, he received new gloves. The entire process of replacing old gloves with new ones took approximately 10 minutes. Zobrist calculated that the cost of operating the machine used by the worker was 100 dollars per hour. From this calculation, he determined that the changing of gloves resulted in opportunity costs of 17 dollars per hour. The gloves themselves cost less than 10 dollars! This “economy” persuaded Zobrist to re-evaluate FAVI’s original management philosophy. A new management philosophy was created, based on the idea that there are two types of firms: a “HOW” company and a “WHY” company. FAVI was an example of a “HOW” company. According to this model, it is usual to tell employees what to do, how long they should work, and when to go to work. Obviously, at FAVI, this behaviour had two consequences. Firstly, employees were evaluated according to all possible scales (number of hours worked, number of units produced, etc.) but not by the scale which is really important (customer satisfaction). Secondly, employees did not have the opportunity to influence their work routine. They were, figuratively speaking, bound by the chains of bureaucracy (a change had to be approved by a manager, who had to seek the approval of *his* manager, and so on, *ad absurdum*). By its transition from a “HOW” to a “WHY” company, FAVI had to learn to ask different questions from the ones they had been used to asking for decades. Thousands of HOW questions were replaced only by one question: WHY? The new emerging culture at FAVI no longer wanted to dictate to its employees about how they should do their work. It gave them greater freedom with the proviso that they had to learn to ask the question WHY? In the case of FAVI, asking the question WHY changed the overall focus of the company. As a result, its approach to

performance changed, too. By using the question WHY, all corporate efforts began to orientate toward one central point – the customer. This cultural change turned attention away from narrow specialization, strict qualification, and a particular department towards the performance of the whole. And the consequences of this change for the company were radical. The time clock was removed. The new management concept led its employees not to consume time but to produce results. According to the new model, the HR department was closed due to the fact that people were no longer seen as machines but as human beings with specific psychological and physiological needs. Production also underwent several changes. It was restructured into units that formed self-managed teams with approximately 24 employees (an organization that was similar to the self-organization of workshops applied in the Bat'a Shoe Company). Every production team was responsible for a specific customer and a tailored product. The attempt to change the management model led not only to the invigoration of autonomy in individual workplaces but mostly to the elimination of a formal hierarchy. Each team was able both to choose its own leader and to dismiss its own leader. In general, the transition to the new model has brought significant results. From a long-term perspective, the company has been able to reduce prices to its customers by about three percent per year. Over a period of twenty-five years, it has never experience delays in delivery. It has become the European leader in the production of shift forks for the automotive industry. The size of its market share is reflected in the fact that one half of cars produced in Europe have shift forks produced directly by FAVI. Finally, the company has introduced entirely new products manufactured from brass, which have been exported to China.

As evidently demonstrated by the experience of Toyota and FAVI, it is possible to create alternative management models in which the culture encourages initiative, creativity and passion in each employee. People engaged in these companies work in favour of the profit of their company beyond their work duties. This is so because these companies recognize the huge potential that is hidden in people. The cultural feature of this model is the belief that people together know more than the smartest person among them. And what is the purpose of this model? To manage as little as possible – in other words, to allow people to learn from their own mistakes.

#### **4 CONCLUSION**

The most serious consequences of the traditional “HOW” management model are the paralyzing of involvement, the loss of income, and work-related stress. These hidden costs are caused by one factor, namely the lack of employee involvement in the decision-making structures of organizations. “HOW” companies do not trust their own employees and are not willing to pass a large proportion of “management” responsibilities onto their shoulders. Consequently, this causes the suppression of the intellectual potential of companies. Therefore, most companies achieve low performance capacity. An alternative to this management model is a management system based on the “WHY” culture. In the Brazilian company SEMCO, this procedure is called participative management (Semler 2011). The principal value espoused by companies that begin to apply this model is freedom (and responsibility). In these companies, bureaucracy is replaced by a culture of discipline. Employees in this culture are encouraged to experiment (examples of companies with such a culture are Google, IDEO, SEMCO and others) and to build working relationships based on personal commitments. This latter feature is evident in companies such as Morning Star and W. L. Gore.

As demonstrated in several research projects (e.g. see Collins, 2008), the difference between good and great companies is related to the organizational ability to balance on the fine edge

between order (responsibility) and chaos (freedom). Overall, this means to build a culture based on personal responsibility in which people are given considerable freedom to realize their own ideas. To create a working environment in which workers are given freedom is not easy. It requires the ability of organizations to build a shared vision, to determine operating principles, and to define core values.

Looking further into the business environment, we can see that there exist many interesting companies that could become prototypes of the “WHY” company. Therefore, further research will be focused on the analysis of companies that apply the principles of trust, freedom and responsibility, these being the typical values of such a new and innovative management model.

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## **THE PRINCIPLES OF BIOTIC ORGANIZATION**

*Karel Slinták*

### **Abstract**

The article deals with creation of a model of biotic organization with the aim to measure the level of representation of biotic organizations in the economic environment. The model of biotic organization is created and based on a four-dimensional model. The basis of this model is to define organizations like living systems.

The model of biotic organization is formed by four principles, and these are amorphous structure, leadership, shared vision and service to its own environment. The existence of individual elements of biotic organization in practice was evaluated by means of a survey of fifty-six organizations within the Czech Republic. The research was divided into four areas, namely purpose of the existence, structure, alignment, and coherence. These areas correspond to the four basic principles of biotic organization. From the data obtained, it was found out that only two of these principles, shared vision and service, are applied by more than a third of organizations. Other principles are underrepresented. The majority of the firms surveyed are not organized on the basis of the amorphous structure and do not frequently use the principle of leadership.

There is only a five per cent representation of biotic organizations within the economic environment, which confirms the research hypothesis regarding a very low representation of this organizational form in the current economic environment. A low level of biotic principles representation was caused by conventional way of organizing mainly. This is based on a formal hierarchy, a pyramidal structure and traditional management that create an environment of command and control at the expense of creativity and commitment which can exist due to the biotic principle of leadership.

*Key Words: Adhocracy, Biological system, Leadership, Mechanistic system, Service to society, Shared vision.*

JEL Classification: M20, O30

## **1 INTRODUCTION**

The current perception and conception of organizations as social products of industrial society is based on two simultaneously applied theories. These theories are the theory of mechanistic systems and the theory of living systems. The aim of this article is to determine the principles of biotic organization. It is therefore necessary to focus on the theory of living systems. This concept is different from the traditional perception of an organization within the meaning of a mechanistic system. The reasons can be found in historical analysis.

From the mid-seventeenth century, the general worldview inclined to perceive the world as a mechanistic universe (Drucker, 2002). The essence of this worldview was based on mechanistic ideology. According to this ideology, all processes can be evaluated using analytical tools. In a mechanistic system, the whole is equal to the sum of the individual parts. For enterprise environments, this meant that companies were perceived as machines with different combinations of the factors of production, and clearly defined target behaviour. The traditional theory also introduced concepts for the more efficient administration of these

organizations. The language of managers focused on inputs and outputs, innovation, manufacturing, personnel, logistics, marketing, control devices, static planning, and profit as the only possible measures of performance. It was also assumed that organizations achieved higher performance only by increasing their size, which is an unquestionable fact if organizations are conceptualized as mechanistic systems. In line with this logic, it is true that larger inputs mean larger outputs, and what is larger is better. On the basis of these facts, a classic form of management arose, whose principles created a form of traditionally designed organization, which, according to its nature, could be described as a mechanistic organization.

The main principles of classical management have resulted in a form of mechanistic organization whose specific characteristics describe scientific article *The Principles of Mechanistic Organization* (Slinták, 2013). On the basis of historical analysis, the following principles were incorporated into the model of mechanistic organization: the division of labor, bureaucracy, command and control, and profit. The thesis of mechanistic organization was completed in 1922 by Max Weber (1978).

It took almost forty years for a critique of the concept of mechanistic organization to appear – this by the British theorists Burns and Stalker (1961). They criticized the rigidity and low adaptability of bureaucratic organizations. This critique was undoubtedly related to the increasing complexity of the external socio-economic environment. Influenced by the dynamic complexity of the business environment, Burns and Stalker started to look at enterprises as organic systems. Since then, however, the shift in the concept of the organization has reached a limit due to the enormous growth of the developed economies of the western world.

The return to the thesis of the organization as a living system was caused by the significant economic and social changes that occurred in the 1990s. At that time, it was already apparent that size cannot be an independent variable function of performance, as, at times when demand exceeds supply, enterprises cannot have the character of predictable machines in an environment that is close to biological complexity. In their work, many authors began to explore terms reflecting the area of biology, such as the immune system (Hammer, 2002)<sup>16</sup>; homeostasis (Senge, 2009); dynamic complexity (Forrester, 1987)<sup>9</sup>; cyclic systems and the circular economy (Senge, 2007, 2009); system archetypes (Senge 2009), the DNA of a company (Bateson, 1972; Hock, 2000)<sup>20</sup>; the soul of an enterprise (Handy, 1999); network structure (Kelly, 2007); synergy (Covey, 2010, 2013; Harung 2004; Senge, 2007, 2009); and collective intelligence (Hamel & Breen 2008; Hamel 2013). This change in terminology implies a gradual passing from the philosophy of natural sciences to the philosophy of the biological sciences (Sandow & Allen, 2005).

A more thorough exploration of the regularities of biological systems indicated that in these systems there was little dependency between inputs and outputs (e.g. in the context of business, the allocation of a greater number of staff to a task almost always leads to a situation in which these workers do less than they would have done in smaller numbers), because in biology size is always the result of features (Drucker, 1989). It was also discovered that in a biological system, the whole is something greater than just the sum of the parts. If we express it mathematically, this means that  $1 + 1$  is not two, but rather 4 or 5 or 20. New knowledge from the theory of living organisms has also led to a correction in the conception and perception of organizational size. The information revolution that began in the 1990s, prompted enterprises to address the central question of what the correct size for a task is. In the information era, size becomes a function, and instead of an independent variable it becomes a dependent variable (Drucker, 2002). The nature of the information even shows that the best size will be the smallest effective size (Drucker, 1989).

Defining a custom size, therefore, became important at the end of the last century, a major point in the existence of any enterprise. In thrall of biology, the correct size was transformed into a factor ensuring the efficient processing of information needed to ensure both the mission and performance. Therefore, this article will deal with the new requirements facing current organizations and examine the extent to which the organization has adapted to these requirements, which arise from fundamental changes in external environments.

## 2 METHODOLOGY AND OBJECTIVE

The article aims to create a model of biotic organization and to measure the extent of the principles of biotic organization in the practices of Czech companies. The result of these efforts will be the characterization of biotic organizations in the economic environment of the Czech Republic, based on verification of the following research question: “Is biotic organization in the population of organizations represented in more than 10% of cases?” The model of biotic organization, which is necessary to measure the extent of biotic organizations, will be based on an analysis of the theoretical bases of other authors. The procedure for creating a model of biotic organization is described in chapter 1.3.

### 2.1 Quantitative research

The occurrence of individual elements of biotic organization in operating practice was evaluated by means of a survey of fifty-six organizations operating in the Czech Republic. Data resulting from this quantitative research was processed in the form of descriptive statistics and then categorized into absolute and relative frequencies. Some data tables were converted into graphic form.

The basic parameters of the quantitative research – the details of the statistical sample, the characteristics of the respondents, the field of research, the character and evaluation of the data, and the data collection techniques – are summarized in the following table.

Tab. 1 – Basic parameters of quantitative research. Source: own.

<b>Statistical sample:</b>	About 850 organizations were approached; fifty-six completed questionnaires were returned. The frequency of organizations by size: <ul style="list-style-type: none"> <li>• 20 % large enterprises, 43 % Medium-sized enterprises, 21 % small enterprises, 16 % microenterprises.</li> <li>• The survey return was 6.6%.</li> </ul>
<b>Characteristics of the respondent:</b>	The respondents were employees at the level of middle and upper management.
<b>The field of research</b>	I. Purpose of the Organization, II. Structure, III. Empowerment, IV. Shared Vision
<b>Evaluation and form processing:</b>	Data were organized into absolute and relative frequencies. Inductive statistics were not used because of the small size of the statistical sample and the low return of questionnaires.
<b>Data collection techniques:</b>	Interactive questionnaire

### 2.2 Qualitative research

In addition to quantitative research, the principles of biotic organization was evaluated through qualitative research. For these reasons, selected principles of biotic organization will be explained in context of practical experiences of some companies. These companies were selected based on specific features of their management system.

List of these companies comprises following table.

Tab. 2 – List of companies investigated for the purpose of qualitative research. Source: own.

Specific features of management system	Surveyed firms
Culture of freedom	W.L. Gore, Sun Hydraulics, Semco, SOL, FAVI, IDEO
Unusual form of structure	Harley-Davidson, Semco, W. L. Gore, Visa
Limit of size (specific attractor)	Asea Brown Boveri, W. L. Gore, Google, Semco
Reciprocal obligation	W. L. Gore
Agreement of colleagues	Morning Star

### 2.3 Construction of the model

For the construction of the model of biotic organization, the four-dimensional model of an organization created by S. Covey was used (Covey, 2010). This model is based on the theory of a healthy organization and the motivation that originates from a holistic paradigm (Covey, 2010). The form of the four-dimensional model is shown in the following figure.

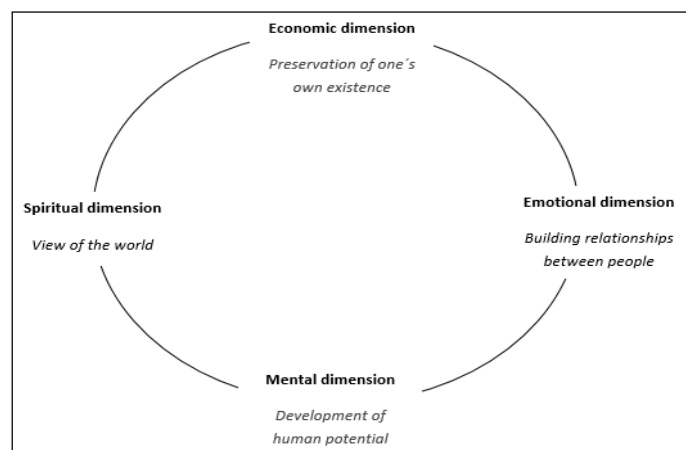


Fig. 1 - Four-dimensional organizational model. Source: own.

Each of these dimensions of the organizational model is defined by specific needs. The economic dimension (the body) lies in the creation of a suitably adapted structure that will be able to generate profit. The emotional dimension (the heart) touches passion and enthusiasm. The emotional dimension is thus linked with involvement and initiative. The mental dimension (the mind) reflects the need for innovation and growth. The spiritual dimension (the soul) represents a search for deeper meaning.

The four-dimensional model was chosen mainly for the reason that it takes into account the experiences of empirical studies (Collins, 2008; Nohria, Joyce & Roberson, 2003) which show that organizations achieve long-term results only if their business model (their ideology) takes into account the human dimensions in the context of the holistic paradigm, which are body, heart, mind and soul.

## 3 MODEL OF BIOTIC ORGANIZATION

The model of biotic organization arises from the technology of postmodern management, which takes into account changing environmental conditions, reflects new assumptions, and recognizes the principles of living systems rather than the principles of mechanistic systems. These principles include an amorphous structure (i.e. adhocracy), shared vision, leadership, and service (to its own environment). Each of these principles is based on natural law,

because all living systems are of a cyclical and self-regulating character. In natural communities there is often the phenomenon of collective intelligence (by analogy with human systems, it can be understood as a certain form of shared purpose observed, for example, in birds or fish); they are self-organized, which means that they are not controlled by others, but rather self-organized through their own unconscious instincts. Finally, each animal fulfills its specific task according to the environment in which it occurs. These principles are in some sense a response to the specific characteristics of the external environment, illustrated in the following figure.

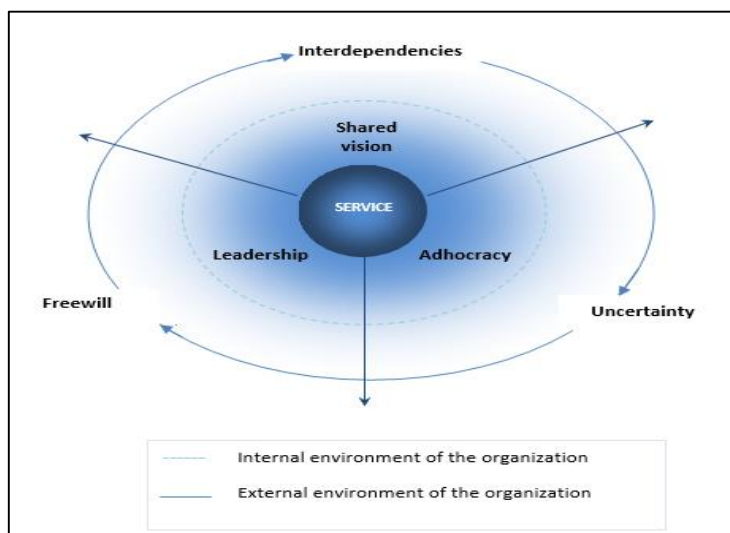


Fig. 2 - Model of biotic organization. Source: own.

In practice, these principles may take different forms. Shared vision is the result of system thinking, on the basis of which the dynamic complexity of the world of interdependencies can at least be partially understood. It sets out a common path and evokes a feeling of partnership and shared purpose. In an environment of chaos and uncertainty, shared vision creates needed islands of order and safety within organizations. The common objective thus defines the limits of individual behavior. In a sense, it replaces the original philosophy of management based on the fragmentation of the organization, in which people are working on the basis of functional classification in order to achieve only partial objectives (not companywide objectives). The amorphous structure creates the internal form of an organization, depending on the task which the organization is engaged in. It is thus a specific kind of adhocracy, which is the counterpart of bureaucracy (Mintzberg, 1979). This approach to the internal configuration of the organization is based on the assumption of the instability and unpredictability of the external environment. It creates a high degree of freedom inside the organization. In practice, this form of organization spread particularly in the creative industries. Structuring for a particular purpose, for example, is typical for Hollywood movie studios, as well as for companies that deal with advanced technologies, including Apple and Google. These companies face enormous pressure from competitors and powerful dynamics in the development of new technologies. In this case, it is obvious that the new technology of postmodern management can be directly enforced by the specific circumstances of the environment.

Biotic organizations are harmonized and, above all, have a culture of trust (and freedom), which gives people considerable power and freedom to focus on what they want to do (Carney & Getz, 2013). This type of culture has been identified in the companies W.L. Gore, Sun Hydraulics, Semco, SOL, FAVI, IDEO, and several others (Carney & Getz, 2013). The amorphous structure, however, can't exist without institutionalized moral authority. As Carney with Getz discovered when they researched freedom in work (Carney & Getz, 2013),

real leaders become guardians of culture in a more free working environment. Companies applying this specific culture include FAVI, IDEO, SEMCO, SeaSmokeCellars, and, previously, Radica Games. The authority of a biotic organization is thus institutionalized by leadership, i.e. a new management function that puts an emphasis on enhancing powers in order to release human potential through specific types of motivation in the form of self-management. However, the core of a biotic organization resides in the ability to reveal a deeper purpose, which grows out of the holistic paradigm. This paradigm can be simply defined in the sense of the attitude reflecting “our world”, not “my world”. Living organizations must be engaged in something bigger than themselves. High performance is achieved only if companies become excited about something more than simply making a profit (Google wants to change the world, Apple wants to create revolutionary products, Walt Disney wants to bring happiness to people, Whole Foods Market wants people to improve their health and well-being etc.). Simply put, living organizations have a purpose that provides their workers with a deeper motivation.

The nature of these organizations requires us to look at them as organs of society with clearly identifiable characteristics, these being an amorphous structure, leadership, a shared vision, and service to one’s own environment. On the basis of these attributes, we can explore the extent to which current organizations approach an organizational form based on biotic principles, and how far such biotic organizations are representative of the business environment.

## **4 PRINCIPLES OF BIOTIC ORGANIZATIONS IN PRACTICE**

Quantitative research aimed at mapping the occurrence of biotic principles was carried out in the following areas: purpose of existence, structure, alignment, and coherence.

### **4.1 Service to society**

Classical economic theory defines the company as a machine for making money. According to this theory, each enterprise should follow a simple rule: to use resources (including human) in order to maximize earnings. In view of this goal, the enterprise is the creator of resources, the purpose of which is to transform inputs into outputs. Of course, outputs must exceed inputs. In financial terms, this means that a positive economic result is achieved, one which usually reflects accounting profit rather than economic profit.

An alternative theory, which is based on the profit motivation, involves the idea of *the market value of the company*. However, because the market value of a company grows when the company makes a profit and falls when the company makes a loss, it can be argued that the goal of increasing market value springs from the same base as the profit motive. These are, therefore, two theories describing the same idea. In both cases, performance is measured by short-term, and usually only financial, indicators. In the background of these concepts is the assumption that every enterprise is a machine that consists solely of the economic dimension.

Research conclusions by Collins and Porras (1994) summarized in the book entitled *Built to Last*, as well as the famous study of the longevity of organizations conducted by Royal Dutch / Shell in 1983 (Handy, 1999; Senge, 2009), however, show that the ability to exist for a long time in a business environment deviates from the mere satisfaction of economic needs. The function of each organization, as an organ of society, must be to satisfy the specific needs of the external environment. The purpose of the existence of a biotic organization is to serve society (its own environment). This definition of the corporate sense corresponds with research findings according to which the vitality of organizations is very closely related to the ability of organizations to satisfy the needs which emerge from the external environment. In

contrast to traditional economic theory, the criteria of success in the case of biotic organizations lie only in the external environment. The purpose of biotic organizations, therefore, will always be limited by the external environment. The conditions, characteristics and requirements of this environment can redefine the business tasks and change the default mission of these organizations. The primary function of these organizations is, therefore, to reveal this task, which requires not only external orientation toward the customer, but also internal orientation in the form of the creation of a work environment that reflects the needs and interests of other stakeholders, which are associates and owners. This demonstrates the interdependence of biotic principles, when a deeper sense cannot be created without leadership, an open structure, and shared vision.

The three objectives are clearly rooted in the practice of contemporary organizations. They show their attitude to their customers, employees, shareholders, and society as a whole. Surprisingly, the survey revealed considerable orientation towards the external environment (41%) and a lower than expected proportion of companies oriented towards the profit motive (29%). The following table presents the results of the research.

Tab. 3 - Purpose of existence in practice. Source: own.

<i>What is the purpose of existence of your organization?</i>	<b>Frequency</b>	
	<b>Absolutely</b>	<b>Relatively</b>
Earning	16	29%
Market value	17	30%
Service to society	23	41%

Organizations whose purpose of existence is defined as service to society are still in the minority (41% of the total). Among other things, this means that the majority of organizations (more than 50 %) are too focused on the internal environment and ignore the external one. On the basis of research findings, we can conclude that most companies are, in terms of their actual purpose, still defined as mechanisms for making money (59% of the total).

#### **4.2 Amorphous structure**

Three basic types of structures have been developed in the economic environment over the last three hundred years. These structures are the haphazard structure, the hierarchical structure, and the amorphous (i.e. network) structure. Each of these structures arose in a specific environment. The haphazard structure was the result of the agrarian society that predominated from the 17th to the 19th centuries. It began to transform into industrial society from the 19th century. At that time, people created the first modern business organizations organized on the basis of a hierarchical structure. At present, however, an entirely new kind of structure is emerging, one that symbolizes the age of information. These structures are amorphous, or network structures. In the W. L. Gore company, this new type of organization is referred to as a lattice organizational structure (Hamel & Breen, 2008; Hamel, 2013; Harung, 2004). In the Semco or Harley-Davidson companies, so-called circular structures were established (Carney & Getz, 2013; Semler, 2011; Senge, 2009). No matter what this new type of structure is called, they share one particular feature; that is, they are not built on the principles of formal hierarchy, but rather on a network of relations, which is defined by reciprocal obligations towards colleagues and co-workers.

Research work therefore focused on two basic organizational approaches, namely pyramid schemes and network configuration settings, in order to determine to what extent network



structures are applied in practice in current enterprises. The Results are given in the table below.

Tab. 4 - Typology of structures in practice. Source: own.

<i>What kind of structure is applied in your organization?</i>	<b>Frequency</b>	
	<b>Absolutely</b>	<b>Relatively</b>
Amorphous structure	8	14%
Hierarchical structure	48	86%

The research indicated that only one in seven organizations is organized by means of a network without a stiff formal hierarchy, despite a radically changing ecosystem, which causes the increasing institutional collapse of bureaucratic organizations built on formal hierarchies. In the current environment, it appears that bureaucracy is not able to respond quickly enough to the frequent changes in the environment. The proof of this assertion can be seen in the recent past. It was the collapse of the Soviet Union and other centrally controlled economies, as well as the bankruptcy of the automobile giant General Motors (GM), that provided a great deal of knowledge about the limits of hierarchical structures. Both of these examples are of identical origin. They were social systems built on the technology of traditional management, which does not take into account the conditions of discontinuity, uncertainty, and variability.

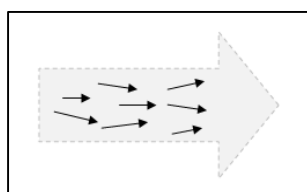


Fig. 3 - Aligning system. Source: Senge & Carstedt (2001)

Nowadays, many organizations strive to take advantage of the effects of synergy. However, these effects are related to the way individual elements within the system are organized. Experience in the building of sports teams suggests that the effects of synergy are achieved by the so-called concept of aligning illustrated in the previous figure. The essence of aligning is ensuring that team members strive to achieve the same goal. Having a common goal affects behavior in such a way that the energy of individuals is multiplied rather than fragmented. Aligning also demonstrates that a network structure cannot work effectively without the existence of a shared vision, which is an integral part of it.

In practice, the outlines of a network structure can be seen in Visa Interactive, W. L. Gore, Semco, and Morning Star, and also partly in Google and Apple. These companies have created a new trend: management without a formal hierarchy. Obviously, this does not mean that there isn't some form of hierarchy, but the hierarchy has, rather, a more natural than formal character, because people working in these companies become leaders due to their competence and knowledge, and not on the basis of contacts and mutual sympathy. In most cases, leaders are elected by members of teams or working groups, as well as recalled by them. The teams can also determine who will work in them. In these organizations, there are no superiors or subordinates, only associates and colleagues. People acquire the freedom (to do what they want), which is balanced by reciprocal obligation (in W. L. Gore) or the agreement of colleagues (in Morning Star) (Hamel, 2011).

Based on the research of organizational practices, the abovementioned firms have acquired two basic characteristics of amorphous structures: firstly, structures without a formal hierarchy require a common focus (i.e. the creation of a shared vision as a common goal); secondly, they require the identification of operating principles that reinforce core values, namely freedom, openness, transparency, and responsibility. These conditions, which are related to the principle of shared vision and leadership, are described in following chapters.

### 4.3 Shared vision

According to our research, most organizations (71% of respondents) have a vision about the future direction of their business. However, this vision does not always lead to an aligned system. The level of inner harmony affects the organization's ability to share its purpose and to evoke a feeling of partnership and solidarity. Alignment of the enterprise requires, apart from a deeper sense and amorphous structures, also the ability to share its vision. If we look at mechanistic organizations, we find that these organizations cannot really communicate. They can only transmit information from top to bottom. They create visions, but the visions are not compatible with the personal visions of individuals. These organizations do not achieve internal harmony, as individuals tend to move in different directions (see figure below).

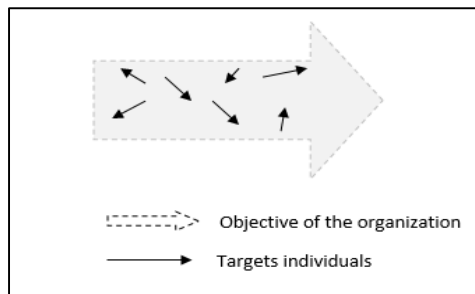


Fig. 4 - Misaligned system. Source: Kiefer & Stroh (1983)

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The research was therefore aimed at mapping not only an organization's ability to create a vision, but also their ability to share that vision, the ability to communicate and to seek a common path or to define a common direction. The results of the research are presented in table 4. It was found that more than 60% of organizations which create a vision (71% of organizations from the sample) are not able to communicate that vision. In most cases, the vision takes the form of either a financial target or a list of positive values or corporate policies. It is a tool of top management rather than an organizing principle that would support the creation of an environment of creativity and collaboration.

Tab. 5 - Shared vision in practice. Source: own.

<i>Is your vision shared throughout the organization?</i>	<b>Frequency</b>	
	<b>Absolutely</b>	<b>Relatively</b>
Yes	22	39%
No	34	61%

The research data supported one of the basic assumptions, according to which the application of the principles of mechanics (we may understand them as traditional management practices) limit the true potential of organizations. Great results cannot be achieved without the alignment of individual parts with the whole. This special conformity can be called metaphorically the conformity of souls, which releases the so-called “E factors” (energy, enthusiasm, effort, excitement, excellence) (Handy, 1999). The E factors are released by those

organizations that combine their own values and goals with the values and goals of individuals. These are companies that are able to apply the principle of biotic organization known as shared vision. It is coincidentally the same principle that has been detected in enterprises encouraging freedom at work (Carney & Getz, 2013). In practice, the atmosphere of mutual sharing and understanding is present in smaller organizational units (see table below), where the “rule of ten” is preserved. This rule is related to the principle of confidence, which is obviously limited by the number of people which an individual can trust, based on personal experience. Simply put, I can’t trust someone I do not know. Previous research focused on the performance of people in working groups has revealed that the best results are achieved in relatively small working groups, so-called specific attractors (i.e. 8-12 people) (Kelly, 2007), in which people know each other and therefore can build relationships based on mutual confidence without the use of compensators in the form of impersonal control mechanisms, which involve additional social and financial costs.

If we build on the practical knowledge of some companies, we can identify, for example, a “rule of 50” applied in the Asea Brown Boveri company, which employs 250 000 people, divided into more than 5000 units (Handy 1999). These departments are further divided into basic units comprising an average of forty-five people. W. L. Gore is organized on the principle of 200, according to which each production unit should comprise no more than 200 people. (It must be noted that each unit is formed by many small creative teams constructed on the basis of personal responsibility, which means that each co-worker can determine what to do, where to do it, and with whom. For this purpose, a specific structure known as the *lattice structure* was created) (Hamel & Breen, 2008). Simultaneously, individual organizational units are organized into industry-related clusters, so that the company as a whole does not lose synergies resulting from intensive, interdisciplinary, and cross-functional communication. The organizing principle limiting the size of organizational units was also reported in the Brazilian company Semco, which decided in the late nineties to organize production at its factories according to production cells including a maximum of 24 workers and 1 coordinator (Semler, 2011). Google, which attracts considerable attention with respect to its rapid development and economic success, excels in the formation of ultra-thin structures consisting of self-managed teams of just 3-4 members (Hamel, 2013).

These practices indicate the efforts of these organizations to avoid the hidden costs of traditional management based on the principles of mechanics (the cost of mistrust resulting from the implementation and maintenance of control mechanisms) and at the same time so unwittingly they took into account principles of the biotic organization that encourage openness, transparency, collaboration, and especially confidence.

Tab. 6 - Conformity of values and objectives in practice. Source: own.

<i>Is there conformity between the values and objectives of your organization and the values and targets of your employees?</i>	<b>Microenterprises</b>	<b>Small organizations</b>	<b>Medium-sized organizations</b>	<b>Large organizations</b>
Yes	78%	42%	46%	45%
No	22%	58%	54%	55%

The shared purpose observed in organizations with ten or fewer employees demonstrates the importance of a personal approach to people and takes into account the importance of the freedom that people need in order to be able to identify with the company itself and especially to be able to develop and grow.

It turns out that in the light of practical experience, organizational size affects the alignment of the whole system. Large organizations have considerable difficulties in reconciling individual parts and, thus, behave as a single unit. The absence of shared purpose in larger organizations results in insufficiently developed system thinking on the part of managers and, thus, the inability to create a process of shared vision. There may also be an unwillingness to lead arising from an excess of traditional management. This assumption will be verified in the next chapter.

#### **4.4 Leadership**

The theory of management has developed two basic principles to ensure the internal consistency of organizations. These principles were identified by Peter Drucker (1998) when considering the nature of organizations. According to Drucker, the organization of type commands and controls is similar to an organism that holds together in its shell. A new form of organization which is appearing today is based on a supporting framework of information. Information is the new integration system of enterprises (it is a necessary precondition for internal cohesion, because responsibility and, thus, self-management cannot exist without shared information) and expression (the ability to acquire information determines the future of the company, because information can be seen as a tool for wealth creation). Traditional management therefore assumes that people must be controlled. The emerging postmodern form of management, by contrast, argues that people must be led. In the economy, information is a new source of wealth; it also means power. Each of these principles, however, shares information within organizations in quite different ways. While traditional management shares only some information, successful leadership is based on the creation of a transparent, open environment in which information becomes the essence of independent and responsible behavior. Simply put, if companies do not share information, they cannot expect people to manage themselves.

The functioning of complex living systems is characterized by the fact that perception and action always take place on the local scale. The existence of centralized control is therefore possible only due to a complex network of local controls. This regularity corresponds to the principle of subsidiarity, according to which decision-making and responsibility within the system should be transmitted to the lowest possible level. In an unstable environment of many variables, the principle of leadership (i.e. to create a vision, to share and communicate the vision, to inspire) appears as an important principle for the strengthening of subsidiarity. The principle of leadership is becoming an alternative to the principle of traditional management, which accumulates too much power in one function (or site), which, in turn, may cause hierarchical breakdown in conditions of uncertainty. The correlation between the ability to share a vision and strengthen the powers that relate to these principles is illustrated in the following figure.

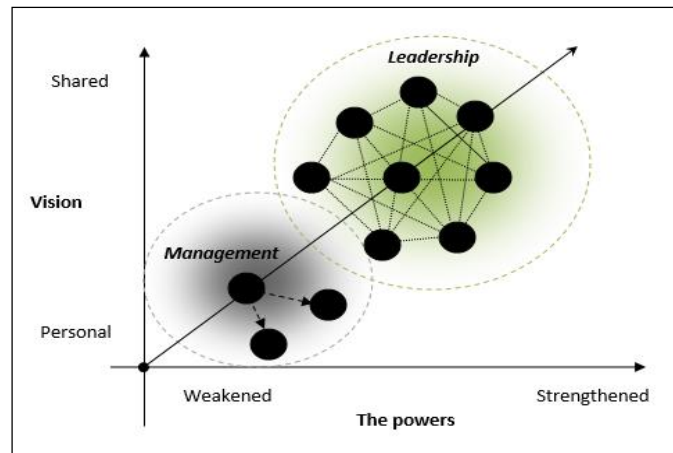


Fig. 5 - Influence of management and leadership in shared vision and empowerment. Source: own.

Management (i.e. planning, organization, and control) is appropriate only when it is applied to non-living parts of the organization (property and financial capital). Leadership is the key to creating the structure of the engagement which offers the required degree of freedom (and responsibility) in workplaces characterized by synergies in things and relations. The importance of leadership, which increases with increasing complexity and interdependence, is underlined by John Kotter (2000) who sees leadership as a fundamental principle affecting the ability of organizations to adapt to a world of constant change. This research therefore focused on the occurrence of these principles in practice in order to determine whether and to what extent leadership, as one of the principles of the biotic organization, is rooted in the practice of contemporary enterprises (namely in the context of fundamental changes which the external environment has undergone in the last forty years).

The results in table 6 indicate that leadership is still insufficiently exploited due to the character of the environment in which enterprises exist today. (The characteristic features of the current environment are uncertainty, nonlinearity, and free will.)

Tab. 7 - Principles of coherence in practice. Source: own.

<i>Which of these principles is applied more in your organization?</i>	<b>Frequency</b>	
	<b>Absolutely</b>	<b>Relatively</b>
Management (control and planning)	40	71%
Leadership (sharing vision and inspiration)	16	29%

Management, as one of the most important principles of mechanistic organizations, is an integral part of the management systems of more than two thirds of the organizations included in this study. The ability to create a shared vision and transform working conditions to encourage inner motivation was observed in less than a third of organizations. It was also discovered that the size of organizations significantly influences the occurrence of the principle of command and control. The environment of engagement and freedom occurs especially in small organizational units (no more than ten employees). The backbones of most large organizations are constituted by an authoritarian form of management based on predictability and controllability, which are the basic assumptions of traditional management.

## 5 POPULATION OF BIOTIC ORGANIZATIONS

On the basis of our own earlier research, it was found that the predominant organizational form is a hybrid organization combining mechanistic and biotic elements. The predominance of mechanistic principles in the operational infrastructure of business organizations supports the research assumption that the principles of biotic organization in the practices of current companies are underdeveloped.

The research thus focused on exploring the four areas of the organization which deliberately follow the four dimensions of holistic man as a prototype for creating the model of a living organization in order to verify the initial assumption about the occurrence of biotic organization in the business environment. The previous chapter introduced a quantitative survey, according to which the level of structuring in organizational entities and their abilities to empower, share purposes, evoke a sense of partnership, and define their own purpose of existence were evaluated.

The results of the survey, which were assessed in order to form a four-dimensional model of the organization, are shown in the following table.

Tab. 8 - Occurrence of the principles of biotic organization in practice. Source: own.

Dimension of organization model	Subject of research	Relatively frequency	
		Principles of biotic organization	Occurrence of biotic organization in the business environment
Economic dimension	Amorphous structure	14 %	biotic organization comprising 5 % of the total
Emotional dimension	Leadership	29 %	
Mental dimension	Shared vision	39 %	
Spiritual dimension	Service to environment	41 %	

Data from the previous table provided answers to earlier research questions regarding the representation of the principles of biotic organization in practice. Network-organized institutions, whose coherence entails the principle of leadership as a tool for sharing visions and empowering individuals and the principle of a widely shared vision as a discipline creating an environment of shared purpose and partnerships with a purpose that goes beyond just making money, represent only a minority of organizations in the economic environment (approximately 5% of the total organizational population). Analysis of the data also showed that the principles of biotic organization are not dependent on organizational size. This fact is illustrated in the following figure.

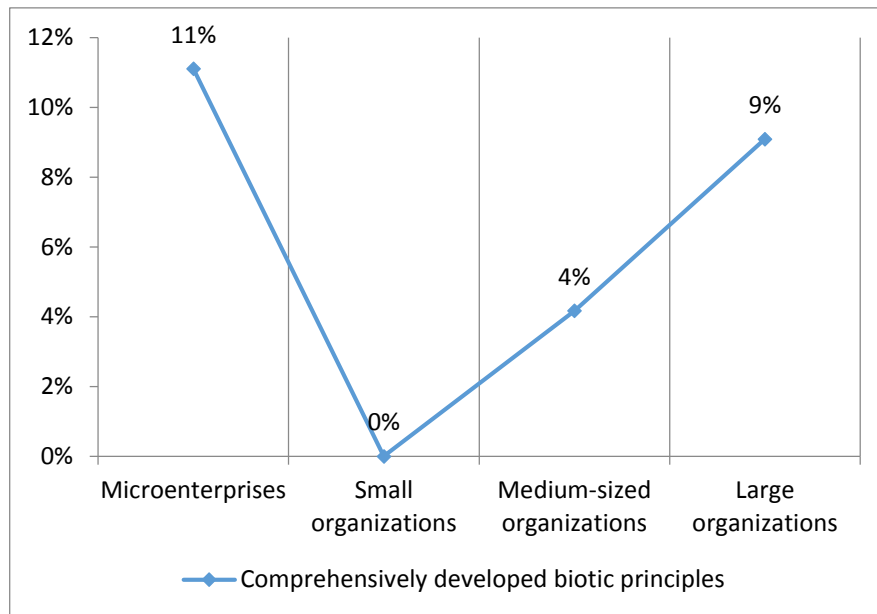


Fig. 6 - Comprehensively developed principles of biotic organization in practice. Source: own.

## 6 CONCLUSION

The aim of the article was to construct a model of biotic organization to map the occurrence of biotic organizations in the economic environment. The research conclusion emerged from an effort to answer the question of whether biotic organizations are represented in practice in more than 10 percent of cases. Based on the analysis of theoretical assumptions, we identified the principles of biotic organization. These principles, which are amorphous structure, leadership, shared vision, and service, created the final form of the four-dimensional organizational model. The occurrence of these principles in practice was verified by survey. Data inserted into the model of biotic organization revealed the relatively low frequency of these principles. The processed data revealed a relatively low frequency of these principles in the practice of contemporary organizations.

The hypothesis that, in practice, biotic organizations represent less than ten percent of cases was confirmed. According to the created model, approximately 5% of organizations may be considered as biotic organizations. Organizations have particular problems with the creation of a network (amorphous) structure and the more frequent application of soft management practices that create space for self-management.

Future research work should therefore be focused on an analysis of the main management techniques taught mainly at economic universities, with an emphasis on promoting support courses relating to change management, the creation of a shared vision, inspiration, and the creation of an internal environment that will build on the principles of freedom and confidence. Of special note is the prevalence of traditional methods of organization and structural forms in current organizations, where, as it turns out, there is almost no alternative to the current pyramidal structure. This is probably a result of the fact that very few companies build management systems without formal hierarchies, ones which are based more on leadership than on management and control, and thus there are too few positive exceptions in the economic environment that could inspire other companies with respect to specific management practices. In this area, it is the practice of some companies more than pure theory that offers much interesting material, whether it is the lattice structure in W. L. Gore, the

circular structure in Semco, the inverted pyramid in the Indian software firm HCLT, or the specific structure formed on the basis of agreements between colleagues in Morning Star.

These firms should be subjected to deeper research in order to discover the common characteristics of these new organizational forms and to create a real alternative to the dominant management system built on the principles of mechanics, which prevails not only in the theoretical background, but also in the practice of today's companies.

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## **THE SPATIAL BREAKDOWN OF INVESTMENTS WITHIN THE OPERATIONAL PROGRAMME TRANSPORT IN THE CZECH REPUBLIC**

*Lenka Smékalová, Pavel Grebeníček*

### **Abstract**

In the period 2007–2013 implementation of the cohesion policy in the Czech Republic represents the most important source for financing transport infrastructure, especially via Operational Programme Transport. The objective of this paper is to analyse all projects approved from 2007 until January 2012 which will enable to study the spatial characteristics of evaluated programme and discuss the breakdown of the beneficiaries at different levels of spatial hierarchy or the eventual volume of intervention in individual districts. The volume and the direction of the investments in relation to the spatial dimension present a new view on the cohesion policy instruments.

*Keywords: cohesion policy, cohesion funds, Czech Republic, districts, European Union, transport infrastructure, transport policy*

JEL Classification: H54, R42, R58

### **1 INTRODUCTION**

The question of importance of the transport and the transport infrastructure for further economic development of any region is long discussed. The fact that the transport infrastructure is one of the important prerequisites for successful development of an area is supported by plethora of authors (for example Rietveld and Nijkamp, 1992; Banister and Berechman, 2001; Ivanová and Masárová, 2011; Marsden and Docherty, 2013 and many others). The majority of course states that the transport infrastructure is not the sole factor in the question of the economic development albeit it still is a very pertinent one (see Álvarez-Herranz and Martínez-Ruiz, 2012; Ding, 2013). Deficiency in transport infrastructure often poses a problem in more urbanized areas and contributes to stronger core-periphery polarization (Meijers et al., 2012).

The topic of transport infrastructure is notably important also within the European Union measures aimed at the reduction of the regional disparities in the member countries. There is an assumption of this topic being of particular interest to the newer member states who suffer from noticeable regional disparities that are oftentimes increased by insufficient transport infrastructure especially in the peripheral regions. This is corroborated by the fact that an operational programme aimed at the topic of the transport services and the infrastructure is present in every new member country that accessed the European Union in 2004 and 2007. Lakshmanan (2011) specifies the benefits of investments into the regional transport infrastructure leading to increase in the transport performance (reducing the distance, improvement of the time of accessibility, and others) which in turn leads to increased accessibility of new markets in cases of the entrepreneurs using the infrastructure in question which are then able to specialize further and produce greater output. The entrepreneurs outside the region have equal chances of better accessibility and naturally increase their import thus affecting the production prices within the region and increasing pressure on efficiency. This finally results in restructuring of the regional economies.

The significant benefits of the transport infrastructure and services are reflected also in model of regional competitiveness by Lengyel (2004) as one of the success determinants of the regional competitiveness, the influence of transport infrastructure in Spain was researched by Cantos, Gumbau-Albert and Maudos (2005), the impact of Dutch transport infrastructure investments by Annema, Koopmans and Van Wee (2007) and many others. The importance of the transport infrastructure for entrepreneurial activity and behaviour is mentioned in case study by de Bok (2009) who researched Dutch entrepreneurs and on this specific example concludes that successful businesses tend to relocate to relatively well accessible locations which offer economies of agglomeration and positively influence the labour market in such locations. Bilan (2013) shows that transport is of importance in many national economies including those who accessed the European Union among the last.

As was previously mentioned the European Union, too, strongly accentuates the transport sector. The Europe 2020 strategy deals with multiple topics among them education which is undisputedly connected to economy, research and development especially in connection with encouraging private investments to R&D (De Wit, and Dearing, 2003; Coccia, 2009 or Moncada-Paternò-Castello et al., 2010), employment, potential of the newly emerging services concerning media and digital content (Horváth, & Machyniak, 2014), climate change and energy sustainability which is closely related to transport issues (Berritella et al., 2008; Dickson et al., 2010 or Marsden, and Rye, 2010), and questions of poverty and social exclusion. The strategy (EC, 2010) mentions transport infrastructure especially with regards to ensuring better accessibility of the shared European market to all entrepreneurs and further explores the topic in connection with the environmental friendliness and the sustainability concept which is based on balancing economic, social and environmental aspects (Hájek et al., 2011a). Sustainability in the transport sector at the level of the European Union is connected with following policy objectives (EC, 2009):

Quality transport that is safe and secure

- A well-maintained and fully integrated network
- More environmentally sustainable transport
- Keeping the EU at the forefront of transport services and technologies
- Protecting and developing the human capital
- Smart prices as traffic signals
- Planning with an eye to transport: improving accessibility

Sustainability of transport is strong topic emphasized in strategic documents (Janic, 2006, van der Heijden, 2006; Shen et al., 2011 or Santos et al., 2010) such as The Greening transport package (EC, 2008), long-term sustainability of transport is further explored in White paper Roadmap to a Single European Transport Area (EC, 2011).

Sustainability of the transport in the Czech Republic supported by the cohesion policy measures has been called into question by Hájek et al. (2011a). While some of the indicators pertaining to the transport sustainability, such as number of deaths in traffic accidents, show overall positive trends there is a marked preference for investments in environmentally less sound types of the transport. The cohesion policy measures in this instance are noticeably focused on road transport expansion as opposed to other types, especially the railroad transport. This likely scenario of the difficulties connected to the environmental aspects of transport infrastructure and services support was noted already in the pre-accession period by Zahradník (2003).

At this point it is necessary to include that procurement of transport infrastructure which is the main topic of the Operational Programme Transport is possible through other way which might be less straining for the state budget. Such possibility is presented by use of public private partnership projects. This particular phenomenon is rather problematic in the Czech Republic as evidenced by frequent changes in legislature (see e.g. Jurčík, 2012), or strain on banks concerning the loans (Blanc-Brude and Strange, 2007 and Belás et al., 2012, Cipovová and Belás, 2012). This particular problem further aggravated by growing insolvency rate in Czech firms (Paseková, 2013) and in cases relatively negative perception of entrepreneurship in the Czech Republic (Smékalová et al., 2014).

This article builds on previous research of the transport in connection with the European Union cohesion policy in the Czech Republic (see Hájek et al., 2011a, Hájek et al., 2011b) and on cohesion policy in general (Hájek et al., 2012) and aims to evaluate the spatial dispersion of the EU Cohesion policy funds in the districts (LAU 1 units) of the Czech Republic with particular focus on support of the economically lagging regions delimited by the Czech government in the frame of national regional policy. The secondary aim is to verify whether this programme in some way contributes directly to the support of small and medium entrepreneurs in the Czech Republic.

## **2 METHODOLOGY**

Information about implemented projects were obtained from the web presentation of the Regional Information Service which maintains a regularly updated database of the implemented projects with complete information about the budget composition and the territorial impact of each project. This database contained the necessary information about the projects themselves and was further complemented by the list of beneficiaries published by the managing authority of the Operational Programme Transport. When combined these two sources provided the authors with information about projects and with basic identification of the beneficiaries. The information about spatial impact was enhanced by determining whether the impacted municipalities at the time of start of the project were located within an economically less advanced region as per governmental regulation no. 560/2006.

The beneficiaries are, too, of importance with regards to their position within public or private sector, their size or the territorial location. This information is however not included in either of the already mentioned databases and as such must have been filled in into the intended comprehensive matrix that would include data about every project and its beneficiary. The information about beneficiaries that was necessary to add is collected in the “Register of economic subjects” database maintained by the Czech Statistical Office. The information from the two databases was connected with the unique identification number of each beneficiary. And thus the data matrix was complemented by the information about institutional sector of the beneficiary, their size, CZ-NACE, and information about residence of the beneficiary. Contents of the resulting data matrix can be seen in table 1. All information concerning both the projects and the beneficiaries were then processed using methods of descriptive statistics and visualised in the geographic information system, namely the ArcGIS software by ESRI.

Tab. 1 – Content of the data matrix pertaining to projects and the beneficiaries. Source:  
Authors

Attribute	Possible values
Name of the project	Unique values
Budgetary composition of the project	Unique values of EU contribution, national contribution and private contribution to the total of the budget in CZK
Thematic focus of the project	Road transport infrastructure; Railway transport infrastructure; Other transport infrastructure; Technical assistance
Spatial impact of the project	Impacted municipalities, districts and regions
Impacted municipality located in economically less advanced region	No; Structurally affected region; Economically weak region; Region affected by above-average unemployment
Identification number of the beneficiary	Unique value
Name of the beneficiary	Unique value
Institutional sector of the beneficiary	Enterprises under foreign control; Non-profit institutions; Other public institutions; Private national enterprises
CZ-NACE of the beneficiary	Unique values as per the Czech Statistical Office classification
Size of the beneficiary	Micro enterprise; Small enterprise; Medium enterprise; Large enterprise
Residence of the beneficiary	Municipality, district, region

### 3 RESULTS AND DISCUSSION

The analysis dealt with 139 projects that were implemented since the beginning of the current programming period in 2007 until January 2012 with the total allocation of CZK 124,2 bn. Out of these the projects of Technical Assistance were omitted as they ensure the day to day management of the Operational Programme Transport. After the data matrix contained 121 projects with total EU allocation of CZK 123 bn which at the time corresponded with approximately 70 % of total allocation of CZK 173 bn.

The calls for proposals issued within the Operational Programme Transport are strongly focused on the intended beneficiaries named already in the Operational Programme Transport document. These are the owners and managers of the transport infrastructure and providers of public transport services (Ministry of Transport, 2011). This very detailed definition of the beneficiaries and the thematic focus prevents this programme from being focused directly on either the small and medium enterprises or the state supported economically less advanced regions. The intent of the Operational Programme Transport is further evidenced by the results of the analysis. Table 2 shows the share of differently sized enterprises on EU support allocation in various region types. When focused solely on the enterprise size it clearly shows that the large enterprises gained overwhelming majority of EU financial support. All these

beneficiaries but three of them are represented by the public sector institutions namely the Road and Motorway Directorate of the Czech Republic, the Railway Infrastructure Administration and Capital Prague. The same beneficiaries also applied for the majority of approved projects as evidenced in Table 3.

Tab. 2 – Share of EU support allocation across region and company types in period 2007- Jan. 2012. Source: Authors' calculations based on data by Regional Information Service

Region type	Enterprise size			
	Small	Medium	Large	Total
Not supported	2,29%	0,02%	58,14%	60,44%
Structurally affected	0%	0%	18,01%	18,01%
Economically weak	0%	0%	9,62%	9,62%
Affected by an above average unemployment	0,12%	0%	11,81%	11,93%
Total	2,42%	0,02%	97,57%	100%

Tab. 3 – Share of number of projects across region and company types in period 2007- Jan. 2012. Source: Authors' calculations based on data by Regional Information Service

Region type	Enterprise size			
	Small	Medium	Large	Total
Not supported	12,88%	1,89%	52,65%	67,42%
Structurally affected	0%	0%	10,42%	10,42%
Economically weak	0%	0%	12,12%	12,12%
Affected by an above average unemployment	4,55%	0,38%	5,11%	10,04%
Total	17,42%	2,27%	80,30%	100%

The small enterprises that took part in implementation of project are connected solely with the water transport and are of both public and private sector. The percentage of allocation they gained is rather small but still amounts to almost CZK 3 bn. in 25 projects.

As for the location of the projects and the financial support into the regions the analysis distinguished among four types of regions. Those that were not supported by the state and the three state supported types as per the governmental regulation no. 560/2006: the structurally affected regions, the economically weak regions and the regions affected by the above-average unemployment. As was previously mentioned the nature of the Operational Programme Transport does not particularly encourage the spatial distribution to be in favour of the state supported regions as the projects mainly concentrate on the infrastructure maintenance or the construction of new following sections of road transport infrastructure. Therefore the spatial dispersion does not reflect the state supported regions but rather the already existing transport infrastructure (compare Fig. 1 and 2). Nevertheless the sum of EU support invested into the transport infrastructure in the state supported regions amounts to CZK 48,6 bn., approximately 40 per cent of total EU allocation. In this context it is rather prudent to check the national intervention of the Czech state in terms of national support and compare it with national support awarded in other regions. Private co-funding of the projects is of little importance compared to total allocation as previously indicated public sector enterprises are by far the most active applicants in the Operational Programme Transport.

The average EU support in the Operational Programme Transport project amounts to 72,5 per cent of the total project budget and remaining 27,5 per cent were provided by the national public resources mostly from the central government. The ratio of EU to state funds is the same in the non-supported regions and well as in the supported regions of the structurally affected type. The ratio is slightly changed in the economically weak regions where the Union support amounts to 79 per cent and the involvement of the national funding is somewhat smaller. Directly opposite case are the regions affected by the above-average unemployment where the EU support declines to 65,5 per cent of the total budget and the state provides residual 34,5 per cent of funds. In comparison with the sum of the supported versus the non-supported regions there is, however, no visible difference therefore no claim of stronger support for regions delimited as support by the Czech government can be made.

The thematic focus of the implemented projects is shown in table 4 which gives evidence of the road transport infrastructure preference to any other transport type. The building and modernization of the motorways, the expressway and the class I roads accounted for 63 per cent of so far assigned funds. Slightly more than one third was concentrated in the railway infrastructure and 2,5 per cent approximately in the other types of transport infrastructure. This marked preference for road transport is in disaccord with the effort to limit the negative influence of transport on the environment.

Tab. 4 – Thematic focus in regions as per the EU allocation in period 2007- Jan. 2012.  
Source: Authors' calculations based on data by Regional Information Service

Region type	Thematic focus				
	Building and maintenance of motorways and expressways	Modernization of class I roads	Modernization of railways	Water and other transport infrastructure	Total
Not supported	20,56%	12,82%	24,75%	2,31%	60,44%
Structurally affected	6,57%	7,34%	4,09%	0%	18,01%
Economically weak	1,85%	3,31%	4,46%	0%	9,62%
Affected by above-average unemployment	10,35%	0,41%	1,04%	0,14%	11,93%
Total	39,33%	23,88%	34,34%	2,45%	100%

As previously evidenced by the results of the analysis and further confirmed by the analysis of issued calls for proposals the Operational Programme Transport does not particularly target economically less advanced regions delimited by the governmental regulation in terms of the spatial dispersion of the EU funds but focuses rather on the districts where there is transport infrastructure to maintain or be newly built as can be seen in Fig. 1 which compares the Union financial support with the road infrastructure existing at the beginning of the year 2012.

The most supported districts in the Czech Republic as shown in Fig. 1 were sites of implementation to major projects. In Prague, the capital of the Czech Republic these were projects concerning the railway station and the road circuit around the capital, in Frýdek-Místek district these were projects concerning the optimizing of presently existing railways and construction of new expressway no. R48. In the most support district of Tábor again a

combination of railway reconstruction and major motorway construction met, in this particular case the railway in question was the fourth transit railway corridor and the road in question was the D3 motorway.

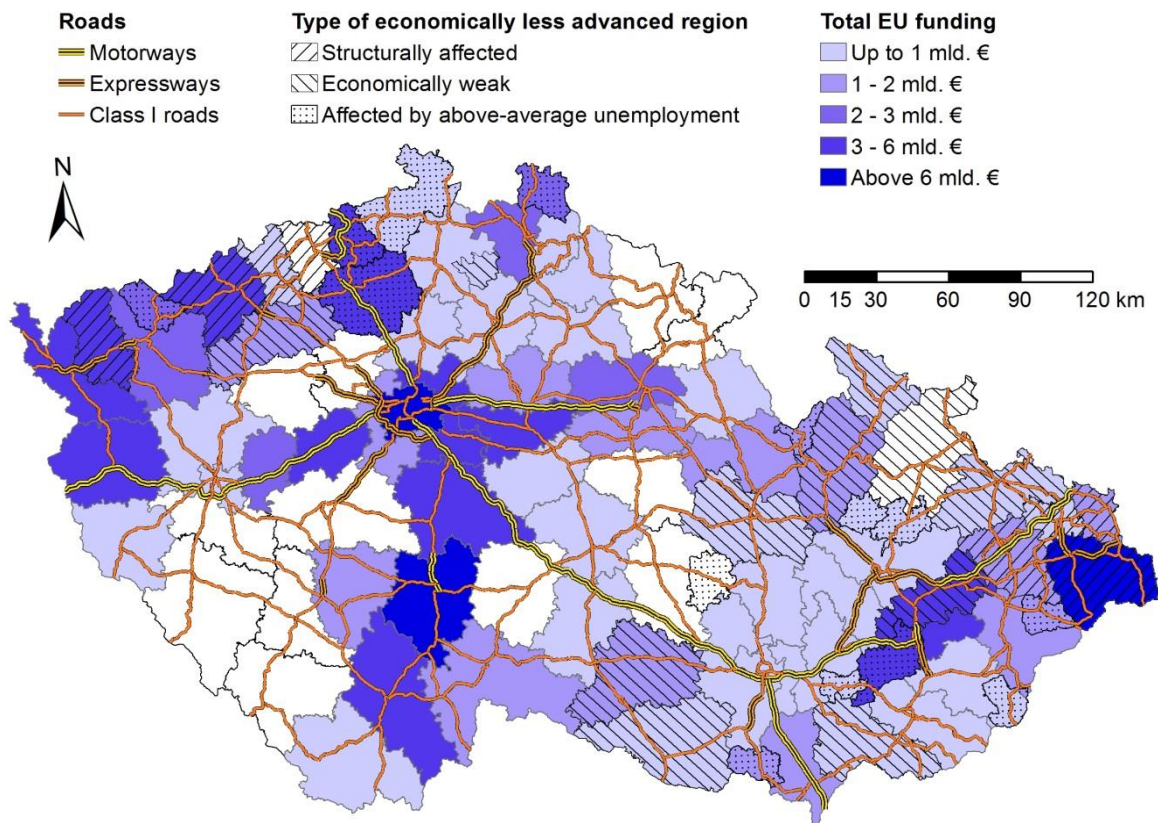


Fig. 1 – Total European Union support in districts of the Czech Republic and state of the road infrastructure as of 1<sup>st</sup> January 2012. Source: Authors' based on Ministry of transport and Regional Information Service

The focus on the economically less advanced regions is evaluated also in Fig. 2 which shows the EU funds allocation per inhabitant in the districts of the Czech Republic with emphasis on the representation of the economically weak regions as per the governmental regulation no. 560/2006 which are delimited on district level or lower levels of Czech administrative structure.

The picture demonstrates little evidence as to the intentional advantage for the economically less advanced regions. The cases of several economically less advantaged districts that also received largest amounts of EU funds are due to their location on the route of planned infrastructure, for example Sokolov district, a structurally affected region, received the second largest amount of EU funds per inhabitant (more than € 61 000) in correlation with that this district noted the largest increase in length of expressways. The same goes for Kroměříž district which is counted among the regions affected by the above-average unemployment where the EU funding per inhabitant amounted to more than € 45 000 and the district noted increase in both the length of motorways and the expressways in period 2007-2012, whereas Tachov district received large allocation of almost € 59 000 per inhabitant which was caused by implementation of railway related project and the construction of new class I road. Other most supported regions were outside the scope of economically less advanced but what they have in common is the spatial nearness as the infrastructure construction often overreaches



the district borders – for example Tábor and Benešov districts located in South Bohemia and Central Bohemia region both gained substantial support of € 114 000, respectively € 59 000 per inhabitant. This was caused by the aggregation of projects related to modernization of the 4th railway corridor (route Prague – České Budějovice – Austrian Summerau) which belongs among the TEN-T railways.

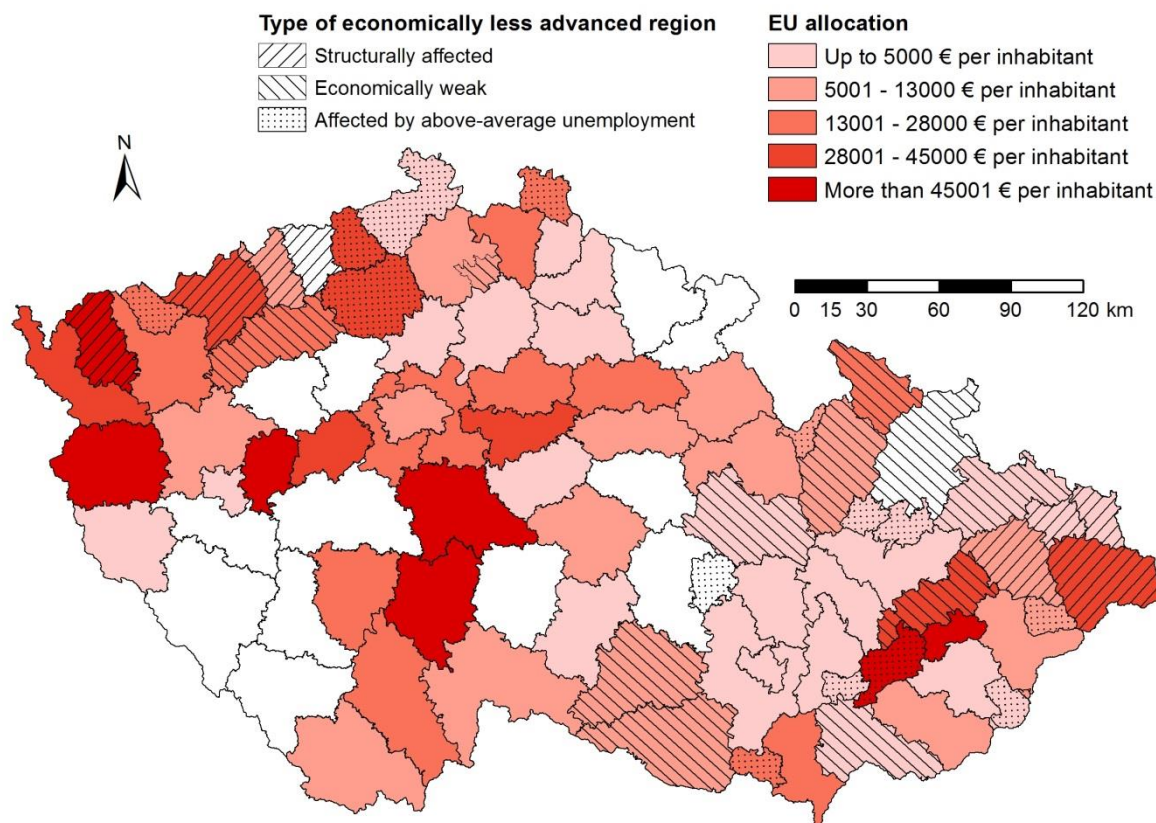


Fig. 2 – Per inhabitant European Union support in the Czech districts as of 1<sup>st</sup> January 2012.  
Source: Authors' based on Regional Information Service

#### 4 CONCLUSION

The importance of the transport and transport policy as a factor of regional development is broadly discussed and the particular discussion is still very much active recently. The transport and particularly its often negative impact on environment is also one of the focus points of the European Union policies in terms of its sustainability. In the Czech since 2004 the environment, the transport, and related infrastructure are strongly connected to the cohesion policy funding - currently within the Operational programme Transport. However, the presented structure of projects gives clear signal that the Czech Republic is in this regard more focused on the issues of road transport. This kind of attitude may present a certain drawback as the preference for the road transport does not particularly correspond with the European wide efforts to make transport more sustainable and environment friendly. The overall significance of the operational programme is suggested by its allocation alone. The largest allocation of all operational programmes of the 2007-2013 period suggests the immense importance that the Czech government ascribes to the transport infrastructure and its state. Given also the continuity of the Operational programme Transport it is clear that the infrastructure issues of the Czech Republic are persistent and given the central geographic

location of the Czech Republic in the European Union are of interest to more than merely Czech actors.

As this paper posed the question of whether the nationally delimited regions with economic and social disadvantages are the main beneficiaries of this particular operational programme it is necessary to say that the overall concept of the Operational Programme Transport does not favour intentional support of the economically less advanced regions as they are delimited by the Czech government. It focuses rather on the Convergence regions of the Czech Republic as a whole and the spatial dispersion of the Union funds has strong relation to already existing transport infrastructure that is being either modernized or whose routes are gradually extended according to the national plans with emphasis on Trans-European transport networks.

The necessary detailed determining of the beneficiaries in the programme documents and calls for proposals also prevents the Operational Programme Transport from being focused on small and medium enterprises as the managers of the infrastructure recruit from large public sector enterprises. However the support of the small and medium enterprises in terms of allocating funding for them is understandably not the focus of the Operational Programme Transport. Rather the concept of better accessibility is fulfilled by the implementation of the Operational Programme Transport especially in terms of the construction and renovation of the transport infrastructure and the small and medium enterprises as well as other subjects of both private and public sector are indirect beneficiaries. On the other hand some of them particularly the ineffective subjects may cease to exist due to the strengthened competition that the improved infrastructure and services attract as Lakshmanan (2011) points out.

### **Acknowledgement:**

*Authors are thankful to the Internal Grant Agency of FaME TBU No. IGA/FaME/2015/026 “Návrh modelu vzniku klastrové organizace v oblasti zemědělství v podmínkách České republiky a v oblasti designu na Slovensku” for financial support to carry out this research.*

*The authors are thankful to the Operational Programme Education for Competitiveness co-funded by the European Social Fund (ESF) and national budget of the Czech Republic for the grant No. CZ.1.07/2.3.00/20.0147 - “Human Resources Development in the Field of Measurement and Management of Companies, Clusters and Regions Performance”, which provided financial support for this research.*

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## **PROBLEMS WITH FINANCING OF SMES AS ONE OF THE BUSINESS RISKS IN THE CONDITIONS OF SLOVAKIA**

*Monika Sobekova-Majkova, Jan Solik, Juraj Sipko*

### **Abstract**

The main aim of this paper is to outline the barriers where SMEs face Slovakia in terms of financing. Moreover, closer attention is paid to the issue of fund-raising and financial risk perception, as one of the potential business risks. After the detection and analysis of barriers of financing this business segment, we provide suggestions of possible measures that could improve current situation.

The paper is based on two surveys conducted in Slovakia. The first dealt with the barriers of youth entrepreneurship, which reviewed the current situation and bring inspiring ideas to promote business in this group of entrepreneurs. This survey was conducted in collaboration with the Association of Young Entrepreneurs in Slovakia and Iuventa within internal grant to the Pan European University in 2011 and 2012. The second survey dealt with the business risk in Slovakia. Survey was part of an international research project undertaken in cooperation with the Czech Republic, results were processed in 2013 and 2014. Survey examined the differences between firms in Bratislava, Trenčín and Žilina.

In this paper we addressed, because of the limited scope, only narrow topic problems in finding finance and financial risk. We believe that linking the two surveys, which are devoted to small and medium-sized enterprises in Slovakia can bring a more comprehensive view on this issue. In this paper we focused due to limited scope only narrow topic problems in finding finance and financial risk. We believe that linking the two surveys, which are formulated to small and medium-sized enterprises in Slovakia, can bring comprehensive view on this issue.

*Key words: small and medium enterprises, access to finance, barriers of financing, barriers of business, financial risk, business risk*

JEL Classification: G32, G39

## **1 INTRODUCTION**

Small and medium-sized enterprises (SMEs) are the most important building part of a market economy. In the European Union and in the US account for 99% of all enterprises (Bhaird, 2010). In other words, this creates a segment in our country almost 50% of the national added value and provides about 70% of employment. SMEs are becoming increasingly more important component of all economies in the world (Karpak, Topcu, 2010). In this context, Henderson and Weiler (2010) indicate that SMEs can be characterized as a major engine of economic growth. The latest statistics of Slovak Business Agency report that Slovakia SMEs constitute 99.9% of all enterprises. After the outbreak of the financial and economic crisis began SMEs, which are characterized by considerable vulnerability, even more exposed to business risk. Moreover, the decline in orders, its production, and profitability caused the rise in unemployment in the context of global instability and reduced access to finance, there has been a declining number of SMEs.

However, the importance of the SME segment is clear, and this group is equally important in Slovakia. We believe that the analysis of one of their biggest problems - funding will bring

adequate benefits. Our goal is by linking the results of two surveys that we conducted among entrepreneurs, to bring comprehensive view on this issue in Slovakia.

## **2 BUSINESS RISKS OF SMES AND THEIR ACCESS TO FINANCE IN THE LITERATURE**

The introductory part of this paper presents the theoretical perspective of the business risks, including financial risks, which we will analyze by using results obtained in the surveys. The second part of the section will logically continue in the issue of financing of small and medium-sized enterprises.

### **2.1 Business risks, including financial risks for small and medium-sized enterprises in the literature and practical studies**

Shadbolt et al. (2010) agrees with the Chavasom (2004) that define risk as any situation, where results are not known with certainty. Smejkal and Rais (2003) associated risk with the following concepts: the uncertainty of the outcome - when we talk about risk, there must be at least two variants. Another condition is that at least, one of the possible outcomes is undesirable. At a similar definition provides the OECD (2008), according to which the risk of uncertainty, in various forms, such as loss of money or events with the potential harmful effects on health and other events that affect human well-being.

Another view, Veber (2004) perceived business risk as the risk of failure associated, however, with the hope to achieve good economic results. Despite many approaches to dealing with the risk Adásková (2009) presents the results of research in which 76% of the polled companies address the risk most often implemented via an intuitive approach, 36.5% used the set systems, 33% use emergency plans and 24% have a designated person responsible for risk management.

Fotr and Hnilica (2009) identify business risk as the possibility that the actual business results will deviate from the expected results with deviations may be desirable (towards higher profits) or side (towards loss), respectively different size (deviations from small to large scale variations). A similar approach to understanding business risk have Chodasová and Bartošová and Belanova (2012). They defined risk as two essential components of business risk and financial risk.

Business risks (market, production, personnel, legal, security etc.) are integrated into financial risk. Viewed in this light, optimal management of these risks will determine the existence of a market, respectively its bankruptcy and closure.

Financial risk is related primarily to the availability of financial resources, changing interest rates, respectively the use of different forms of capital. Nevertheless, research of financial risk, but from different point of global views the examined several authors. Torre et al. (2010) presents a group of SMEs as a core business for the bank through credit lines. According to the authors of the big banks can offer SMEs a lot more services, the relationships were problematic at a time of crisis.

Some academic studies analyzed financial products, but focused instead on credit products. (Bitler et al, 2001) Agostino, M. Gagliardi, F., Trivier, F. (2012) examined the concentration on the local credit market may affect the riskiness of SMEs. Boyd and De Nicolo (2005) report that less competition leads banks to increase charges for loans and earn more. This fact increases the risk of bankruptcy of the debtor. Dierkes et al. (2013) found that the share of corporate credit information improves forecasts of default and thus are better, the lower

failure rate. Other authors Ono, Ueshugi and Roll (2009) in their findings show that the riskiness of businesses have no significant impact on collateral. On the other hand, they found that banks that have claims collateralised try to monitor these borrowers intensively.

Authors Behr and Guttler (2007) propose a new model that predict the probability of default of German SMEs taking advantage of the unique data of German SME loans. They consider financing of bank as the dominant source of external finance for German SMEs. Viewed in this light, it is a new approach that analyzes the relationship of the bank and the customer, and a new feature allows to measure the risk of default of the borrower. Behr with Norden and Noth (2013) found that an increase in borrowing by local state-owned banks significantly reduce corporate financial exposure, while is not effect in private banks.

Italian researchers Gambini and Zazzaro (2013) examined whether the borrowing of the companies from banks can have beneficial effect on their growth. The basic finding is that borrowing money from banks provides smaller businesses the opportunity to grow, while on the other hand, loans can alleviate problems of medium-sized companies.

The problem in the SME sector is also limited awareness of enterprises. This situation in Slovakia confirmed Sobeková (2011), as well as foreign authors Dierkes, Erner, Langer and Norden (2013), who argue that companies in the SME segment are small businesses that are less informed, more risky and more dependent on trade and bank loans.

The question is: How to look the financial risk to businesses in Slovakia during the crisis? Sobeková (2011) analyzes on the basis of the published results of the banking sector, that the situation of loan financing in times of crisis and also on the side of supply and demand. Demand also fell for consumers and for businesses. On the other hand, the number of defaults began to increase. Banks have responded to this problem by tightening credit conditions, which began in the second half of 2008, when standards have tightened up 69% of the banks.

The standards for lending banks tightened particularly in the SME segment. More than 50% of banks significant change of credit standards for large enterprises did not record. The most noticeable change was in the amount of margin for risky loans. The third largest category of tightening occurred in the required collateral loans. This can be a major barrier to accessing credit just for small to medium enterprises. Particularly small and medium-sized businesses suffer from weak capital strength and often have problems with liability.

## **2.2 Access to finance for SMEs in the literature and practical studies**

SMEs have problem with many obstacles of business not only in Slovakia. According authors Pissarides (1999) and Steinerowska-Streb and Steiner (2014) is lack of the finance considered for the main problem to the growth of SMEs. That access to finance is necessary for growth and next developing of SMEs prove also authors Mercieca, Schaeck and Wolfe (2009). Many Slovak authors who know special situation in Slovakia declare lack of capital or access to finance as a one of the biggest problems of SMEs (Sobeková – Majková, Fetisovová, Vlachynský, Sirotko etc.) The authors Dong and Men (2014) informs about this findings about financing of SMEs. They confirmed that relatively small, young firms in nonmanufacturing sectors consistently face more severe financing obstacles/constraints and rely heavily on internal financing. The availability of credit information and the bank concentration ratio have a significant impact on SME financing. The authors Cheng, Tang and Shi (2012) present also weak capital power and credit degree as one of the biggest problems of SME financing.

In comparison of Slovak and German companies there is interesting fact - we can say that German small entrepreneurs do not have problems with obtaining financial resources because



they make a profit also used as internal financial resources. For example French entrepreneurs are somewhere on the board between Slovak and German companies as on July 2011 published the website Euractiv. On the other hand, problem is that during the crises is their situation worse and their support is so small. Business conditions in Slovakia – increasing VAT, decreasing flat expenses, etc. have bad impact on their financial situation.

The results coming out from NADSME (2011), the current Slovak Business Agency (SBA), it is clear that the outbreak of the crisis experienced relatively steep decline in earnings primarily of small businesses. The crisis in the form of a negative impact on their operation experienced 87% of SMEs but with varying intensity. The later survey of 2013 indicates that 45% of respondents used when starting a business support from the Ministry of work. Only 4% of businesses use when starting a business bank loan because the bank calls for collateral for the loan, which were unable to meet. One of the biggest problems identified by survey is obtaining of financial resources to challenging projects. It is alarming that none of the surveyed enterprises used credit resources for the development of international activities.

Most studies, however, engaged in financial and business risks exempli gratia Majková (2008) as the main barriers identified - weak financial strength makes it impossible for small businesses to get loans and provide security and low awareness of the various funding opportunities.

More to the point, research of the needs of young entrepreneurs and the obstacles to their business implemented, according to the survey of the Association of Young Entrepreneurs (AIPL) in collaboration with Jakubec, Sobeková and Solík (2012), that the first hurdle in business perceived lack of start-up capital (77.64%) and the second most marked the lack of experience, knowledge and professional contacts (71.70%).

### **3 OBJECTIVE AND METHODOLOGY OF THE RESEARCH**

First, the importance of the SME segment is undeniable. Second, it seems that one of the biggest problems which this group of entrepreneurs struggling is a lack of funding and financial risk. In this context, our goal is by combining the results of two surveys we conducted among entrepreneurs, to bring a more comprehensive look at this issue in Slovakia. The contribution is due to the limited informations, we focus only narrow topic - problems with obtaining finance and financial risk. We believe that the analysis of one of the biggest problems of SMEs in Slovakia - funding will bring appropriate benefits.

Moreover, analysis of the results based on the results of two surveys conducted in Slovakia. The first survey dealt with the barriers to youth entrepreneurship, which reviewed the current situation and bring inspiring ideas to promote business in this group of entrepreneurs. The survey was conducted in collaboration with the Association of Young Entrepreneurs in Slovakia and Iuventa within internal grant to the Pan European University in 2011 - 2012. The second survey dealt with the business risks in Slovakia in 2013. Survey was part of an international research project undertaken in cooperation with the Czech Republic and examined the differences between undertakings in Bratislava, Trenčín and Žilina.

The first research that we composed in cooperation with Association of Young Entrepreneurs, we examined obstacles in doing and starting business in Slovakia. We prepared online questionnaire so the choice of respondent type was stochastic. Our research group was divided to two parts, in one there were respondents, on the one hand young people who were potential young entrepreneurs and second young entrepreneurs to 34 years old. Only one fact could influence group of young people not entrepreneurs, therefore we assume that online questionnaire filled more people that would like to be in future entrepreneurs that not to be.

The questionnaires were filled in 2011, from July to November and the results were analyzed in 2012. Whole group had 1232 respondents: 324 were young entrepreneurs chosen by random selection and 908 young people not yet entrepreneurs, but they are thinking about starting their own business. (Jakubec, Sobeková, Solík, 2012)

We consider this survey for representative survey proving barriers in doing business of young entrepreneurs in Slovakia. According following Tab. 1 young entrepreneurs in Slovakia have 28 % share on total count of entrepreneurs in Slovakia. Also our sample was representative. We decided for random selection through internet by online questionnaire (50 %) and also personally by interview (50 %). The online questionnaire was published at the website of the Association of Young Entrepreneurs so all of them had the chance to fill it.

We counted the size of representative sample. We realized with 95 % of reliability of data, so we consider with sampling error +/- 5 %. The minimum size of sample should be according formula  $n = (1,96)^2 * \sqrt{p * (1 - p)} / 0,052$  where p is share of the sign. The size of our minimum sample size was 310 and real size of our sample was 324. Our sample was too closed with basic file in dividing by region and also by gender. According to Slovak Business Agency data, in the basic file there are 76.70% male and 23.30% female members. In our selection file, the numbers were very close, we found 64.20% men and 35.80% women.

Tab. 1 - Numbers of Entrepreneurs in Slovakia according to Legal Form and Size Group in 2012 (Basic file). Source: SBA

Legal Form	Total	Share of total companies	Share of young entrepreneurs to 34 years old	
			Total	in %
<b>Entrepreneurs individuals</b>	<b>402 325</b>	<b>72.3%</b>	<b>112 967</b>	28.1%
- tradesman	375 722	67.6%	108 489	28.9%
- free enterprise	19 069	3.4%	3 920	20.6%
- independent farmer	7 534	1.4%	558	7.4%

Following Tab. 2 shows regional structure comparison of basic and selection file. In the column difference we see the difference % between selection and basic file. But in each category it is smaller to 7 %.

Tab. 2 - Regional structure comparison of basic file and sample in 2012 (selection file).

Source: Slovak Business Agency

Region	Sample		Basic file*	Difference
	Total respondents	% respondents	% companies	% companies
Bratislava	92	28.40%	34.70%	- 6.30%
Žilina	52	16.05%	9.40%	+ 6.65%
Prešov	38	11.73%	9.20%	+ 2.53%
Košice	37	11.42%	10.30%	+ 1.12%
Trenčín	34	10.49%	8.30%	+ 2.29%
Banská Bystrica	31	9.57%	8.80%	+ 0.77%
Nitra	21	6.48%	10.00%	- 3.52%
Trnava	19	5.86%	9.20%	- 3.34%

*Note: Company distribution according to headquarters region.*

The second survey of business risks in selected regions of Slovakia we conducted by using a questionnaire inquiring about two years later in 2013. In this light, our sample included 371 enterprises: 102 enterprises from Bratislava region, 164 companies from Zilina region and 105 companies from Trencin region. The scope of the sample ranged from 0.2% to 0.09%. Similarly, it was a random choice and questionnaires were composed and distributed directly - the personal meetings or through the Internet. Representative sample was evaluated similarly as in the previous research.

Bratislava region is economically the strongest of all the regions, survey shows that nearly twice the number of small and medium-sized enterprises than in other regions. While in the Bratislava region's unemployment rate is about 6% in Trencin region is 11% and 13% of Žilina.

### 3.1 Analysis of results and hypotheses

We used for the analysis of percentage share table software Excel (Office 2007) and its possibilities to process data using pivot tables. It was important to use tools of descriptive statistics (averages and percentages). For the analysis, we used the method comparison and deduction. Than we used statistical method especially Pearson's chi-square and P-value to identify statistical differences, which was done in statistical software R. By using methods that are mentioned above we verify our hypothesis. We will present only some problems from our research because of article length limits. These arguments we constructed using our experience and estimation. Our hypotheses were built on the assumption of different points of view between young entrepreneurs and potential young entrepreneurs and on differences between men and women.

In addition, to the analysis of statistically significant differences we selected part of the results, where were also used data mining (decision tree method). The calculations were implemented in Weka software.

### 3.2 Testing Hypotheses

In both academic researches we had many hypotheses but in this article (because of the length) we prepared only 3 alternative hypotheses (H1 – H3) connected with financing of SMEs. Following hypotheses we will try to verify by using statistical methods. To each alternative hypothesis, there is also a null hypothesis that assumes there are no statistical verified differences between observed groups.

**Null hypothesis**  $\pi_1 = \pi_2$  so  $\pi_1 - \pi_2 = 0$

**Alternative hypothesis**  $\pi_1 - \pi_2 \neq 0$

We prepared the five following alternative testing hypotheses, which were done by expert's estimation:

**Hypothesis 1:** One of the biggest barriers in SMEs financing in Slovakia is access to finance and lack of capital. Young entrepreneurs sense different lack of information in starting business as young people that are potential entrepreneurs. We suppose that there is the dependence of sensing the lack of information and status of people. Young people that are not entrepreneurs do not have enough experiences and so their view is quite different.

**Hypothesis 2:** One of the major business risks within the surveyed regions is market risk and financial risk. Companies in the Bratislava region perceive it the least intensively, as it operates in the most developed region.

**Hypothesis 3:** Firms in the Bratislava region can better manage financial risk and easier to obtain the necessary financial resources.

## 4 The results of research and discussion

In this section of the paper we focus on analysis of the results and the verification of set of alternative hypotheses concerning with the financing of SMEs in Slovakia.

### 4.1 Problems with financing of SMEs in Slovakia

We supposed that young entrepreneurs and also potential young entrepreneurs think that people do not have enough information, especially majority about obtaining financial resources and also about tax and insurance law. Our results show that when young entrepreneurs started the business, they had lack the most information about obtaining financial resources 54.01%. On the other hand, during current times potential young entrepreneurs think that the most lack of information about how to manage the employee and about establishment the business, administrative duties during starting business. In sum, their views are quite different as is presented in following table 3.

Tab. 3 - The lack of information about business in group of entrepreneurs and potential entrepreneurs. Source: results of scientific research

<b>Answer – the lack of information</b>	<b>Entrepreneurs</b>	<b>Potential entrepreneurs</b>	<b>P-value</b>
About obtaining financial resources	54.01%	36.34 %	0.3935
About health and social insurance, accounting and laws	50.00%	29.85 %	0.0347
About administrative duties of the entrepreneurs to the authorities	48.15%	31.94 %	0.3449
About legal forms and establishment of the business	27.78%	31.39%	<u>p-value &lt; 0.01</u>
About doing business in abroad	26.23%	22.25%	0.2248
How to manage company and	24.38%	32.85 %	<u>p-value &lt; 0.01</u>

employees			
About business plan	23.77%	25.44 %	<u>0.001877</u>

We tried to count chi-square to know the dependence of sense the lack information between entrepreneurs and potential entrepreneurs to start a business. First, we see the differences between these two groups in Tab. 3, after taking chi-square ( $\chi^2 = 51,94 > 18,5 = \chi^2_{0,005}$  with 6 dgf.) we verify alternative H1 – there is the dependence which is statistically significant at 0.5% level of significance.

In the case of information about legal forms and establishment of the business, how to manage company and employees and about business plan, there are the biggest differences between young entrepreneurs and potential entrepreneurs (p-value > 0.05).

One of the aims of our research was to identify main barriers to start do business and also problems of young entrepreneurs. We found that following barriers of young entrepreneurs as the most important (Tab. 4):

- lack of financial resources 77.64%;
- lack of experience, knowledge and professional contacts 71.70 %.

These two barriers are the most important. However, they identify that mentoring is more important than financial resources, in this part, they indicate financial resources as the most important barriers. More to the point, behind them there is a lack of state grants 42.18 % a corruption 41.96%. We came to the conclusion that it is threatening number. Viewed in this light, the fifth biggest barrier was the fair of economy crisis 39.9% and high tax and insurance costs 36.56% and often law changes 36.01%.

Tab. 4 - Barriers of Young Potential Entrepreneurs – Answer on Question What Exactly To You Miss Start Own Business? Source: results of scientific research

<b>Answer</b>	<b>% share</b>
starting capital	78%
good business idea	41%
education and professional experiences	35%
ability to navigate in the laws	32%
better business environment	29%
willingness to take a risks	28%
merchant gift	14%
determination and perseverance	10%
ability to manage people	8%
support of family	8%
health	5%
nothing	3%

Nevertheless, men and women see as the biggest barrier of lack capital in terms of starting of business. Viewed in this light, women perceive law enforcement more positively than men, but are worried about the impact of the economic crisis and they think that young people are often prevented from lack of experience in business. According the education level there is the only difference in the perception of lack of contact that represents 10% of graduated, but only 15 % of respondents with primary education. In short, for majority young people is also

deficit of capital the biggest barrier in starting own business. On the other hand, 41 % of them miss a good business idea. They do not have education and professional experiences and they do not know to navigate in the laws of the country.

We identify the differences between entrepreneurs and young people. Moreover, entrepreneurs have some experiences, they have just started with business and so have more realistic view and know that missing capital is not only one big problem.

#### 4.2 Perceptions of business risks in Slovakia

Our research, in addition to other important information we examine how companies in Slovakia perceive business risks. First, we have been interested about differences between the selected regions. At the beginning, we assumed that firms in the Bratislava region at least suffer from the business risks, because they are located in the most developed region. The results are presented in Table 3. In addition to examining the percentage of firms that considered risks as a key, we investigated the statistical dependence between regions. P-value for all kinds of risks in addition to legal risk greater than 0.05 so do not reject the null hypothesis, respectively. Unfortunately, statistically relevant evidence that H2 is true, as the Pearson  $\chi^2$  is 12.3648 at 10 degrees of freedom, the overall P-value is 0.2614 > 0.05. Tab. 5 presents results in the perception of business risk.

Tab. 5 - Identification of business risks in Slovakia in 2013. Source: results of scientific research

<i>In your job you may experience with many risks. Which ones do you consider during current times as crucial? (Please indicate max. three answers.)</i>	2013 BA	2013 ZA	2013 TN	P-value
1. Market risk (lack of contracts) in% *average value of risk **	<b>80.39</b> 56.00	<b>80.49</b> 51.30	<b>82.86</b> 53.27	0.8672***
2. Financial risk (poor access to finance companies) in% average value **	<b>53.92</b> 31.94	<b>58.54</b> 32.95	<b>50.48</b> 30.01	0.4179
3. Operational risk (failure to manage processes) in% average value **	<b>20.59</b> 24.17	<b>22.56</b> 30.09	<b>14.29</b> 20.71	0.2408
4. Personnel risk (poor staff) in% average value **	<b>41.18</b> 31.04	<b>38.41</b> 30.89	<b>47.62</b> 30.77	0.3245
5. The legal risk in% average value **	<b>16.67</b> 37.5	<b>37.20</b> 28.76	<b>32.38</b> 32.01	<b><u>0.001574</u></b>
6. Safety risk (accidents, incidents etc.) in% average value **	<b>29.41</b> 20.28	<b>32.93</b> 24.73	<b>27.62</b> 28.76	0.63

Notes: \* Data are calculated as the number of respondents who replied with the answer given to the total number of firms;

\*\* Arithmetic mean of the values reported by businesses in different regions.

\*\*\* Using proportional test, we determined whether the individual types of risk occurs difference between regions. P-value, we determined for each risk separately.

As mentioned above, except for the legal risk, which is in the Bratislava region (16.67%) significantly lower than in Zilina (37.20%) and Trenčín (32.38%). We present P-value of 0.001574 < 0.05, that indicates the regions are statistically significant differences in other risk shows that differences between regions are not that big. For more detailed analysis, we find (Tab. 6) that between Bratislava and Zilina reaches P-value of 0.005872 < 0.05,  $\chi^2$  value Pearsonovho is 11.8162 at 1 degree of freedom. Similarly, we found a statistically significant

difference between the Bratislava and Trenčín, where P-value reaches  $0.0132 < 0.05$ . The difference can not be established between Zilina and Trenčín, where P-value reaches  $0.499 > 0.05$ .

The results show that, while alternative H2 can not be statistically verified, we managed to reject the null hypothesis in the case of legal. Statistically significant differences we found in the Bratislava region. Moreover, SMEs operating in it is statistically significant are less threatened by this risk as small entrepreneurs in Žilina and Trenčín.

Tab. 6 – P-value in law risk in 2013. Source: results of scientific research

Law Risk	2013 BA	2013 ZA	2013 TN	P-value BA:ZA	P- value ZA:TN	P- value BA:TN
Share in %	<b>16.67</b>	<b>37.20</b>	<b>32.38</b>	<b><u>0.0005</u></b>	0.499	<b><u>0.0132</u></b>

According to our estimation, we assumed that the average market risk in the Bratislava region is at least 40% and in other regions is even higher. Businesses were threatened by market risk in each region, the most intense in the Bratislava region, however, its average height 56 in Žilina 51.30 and 53.27 Trenčín region.

### 4.3 Financial risk management and ability to raise the funds

According to the H3 hypothesis: Enterprises in the Bratislava region can better manage financial risk and easier to obtain the necessary financial resources.

In the survey, we were interested in how businesses are able to manage financial risks to which they are exposed. On the other hand, when examining the differences between regions, we found differences between Bratislava and Zilina, which indicates that enterprises in the Bratislava region can better manage financial risk than those in Žilina (Tab. 7). Between Bratislava and Trenčín, Trenčín and Žilina statistically significant differences are not confirmed.

Tab. 7 – Ability to manage financial risk in 2013. Source: results of scientific research

<i>Do you think that you know to manage financial risks?</i>	2013 BA	2013 ZA	2013 TN	P-value BA:ZA	P- value ZA:TN	P-value BA:TN
<i>Yes in %</i>	40	23	32	<b><u>0.00486</u></b>	0.1599	0.2623
<i>To some extent %</i>	52	68	58	<b><u>0.0149</u></b>	0.1265	0.4924
<i>No, i can not judge %</i>	8	9	10	0.886	0.862	0.662

Furthermore, analysis of the results by using the Pearson chi-square and review P-values we tried to analyze business optimism by the method of decision trees.

As explained variable we selected question 20, which presented how our business will exist next 5 years. Numbers in the program were assessed by always zero, and zero is started as a negative response digit growth escalated until a clear yes.

Explanatory variables, we selected the answer to question 19 (Can you manage financial risks?), 22 (How changed your profitability?) And 13 (Do you know the criteria for assessing credit?).

Asked 20 companies responded as follows: a - do not survive to 5 years (5 responses), b = survive, but with great concern (28 replies), c = survive, but with some concerns (180 responses), d = definitely survive (158 responses).

In short, decision criterion was constructed as follows:

- Successful businesses (ot20 = 0) - If 19 = 1, 13 = 1, 22 = 1
- Failed (ot20 = 1 or 2) - where 19 = 3 or 4, if 19 = 22 = 3 and 3 = 3, and 13 or, in the 4 and 19 = 22 = 13 = 3 and 3

The resulting matrix provides the following actual placement of the undertakings:

a	b	c	d	
0	0	4	1	a = 0
0	0	22	6	b = 1
0	3	<u>101</u>	76	c = 2
0	2	57	<u>99</u>	d = 3

From the 180 companies, 101 firms have expressed some concern in response to question 20 c, we used the criteria where we were able to correctly identify 99 out of 158 companies which have expressed strong survive.

Software lined up explanatory variables by relevance, moreover according to the our results it appears that the question 19 was the most important explanatory variable and question 20, 22 and then the 13th as well.

Eight businesses answered that they can not manage financial risks (answer to question 19 zero). Only six of them (75%), in fact, answered for question 20 with answer 2 - i.e. they think they will survive with some concern, the other 25% think otherwise.

By contrast, 112 companies that responded that they think they can manage financial risks, only 71 (64%) answered on question 20 with response 3 - i. e. they think they definitely survive. The remaining 41 firms believe otherwise.

We came to the conclusion, it appears that firms that think that they can manage the financial risks are more cautious with response, and certainly survive up to 5 years. Only 64% of those who think that they can manage the financial risks they think and certainly survive up to 5 years.



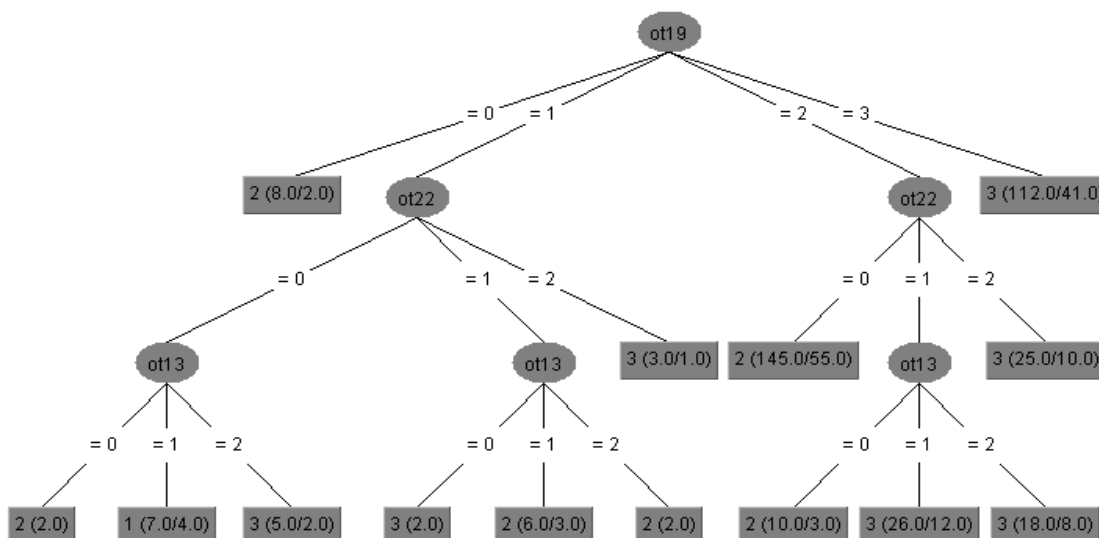


Fig. 1 - The decision tree as a result of question: do you think that your company will survive the next 5 years? Source: results of scientific research.

Up to 75% of companies that state that can not manage the financial risks they think will survive, but with some concern. In this context, it seems that even if you find companies that can not manage financial risks, their existence again is so black, with only some concerns about survival.

## 5 CONCLUSION

The aim of the paper was to outline the barriers which SMEs encounter in Slovakia and in terms of the financial risk further analyze the business risks of SMEs in Slovakia. We believe that we through closer interpretation of the results of the two presented surveys we fulfill this goal.

The question is: What are our specific findings? We have set three working hypotheses. The first working hypothesis examined that one of the biggest problems the entrepreneurs in Slovakia fighting, is to access to finance and lack of capital. This special issue came to the fore at young entrepreneurs. According to the results (Tab. 2 and 3), we found that indeed most entrepreneurs considered lack information on the funds and fund-raising as the biggest problem in business.

The second hypothesis examined the perceptions of business risks. We assumed that firms in the Bratislava region perceived risks less intensive than firms in other selected regions. The percentage of enterprises confirmed that, but the results are not statistically clearly interpretable. We were able to confirm only in the group of legal risk.

However, last working hypothesis was composed that companies in the Bratislava region can better manage financial risk and easier to obtain the necessary financial resources. We came to the conclusion that we can not generalize the argument that Bratislava firms are indeed the better. In short, we achieve statistically significant value when comparing the Bratislava and Žilina region. According to the results, we found that firms that think that they can manage the financial risks are more cautious in response and certainly survive up to 5 years. Only 64% of those who think that they can manage the financial risks they think and certainly survive up to 5 years.

Nonetheless, in the introduction we mentioned that one of the milestones of the paper is to propose the possibility that the business risk of the group of companies to reduce and facilitate their access to the necessary finance. How our suggestions make this situation better? We would like to bring some proposals, especially to make business easier to young entrepreneurs. In sum, it was too complicated in current times of crisis but they were prepared after constructive debate of authors of research. For the better understanding we composed a table with chosen problems and proposals of solution, all of them are specific for Slovak market.

Tab. 8 - Key barriers and proposals of solutions to support business in Slovakia.

Source: Sobeková, Solík, Arrows (2014)

<b>Problem</b>	<b>Solution</b>	<b>Key attributes of proposal</b>
Lack of access to micro capital in 5000, resp. 15 000 euro	Supporting schemes with the accent on microfinance or guarantee schemes with participation of private sector	<ul style="list-style-type: none"> <li>○ amounts to 5000 €</li> <li>○ low bureaucracy</li> <li>○ on-line agreement process</li> <li>○ small interest rate</li> </ul>
Lack of capital for innovative and venture projects	Support of business angels nets	<ul style="list-style-type: none"> <li>○ support information about this financial resource</li> <li>○ guidance about this type of finance</li> <li>○ support the activities of regional nets</li> <li>○ presentation of successful stories</li> </ul>
Lack of preparedness for business (missing contacts, exchange of experiences and mentoring)	Correction existing support state guidance programs	<ul style="list-style-type: none"> <li>○ orientation for long-term guidance and education in first three years of business</li> <li>○ mentoring</li> <li>○ business coaching</li> </ul>
	Support of co-working centres in regions of Slovakia	<ul style="list-style-type: none"> <li>○ Changes of information between young entrepreneurs and coaches or other companies</li> <li>○ Higher concentration of young people</li> </ul>
Problem of obtaining and maintenance of contacts in abroad (special problem in international business)	Support of business missions of young entrepreneurs	<ul style="list-style-type: none"> <li>○ Effective presentation of products on foreign exhibitions and markets</li> </ul>
Lack of information about start and development financial support for young entrepreneurs	Increasing of information about services for young entrepreneurs	<ul style="list-style-type: none"> <li>○ Coordination of support of NADSME and first contact centres and companies</li> <li>○ Support of information changes through internet and also personally</li> </ul>

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## **CZECH REPUBLIC'S TAX POLICY AND ITS APPROACH TO TAXATION OF DONATIONS**

*Šárka Sobotovičová*

### **Abstract**

Donations in the Czech Republic were subject to the gift tax till the end of 2013. The gift tax ranks among property taxes. The approach to taxation of donations has basically changed since 2014 and gifts are newly identified as gratuitous income. This gratuitous income is incorporated into the income taxes. This article deals with the taxation of gifts and gift tax developments in the Czech Republic. It captures the dynamics of the gift tax since its introduction in 1993 until 2013. Due to the change in taxation of donations since 2014, an assessment of the impact of this change on the tax rate is provided.

*Keywords: gift tax, income tax, property taxes, tax revenues, wealth transfer tax*

JEL Classification:H20, H24

### **1 INTRODUCTION**

The gift taxes have generally come into existence as a supplement to the inheritance taxes. The reason is that the core of a property transfer by inheritance and donation is the same, since in both cases the property is transferred into the ownership of another person without charge. One of the reasons for the application of the gift tax is taxation of property which was donated while a donor is alive. Otherwise, taxpayers from countries, which apply inheritance tax, might optimize taxation of inheritance by donation of property while being alive.

The gift tax belonged to property taxes in the Czech Republic and referred to capital transfers tax. Progressive sliding tax rates were applied which differed according to family relationships. The gift tax was incorporated into the income taxes on January 1, 2014. A unified tax base is applied, which is different for both individual and legal entities.

### **2 THEORETICAL BASIS**

According to tax theory, the gift tax together with the inheritance tax ranks among the property taxes. It is capital transfer tax and relates to gratuitous transfers (Kubátová, 2010). As Široký states (2008), theory of property taxes can be generalized about as the theory of a wealth tax. Reasons for property taxation can be found both in the principle of utility and even the principle of ability to pay. In the case of taxation of donated property, a taxpayer may get the impression that they have not obtained the property for free, and therefore they will treat it with greater responsibility.

The argument for maintaining the transfer tax is based on its tendency to progressivity, which is related to tax fairness (Blechová, 2012). Where there is no tax exemption scheme for inheritance and gift taxes, there are progressive rates of taxation, which contribute to greater fairness of the tax system (Kubátová, 2010). To illustrate, a proponent of transfer taxes is Lumley (1998), who states that these taxes represent a stable income to a state budget. Jackson and Brown (2003) reported that the choice of transfer taxes is administratively less demanding and gift recipients consider the tax to be a smaller tax burden.

As Kubátová stated (2010), an important and often very frequent reason against taxation of property acquired through donation is that the subject of donation is always the property, which was, in most cases, acquired from already taxable income of a taxpayer (Joulfaian, 2003). It means that such property is therefore inherently taxed twice. The gift tax is considered to be a disincentive, which forces to “eat up” property, instead of accumulate it. The revenue from the gift tax is very low in the Czech Republic compared to the costs of this tax administration (Radvan, 2007).

Wealth transfers in the form of gifts between the livings are subject to the gift tax - inter vivos transfers (Joulfaian, 2004). In practice, taxing inter vivos transfers is difficult partly because it requires those concerned to report the taxable event. There are also many ways in which money can effectively be spent for the benefit of others without involving any direct transfer of money (Mirrlees, 2011). The reasons for donation may differ. It can be a transfer of wealth to the next generation among relatives or transfers motivated by altruism or by “joy of giving”. Therefore, some countries apply different tax rates and the tax exemption in connection with relationship between the transferor and the acquirer.

The taxation of gifts can occur in several forms in the European Union. Some countries tax the donations with a separate gift tax. However, it can also happen that the taxation of gifts is part of a more 'general tax' (e.g. income tax). Finally, it is possible that Member States do not tax gifts as such, but that donated real estate is nonetheless subject to a real estate transfer tax.

As reported by the European Commission (2014), the approach to the taxation of gifts in individual states of the European Union can be summarized as follows:

- Gifts (or the receipt of them) are taxed in 21 Member States.
- 16 countries make use of a specific tax.
- Denmark uses both a tax (relatives) and a provision in the personal income tax (third parties) for taxing gifts.
- Of the seven Member States without a gift tax in six, under conditions, donated real estate is subject to a real estate transfer tax.
- Only Estonia does not tax any gifts.

### **3 DEVELOPMENT OF THE GIFT TAX IN THE CZECH REPUBLIC**

The gift tax was introduced in the Czech Republic in 1993 by Act 357/1992 Coll. on inheritance tax, gift tax and real estate transfer tax. For the purposes of calculating the gift tax, taxpayers were divided into three groups based on kinship with the transferor:

- I. category was formed by first-degree relatives. It was bloodline both ascending and descending, so it means that it included both descendants as well as ancestors (sons, daughters, grandsons, great-grandsons, father, grandfather, great-grandfather, etc.) and husbands,
- II. category included collateral relatives - siblings, nephews, nieces, uncles and aunts, then children’s spouses, children and parents of spouses, spouses of parents and persons who lived with the donor for at least one year prior the transfer in a common household, and who therefore took care for the common household or were dependents on the transferor for their support,
- III. category featured other natural persons and legal entities.

A significant change occurred in the gift tax in 2008. It was a full exemption of gratuitous acquisition of property between persons of the I. and II. category. Gratuitous acquisition of financial means and movable assets for personal needs up to CZK20,000 realized between persons of the III. category are tax exempt.

The gratuitous acquisition of property is subject to the gift tax. The taxpayer was the acquirer who acquired the property free of charge if it was a donation in the homeland. In case of a donation into a foreign country, the taxpayer is a transferor. Taxable subjects were immovables, movables and other property benefits. The tax base was equal to the value of the acquired property reduced by the value of proven debts and other liabilities connected with the acquired property, customs duty paid if the acquired property was imported or exported. The value of gifts, which the acquirer has received from a single transferor within two years, was combined to prevent a purposeful reduction of taxes by dividing one donation to several smaller ones.

There were progressive sliding tax rates and differed according to family relationship. Tax rates for the taxpayers included in III. category are listed in the following table.

Tab. 1 – The gift tax rate for persons of III. category. Source: own processing according to Act 357/1992 Coll. on inheritance tax, gift tax and real estate transfer tax

<b>Tax base over CZK</b>	<b>Tax base to CZK</b>	<b>Tax rate</b>
-	1 000000	7%
1 000000	2 000000	CZK 70000 and 9 % from tax base exceeding CZK1 mil.
2 000000	5 000000	CZK 160 000 and 12 % from tax base exceeding CZK2 mil.
5 000 000	7 000 000	CZK 520 000 and 15 % from tax base exceeding CZK5 mil.
7 000 000	10 000 000	CZK 820 000 and 18 % from tax base exceeding CZK7 mil.
10 000 000	20 000 000	CZK 1 360 000 and 21 % from tax base exceeding CZK10 mil.
20 000 000	30 000 000	CZK 3 460 000 and 25 % from tax base exceeding CZK20 mil.
30 000 000	40 000 000	CZK 5 960 000 and 30 % from tax base exceeding CZK30 mil.
40 000 000	50 000 000	CZK 8 960 000 and 35 % from tax base exceeding CZK40 mil.
50 000 000	and more	CZK 12 460 000 and 40 % from tax base exceeding CZK50 mil.

The act on inheritance tax, gift tax and real estate transfer tax was repealed on January 1, 2014 and gratuitous income has become subject to the income tax imposed on legal entities and natural persons. Gratuitous property acquisition realized between persons of the I. and II. category remains tax exempt under the new Civil Code. Partial relief for persons included in the III. category with acquisition up to CZK20,000 was cancelled. However, occasional gratuitous income up to CZK15,000 is exempt.

#### **4 AIM AND METHODOLOGY**

The aim of this paper is to evaluate the approach to taxation of gifts in the Czech Republic. There is a description of developments in the gift tax in the Czech Republic based on the tax encashment and regulation following legislative changes. Due to the change in the approach



to taxation of gifts, a comparison and evaluation of the impact of this change on the tax rate is performed.

An important tool to study the dynamics of economic processes is time series analysis (Ramík, 2007). Simple rate time series dynamics allows us to characterize the basic features of their behavior. The basic features of time series dynamics include absolute increase.

The absolute increase (first order differential) can be calculated according to formula 1:  $y_t = y_t - y_{t-1}$ ,  $t = 2, 3, \dots, n$  (1)

wherein:

$y_t$  is the value of the gift tax revenues in the year  $t$ ,

$y_{t-1}$  is the value of the gift tax revenues in the year  $t-1$ .

Another used elementary characteristic is the growth rate, which indicates the percentage of increased value of time series at a certain point in time compared to the previous point in time. Growth rate in the year  $t$  is calculated according to formula 2:

$$k_t = \frac{y_t}{y_{t-1}}, t = 2, 3, \dots, n \quad (2)$$

wherein:

$y_t$  is the value of the gift tax collection in the year  $t$ ,

$y_{t-1}$  is the value of the gift tax collection in the year  $t-1$ .

Tax imposed represents the amount of tax as reported in tax returns and yield ( $Y$ ) is calculated according to formula 3:

$$Y = \frac{TR}{TI} * 100 \quad (3)$$

wherein:

TR is tax revenue,

TI is tax imposed.

When calculating the amount of the gift tax for progressive sliding tax rate, we proceed in accordance with Table 1. The tax base is rounded up to whole hundreds and tax rates are applied according to the zone in which the tax base is located.

When calculating the amount of income tax, we apply a unified tax rate and the tax is calculated according to formula:

$$T = TB * t_s \quad (4)$$

wherein:

TB is tax base TB (rounded down to CZK100),

$t_s$  is statutory tax rate.

In the article, the method of analysis was used to define, characterize, and classify the basic concepts and their impact in dealing with differences. The method of comparison was employed to a mutual comparison of tax burden. Acquired knowledge was evaluated by the synthesis method at the end of the article.

## 5 RESULTS

Development of the gift tax revenues in the Czech Republic in the years 1993-2013, including the absolute difference of the first order and the growth rate, is given in the following table. It also states the tax imposed since 1995 (earlier data are not available) and yield for individual years is calculated. The gift tax revenues were mainly influenced by changes in the legislation within individual years. Due to progressively introduced extensive exemptions, revenues of this tax in 2013 fell below the level of 1993, when the tax was introduced. The total gift tax collection in 2013 was CZK48 mil. lower than in 1993.

Tab. 2 – Gift tax revenues. Source: own processing according to  
<http://www.financnisprava.cz/cs/dane-a-pojistne/analyzy-a-statistiky/udaje-z-vyberu-dani>

<b>Year</b>	<b>Tax revenues</b>	<b>Absolute increase (in mil. CZK)</b>	<b>Growth rate</b>	<b>Tax imposed</b>	<b>Yield</b>
1993	156	-	-		
1994	389	233	2.494		
1995	357	-32	0.918	303	117.822
1996	296	-61	0.829	926	31.965
1997	350	54	1.182	369	94.851
1998	427	77	1.220	569	75.044
1999	405	-22	0.948	443	91.422
2000	413	8	1.020	453	91.170
2001	475	62	1.150	453	104.857
2002	601	126	1.265	566	106.184
2003	648	47	1.078	-113	*
2004	818	170	1.262	752	108.777
2005	510	-308	0.623	524	97.328
2006	604	94	1.184	569	106.151
2007	692	88	1.146	720	96.111
2008	345	-347	0.499	299	115.385
2009	162	-183	0.470	157	103.185
2010	138	-24	0.852	137	100.730
2011	4279	4141	31.007	4269	100.234
2012	3368	-911	0.787	3359	100.268
2013	108	-3260	0.032	93	116.129

\* Yield cannot be determined because the value of tax obligation is negative.

Gift tax revenue developments were affected by the amendment in 1996, which broadened the range of gift tax exemptions and changed the taxation regime for consideration and gratuitous transfers of real estate.

There was an increase by CZK47 mil. in tax revenues in 2003 compared with 2002, which is reflected in tax revenues in the performance of the budgeted amount to 95.3 %. Relatively extensive exemptions on gratuitous property acquisition are guaranteed in the gift tax; especially for financing public benefit activities, including property acquisition by foundations and endowment funds, state-registered churches and religious societies, charitable societies, and political parties. Despite this fact, the gift tax revenue indicated an upward trend. The gift tax revenue growth, compared to the previous period, was caused not only due to the increase in the number and value of the property gratuitously transferred, but

also due to increased effectiveness of recovery of tax claims. The main particularity of this year is a negative tax obligation, which has been introduced due to depreciation of arrears for impregnability of CZK723.9 mil. The reason for the depreciation of claim resulted from the bankruptcy proceedings and was based on a qualified estimate of the bankruptcy yield.

The gift tax revenue has increased by CZK170 mil. in 2004 compared to 2003. In total, the gift tax collection amounted to CZK818 mil. in 2004, representing an increase of CZK662 mil. in comparison with 1993. The total revenue of the gift tax in 2005 amounted to CZK510 mil. which represents only 63.8 % of the budgeted amount and CZK308 mil. less than in 2004. Revenues developments were affected by a larger number of exempt transfers of property rights to housing from the cooperative ownership to personal property. The gift tax revenue is influenced both by a decrease in the value of donated property and a quite extensive relief, when acquisition of movable personal belongings up to CZK1 mil. and up to the same amount of the acquisition of funds in the homeland is exempt. The gratuitous acquisition of property for financing research and development was newly exempt with legal entities in 2005.

The total gift tax revenue reached the amount of CZK345 mil. in 2008 and compared to 2007, there was a decline by CZK347 mil. The decrease in tax revenues was caused mainly by extending the exemption of gratuitous property acquisition between persons from the I. and II. category of taxpayers from January 1, 2008. This new legislation also affected the decrease in the amount of the gift tax collection between the years 2009 and 2010.

The gift tax revenue in 2011 and 2012 differs significantly from other years. It is influenced by legislative changes, which burden gratuitous acquisition of greenhouse gas emissions allowances for electricity generation with the gift tax in these two years. The gift tax rate in these cases represented 32 % of the tax base.

The total gift tax revenue amounted to CZK4.279 mil. in 2011. The increase of the gift tax due to the introduction of the gift tax on the emission allowances should be CZK4.800 mil. Taxpayers were obliged to file the gift tax returns to the local office by March 31 of the calendar year. For this reason, most of the gift tax was already collected during the first half of 2011. Due to the fact that in several cases it was found that the tax exemption applies to taxpayers to a greater extent than was originally assumed, the amount did not completely meet the budget.

Based on the above mentioned legislative changes, the gift tax collection was high in 2012 compared to the year before the amendment and amounted to CZK3.368 mil. However, it was lower by CZK911 mil. (21.3 %) in comparison with 2011 due to the lower average market value of greenhouse gas emissions allowances, which the tax base is calculated from.

The reason for a significant decrease in the gift tax collections in 2013 is mainly a termination of the temporarily introduced gift tax for operators of equipments for electricity production using gratuitous acquisition of greenhouse gas emissions allowances.

The gift tax revenue depends on the number and values of gratuitous property transfers and is affected by low tax rates and widespread exemptions. The collection amount is also affected by the persistent overall economic situation with a direct link to the decreasing solvency of donors.

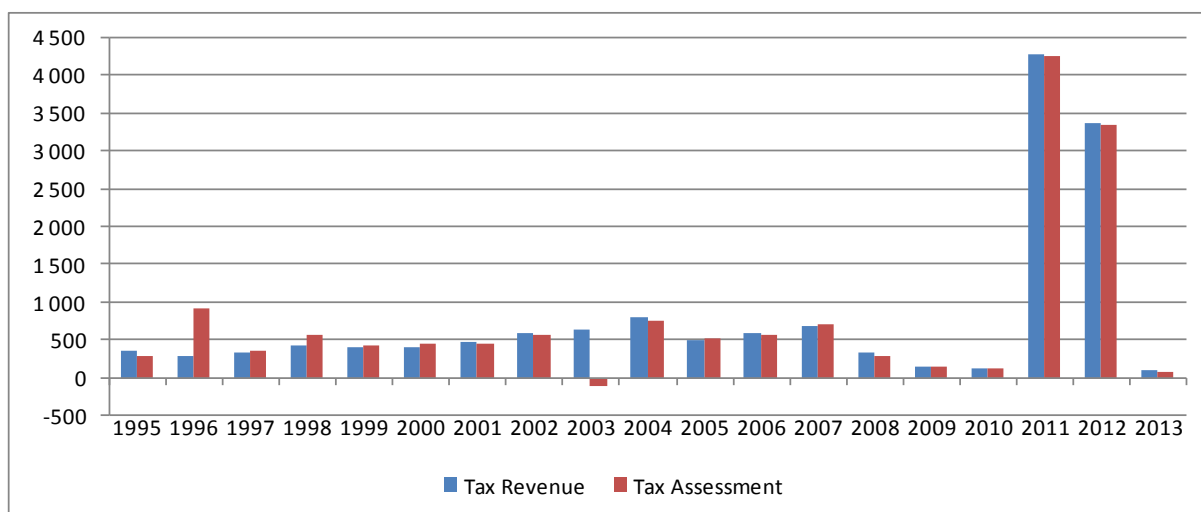


Fig. 1 – Comparison of the gift tax collection and tax regulation between 1993-2013. Source: <http://www.financnisprava.cz/cs/dane-a-pojistne/analyzy-a-statistiky/udaje-z-vyberu-dani>

As summarized in the graph above, the gift tax revenue has been stable over time and began to decrease in 2008. This trend also continued in 2009 in connection with the amendment which introduced full exemption from the gift tax on January 1, 2008 for persons of the I. and II. categories. More significant changes in the gift tax revenue may be recorded in 2011 and 2012, when gratuitous acquisition of greenhouse gas emissions allowances was subject to the gift tax. The gift tax regulation represents the tax amount as indicated in tax returns. The tax regulation is lower than the tax collection in most of the reference years (11 out of 19, since data for the years 1993 and 1994 are not available). The tax regulation from 2003 is nonstandard and is influenced by depreciation of arrears for impregnability as mentioned above.

The approach to taxation of gifts has changed in the Czech Republic since January 1, 2014. The gift tax was abolished and gifts, which are now being referred to as gratuitous income and are subject to the income tax. Following this change, the algorithm of tax calculation has completely changed. Progressive sliding rate taxes were at the same rate for both individuals and legal entities at the end of 2013 and partial exemption was applied. A unified tax rate has been applied since 2014, which is 15 % for natural persons and 19 % for legal entities (Janoušková, 2012).

Prerequisite for the calculations: immovables and movables, both things and money and claimed exemption are in amount of  $2 * 20.000$  CZK according to the wording of the law in force in 2013. The calculation for natural person is performed in two variants. Firstly, it is a variant for those with no income, where natural person may use a tax relief in the amount of CZK24.840. Secondly, for those with income where other incomes at the minimum amount of CZK165.600 are assumed and therefore, a tax relief does not reflect in the amount of the gift tax. A transferor and acquirer are included into the III. category.

Tab. 3 – Model calculation of tax burden for individuals. Source: own calculations

Property	Gift tax in 2013	Tax from donations in 2014 natural person without income		Tax from donations in 2014 natural person with income	
	Tax	Tax	Difference	Tax	Difference
165600	8 792	24 840	16048	0	-8792
1 000 000	67 200	150 000	82800	125160	57960
2 000 000	156 400	300000	143600	275160	118760
5 000 000	515 200	750000	234800	725160	209960
7 000 000	814 000	1 050000	236000	1 025160	211160
10 000 000	1 352 800	1 500000	147200	1 475160	122360
20 000 000	3 451 600	3 000000	-451600	2 975160	-476440
30 000 000	5 950 000	4 500000	-1 450000	4 475160	-1 474840
40 000 000	8 948 000	6 000000	-2 948000	5 975160	-2 972840
50 000 000	12 446 000	7 500000	-4 946000	7 475160	-4 970840
60 000 000	16 444 000	9 000000	-7 444000	8 975160	-7 468840

Based on the above calculations, it is clear that the new system of taxation for most natural persons is disadvantageous and the calculated tax is higher. Taxation of donations with a value higher, than about CZK12.3 mil., would be more advantageous because an impact of progressive sliding rate taxes becomes evident. The average tax rate is higher than the actual income tax rate for individuals, which is 15 %.

There is an advantage for some taxpayers who, besides gratuitous incomes, do not have additional incomes, or their other incomes are low. Then, they can take advantage of tax allowances, which reduces the tax base, and tax reliefs which reduce the already calculated tax (Janoušková&Sobotovičová, 2013).

Tab. 4 – Model calculation of tax burden for legal entities. Source: own calculations

Property	Gift tax in 2013	Tax from donations in 2014	
	Tax	Tax	Difference
165600	8 792	31 464	22 672
1 000 000	67 200	190 000	122 800
2 000 000	156 400	380 000	223 600
5 000 000	515 200	950 000	434 800
7 000 000	814 000	1 330 000	516 000
10 000 000	1 352 800	1 900 000	547 200
20 000 000	3 451 600	3 800 000	348 400
30 000 000	5 950 000	5 700 000	-250 000
40 000 000	8 948 000	7 600 000	-1 348 000
50 000 000	12 446 000	9 500 000	-2 946 000
60 000 000	16 444 000	11 400 000	-5 044 000

Based on the above calculations, it is clear that the new system of taxation for majority of legal entities is even more disadvantageous than for natural persons. This is because the tax rate for legal entities is higher, namely by 19 %. The taxation of donations would be more

advantageous for donations over CZK37 mil. In such cases, the impact of progressive sliding rate tax becomes evident so that the average tax rate is higher than the actual income tax rate for legal entities.

## **6 DISCUSSION**

The gift tax is a one-off tax which has a different method of assessment. In the tax return, a taxpayer indicates only the data needed for tax determination. The actual tax for the taxpayer is assessed by a tax office and they are informed about it through the tax assessment. Therefore, tax maturity is based on delivery of tax assessment and its due date is not tied to the year when the property transfer occurred. Especially in the early years, the tax assessment takes longer delays, such as up to two years after receiving a gift.

Revenues of the gift tax amounted to CZK15.541 mil. and the tax imposed amounted to CZK14.848 mil. over the entire period of the gift tax in force. The difference between the gift tax revenues and tax imposed is mainly influenced by the time discrepancy between the tax collection and its assessment, and also between paid interest and penalties. The gift tax revenue growth, compared to the previous period, was caused not only due to the increase in the number and value of the property gratuitously transferred, but also due to increased effectiveness of enforcement activities of tax administrators. Reducing collection and tax regulations occurred mainly in the context of adopted legislative amendments, especially in connection with extending the exemption.

The highest absolute increase was achieved in 2011, when gratuitous acquisition of greenhouse gas emissions allowances began to be subject to the gift tax. Such an increase in tax revenues is debatable, as it was affected by specific legislative arrangements with limited validity. The issue of taxation of emission allowances within the gift tax in the Czech Republic is different from procedures in other EU Member States. This method of taxation allowances for greenhouse gas emissions is still the subject of litigation and is not binding resolved. The Supreme Administrative Court addressed the question of whether the Czech legislation is not in contrary to Article 10 of the European Parliament and Council Directive 87/2003/EC of October 13, 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community. The Advocate General of the Court of Justice of the European Union Juliane Kokott has stated that the gift tax which the Czech government has imposed on emission allowances is not in conformity with European Union law. Although the findings of the Court are not binding, it can be assumed that the parties concerned will apply for a refund of the paid tax.

There were progressive sliding rate taxes in the Czech Republic till the end of 2013. The Explanatory Memorandum (2013) states, that the tax calculation is unnecessarily complicated with regard to the yield of this tax. In comparison with other EU states, the legislation of the gift tax in the Czech Republic was one of the simplest and most transparent, and property taxes were relatively low.

Based on the calculation, it is clear that there is an increase in the taxation of gifts for both natural persons and legal entities. Only very expensive gifts are burdened by lower taxes under the new legislation. This is because the flat tax rate applied to income is lower than progressive sliding rate of the gift tax only at a high tax base. There are exceptions to individuals who have no other incomes apart from donations or their incomes are low and can take advantage of tax reliefs or tax allowances.

Regarding legal entities, donations to public beneficial taxpayers are still exempt, if they are for purposes defined by law or a capital contribution for the taxpayer.

## **7 CONCLUSION**

Based on the analysis of developments in the gift tax revenues, it was found that the tax collection ranged from CZK108 mil. to CZK818 mil. between the years 1993-2013. The tax collection was significantly higher in the years 2011 and 2012, when gratuitous acquisition of greenhouse gas emissions allowances began to be subject to the gift tax according to legislative changes. The question is, however, the relevance of such an increase in revenues, which is influenced by specific legislative arrangements with limited relevance in relation to other time periods.

The gift tax revenues were low in comparison with other taxes. The Civic Democratic Party came up with a proposal in 2003 to repeal the gift tax arguing that the collection costs are high, both on the part of the state and the taxpayers' one. Several EU member states have already abolished capital transfers taxes. This is also in accordance with a global trend of shifting the tax burden from direct taxes to indirect taxes.

Taxation of donations was included into the income tax in 2014 and thereby the tax rate has also changed. Most gifts between taxpayers of the I. and II. category remains tax exempt. The tax from gratuitous performance has increased for most taxpayers included in the III. category. The only exceptions are some individuals for whom taxation under the income tax base is more profitable (making use of tax reliefs or tax base to compensate for loss of business or lease). In case of a more valuable gift, when taxation is higher, it may be better to use other legal provisions, to time donation appropriately, or even handle the transaction as a pecuniary matter. The benefit of the new legislation should consist in simplicity and administrative savings associated with the inclusion of gifts under the income tax regime.

Moreover, gratuitous income is stated in the income tax return since 2014. Therefore, the tax is paid automatically without assessment. Previously, there was not an exception for gifts. There was a long time gap between assessment of the gift tax and filing the tax return. The tax was paid only on the basis of the received payment assessment.

### **Acknowledgment**

*This paper was supported by the Ministry of Education, Youth and Sports Czech Republic within the Institutional Support for Long-term Development of a Research Organization in 2015.*

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## **ATTITUDE OF CZECH FIRMS TO INVESTMENT IN DESIGN**

*Pavla Staňková, Jan Kramoliš*

### **Abstract**

Currently, product design and company design are becoming important tools which influence the final decisions of customers. For this reason, firms are aware of the importance of design for the success of a product in the market. However, the question is whether they tailor their investment to design adequately. The return on investment in design is a key question when making decisions; it is also a tool for competitiveness and performance. The aim of this article is to present the attitudes of Czech firms to investment in design, whether they have a design budget set out, what impact they expect that design will have on the company's economic results and how they perceive the return on investment in design.

*Keywords: Design, investment, profitability, competitiveness, performance*

JEL Classification: M1, O32, M31

### **1 INTRODUCTION**

Bruce and Bessant, J. (2002) define design as the application of human creativity to a purpose – to create products, services, buildings, organizations and environments which meet people's needs. It is the systematic transformation of ideas into reality, and it is something which has been happening since the earliest days of human ingenuity.

Stamm (2008) specifies three interpretations of the term design:

- Design is a tangible outcome.
- Design is a creative activity.
- Design is a process by which information is transformed into a tangible outcome.

According to Fairhead (1988), we can define four different levels of the understanding of design given, see Figure 1:

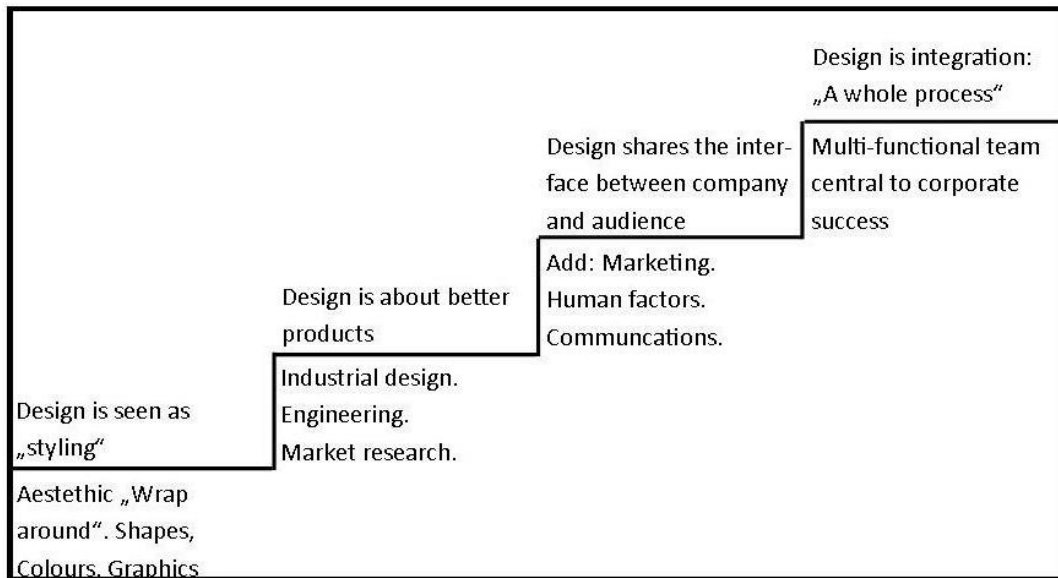


Fig. 1 – The growing world of the design. Source: FAIRHEAD, J. (1988)

Design management is a term for which there is no clear-cut definition. However, it is evident that this term represents the connection of two fields – design and management. According to Kathryn Best (2006), a wide variety of perspectives exist that reflect the rich array of individuals, professions and context involved in the area of design management. Hollins (2002) defines design management as the organisation of processes for developing new products and services.

Bruce, M. and Bessant, J. (2002) identify the following fundamental issues of design management:

- a) How do particular perspectives fit into the design process and what can they bring?
- b) How can design professionals support these different contributions?
- c) How tolls/techniques are made available to help make this contribution?
- d) How can the effectiveness of the design process be measured?
- e) How can the process be improved?

According to the Design Management Institute in Boston (2014) the definition of Design management encompasses the ongoing processes, business decisions and strategies that enable innovation and create effectively-designed products, services, communications, environments and brands that enhance our quality of life and provide organizational success. On a deeper level, design management seeks to link design, innovation, technology, management and customers to provide a competitive advantage across the triple bottom line: economic, social/cultural and environmental factors. It is the art and science of empowering design to enhance the collaboration and synergy between "design" and "business" to improve design effectivity. The scope of design management ranges from the tactical management of corporate design functions and design agencies, including design operations, staff, methods and processes—to the strategic advocacy of design across an organization as a key

differentiator and a driver of organizational success. It includes the use of design thinking—or using design processes to solve general business problems.

## 2 THEORETICAL BACKGROUND

Investment in design has traditionally been linked to company performance (Bloch, 1995; Gemser and Leenders, 2001; Potter et al., 1991; Ulrich and Pearson, 1998). According to Chiva and Alegre (2009) design investment on its own seems to be rather ineffective in providing a basis for sustainable competitive advantages because it can be easily duplicated. The benefits from a growing investment in design can be more readily defended if the company employs these resources through effective skills. A company that invests in design and develops the right skills to obtain efficient designs may have better results than others that do not have these skills. Gemser and Leenders (2001) suggest that it is very likely that the impact of design on company performance will vary depending on the skills and talents of the people involved in the design process.

Table 1 provides some examples of the studies of different firms, sectors and countries that share the common topic – design and performance.

Tab. 1 – Studies focused on design and its impact of performance and competitiveness.  
Source: own

<b>Author</b>	<b>Topics</b>	<b>Main focus</b>
Robin Roy and Stephen Potter (1993)	The commercial impacts of investment in design	Impact of investment in design in small and medium-sized UK manufacturers
Ricardo Chiva and Joaquín Alegre (2009)	Investment in Design and Firm Performance: The Mediating Role of Design Management	The analyse the effect of design investment on company performance and how this relationship is mediated by design management skills
Robin Roy and Johann Riedel (1997)	Design and innovation in successful product competition	Conceptual analysis of the role of design and innovation in product competition.
Margaret Bruce and Rachel Cooper (1999)	Effective design management for small businesses	The research documented the ways in which small manufacturing and service companies use professional design skills and their approaches to managing product, engineering and graphic design.

All studies confirm a positive influence on performance and competitiveness. For example, the research study by Roy and Porter (1993): A survey of 221 small and medium-sized UK manufacturers which received a government subsidy to employ a professional design consultant to help develop new or improved products or graphics showed that 60% of all projects and 90% of the implemented ones were commercially successful. Other benefits

included the firms gaining design management skills and some impact on the UK trade balance.

This research study confirms the above-mentioned findings that graphic design projects are significantly more likely to be profitable (chisquare  $p < 0,03$ ) than projects involving product design expertise or projects involving engineering or engineering plus industrial design. However, as Figure 2 shows, once the projects are put into production, the likelihood of product or engineering projects being profitable is almost as great as that for graphics projects.

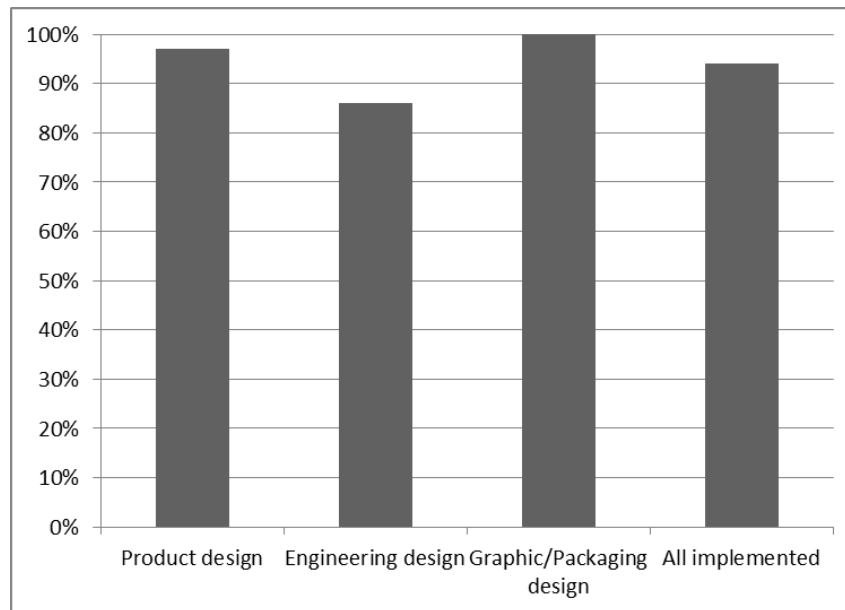


Fig. 2 – Profitable and low making projects in relation to design input, implemented projects.  
Source: ROY, R. and POTTER, S. (1993)

The main difference, as Figure 3 shows, is in the payback period, with graphics projects on average returning investment somewhat faster than product or engineering projects.

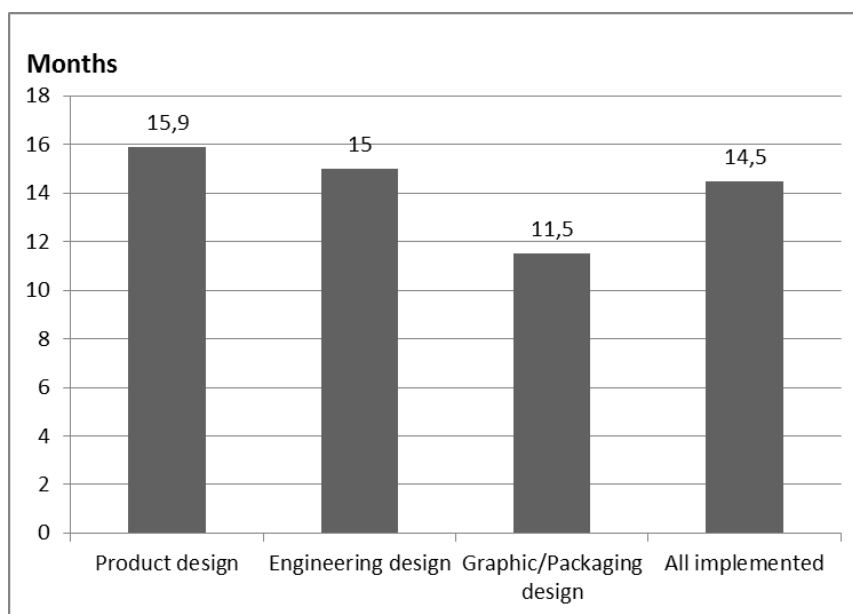


Fig. 3 – Payback period on profitable, implemented projects according to design input.  
Source: ROY, R. and POTTER, S. (1993)

Overall, in the quantitative sample, 69% of all the projects and those that were implemented returned their total investment (i.e were profitable) with a mean payback period of 14.5 months.

These figures present a very good case for investing in design projects. Graphics design projects appear to involve little technical uncertainty or financial risk. Although there is a relatively high risk of failure at the start of a product or engineering project, because most of the failed projects involved exploring ideas that were abandoned before being put into production, the financial loss (except for engineering projects requiring expensive feasibility studies) is likely to be quite small. And once a project has been implemented, the prospect of a rapid return on investment becomes very good, and the risk of financial loss is low, for all types of design.

The study by Chiva and Alegre (2009) presents the results of an analysis into the effect of design investment on company performance and how this relationship is mediated by design management skills. Chiva's and Alegre's partial mediation model (See Figure 4) reveals a positive and significant, although moderate, relationship between design investment and design management, and between design management and firm performance, thereby supporting it. Finally, the direct relationship between design investment and firm performance indicated in the direct effect model is almost cancelled out and becomes nonsignificant in the partial mediation model. This means that the positive and significant impact of design investment on firm performance evidenced in the direct effect model is due to a concept not taken into account in this model: design management. This in turn means that design management plays a substantial role in translating design investment into performance.

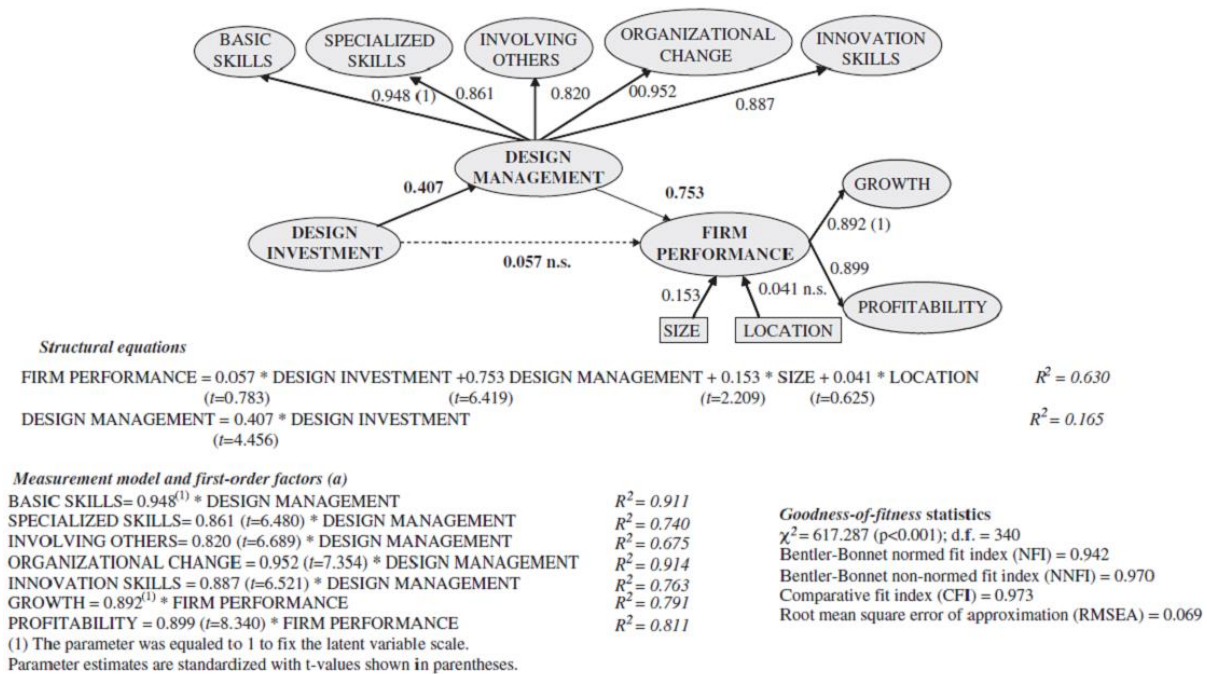


Fig. 4 – Payback period on profitable, implemented projects according to design input.  
Source: ROY, R. and POTTER, S. (1993)

Bruce, M. and Bessant, J. (2002) summarized the key benefits from design investment:

- Increased profit due to increasing sales or due to decreasing manufacturing costs.
- Increased market share.
- Gaining a competitive advantage.
- Revamping mature and failing products.
- Providing a strategy for growth.
- Design is a way of launching a new product or service.

The benefits from design investment were also highlighted in research conducted by the UK Design Council which focused on the contribution made by design and presents mail responses (1999, in Bruce, M. and Bessant, J., 2002):

- 91 per cent felt it improved the image of their company.
- 90 per cent felt it improved quality of their products.
- 88 per cent felt it helped them communicate more effectively with their customers.
- 84 per cent felt it helped increase profit.
- 80 per cent felt it helped break into new markets.
- 70 per cent felt it reduced costs.

### **3 MATERIALS AND METHODS**

The aim of the research conducted at the Faculty of Management and Economics of the Tomas Bata University in Zlín was to find what attitudes Czech firms have to investment in design, whether they have a set design budget, what impact they expect that design will have on the company's economic results and how they perceive the return on investment in design.

The research process consists of two main parts. In the first part of the research, undertaken from January to March 2014, a method of smart internet questionnaires was used. It was designed by the authors of this paper and based on the experience gained from their previous research.

The primary aim was to investigate company concern for design in relation to other factors. This was done by asking specific questions. The secondary aim was to investigate company concern for the importance of design itself.

In the second part of research process, the results were analysed using quantification and by means of seeking a mutual dependence. The questionnaire form contains 16 questions. The responses were divided into several categories with common features. In total 166 entries collected from 305 addressed respondents were analysed in the research.

Hypotheses were tested on the level of significance of  $\alpha = 0.05$ . The H1 hypothesis was subjected to the Pearson's chi-squared  $\chi^2$  test of independence for a contingent table, using IBM SPSS Statistics software. P-value and Excel XLStatistics5 programme were used for a statistical evaluation of the H2 hypothesis.

The questionnaire survey was processed by methods of descriptive statistics and the Pearson's chi-square test. The Excel XLStatistics5 programme was used to verify our hypotheses.

$$\chi^2 = \sum_{i=1}^r \sum_{j=1}^c \frac{O_{ij} E_{ij}}{E_{ij}} \quad (1)$$

where:

$\chi^2$  = Pearson's cumulative test statistic;

$O_i$  = an observed frequency in a given contingency table;

$E_i$  = an expected (theoretical) frequency, asserted by the null hypothesis;

$r$  and  $c$  are the number of rows and columns in the table, respectively. (McDonald, 2008)

The dependence of variables was tested by means of the Pearson's chi-square test with significance level  $\alpha = 0,05$ .

Some fields were verified by means of descriptive statistics indicators. The percentage calculations and weighted averages were used.

The results of the research were consulted with experts in design, design management and innovation.

The table below shows the occupational structure of the respondents who participated in the e-research.

Tab. 2 – Target group characteristics. Source: own.

	relative (%)	market orientation
Subcontractor	26.8	<b>B2B</b>  <b>49.8 %</b>
Producer	30.1	
Service provider	29.4	
Merchant	13.7	

	relative (%)	market orientation
Subcontractor	9.7	<b>B2C</b>  <b>50.2 %</b>
Producer	33.8	
Service provider	35.3	
Merchant	21.1	

The table above indicates that B2B and B2C were almost equally represented (49.8 % and 50.2 %) in the investigated area. The zero share in the respondent structure is represented by B2G business. This means that just the B2C and B2B sectors should have major share. Firstly, a list of selected suitable subjects was compiled. Then, this list was sent out to be filled in through the internet research questionnaires.

Tab. 3 – Target group characteristics: Business size distribution - Number of employees.  
Source: own.

Number of employees	B2B only	B2C only	B2C and B2B (both only)	Relative (%)
1- 10 (Micro)	9	18	1	16%
11-50 (Small)	10	11	8	17%
51-200 (Medium-sized)	15	15	6	22%
200 + (Big)	31	22	22	45%

## 4 RESULTS AND DISCUSSION

The current attitude to investment in design in business concepts of Czech companies in the subjects examined in the Czech market is characterized by the following queries. In cases of a majority consensus, the data are quantified by a relative indicator and supplemented by

important findings in the form of a comment. In cases of a fragmentation of answers, only the most important findings in the surveyed area are listed.

The following hypotheses were set:

H1<sub>0</sub>: There is no correlation between the expected time of a design investment return and firms operating in the B2B and B2C sectors

H1<sub>1</sub>: There is a correlation between the expected time of a design investment return and firms operating in the B2B and B2C sectors

H2<sub>0</sub>: There is no correlation between the expected time of a design investment return and the size of the firm.

H2<sub>1</sub>: There is a correlation between the expected time of a design investment return and the size of the firm.

#### **4.1 The expected contributions of Investment in Design**

The aim of this research question was to find out what are the expectations of what impact design will have on the economic result, see Tab. 4.

Tab. 4 – Expected results. Source: own.

<b>Business Expected results from investing in design (%)</b>	
Very strong	11 %
Strong	30 %
Average	43 %
Weak	13 %
None	3 %

According to the research result, 43% of firms expect that design will have an average impact on their economic result. Another 30% are optimistic and state that the impact will be strong. Similarly, 11% of firms think that the impact will be very strong. On the other hand, some of the respondents have different opinions; 13% of respondents stated that the impact of design on the economic result will be weak and 3% of respondents even stated that there will be no impact.

A possible interpretation of these results is that the managers of Czech firms are, as a majority, aware of the importance of design and they acknowledge this importance for further development of their firm in a given business field. Thus, design as an entity has to be accounted for and included in planning.

#### **4.2 Budget set for design**

The next question investigated was whether firms have a financial amount set out specifically for design in their budgets. The pie chart below shows cumulative results in relative indicators.



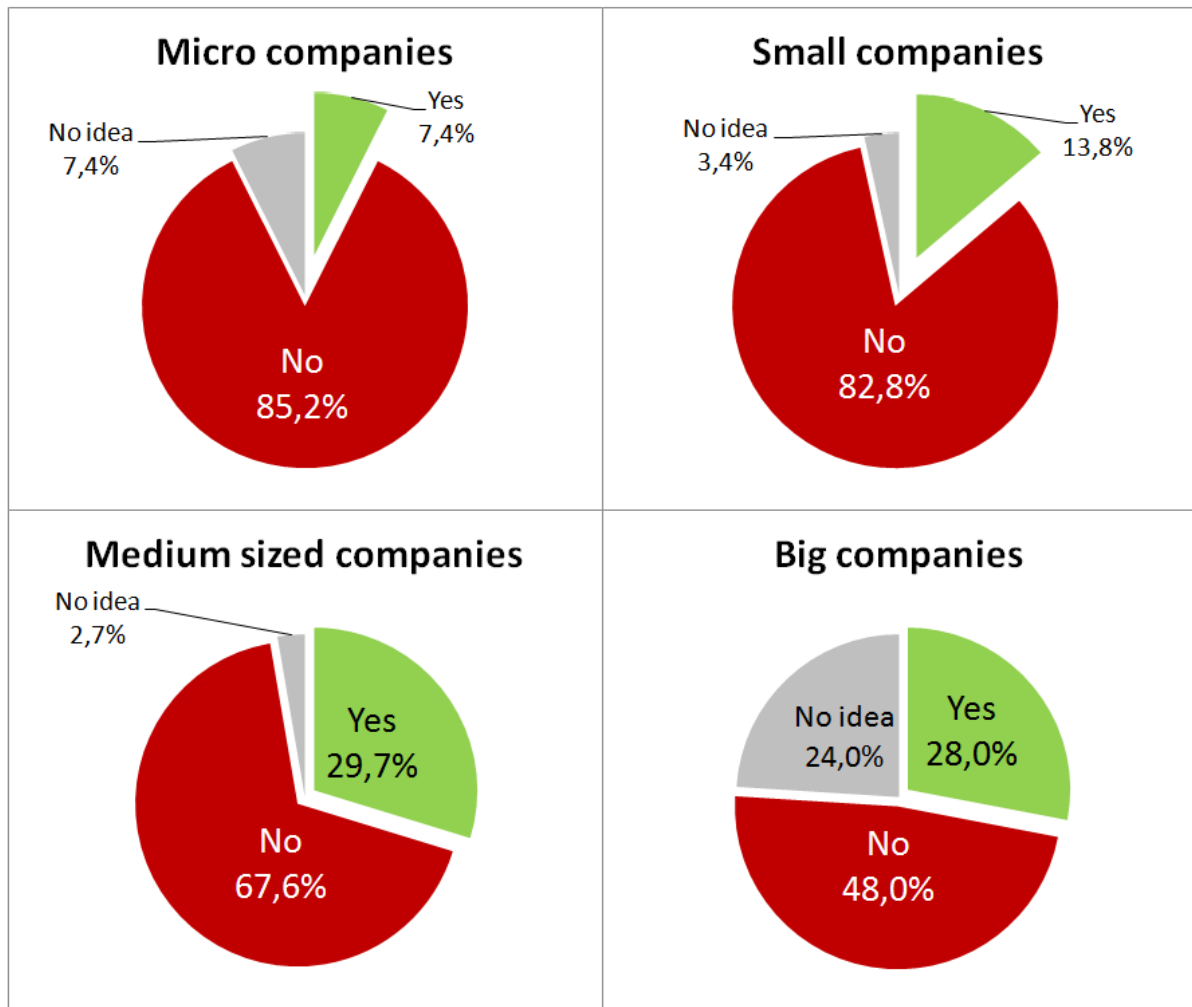


Fig. 5 – Pie chart – has a financial amount set out specifically for design? Source: own.

From Fig. 5 above it is evident that most of the firms do not have a financial amount set out specifically for design in their budget. When looking into this segment in more detail and from the firm size point of view, the answers to the questions are distributed almost evenly. From the research point of view, the answer “YES” is more interesting; nearly one third of medium and big-size firms set out a certain amount for design in their budgets. Under closer observation we can see that a design budget mostly occurs in medium-sized firms (29.7%). In small firms it occurs in 13.8% and in micro firms in only 7.4%. This fact confirms the statement that the bigger the firm is the bigger the chance that it has a set design budget. On the other hand, we have to take into consideration the target group characteristics, as the big firms have the largest representation (nearly one half of the total amount) in the research conducted.

To generalize the result, it can be said that the managers of Czech firms recognize design as an important entity which can influence the prosperity, but they do not account for design and the investment into it in their company. Such a conclusion probably best describes the current situation concerning design in Czech firms.

#### **4.3 Return on design investment**

The question investigated the opinion of firms on a return on investment in design from a time point of view. The subject of this research question was to investigate whether Czech firms

expect that money invested into design today will return a profit. There were four categories to be chosen from with suggested time intervals:

- Short term return – within 1 year
- Medium term return (I.) – 1 to 2 years
- Medium term return (II.) – 3 to 5 years
- Long term return– more than 5 years

Tab. 5 – Estimated time of return on design investment. Source: own

<b>Estimated time of return on design investment</b>		
Within one year (short term)	17.5 %	57.9 %
1 - 2 years	40.4 %	
3 - 5 years	28.3 %	
More than 5 years (long term)	13.8 %	

In an expert's opinion, this research result tells us that managers often perceive the return on design investment unrealistically. As a sum, nearly 58% of respondents expect a return on the investment within two years. According to a design expert, the process of creation, the development and introduction of a new design in a production firm is a long-term process in which a number of people of various professions take part. Such a process is accompanied by many technical and technological restrictions. Testing is often undertaken but then, the product is produced for many years to come. The return on investment is within about three to five years depending on the type of business and the product characteristics.

However, it is important to highlight that in the event of a design change which is part of a rebranding of the firm itself the time of return is generally shorter.

#### **4.4 Hypothesis verification**

The verification of the set hypotheses is presented below.

H1<sub>0</sub>: There is no correlation between the expected time of return on design investment and the firms operating in the B2B and B2C sectors

H1<sub>1</sub>: There is a correlation between the expected time of return on design investment and the firms operating in the B2B and B2C sectors

	A	B	C	D	E	F	G	H	I
1	Data			Descriptives					
2	Expected on investment in design	Business category							
3	1 – 2 years	B2C		Category Labels and Counts (Frequencies)					
4	Less than one year	B2C		Business category					
5	1 – 2 years	B2B		All B2C B2B B2B, B2C					
6	Less than one year	B2C	Expected on investment in design	All	166	59	68	39	
7	More than five years	B2B		1 – 2 years	67	26	26	15	
8	3 – 5 years	B2C		Less than one year	29	12	12	5	
9	1 – 2 years	B2B		More than five years	23	6	11	6	
10	1 – 2 years	B2B		3 – 5 years	47	15	19	13	

Fig. 6 – Screenshot of testing hypothesis H1 (XLstatistics). Source: own.

	A	B	C	D	E	F	G	H	I	J
1	Analysis of r x c tables									
2										
3	(Pearson) Chi-square Test									
4	(For independence of Expected on investment in design and Business category)									
5	H <sub>0</sub> : Variables are independent (no interaction between variables)									
6	H <sub>1</sub> : Variables are dependent (interaction between variables)									
7	Chi-square	2,506841								
8	DF	6								
9	p-value =	0,867701								

Fig. 7 – Screenshot of hypothesis H1 verification (XLstatistics). Source: own.

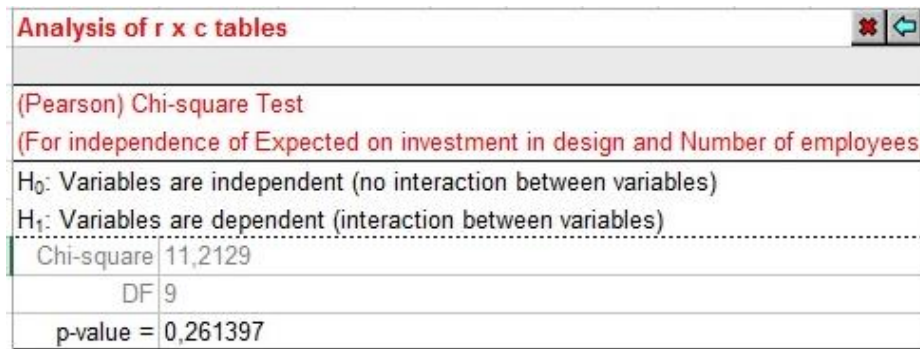
According to the results, with p-value of 0.867701 (the standard risk value was 0.05), the H<sub>0</sub> hypotheses is rejected, which means that it cannot be stated that there is a difference between the firms operating in the B2B or B2C sectors in relation to their expected return on investment in design.

H<sub>20</sub>: There is no correlation between the expected time of a design investment return and the size of the firm.

H<sub>21</sub>: There is a correlation between the expected time of a design investment return and the size of the firm. (See Figure 8 and 9)

	A	B	C	D	E	F	G	H	I	J
1	Data			Descriptives						
2	Expected on investment in design	Number of employees								
3	Less than one year	1 - 10		Category Labels and Counts (Frequencies)						
4	1 – 2 years	1 - 10		Number of employees						
5	1 – 2 years	1 - 10		All 1 - 10 11 - 50 51 - 200 201 and more						
6	3 – 5 years	1 - 10	Expected on investment in design	All	130	26	29	1	74	
7	More than five years	1 - 10		Less than one year	23	6	6	1	10	
8	Less than one year	1 - 10		1 – 2 years	53	14	15	0	24	
9	1 – 2 years	1 - 10		3 – 5 years	37	5	5	0	27	
10	1 – 2 years	1 - 10		More than five years	17	1	3	0	13	

Fig. 8 – Screenshot of testing hypothesis H2 (XLstatistics). Source: own.



Analysis of r x c tables	
(Pearson) Chi-square Test	
(For independence of Expected on investment in design and Number of employees)	
H <sub>0</sub> : Variables are independent (no interaction between variables)	
H <sub>1</sub> : Variables are dependent (interaction between variables)	
Chi-square	11,2129
DF	9
p-value =	0,261397

Fig. 9 – Screenshot of hypothesis H2 verification (XLstatistics). Source: own.

According to the results, with p-value of 0.867701 (the standard risk value was 0.05), the H<sub>0</sub> hypotheses is rejected, which means that it cannot be stated that there is a difference between the firms in relation to the number of employees and the expected return on investment in design.

## 5 CONCLUSION

Within the Czech Republic, design is, generally, a popular subject which we encounter on a daily basis everywhere we go. Inspired by international examples, Czech managers acknowledge design as an entity which can have a positive impact on the development of a firm, its position in the market and its ability to compete with others. However, from respecting and recognizing design there is still a long journey to real action in one's own company. An analysis of what a high-quality strategically-planned design can do to a given firm is generally missing.

Surely, this is connected to the fact that creating and developing a new design is a long-term process which presumes the coordination of people from many professions and the result does not come immediately or within one year. Firms would rather concentrate on solving ad hoc problems and their primary aim is to sell right away.

Through the research conducted at the Faculty of Management and Economics of the Tomas Bata University in Zlín it was found that nearly half of the firms (43%) anticipate a strong impact from design on the company's economic result. Such a finding is in line with the results of international studies in which firms are even more optimistic as is apparent from the UK Design Council research (1999, in Bruce, M. and Bessant, J., 2002) according to which 84% of firms felt that it helped increase profit.

The research also confirmed an assumption that even though firms are aware of the role of design as a competitive tool, finances for design are often difficult to find and only 23% of the firms researched have a financial amount set out specifically for design in their budgets.

If we compare the results of the research conducted with the results of research published by international authors, we can see that interesting results were found concerning the expected time of return on investment. 57% of the firms researched expect a return on investment in design within 2 years, which is, according a Czech design specialist, unrealistic. However, such results were also confirmed by research by Roy, R. and Potter, S. (1993), during which the return on investment in a product design was observed though the implementation of specific projects. The return on investment in a product design was found to be within 16 months and the return on investment in a graphic design or packaging design in about 12 months.

The research also confirmed an assumption that the expectations of firms in the field of design and investment also depend on the type of business (e.g. business in the B2B market or B2C market) and also on the size of a firm.

The limitations of this research are mainly represented by the number of investigated selected companies and businesses in the Czech Republic. The research can be considered not to involve tens of other companies and businesses that are non-existent in the market anymore. Another fact is, that some companies would like to present themselves within the questionnaire claiming they would like to use the "investment in design" even though they are not economically fit to be able to afford it can become another problem. However, a likely situation may be that a company's representative, who filled in the questionnaire, overestimated this fact and the company actually does not possess sufficient funds for using and applying for this purpose. The research that was carried out did not investigate the time factor in regard of a demanding interpretation of the questionnaire question with the respondents.

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## **EFFICIENCY OF NETWORKING REGIONAL HOSPITALS IN THE CZECH REPUBLIC – CASE STUDY OF PLZEŇ REGION**

*Pavla Staňková, Šárka Papadaki, Petr Klímek*

### **Abstract**

Integration of hospitals for increasing their efficiency is the current trend in healthcare. Integration can be either vertical, which leads to the integration of health organizations in various complementary or related activities; or horizontal, when associated healthcare organization offer similar services. Except the integration of private hospitals (e.g. Agel, the private hospital chain) the current trend in the Czech Republic is to integrate hospitals managed by the county. The first integration of regional hospitals took place in 2004 (Health Holding Královehradecký region) and the latest integration was on January 1, 2015 (Hospital of Pardubice region). Drawing from an example of Health Holding of Plzeň Region, the aim of this article is to answer the research question whether the horizontal integration of regional hospitals leads to their greater efficiency.

*Keywords: Performance, Hospital, Regional hospital, Integration, Vertical integration, Horizontal integration*

JEL Classification: I11, L14, M21

### **1 INTRODUCTION**

In 2013, hospitals in the Czech Republic consumed 131.3 billion CZK from the total of 290.9 billion CZK issued to the resort of health care. This amount represents approximately 7.12% of GDP (UZIS 2014). Due to the fact that health care expenditures have an increasing tendency, it is necessary to find ways to keep them at an acceptable level. One of the ways of doing so is different modes of integration – the connection of various institutions in one unit. These tendencies are described in many scientific articles, e.g. by Bazzoli (2004), Baker (2001), Clement (1997), Lake (2003), Ackerman (1992) etc., with an emphasis on the positive benefits of this merger.

In general, the integration of services offers (1) more access to capital to improve facilities and (2) economies of scale to improve technical services. On the other hand, the institution staff, physicians and community lose considerable autonomy in integrated services (Shortell 1988).

Integration can be either horizontal or vertical. Horizontal integration is defined as the coordination of activities across operating units that are at the same stage in the process of delivering services. Horizontal integration involves grouping organizations that provide a similar level of care under one management umbrella. Vertical integration is defined as the coordination of services among operating units that are in different stages of the process of delivery patient services (Pan American Health Organization 2008).

The various advantages and disadvantages of the types of integration arising for the institutions can be summarized in the following points see Table 1 (Schulz 2003).

Tab. 1 The advantages and disadvantages of the types of integration. Source: Schulz 2003.

Type of integration	Institution	
	Advantage	Disadvantage
<b>Horizontal, e.g., multihospital system</b>	Access to capital Economies of scale Management resources Improved recruitment More political power Hospital survival	Loss of autonomy
<b>Vertical systems, e.g., HMO, clinic and hospital</b>	Offer full range of services More competitive Economies of scale Articulation of services More political power	Loss of autonomy
<b>Investor-owned</b>	Access to capital More freedom to serve organization goals	Stock holder and corporate control

We can observe the trend of integration not only in the industry but also in services such as the hospital industry. In the USA, the number of hospital integrations dramatically increased integration in past 20 years (Huckman 2006; Gaynor and Wilson, 1999). Integration in the USA typically refers to horizontal integration of hospitals or physicians and vertical integration of hospitals and physicians (Bazzoli 2004). A similar trend has been observed in the Czech Republic during the past decades. When focusing on horizontal integration two primary benefits can be seen: (1) increased market power and (2) greater efficiency (Huckman 2006; Lake 2003). A number of foreign authors describe the benefits and risks of jointing, e.g. Bazzoli (2004), Baker (2001), Clement (1997), Lake (2003), Ackerman (1992), etc. The authors state the following positive points:

- Access to better resources due to the collective purchase
- Greater negotiating power
- Costs reduction and improvement of medical technology through information exchange
- Elimination of service duplication
- Providing complex services
- Allocation of risk between multiple organizations
- Enhanced relationships with customers
- Improved quality of care

On the other hand, several authors such as Halverson (1997) or Zuckerman (2006) state the disadvantages of integration. Among others they list the following:

- New costs from inter-organizational cooperation
- Loss of autonomy and control

For the overview of studies and articles focusing on hospital integration see Table 2.



Tab. 2 Studies focused on healthcare and hospital integration. Source: own work

<b>Author</b>	<b>Topics</b>	<b>Main focus</b>
<b>Stephen L. Walston, John R. Kimberly and Lawton R. Burns (1996)</b>	Owned vertical integration and health care: Promise and performance	Benefits and actual outcomes of vertical integration in health sector and comparison to the other sectors of the economy
<b>Martin Gaynor (2006)</b>	Is vertical integration anticompetitive? Definitely maybe (but that's not final)	Competitive and anticompetitive effects of vertical integration
<b>Robert S. Huckman (2006)</b>	Hospital integration and vertical consolidation: An analysis of acquisitions in New York State	The study examines the effect of hospital acquisitions in New York State on the distribution of market share for major cardiac procedures across providers in target markets
<b>Alison Evans Cuellar and Paul J. Gertler (2006)</b>	Strategic integration of hospitals and physicians	The study finds out that integration has little effect on efficiency; however, it is associated with an increase in prices, especially when the integrated organization is exclusive and occurs in less competitive markets.

Walston, Kimberly and Burns (1996) summarize benefits of vertical integration in health care as follows:

- Lowering costs and eliminating unneeded services – confirmed by the studies of Findlay (1993), Coddington (1994), Shortell (1988), Peters (1991), Ackerman (1992), Gillies (1993), Conrad (1993), Wheeler (1986), Johnson (1993), Conrad and Dowling (1990), Brown and McCool (1986)
- Economics of scale – confirmed by the studies of Findlay (1993), Peters (1991), Ackerman (1992), Brown and McCool (1986)
- Increased market and negotiating power – confirmed by the studies of Findlay (1993), Shortell (1989), Peters (1991), Fox (1989), Johnson (1993), Conrad and Dowling (1990)
- Profit and market share gains – confirmed by the studies of Coddington (1994), Wheeler (1986), Brown and McCool (1986)
- Better recruitment and retention – confirmed by the studies of Coddington (1994) and Peters (1991)
- Environmental acceptance – confirmed by the study of Zuckerman and D'Aunno (1990)

All studies agree on benefits of vertical integration.

Most researchers, such as L.R. Burns et al. (1990; 1998), S.M. Shortell et al. (1996) and G.J. Bazzoli et al. (1999) presume that horizontal and vertical integration do not have influence on revenue increase. They insist that integration has some influence on profit increases through reducing expenses. In addition, this result differs from the results of J.P. Clement et al. (1997), who claim that horizontal integration has influence on revenue increases. Yang (2004) in his study shows that the hospitals with only functional integration are more profitable than the hospital with clinical and functional integration.

## **2 SYSTEM OF HEALTH CARE IN CZECH REPUBLIC**

The fundamental milestone for the networking of hospitals in the Czech Republic was the year 1992 and the emergence of Act no. 160/1992 Coll., on health care provided in private medical facilities, which gave legal framework for the privatization of health care and the emergence of private health care. As seen from Fig. 1 and 2, which describe the progress of medical facilities in the Czech Republic from 1992 to 2013 and the growing number of hospitals in the Czech Republic from 1992 to 2013, the period of privatization led to a rapid increase of the number of medical facilities. Especially the leap from number 3 956 in 1992 to 17 176 by the end of 1993 is obvious, as well as an increase from 157 hospitals (1993) to 199 (1994).

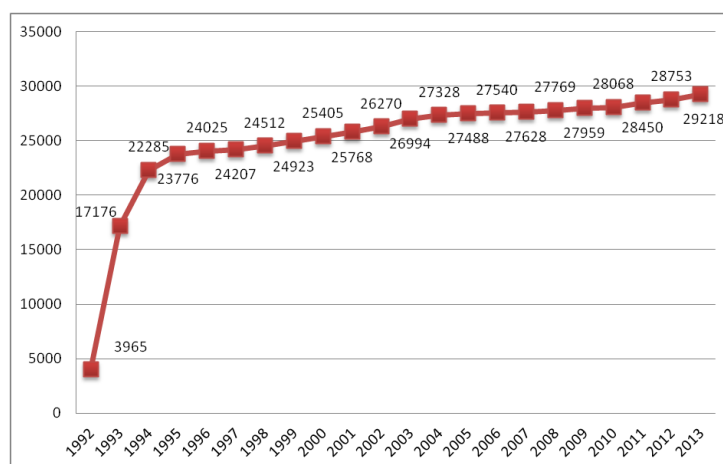


Fig. 1 - Trends in the number of medical facilities in the Czech Republic 1992 – 2013.  
Source: own work according to UZIS ©2010-2014a.

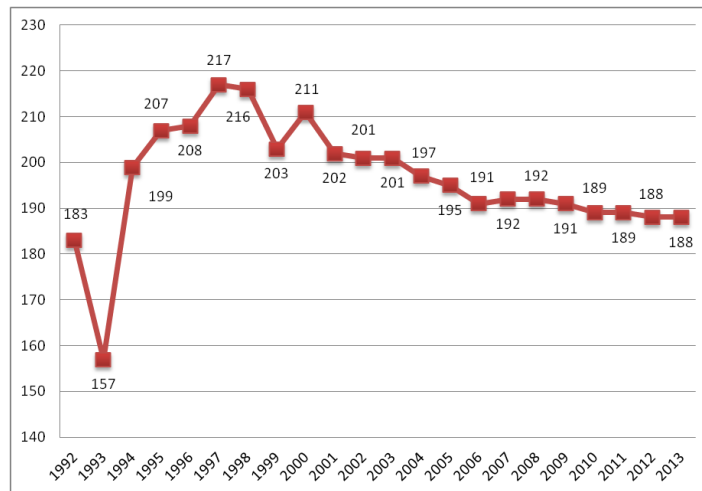


Fig. 2 - Trends in the number of hospitals in the Czech Republic 1992 – 2013. Source: own work according to UZIS ©2010-2014a.

Changes occurred not only in the number of health care facilities, but also in the legal form of individual hospitals. The Act no. 290/2002 Coll., On the transfer of certain other assets, rights and obligations of the Czech Republic to regions and municipalities, under which 82 district hospitals passed into the competence of the regions, came into force on January 1, 2003. These hospitals were gradually converted into joint-stock companies. In 2009, the total of 52 such hospitals existed in the Czech Republic.

From the perspective of the founder hospitals can be divided into hospitals established by the Ministry of Health, regions, towns, municipalities, churches and other central institutions and other legal entities. According to the information from the Institute of Health Information and Statistics of the Czech Republic (UZIS 2012) 120 hospitals established by a legal entity existed in the Czech Republic on June 30, 2012. These hospitals constitute 64% of all hospitals, 40 of them being hospitals established by the county, city or municipality (21 %), 19 hospitals established by the Ministry of Health (10%), 5 hospitals established by other central organs (3%), 3 of the hospitals established by Ministry of Defence, 2 by Ministry of Justice, and 3 hospitals founded by the Church (2%), see Figure 3.

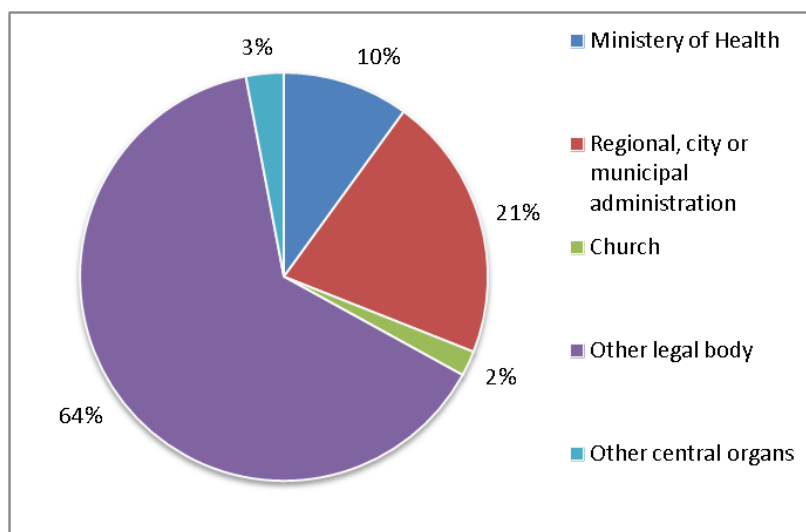


Fig. 3 - The percentage of hospitals in the Czech Republic according to founder on June 30, 2012. Source: own work according to UZIS ©2012 and UZIS ©2010-2014a.

As is clear from the Act no. 372/2011 Coll., On health services and terms and conditions for providing such services (UZIS 2012) faculty hospitals are established by the Ministry, of which 9 hospitals are established by the Ministry of Health and 1 hospital by the Ministry of Defence. Another legal entity establishes 67% of these (i.e., 98 in the absolute number); a county, city or municipality establish 22% acute care hospitals , (i.e., 33 in the absolute number); Ministry of Health establishes 7% acute care hospitals (i.e., 10 in the absolute number); other central institutions establish 3% acute care hospitals (i.e., 4 in the absolute number); and church establishes 1% acute care hospitals (i.e., 1 in the absolute number). Other legal entity is the founder of the largest number of 22 hospitals (73%) of the hospital aftercare, followed by 7 hospitals follow-up care (21%) established by the regions, cities or municipalities and 2 hospitals aftercare (6%) established by the church, see Table 3.

Tab. 3 - The percentage of hospitals in the Czech Republic according to founder on June 30, 2012. Source: own work according to UZIS ©2012 and UZIS ©2010-2014a.

	University hospitals	Othe hospitals	Hospitals with chronic beds	Total
Ministry of Health	9	10		19
Regional, city or municipal administration		33	7	40
Church		1	2	3
Other legal body		98	22	120
Other central organs	1	4		5
Total	10	146	31	187

The concepts **founder** and **owner** should be distinguished when discussing hospitals. . The category of **founder** reflects the legal form of hospitals, i.e., the hospital as a legal entity or the hospital as a contributory institution. Legal entity operates under the Commercial Code and contributory organization is founded by a government department or territorial self-governing units.

The category of **owner** reflects owning the hospital, which in practice of hospitals means that a legal entity may be owned by local government units.

The actual situation in terms of owners of the hospitals in the Czech Republic is that 51% of all hospitals in the Czech Republic are owned by the county, town or municipality (95 hospitals), of which 29% are owned by region through the ownership of legal entities (joint-stock company, a limited liability company, a public company) and 22% are directly founded by the region. 34% of hospitals are owned by another legal entity (65 hospitals); 10% still remain the property of the Ministry of Health (19 hospitals); 2% are owned by the Church (3 hospitals) and 3% are owned by the Ministry of Defense and Ministry of Justice (5 hospitals). Based on the calculation, it is then possible to obtain redistribution of hospitals according to ownership, see Figure 4.

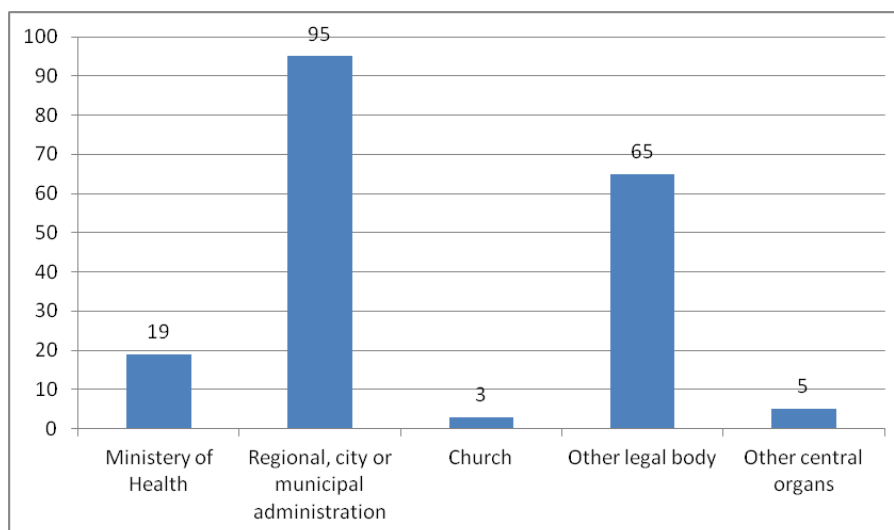


Fig. 4 - The number of hospitals in the Czech Republic, according to property on June 30, 2012. Source: own work according to UZIS ©2012 and UZIS ©2010-2014a.

### **Ratings of the economic situation of hospitals**

Indicators of costs, revenues and profits are the most widely used scales of economic situation in hospitals. Although these indicators are often presented in comparative statistics, according to Staňková (2013) rating through the profit is very problematic for several reasons:

- a) Most companies with commercial character cease to use profit as a basic indicator of the economic situation and increasingly use cash-flow indicators, i.e., indicators that monitor cash flows as a comparison between revenues and expenditures.
- b) Profit can be expressed in various forms, such as net profit, profit before tax, earnings before interest and taxes, earnings before interest, tax and depreciation (Knápková, Pavelková and Chodúr 2011, 20). When comparing the economic situation in hospitals it is necessary to carefully consider which indicator will be used and compared.
- c) To assess the profit of hospitals their legal form of business is also important. Nonprofit hospitals, i.e., hospitals operating as contributory organizations, are not primarily founded for profit and their aim is balanced economy. It may also happen that in the event of loss of non-profit organizations that loss is covered from other resources of the founder, therefore, the economic situation of hospitals is distorted. Conversely, hospital business as a legal entity is an organization founded for the purpose of making profit.
- d) In assessing the economic situation of hospitals the problem of ethics may occur. In a present-day society an opinion prevails that provision of health services is a mission, an activity that is socially beneficial, necessary and should not be tied to economic indicators. Unfortunately, this opinion makes it difficult to provide financial management of hospitals because the hospitals themselves get into a difficult financial situation as they must provide services for which they do not get paid. On the other hand, the question arises whether it is ethical to refuse this service to a person who needs it and whose life depends on it.

Although pitfalls of economic situation of hospitals were mentioned, this field of hospital management cannot be ignored. Hospital may have good quality care, enough patients, top doctors, but if this is concurrently not reflected in the economic situation of the hospital management, the management is wrong.

According to the information from the Institute of Health Studies and Statistics of the Czech Republic (UZIS 2014b), the total hospital costs (information collected from 163 hospitals) by December 31, 2013 attained the amount of 131 316 mil. CZK and compared to 2012 it increased by 0,4%. Total revenues of hospitals by December 31, 2013 amounted 129 438 mil. CZK and compared to 2012 they decrease by 1.3%. The profit of all 163 hospitals was the loss of 1 878 mil. CZK. In terms of the founder (see Table 4), all types of hospitals managed with a loss, with the exception of hospitals owned by other central organs.

Tab. 4 - Overview of costs, revenues and profit of hospitals according to founder by December 31, 2013 in mil. CZK. Source: own work according to UZIS 2014b; N=163.

	<b>Costs total</b>	<b>Revenues total</b>	<b>Economic outcome</b>
Ministry of Health	61 590	60 707	-883
Regional, city or municipal administration	18065	17905	-160
Other legal body and church	48466	47630	-836
Other central organs	3 195	3 196	1
<b>Total</b>	<b>131316</b>	<b>129438</b>	<b>-1878</b>

If the categorisation of hospitals by the owner is to be respected, i.e., hospitals running business as legal persons under the ownership of municipalities, cities and counties are included in the category of municipality, city and region, the overall loss of hospitals increases from 160 mil. to 1308 mil. CZK. This points out the inefficient economy of hospitals owned by regions, see Tab 5.

Tab. 5 - Overview of costs, revenues and profit of hospitals according to owner by December 31, 2013 in mil. CZK. Source: own work according to UZIS ©2010-2014b; N=163.

	<b>Costs total</b>	<b>Revenues total</b>	<b>Economic outcome</b>
Ministry of Health	61 590	60 707	-883
Regional, city or municipal administration	52044	50736	-1308
Other legal body and church	14487	14799	312
Other central organs	3 195	3 196	1
<b>Total</b>	<b>131316</b>	<b>129438</b>	<b>-1878</b>

### **3 RESEARCH OF EVALUATING THE PERFORMANCE OF NETWORKING REGIONAL HOSPITALS IN THE CZECH REPUBLIC**

The aim of the research conducted at the Faculty of Management and Economics, Tomas Bata University in Zlín, was to find answer to the following research question:

Does networking of regional hospitals lead to improving performance of hospitals?

The main file consisted of 188 hospitals operating by June 30, 2013, in the Czech Republic, of which 97 hospitals are owned by the county, municipality or town. The research found that

28% of hospitals owned by the county, municipality or town in the Czech Republic (i.e., 27 hospitals) have formed an association aimed at improvement of the economy, better patient care, greater possibilities of use and career growth for employees. It is also based on the principle of solidarity, when the health regulations do not favour small hospitals, and placement of acute health care is provided throughout the region.

The trend of association of hospitals owned by regions began in 2004, when the first association of hospitals was created. This trend continues into the present. Currently (by January 1, 2015), 5 associations of hospitals owned by the regions exist in the Czech Republic.

*a) Health holding Královéhradecký region*

One of the oldest associations of hospitals owned by the region in the Czech Republic. Founded in 2004, it originally associated five of the following hospitals:

- City Hospital Dvůr Králové nad Labem, Regional Hospital Jičín, Regional Hospital Náchod, Regional Hospital Rychnov nad Kněžnou, Regional Hospital Trutnov

In 2013 Regional Hospital Rychnov nad Kněžnou became a part of Regional Hospital Náchod, therefore 4 hospitals are currently part of the association.

*b) Hospital of Ústecký region*

Hospital of Ústí nad Labem region was founded on September 1, 2007, and currently it comprises 5 hospitals:

- Děčín Hospital, Chomutov Hospital, Most Hospital, Teplice Hospital, Masaryk Hospital in Ústí nad Labem

*c) Hospital holding of Středočeský region*

Hospital holding of Středočeský region was founded on September 18, 2009, and its original members were 5 hospitals:

- Hospital of Rudolf and Stefanie Benešov, Regional Hospital Kladno, Regional Hospital Kolín, Regional Hospital Mladá Boleslav, Regional Hospital Příbram.

Hospital Kutná Hora became a part of the association on January 1, 2010, but insolvency proceedings were initiated in February 2010.

*d) Health holding of Plzeň region*

Health holding of Plzeň region was formed on June 30, 2010. The members of the holding company are the following hospitals:

- Domažlice Hospital, Klatovy Hospital, Rokycanská Hospital, Stod Hospital, Hospitals of subsequent care Horažďovice, Hospitals of subsequent care Svatá Anna

*e) Hospitals of Pardubický region*

Hospitals of Pardubický region is the youngest association that was established on January 1, 2015. It links the following hospitals:

- Hospitals of Pardubický region - Pardubice Hospital, Chrudim Hospital, Svitavy Hospital, Litomyšl Hospital, Ústí nad Orlicí Hospital

The first part of the research tried to verify the hypothesis on a case study of Health holding of Plzeň region. For further research were selected only Health holding of Plzeň region. Only for this hospitals we have economic and noneconomic information before and after the

integration. In the secondary research the team focused on the following indicators for the year 2005 - 2013:

- Economic outcome
- Bed occupancy
- Receivables after maturity date
- Payables after maturity date
- Current Ratio

The following hypotheses were set:

*H1<sub>0</sub>: There is no difference between the hospital economic results before and after the horizontal integration.*

*H1<sub>1</sub>: There is a difference between the hospital economic results before and after the horizontal integration.*

*H2<sub>0</sub>: There is no difference between the bed occupancy before and after the horizontal integration.*

*H2<sub>1</sub>: There is a difference between the bed occupancy before and after the horizontal integration.*

*H3<sub>0</sub>: There is no difference between the receivables after maturity date before and after the horizontal integration.*

*H3<sub>1</sub>: There is a difference between the receivables after maturity date before and after the horizontal integration.*

*H4<sub>0</sub>: There is no difference between the payables after maturity date before and after the horizontal integration.*

*H4<sub>1</sub>: There is a difference between the payables after maturity date before and after the horizontal integration.*

*H5<sub>0</sub>: There is no difference between the current ratio before and after the horizontal integration.*

*H5<sub>1</sub>: There is a difference between the current ratio before and after the horizontal integration.*

Hypotheses were tested on the level of significance of  $\alpha = 0.05$ . The H1 hypothesis was subjected to **Mann-Whitney Test**. This test is useful in cases where the assumption of normality is questionable and no suitable transformation of the data can be found, and in cases where one or more observations are suspected to be outliers. To perform the test, the two samples are combined and ranked from smallest to largest (from rank 1 to rank  $n_1+n_2$ ), with any tied observations being given the average rank for the values in the tied group.  $X_1, X_2, \dots, X_m$  and  $Y_1, Y_2, \dots, Y_n$  are two **independent samples** (unpaired). We want to test the null hypothesis that its distribution functions are the same. We sort **all** values of  $X_1, X_2, \dots, X_m$  and  $Y_1, Y_2, \dots, Y_n$  into the growing row. We count the sum of rank for  $X_1, X_2, \dots, X_m$  ( $T_1$ ). Similarly  $T_2$  is the sum of rank for  $Y_1, Y_2, \dots, Y_n$ .

Then we can calculate  $U_1$  and  $U_2$  by using the formulas:



$$U_1 = mn + \frac{m(m+1)}{2} - T_1, \quad U_2 = mn + \frac{n(n+1)}{2} - T_2.$$

**Decision rule:**

If number  $\min(U_1, U_2)$  is smaller or equal than the value from special tables, we reject the null hypothesis. The small p-value (smaller than 0.05) in the calculated results indicates that the samples come from populations with significantly different medians.

Table 6 presents results of Mann-Whitney Test of hypotheses that were set up for research differences in chosen indicators between before and after the horizontal integration.

Tab. 6 Results of Mann-Whitney Test of hypotheses. Source: own work.

P-value	Economics Results	Bed occupancy	Receivables after maturity date	Payables after maturity date	Current ratio
Hospital Domažlice	0,415585	0,025022	0,403248	0,5	0.016503
Hospital Klatovy	0,044041	x	0,110336	0,00715	0.196884
Hospital Rokycany	0,009508	0,018668	0,009508	0,00526	0.009508
Hospital Stod	0,044041	x	0,110336	0,00715	0.044041
Hospitals of subsequent care Horažďovice	0,005258	0,012591	x	x	0.009508
Hospitals of subsequent care Svatá Anna	0,016503	x	x	x	0.334908

The difference was not proved as statistically significant
The difference was proved as statistically significant Economic result is significantly higher before the horizontal integration. Bed occupancy is significantly higher before the horizontal integration. Payables after maturity date are significantly lower before the horizontal integration. Current liquidity is significantly higher before the horizontal integration.
The difference was proved as statistically significant Economic result is significantly lower before the horizontal integration. Bed occupancy is significantly higher before the horizontal integration. Receivables after maturity date are significantly higher before the horizontal integration. Payables after maturity date are significantly higher before the horizontal integration. Current liquidity is significantly lower before the horizontal integration.

The research results did not confirm the significant effect of horizontal integration on selected indicators of the effectiveness of health care organizations. The worst results were in the field of bed occupancy indicators. All hospitals with available data had worse bed occupancy after integration. This may be caused by other factors, especially changes in hospital funding. The goal of many hospitals was to reduce patient time of hospitalization.

The best results were achieved in the indicator of receivables after maturity date. There is a decrease in overall receivables after maturity date after the horizontal integration. The research has not clearly demonstrated the positive impact of integration on economic results. Three hospitals have achieved better results after horizontal integration, two hospitals have achieved worse results and one hospital did not show any statistically significant difference before and after the horizontal integration.

There has been no confirmation of the hypotheses. Hypothesis H1 - by three hospitals has shown that economic result is significantly lower before the horizontal integration. Hypothesis H2 – in all hospitals is bed occupancy significantly higher before the horizontal integration. Hypothesis H3 – the difference before and after integration was not proved as statistically significant. H4 - There is no difference between the payables after maturity date before and after the horizontal integration. H5 – in three hospitals are current liquidity is significantly lower before the horizontal integration.

#### **4 CONCLUSION**

Using the Mann-Whitney Test and trend analysis, the research realized at the Faculty of Management and Economics, Tomáš Baťa University in Zlín, on an example of Health Holding of Plzeň Region has not clearly confirmed the premise that the horizontal integration of hospitals leads to greater efficiency. This research, however, partly confirms Cuellar and Gentler (2006) that the integration has little effect on efficiency. Nevertheless, it is clear that the benefits may be non-economic as well as economic. In addition, it is necessary to consider other circumstances that may affect the restrictions evaluation, e.g., a relatively short period of existence of integration, political influences, the absence of a national health strategy, unclear and unstable conditions for the financing and provision of health care, etc.

According to Suchý (2014) a integration of joint activities in a holding is highly problematic, because it is a challenging process in which subjects must change their processes, procedures, agendas and information systems. The complexity of these processes and failure to prove the immediate effectiveness should not be the reason for the negative understanding of integration. Hospitals in the long term can expect that the integration will bring along savings mainly due to the reduction of duplicate operations and functions, higher revenues through joint agreements with insurance companies or joint marketing and PR policy. It may also bring an increase in the quality of healthcare by defining common practices in the provision of health care, utilization of comparisons and benchmarking in the evaluation of health services.

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## **SUCCESS FACTORS OF RURAL SMEs: A CASE STUDY OF POLISH MICRO ENTERPRISES**

*Wadim Strielkowski, Evgeny Lisin, Jan Herget*

### **Abstract**

Our paper tackles the nature of Polish micro enterprises, in particular factors that influence their success. Rural micro-enterprises represent a key factor in sustainable rural development and through creating the employment opportunities, contributing to the local budgets and helping to conserve environment they play the decisive role in transformation processes. Moreover, some of the SMEs in question contribute to the production of renewable energy and therefore foster the sustainable regional development.

The research design was based on a questionnaire survey of 300 rural micro-enterprises in Mazowieckie and Warmia-Mazury provinces of Poland. The undertaken survey provides a rich profile of Polish rural micro-enterprise. Statistical and econometric analyses are conducted in order to indicate those factors that influence the success of Polish rural enterprises. A number of factors that are found to be significant include owner/manager characteristics and enterprise characteristics. The owner/manager characteristics include: owner/manager age (positive impact), owner/manager age squared (negative impact), need of cash as the main motive for establishing an enterprise (negative impact), risk-taking as the main motive for establishing an enterprise (positive impact) and owner/manager education (positive impact). The enterprise characteristics include enterprise location within a region with competitive situation (positive impact), enterprise legal status (negative impact), Broadband Internet connection in enterprise (positive impact) and the fact whether enterprise has any certificates for its products (positive impact). The results have significant implications for the researches and policy-makers and can become a basis for preparing relevant enterprise support policies in Poland.

*Keywords: SMEs, entrepreneurship, rural development, sustainable development, economies in transition*

JEL Classification: L25, L26, P36, Q01, Q10, R10

## **1 INTRODUCTION**

One can hardly doubt the importance of micro-enterprises as the key factor in sustainable urban development. The success of European micro-enterprises (which are the largest part of all European SMEs) is embedded in the Lisbon strategy, constituting one of its main pillars.

There has been some research in international and Polish literature into the factors that influence enterprise success (Storey, 1994; Barkham et al., 1996; Grabowski and Kulawczyk, 1992; or Polish Agency for Enterprise Development, 2004;) and micro-enterprise success in particular (Zienkowski, 1992; or Zolnierski, 2005). There has also been some research done about rural enterprises (North and Smallbone, 1996; Zahrai, 2000; Skowronek-Mielczarek, 2002; or Strielkowski, 2012). However, these studies have never undertaken an analysis of rural micro-enterprises, nor have they

ever specifically concentrated on rural micro-enterprises in the selected sector of the economy (i.e. food-processing or farm enterprises).

Therefore, the purpose of this paper is to identify factors influencing Polish rural food-processing micro-enterprise success (measured by profits per employee). The extensive fieldwork that has been undertaken in the Mazowieckie and Warmia-Mazury provinces of Poland provides a rich profile of rural micro-enterprises in the food-processing sector.

## **2 MICRO-ENTERPRISES AND RURAL DEVELOPMENT**

The basic feature of a rural enterprise that distinguishes it from the whole class of enterprises in general is its spatial context: a rural enterprise is a micro, small or medium enterprise involved in non-agricultural activities in rural areas. According to some, rural enterprises have several specific characteristics which differentiate them from the rest of SMEs (urban SMEs). North and Smallbone (1996) conducted a study of mature rural SMEs in remote rural areas of the United Kingdom, identifying the four most important characteristics of rural enterprises. They found that the majority of rural enterprises aim to achieve sustainability and a good living in a rural environment, rather than to make profits. The second characteristic of rural enterprises is that they have a higher survival rate. Some other studies (see for example Zahrai, 2000) highlight other basic traits which are characteristic of rural enterprises, including scale, labour and capital intensiveness, access to capital, market orientation and flexibility.

### **2.1 The role of SMEs and micro-enterprises in rural development**

The specifics of SMEs in rural areas make them among the most crucial factors in sustainable rural development (Noteboom, 1992). Special stress is put on their reinforcement in the traditionally agricultural regions usually characterized by a high rate of unemployment, where the definite possibility of mass job creation exists through employing workers to fulfill simple tasks at relatively low financial costs.

According to some authors (e.g. Zahrai, 2000), the creation of micro-enterprises in rural areas is closely connected with generating new job opportunities. In this way unemployment is reduced, a new class of small owners is formed and, as a result, a change in the social and professional structure of those regions is achieved. By increasing employment levels in rural areas, micro-enterprises can ease the social tensions and contribute to the reduction of high social costs of transformation (such as mass firing due to restructuring in the industrial and agricultural sectors). Rural enterprises are different from their counterparts in urban locations; these differences range from their approach to the environment to the production processes used.

## **3 RURAL ENTERPRISES IN POLAND**

This account of Polish micro-enterprises should start from the story of the Polish SME sector in general, since micro-enterprises constitute about 95% of all SMEs in Poland. Hereinafter in this sub-section, SMEs are used as a proxy for micro-enterprises in Poland.

The total number of Polish private SMEs increased from 1,205 thousand in 1990 to 3,495 thousand in 2002 due to the transitional changes in the Polish economy (Polish Central Statistical Office, 2005). The prevailing enterprises were sole-traders. At the

end of 2003 there were 3,581.6 thousand SMEs in total, which is a 3.2% increase (Polish Central Statistical Office, 2005). The rapid growth in the number of small and medium enterprises – and especially micro-enterprises – was the Polish economy's distinguishing feature (Fig. 1).

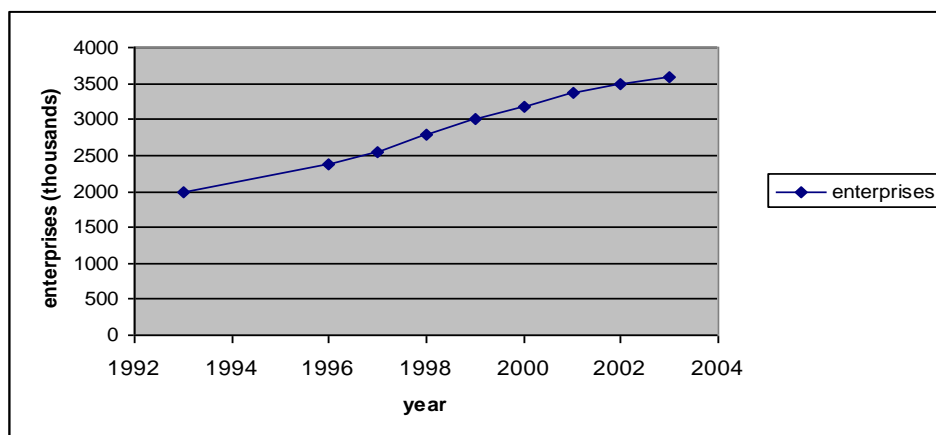


Fig. 1 –Polish SMEs in 1993-2002 (thousands). Source: Polish Agency for Enterprises Development (2004)

The dominant role among Polish SMEs is played by micro-enterprises (employing up to 9 people), which constitute 95.2% of all enterprises operating on the Polish market. Small enterprises constitute 3.8%, medium enterprises 0.8%, and the rest are large enterprises, with 0.2% (Ministry of Economy of the Republic of Poland, 2004). The most dominant group of enterprises in the 1990s was sole-traders. They constituted more than 80% of all registered SMEs.

There are still many obstacles to establishing an enterprise in Poland. According to Porter, (2001) Poland occupied the 24<sup>th</sup> position in the ranking of the number of procedures necessary to start an enterprise, 19<sup>th</sup> place according to the time required (31 days), and 26<sup>th</sup> place according to the costs of establishing a firm among the 29 OECD Member States (Porter, 2001).

#### **4 DATA COLLECTION AND ANALYSIS**

The starting point for the sample selection for this paper was not a probabilistic form. The geographical areas from which the rural micro-enterprises have been drawn were selected based on the considerations of accessibility and budgetary economy. However, it would be true to say that both regions selected – Warmia-Mazury and Mazowieckie provinces represent high level of unemployment and low density of small business in one case and the highest employment in the country together with the widest network of micro-enterprises in the other. It would be too straightforward to suggest that the sampling procedure was ideal from the standpoint of statistical theory, though it is assumed that the sample obtained can be regarded as quasi-random.

At the first stage a list of parishes in both provinces was obtained from the Polish Central Statistical Office. Using the database of parishes 28 parishes were randomly chosen from the list of 56. At the second stage of the sampling process four rural communities were randomly selected within each parish. The 112 communities



obtained then were cross-checked using the community database from the Polish Central Statistical Office. At the third stage of sampling process communities representatives were contacted for survey implementation. Seventy-nine community representatives agreed to help with the research (representatives of 43 communities of Warmia-Mazury province and 36 communities in Mazowieckie province).

At the fourth stage of sampling process enterprises within selected communities were contacted (face-to-face semi-structured interviews).

## **5 THE MODEL OF THE SUCCESS OF POLISH RURAL FOOD-PROCESSING MICRO-ENTERPRISE AND ITS ESTIMATION**

The econometric techniques employed in this paper are fixed and random effects models. Various tests (i.e. Breusch and Pagan test) are run in order to test for random effects and the Hausman (1978) procedure is used to obtain the most appropriate model.

The results of all econometric models: those restricted and unrestricted models comparing all enterprises within the sample are presented and compared. In the conclusions the discussion on the major differences and similarities of both provinces – the poor province and the rich province – is done and major implications are highlighted.

### **5.1 Variables used in the econometric analysis**

Based on economic theory and previous empirical work, the generalized model of enterprise success used here anticipates that the success of small enterprise is influenced by combination of factors internal to the firm and external to the firm. Success of the enterprise is measured as the profit per employee in 2004. Overall, there are 29 hypotheses to be tested. Due to the fact that the explanatory variables used in this model might have many levels (usually expressed by dummies), the number of variables that goes into estimating the model is equal to 7 for the small model, 20 for the intermediate model and 29 for the large model..

The small model of enterprise success uses only truly exogenous variables, the intermediate model of enterprise success uses an extended list of variables (purely exogenous variables and arguably exogenous variables), the large model of enterprise success uses all variables from the small and intermediate models and, in addition, adds subjective variables. The complete overview of the research variables is listed in Appendix 1.

### **5.2 Econometric techniques employed for the estimation of the model of rural enterprise success**

The general econometric model for estimation has the following form:

$$Y_i = \sum_{k=1}^k \beta_k X_{ki} + \sum_{m=1}^m \beta_m Z_{mi} + \sum_{l=1}^l \beta_l W_{li} + u_c + e_i \quad (1)$$

where X are the exogenous variables of the small model, Z the extra objective variables of the intermediate model and W the extra subjective variables added to make the large model.  $u_c$  is a community identifier.

The full list of econometric techniques used includes Breusch and Pagan test for the presence of individual community effects, Hausman test for individual location effects, general least squares (GLS) for the estimation of fixed effects and random effects models as well as ordinary least square (OLS) estimations with robust standard errors.

### 5.3 Model estimation

The small model (Tab. 1) was computed for all 300 valid enterprise cases of truly exogenous variables. Overall, it seems that coefficient of determination (R-squared) are quite small in all three cases indicating the weak explanatory power of the model. Small coefficients of determination are reported quite often in similar studies (see for example study on barriers to entry by Xhillari and Telhaj (2003)). Small coefficients of determination mean that a good deal of variance in the model still remains unexplained. However, the results of the model can still be used to study factors that are significant for enterprise success. There are three variables that have come through as significant in the whole sample model: owner/manager age, owner/manager age squared and a provincial dummy.

Tab. 1 – stepwise small models (OLS estimation). Source: Own results

	Interact Model (Equation 1)		Whole sample model (equation 2)	Rich province only	Poor province only
	Poor	Rich*Dummy	Full Small	Rich Small	Poor Small
Age	1038.598**		1043.679**	1342.164**	
	[429.853]		[419.697]	[634.800]	
Age squared	-10.354**		-10.473**	-12.978**	
	[4.388]		[4.250]	[5.759]	
No. of Main Competitors	-232.841**	287.278**			-170.081*
	[113.579]	[116.325]			[92.211]
Distance from City					-29.214*
					[15.190]
Secondary		-3823.073			6643.932***
		[2350.301]			[1649.520]
College					10398.178**
					[4401.674]
University Second Level					4700.030***
					[1272.355]
University Third Level					4857.889***
					[1335.555]
Rich Province dummy			4207.899**		
			[1965.765]		
Constant	-15240.54		-19049.278*	-22988.3	3364.899***
	[9239.507]		[10152.628]	[15251.701]	[1051.720]
Observations	300		300	142	158
R-squared	0.03		0.02	0.01	0.09

There are three variables that have come through as significant in the whole sample model: Broadband, owner/manager age, enterprise location by the province, enterprise size and enterprise legal status.

Tab. 2 – stepwise intermediate models (OLS and GLS estimation). Source: Own results

	Interact model (Equation 2)		Whole sample model (equation 1)	Rich Province	Poor Province
	Poor	Rich*Dummy	Full intermediate	Rich intermediate	Poor intermediate
Broadband			4715.966**		3848.662***
			[2188.774]		[1257.223]
Age Squared		-6.812**	-11.666**	-10.223**	
		[3.046]	[4.666]	[5.013]	
Size		-2191.020*	-1280.400**	-2157.045*	-536.058*
		[1153.113]	[612.808]	[1163.098]	[291.807]
Age			1209.318**	1150.540**	
			[473.960]	[558.625]	
Company Limited		-8999.172***	-3045.147*	-	9099.286***
		[3065.141]	[1610.712]	[3192.195]	
Family firm		-5624.842**	-3102.294	-5430.856**	
		[2548.108]	[2091.401]	[2485.724]	
Beverages		-5047.795		-4837.42	
		[3150.840]		[3060.961]	
Secondary					2488.471*
					[1301.114]
SAPARD	16073.624**	-17120.282**			13781.931**
	[6659.155]	[6989.235]			[6139.540]
Enterprise Age	-1.771*				
	[0.967]				
College					5837.479
					[3726.657]
Enterprise Trademark					1567.112
					[1078.509]
No. of Main Competitors					-137.468
					[84.288]
Rich Province Dummy			4592.700**		
			[2126.489]		
Constant	5545.157***		-16988.271*	-3589.69	6078.959**
	[596.212]		[9726.110]	[10606.472]	[2356.775]
Observations	299		299	141	158
R-squared	0.12		0.07	0.09	0.29

The variables that have come through as significant in the whole sample model include: owner/manager age, owner/manager motive for enterprise creation, certificates, enterprise size, enterprise legal status and enterprise location by province.

Tab. 3 – stepwise intermediate models (OLS and GLS estimation). Source: Own results

	<b>Interact model (Equation 1)</b>		<b>Whole Sample Model (Equation 2)</b>	<b>Rich Province Only</b>	<b>Poor Province Only</b>
	All Full	Rich*Dummy	Full Full	Rich Full	Poor Full
Age Squared			-14.050**	-12.861*	
			[5.938]	[6.540]	
Risk	-2631.992	34402.072**	16473.267	30390.175*	
	[1703.255]	[14926.098]	[10227.565]	[16337.380]	
Cash		-8414.925**	-5608.769**	-7539.228**	
		[3970.499]	[2393.056]	[3749.685]	
Certificate	7398.216		9993.768*		
	[4606.351]		[5230.458]		
Company Limited		-10871.417**	-2987.391	-8538.757**	
		[4948.650]	[1972.851]	[3880.222]	
Age Squared		-20.704*	1386.532**	1341.559**	
		[10.772]	[574.779]	[663.042]	
Family Firm	-5068.279*		-4332.813	-5811.497*	
	[2736.587]		[2876.995]	[2975.912]	
Enterprise Size	-1263.499***		-1117.902**	-2332.892**	-798.185**
	[405.211]		[530.410]	[1005.343]	[368.653]
Enterprise Age		-832.844	-120.746		
		[572.929]	[79.778]		
Cooperative		-17470.034*	-4904.386*		
		[9059.246]	[2902.264]		
Family and Friends	-5199.051*			-7131.623**	
	[3067.665]			[3082.356]	
Independence	-5167.550**	7117.980**			-4251.341**
	[2023.656]	[3316.683]			[1826.845]
SAPARD	12749.434**	-17461.661**			14143.753**
	[6063.069]	[7878.463]			[6514.079]
Ent. Age Squared	-4.302***	20.331*			-2.645***
	[1.404]	[12.301]			[0.791]
Family Tradition	7731.311***	-11687.816**			6545.174***
	[2137.872]	[4592.118]			[1810.789]
No. of Main Competitors	-129.616*	140.996			-138.254*
	[70.264]	[86.020]			[77.009]
Years of Experience	272.163***				133.197**

	[96.698]				[63.576]
Broadband	2654.266*				3582.771***
	[1566.053]				[1323.370]
Trademark	3673.648***				2419.119**
	[1235.759]				[1217.989]
Patent	-5140.197*				
	[2802.377]				
Competition in Quality	6803.559*	11945.576**			
	[3744.235]	[5612.912]			
Civil Law Partnership					2743.169
					[1773.448]
Secondary					2162.437
					[1357.760]
College					5167.706
					[3219.811]
Competition in Price					2220.541**
					[1078.197]
Financial Help					-1856.739
					[1278.886]
Neg. Tax					-1548.558
					[1020.541]
Rich Province Dummy	-33609.91		3579.247**		
	[21550.534]		[1693.365]		
Constant	13733.036***		-15347.266	-3427.206	8195.047**
	[3601.382]		[10931.066]	[12682.934]	[3267.663]
Observations	299		299	141	158
R-squared	0.38		0.17	0.26	0.39
Robust standard errors in brackets					
* significant at 10%; ** significant at 5%; *** significant at 1%					

## 6 MAIN CONCLUSIONS

Summarizing the findings from the three econometric models which are using the data for all enterprises it can be seen that both owner/manager age and enterprises location play the key role in enterprise success. This suggests that those two factors should be attributed some special attention when the success or influencing the success of Polish rural micro-enterprises are concerned. The results also show that enterprises in Mazowieckie province are more successful than those in Warmia-Mazury province.

Enterprise size and enterprise legal status are negatively impacting enterprise success; those factors have emerged in two models. The result about the legal form suggests that enterprises that are created as family enterprises and limited companies are generally less successful (earn less profit per employee) than sole-trader companies. The result about enterprise size can be regarded is a technical issue – it is a matter of the measure of enterprise success that has been selected for this work. When different

measures of success are used for testing, it becomes insignificant. Thus, this result does not mean that rural enterprises should not employ more people providing they want to be successful.

Factors such as Broadband Internet connection in enterprise, cash motivation of owner/manager and certificates obtained by the enterprise are also of considerable importance for enterprise success.

Our results confirm related findings of Kadocsa and Francsovcics (2011), Strielkowski (2012), or Janda et al. (2013) who show that small enterprises in the CEECs did not perceive any major impacts of EU accession. The Hungarians small businesses did not capitalize on the opportunities offered by the EU, did not make effort to apply for EU grants and funds and did not attempt to penetrate new markets.

Our analysis shows that the success of the rural food processing microenterprise in Eastern Europe is most related to its owner-manager. Surprisingly, the characteristic of the owner - manager which matters the most is not his education or his experience with food processing but his age. The major policy recommendation for government authorities dealing with support policies is therefore not to look so much on enterprise characteristics but to concentrate on the characteristics of the entrepreneur. Our analysis also confirms that the profitability of rural food processing microenterprises is positively correlated with favorable micro and macroeconomic conditions differentiating between rich and poor areas.

#### **Acknowledgement:**

This paper was partially supported by the Ministry of Education and Science of the Russian Federation, research project No. 26.1795.2014/K.

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### Appendix 1

Tab. 4 - Variables used in the econometric model for testing the main research hypotheses and their categories (levels). Source: Own results

Name	Variable Definition	Variable type	Expected sign
<b>Enterprise success (dependent variables)</b>			
Y	Enterprise gross profit per employee in 2004	Polish Zloty (PLN)	
X <sub>1</sub>	Owner/manager reason for establishing an enterprise	1 = self-realization 2 = independence 3 = risk 4 = need of cash 5 = threat of unemployment 6 = influence of family and friends 7 = family tradition	+ self-realization, independence and risk are expected to have higher influence on enterprise success
X <sub>2</sub>	Owner/manager education	1 = primary 2 = secondary 3 = college 4 = university second level 5 = university third level	+ relationship between education and enterprise success
X <sub>3</sub>	Owner/management business experience	Years	+
X <sub>4</sub>	Owner/manager training	Dummy (1 = obtained some training in the field related to the firm area of business, 0 = otherwise)	+
X <sub>5</sub>	Owner/manager age	Years	+
X <sub>5</sub>	Owner/manager age squared	Years	-
X <sub>6</sub>	Owner/manager previous sector experience	Dummy (1 = experience in the same sector of economy, 0 = otherwise)	+
X <sub>7</sub>	Owner/manager ties to the region	Dummy (1 = close ties, 0 = otherwise)	+ relationship between
X <sub>8</sub>	Age of the enterprise	Years	-



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X <sub>8</sub>	Age of the enterprise squared	Years	-
X <sub>9</sub>	Establishing of enterprise on local market	Dummy (1 = strategic reasons, 0 = otherwise)	+
X <sub>10</sub>	Legal form of the enterprise	1 = sole-trader 2 = family enterprise 3 = limited liability company 4 = unlimited partnership 5 = civil law partnership 6 = cooperative	Sole-traders are expected to perform better than commercial companies
X <sub>11</sub>	Location of the enterprise by the province	Dummy (1 = Mazowieckie province, 0 = Warmia-Mazury province)	Expect some regional differences
X <sub>11</sub>	Location of the enterprise by parish	Parish dummy	Expect some regional differences
X <sub>11</sub>	Location of the enterprise by community	Community dummy	Expect some regional differences
X <sub>12</sub>	Distance from the parish to the regional center	Kilometers	Expect some differences
X <sub>13</sub>	Size of the enterprise	Number of employees	-
X <sub>14</sub>	Ownership of the enterprise	Dummy (private sources =1, 0 = otherwise)	Enterprises owned by physical entities of families tend to be more successful
X <sub>15</sub>	Internet in the enterprise	Dummy	+
X <sub>16</sub>	Broadband in the enterprise	Dummy	+
	Enterprise product/good	1 = products of vegetal origin 2 = products of animal origin 3 = secondary-processed products 4 = beverages	Expect some product differences
X <sub>17</sub>	The fact that enterprise has branded products	Dummy	+
X <sub>18</sub>	Number of enterprise's main competitors	Number of firms	-
X <sub>19</sub>	Areas in which enterprise is exploiting its advantage	1 = prices 2 = services 3 = quality of products 4 = innovativeness of products	- + + +
X <sub>20</sub>	Enterprise's innovation	1 = know-how 2 = international certificates 3 = licenses 4 = patents (valid on the national level)	+ + + +
X <sub>21</sub>	Government financial support	Dummy	+
X <sub>22</sub>	Negotiations with local governments on tax reduction	Dummy	+
X <sub>23</sub>	EU SAPARD funds in the enterprise	Dummy	+ Enterprises that managed to obtain funds from EU program are more successful
X <sub>24</sub>	Public non-monetary assistance to the enterprise	Dummy	+
X <sub>25</sub>	Enterprise participation in local schooling	Dummy	+
X <sub>26</sub>	The fact whether enterprise obtained the credit	Dummy	+
X <sub>27</sub>	Enterprise distribution of sales in 2002-2004	Dummy (1 = local market and beyond (local market +), 0 = local market )	Enterprises with broader distribution of products are more successful
X <sub>28</sub>	Impact of Polish EU accession on the enterprise	Dummy (1 = some impact, 0 = no impact)	+ opportunities of EU Accession tend

			to be more successful
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## **TRENDS IN PERFORMANCE MANAGEMENT: COMPARISON AND SUMMARY OF SURVEYS**

*Michaela Striteska, Lucie Jelinkova*

### **Abstract**

This paper deals with development and trends in performance measurement and management. Based on the comparison and summary of three surveys, carried out in the years 2011 - 2013 in the Czech manufacturing and non-manufacturing companies, are identified three key research areas. First area deals with models or frameworks that businesses currently use for performance management, second discusses the specific performance measurement areas and indicators that are used and in the third area are identified key elements of successful performance management that need to be fulfilled. Through these research areas is mapped current form of performance management process in the Czech companies and are also identified characteristics which should be met in the future to create effective performance management system. The findings of this summary and comparison are evaluated within the context of theoretical assumptions and results of similar research studies. The paper was created on the basis of literature review and 46 case studies analysis. The case studies were worked out by analyzing internal company materials and by conducting semi-structured interviews with the top management.

*Keywords: performance measurement, performance management, framework, measures, comparison*

JEL Classification: M14, M21, M29

## **1 INTRODUCTION**

In today's business environment, companies are confronted with the continual and quickly ongoing changes. The dynamic development of the business environment has a major influence to the development of approaches to performance measurement and management "Within the next five years, every company will have to redesign how to measure its business performance" (Eccles, 1991). To be able to do this change, managers need a comprehensive understanding of trends and deeper knowledge of new approaches in performance management and measurement. The main aim of this paper is to contribute toward building such an understanding and knowledge.

Specifically, we investigate the models and frameworks that are currently used to measure and manage company performance. In the past two decades, a wide variety of performance measurements systems have been developed and implemented to overcome the limitations of traditional financial measures. All, in different ways, are designed to provide a "balance" overview of the company's performance. Therefore, we further explore which particular areas and measures are used to monitor performance. As stated Stivers et al. (1998) although much is being written about nonfinancial performance measures, very little is known about actual current practices. Another equally important study objective is to determine the key elements that have to be met by companies to design effective PMS having regard to the global trends.

The performance management system could be examined according to Neely et al. (1995) at three different levels: at the level of particular performance measures, at the level as an entity (multi-dimensional measures, measures at the operational level, the integration of measures

across the organization's functions and through its hierarchy, inclusion of cause-effect linkages), at the level of relationship between the PMS and environment within which it operates (strategy re-formulation, the consistency with the existing recognition and reward structure). Within this paper the performance management systems of selected Czech companies at the level as an entity is examined.

## **2 PERFORMANCE MEASUREMENT AND MANAGEMENT FRAMEWORKS: LITERATURE REVIEW**

### **2.1 Characteristics of effectively created management frameworks**

For successful performance management in companies are used systems, which can be understood as a comprehensive and universal set of activities and methods of measurement (Wagner, 2009), so called performance measurement system (PMS). These systems are the heart of the process of performance management, support its philosophy and are necessary for the effective and efficient functioning (Lebas, 1995). For companies that use PMS as the basis for their activities and development, the health of the companies depends on the effectiveness of the PMS (Najmi et al., 2005).

Therefore, in order to consider a performance measurement system as effective must fulfill specific roles. For example Lima et al. (2010) identified these roles based on interviews with experts and with the help of the Delphi Method. The most frequently cited PMS roles in the literature are: strategy implementation and revision, providing connections, performance measurement and evaluation, monitoring progress and be a tool for internal communication and motivation. (Gimbert et al., 2010; Micheli, Manzoni, 2010) In the last two decades the attention was paid especially to the role - implementation and revision of the strategy. Most surveys have focused on the area of transforming strategy into action, thus confirming that the PMS is a useful tool in this regard. (Kaplan, Norton, 1996; Simons, 2000)

The basis for the creation of an effective performance management framework is to create an effective performance measurement system. Neely et al. (2007) identify six following key characteristics of chosen PMSs listed before 2002:

- The set of performance measures used by the company must provide a "balanced" company image.
- The use of a PMS should provide a brief overview of the company's performance.
- The need for companies to establish a set of performance measures which are multi-dimensional.
- A measurement and performance management system will provide a comprehensive view of the entire company.
- Performance measurements should be integrated into all activities of the organisation through its hierarchy.
- A PMS should help to understand how the results are affected by different determinants.

Moreover Gomes et al. (2011) created from available literature on performance measurement in the last two decades following summary of relevant features and characteristics of performance measures and PMSs:

- Must reflect relevant non-financial information, based on key success factors of each organization.
- Should be implemented as means of articulating strategy and monitoring organization results.

- Should be based on organizational objectives, critical success factors and customer needs and monitoring both financial and non-financial aspects.
- Must accordingly change dynamically with the strategy.
- Must meet the needs of specific situations in relevant manufacturing operations, and should be long-term oriented, as well as simple to understand and implement.
- Must make a link to the reward systems.
- Financial and non-financial measures must be aligned, and used within a strategic framework.
- Should stimulate the continuous improvement processes.
- Must be easy to understand and to use.
- Must be clearly defined and have a very explicit purpose.
- Should allow a fast and rigorous response to changes in the organizational environment.

## **2.2 Development and trends in performance measurement and management**

The development of an approach to companies' performance management is dependent on the development of the economic environment. This development can be seen in all components of PMSs, and is especially noticeable in defining performance measurements and in establishing the methods of measurement (Wagner, 2009). According to opinion of Dluhosova (2007) depends the success of performance measurement and management, above all, on the choice of correct performance measures and of an instrument to measure as well as on the possible use in corporate management. The main determinants of this development can be identified as: technical-economic model of the economy, globalisation trends, the development of modern technologies, the impact of intellectual assets, the degree of knowledge of economic systems etc. (Dluhosova, 2007). Huyett and Viguerie (2005) defined another determinants: the combined pressure of global competition, technological advancements, interconnectivity and economic liberalization.

The history of performance measurement dates back to the early 19th century, when the increasing industrialization led to the measurement of the productivity performance management (Bititci et al., 2012). Performance measurement was based on Accounting Standards and Cost Accounting. Since 1920, financial ratio indicators (ROI, ROE, ROCE) have been particularly used for measuring performance, and are still widely used as a diagnostic tool for measuring the financial health of a company.

Due to the fact that the product manufacturers and service providers can be consider as service operations; so traditional accounting measures and the static view of costs are no longer appropriate in modern business environment. (Quinn et al., 1990) Based on the findings that traditional financial measures are no longer sufficient for understanding performance in a dynamic business environment because they promote short-termism leading to a lack of strategic focus and failure to provide data on quality (Dixon et al., 1990, Bititci, 1994, Kagioglou et al., 2001, Robinson et al., 2005, Wagner, 2009) were developed and implemented wide variety of performance measurement systems – eg. Performance Measurement Matrix (PMM) (Keegan et al., 1989), the results and determinants framework (Fitzgerald et al., 1991), Economic value add (Stewart, 1991), SMART Performance Pyramid (Lynch, Cross, 1991; Tangen, 2004), Economic value add (Stewart, 1991), Balanced Scorecard (Kaplan and Norton, 1992), EFQM Business Excellence Model (EFQM, 2003), Dynamic performance measurement system (Bititci et al., 2000), Integrated performance measurement framework (Medori and Steeple, 2000).

The SMART model (Lynch, Cross, 1991) developed in 1988 represents a significant change in the approach to performance measurement. It is the first time when attention was focused on linking strategy to operations, the use of external and internal performance measurements and modelling of the company as an integrated system. At the beginning of 1990, the MVA model (Stewart, 1991) introduced a completely new approach that viewed performance measurement exclusively from a market perspective. This was followed by the BSC model (Kaplan and Norton, 1992), which includes both financial and nonfinancial performance measurements. This has gained great attention over the last fifteen years and has been successfully applied in many sectors. Several years later the EFQM model (EFQM, 2003) was developed for the needs of European companies.

Sureshchandar and Leisten (2004) argue that BSC framework do not take account of many other important stakeholders. Also, Neely et al. (2001) claim that organizations have strategy to bring value to a set of stakeholders. On the basis of this criticism was created Performance prism. This framework integrates stakeholder perspective under five facets - stakeholder satisfaction, stakeholder contribution, strategies, capabilities and processes.

Figge et al. (2002) argue that many organizations begin to integrate social and environmental perspective into their systems of performance measurement and management along with the traditional perspective. The era post 2000 generates a lot of frameworks updating the BSC approach – eg. Kanjis business scorecard, argues that BSC approach should be consistent with business excellence and TQM (Kanji and Sá, 2002); Total performance scorecard, integrated personal and organizational scorecard with PDCA cycle (Rampersad, 2005); Dynamic multi-dimensional performance Framework, which is composed of five performance dimensions – financial performance, customer, process, people and future (Maltz et al., 2003). The other recent development brings – eg. the flexible strategy game-card that highlights the dual perspectives of performance - enterprise perspective and customer perspective (Sushil, 2010); System dynamics based balanced scorecard – connecting traditional BSC and system dynamics principles (Barnabe, 2011); Sustainability performance measurement system, which describes phases of evolution of corporate sustainable PMS. (Searcy, 2011) Current systems of performance measurement and management are based on system dynamics, sustainability and simulation view of performance. (Yadav et al., 2013)

### **3 OBJECTIVES AND METHODOLOGY OF THE INVESTIGATION**

In the years 2011 – 2013, three research surveys were carried out, each time lasting a period of 3 months (October to December). In general, everything was focused on mapping the current form of PMSs in Czech companies and identifying the characteristics that an effective performance management system should meet. Even though each survey had its specific objective, each one specifically investigated three consistent areas:

- 1. Models or frameworks that businesses currently use for performance management,*
- 2. The specific performance measurement areas and indicators that are used,*
- 3. Key elements of successful performance management that need to be fulfilled.*

To fulfil the objectives of the research investigation, the method of analysing case studies was selected, as it was necessary to obtain a large amount of data from specific companies. In total, 46 companies were examined, of which there were 35 manufacturing and 11 providing services. The criterion for selection was the size of the company by number of employees and turnover, and previous experience with measurement and performance management, which were determined using previously conducted secondary analyses. Medium and large

businesses were included in the research investigation, among which the assumption was established that a systematic approach to performance management was used.

The case studies were worked out by analyzing internal company materials relating to the area studied and by conducting semi-structured interviews. The data collection phase of the study began with a general examination of relevant literature and research studies, to provide the researchers with sufficient theoretical background. After that the characteristics of basic information about company, vision, values and strategy, performance management and measurement system in selected companies was performed on the basis of all available internal documents. Interviewing was the second technique used for data collection.

The semi-structured interview was conducted based on the methodology and rules presented by Allhoff (2008) and Scharlau (2010). A total of 60 interviews were conducted with mid-level managers (quality manager, HR manager, manager for strategic development) and top level management (general director, financial and sales director) of selected companies. Content analysis was used to process the data.

More detailed characterisation of individual research investigations:

*1. Key features of Strategic Performance Management Systems - year 2011*

The main goal of this research study was to investigate the features of PMS in Czech large size manufacturing companies from two points of view. First was to identify and analyze the current form (models, features, roles, strengths and weaknesses) of PMS in selected manufacturing companies. Second was to determine the requirements that have to be met in the future to design effective PMS. The attention was also paid to factors that affect performance of the manufacturing enterprises and to aspects (characteristics, components, crucial elements) of successful performance management. Totally six large manufactures (automotive, electrical, glass and chemical industry) were analysed by the method of semi-structured interviews with the usage of the 10 open questions (Striteska, 2012).

*2. Current Performance Management Systems and Factors affecting their Quality - year 2012*

The aim of the investigation was to determine the form of current performance measurement systems in selected Czech manufacturing companies (the level at which it operates, the significance of specific financial and nonfinancial indicators for decision-making, and satisfaction with the information provided). A great deal of attention was also paid to identifying the key factors that affect the quality of the process of performance management.

Interviews and analysis were conducted in eleven middle and nine large-size manufacturing companies (metal working industry, plastic processing, manufacturing of packaging, food processing industry, electrical engineering, the energy, the petrochemical and tobacco industry). The interviews covered 10 open questions (Jelinkova, Striteska, 2014; Striteska et al., 2014).

*3. Strategic performance management with Focus on Customer – year 2013*

The main objective of the investigation was to determine whether the companies surveyed had set a long-term strategic concept including objectives and processes focused on the customer and whether the strategy was implemented by means of the strategic performance measures. Partial objectives of this investigation were also to identify the attitude of the companies to monitoring and measuring customer satisfaction, the use of customer satisfaction measurement as an input in the process of continuous improvement and identifying the ways in which the companies determine their competitive position. Consequently, an analysis was made of how the information gathered is used in the company.

The final sample for interviewing included a total of 20 managers, 11 of which were at the highest management level and 9 were at mid-level management of the companies, the activities of which were manufacturing, process manufacturing, chemical processing, energy, automotive, information technology, transportation, health, banking, insurance and other services. The selected companies can be divided into 9 large companies and 11 medium companies (Striteska, Jelinkova, 2014).

## **4 FINDINGS AND DISCUSSION**

### **4.1 Approach, model or framework used for performance measurement**

After more detailed analysis, the individual models or methods for measuring performance can be divided into separate groups, which are: comprehensive approaches, a set of Key Performance Indicators (KPI) and performance measurement based on financial indicators. As comprehensive approaches are considered the Balanced Scorecard model and EFQM, which are instruments for measurement and evaluation as well as performance management.

The following table (Tab. 1) shows the frequency (in %) of the use of the different models/methods for measuring the performance of the companies surveyed in 2011-2013.

Tab. 1 – The frequency of the use of models/methods. Source: own processing

Set of models	The frequency of the use of models in the year		
	2011	2012	2013
Comprehensive approaches	33%	15%	10%
Set of KPI	50%	40%	50%
Financial indicators	17%	45%	40%

The table above clearly shows that there is still a large percentage of Czech companies using primarily financial indicators to measure performance, supplemented at most by monitoring customer satisfaction. In the first year of the survey, this percentage was the lowest, as only large manufacturing companies were examined, based on the assumption that at the beginning (1991-2000) the main development of performance measurement systems related to manufacturing operations (Sushil, Sagar, 2013) . At the same time, there is here the highest percentage of the use of comprehensive approaches, namely the BSC methods.

In further investigations, at least half of the companies have always been medium-sized businesses, and this is reflected in the given results. A somewhat surprising finding is little use of comprehensive approaches to performance measurement. Of all the companies surveyed, only one uses an EFQM model to measure performance, the other approach based on the BSC method.

Companies that were included in the group measuring performance based on a KPI set were subjected to a detailed analysis. The areas investigated were those in which the individual KPIs were defined. Overall it could be stated that two-thirds of them have measures set in all the main perspectives of the BSC method (finance, customers, processes and employees). So far, one-third consistently omits measuring the performance of employees.

Although many research studies have confirmed the strong relationship between human resources management and the attitude of the employees on the one hand and the performance of the organization on the other hand Armstrong (2007) provides a number of relevant



research surveys, HRM indicators are not yet the norm in examining the effectiveness of human resources management and its impact on company results (Guryn, 2006).

Very often, however, these companies apply specific tools which will also contribute to improving performance such as Lean Management, process analysis and benchmarking.

If we summarise the results obtained, it can be stated that comprehensive approaches are still little used in Czech companies. Trunecek et al. (2005) conducted a survey in 2005 among 139 Czech companies and found that only 11% of them fully utilise the BSC model and 40% do not even know it. For more than five years, our results are similar; a higher percentage of the use of BSC is only among large manufacturing companies. An interesting finding is that the companies surveyed, with one exception, do not even use an EFQM model that was created for the needs of European businesses and is often used in Western Europe.

Nevertheless, we can identify an ever-growing trend in the use of a KPI set, which seeks to provide a “balanced” view of a company’s performance evaluation. Performance management solely on the basis of financial indicators is now declining and less than 40% of the companies surveyed use it. Compared to the previously conducted studies (Fibirova (2007), Horova a Hrdy (2007), Kral et al. (2007) or Skodakova (2009), where management on the basis of financial indicators still predominated in the practices of Czech companies, among the companies we surveyed performance measurement prevails based on a set of KPIs.

#### **4.2 Specific areas of measurement and types of performance indicators**

The survey of Stivers et al. (1998) conducted in U.S. Fortune 500 companies and in Canadian Post 300 companies examined the degree to which executives identify particular nonfinancial performance measures as important and whether the companies are measuring them. They revealed that customer service factors are perceived to be the most important measures. On the other hand, factors in the innovation and employee involvement categories were perceived to be less important in goal setting. Chow and Van der Stede (2006) stated that in a study carried by Wm. Schiemann & Associates, the executives widely acknowledged the limitation of traditional financial measures. Nevertheless, they still favored them over nonfinancial measures because they saw them as being generally less ambiguous. The ever increasing application of nonfinancial measurements closely related to areas in which performance is measured using them. In the context of these research studies, it was interesting to take a closer look at the areas and performance measures used by surveyed companies.

Tab. 2 – Specific performance measures and frequency of their use. Source: own processing

<b>Performance measurement area</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
<i>Financial performance</i>			
Traditional financial indicators	100%	100%	100%
Value based indicators (EVA, MVA, CFROI)	33%	15%	10%
<i>Customer performance</i>			
Complaints	100%	90%	75%
Customer satisfaction	100%	75%	95%
Customer retention	33%	35%	20%
<i>Internal process</i>			
Innovation process	33%	20%	40%
Operating process (quality, time, costs)	100%	100%	100%

<i>Employee performance</i>			
Employee satisfaction	50%	35%	30%
Labor productivity	83%	70%	60%
Employee retention	17%	20%	25%
Employee Skills	33%	35%	25%
Employee engagement	17%	10%	25%

The above mentioned results in many aspects still correspond with the survey of Lingle and Scheemann from 1996, who found that financial performance measures are included in regular management review in 98% of surveyed companies, operating efficiency in 82%, customer satisfaction in 76% and employee performance in 57%.

Strong critique of traditional performance measurement systems and confidence of managers in financial indicators have led to place greater emphasis on „modern“ financial indicators based on value management. However as stated (Venanzi, 2012), more than 10 years later, this scenario seems to have changed only a little, paradoxically. International evidence as well as our survey indicates that managers remain anchored to traditional financial metrics and other metrics like EVA are used rarely (Graham et al., 2005). The unchanged behaviour in financial performance measurement confirmed also recent study conducted by the U.S. National Association of Corporate Directors boardrooms which investigated that only 16% use economic value measure as financial metric in compensation plans (Daly 2011).

Yadav et al. (2013) stated that in the era post 2000 can be seen some new performance measures, such as leadership, training, education, innovation, capabilities, knowledge, personal improvement, etc. Unfortunately all of these measures are rarely seen in the PMSs of monitored companies.

#### **4.3 Key requirements that have to be met in the future to design successful performance management system**

At the end of interviews, managers always got room for expressing their own opinion, how effective PMSs that respond to global trends and changing roles of business should be developed or enhanced. In the discussion it was often found that managers are not fully aware of all the components that should modern performance measurement system include, as stated the literature. It was quite complicated for managers to finding answers to this question. Despite their opinions regarding key characteristics of effectively created performance management system could be summarized to following points:

- simple and clear performance system that strengthen the monitoring of all strategic goals,
- engagement of all hierarchical levels, measures should be integrated through its hierarchy,
- interconnection with the remuneration policy – instrument for employee motivation,
- It systems that enable the collection, analysis and reporting of requested data,
- well trained employee.

On the other hand surprisingly not once has been mentioned the establishment and checking the validity of linkages (cause and effect relationships) among particular strategic performance measures. In the companies that do not use comprehensive performance management approaches no relationship is revealed between the skills and motivations of

employees or key processes and the development of customer satisfaction. And if these relations are examined in a company, they usually remain at the level of apparent hypotheses. This fact is closely related to the finding that the indicators mapping the human resources are not yet the norm in examining the effectiveness of human resource management and its impact on corporate results (Guryn, 2006).

Another important characteristic of effective PMS which was not mentioned is that measures should be conceived as part of fast feedback management systems and should be designed for stimulating continuous improvement capability rather than simply monitor operations strategy (Maskell, 1991). The PMS should be regularly reviewed and updated in order to remain flexible. The latest trends stated in the current literature, which are system dynamics, modelling and simulation, were mentioned within the interviews only once.

## **5 CONCLUSION**

In the Work of Yadav et al. (2013) that deals with the research trends of the last two decades of the performance measurement and management frameworks, the writers came to the conclusion that industrial economies have experienced structural changes and so as the changes have been experienced in PMS research. As a key transformation in the period 1991 - 2000 can be considered the development of an integrated and balanced system of performance measurement and management. For the second decade 2001 - 2011 is typical integration of multi-stakeholder perspective and dynamism of system. Current literature mainly focuses on flexible strategy game-card usage and integration of sustainability in company performance management system.

Compared to the previously conducted research studies our surveys revealed continuously increasing trend in the use of set of KPI, which seeks to provide a “balanced” view of a company’s performance evaluation. Unfortunately, comprehensive approaches to performance management are still not frequently used in surveyed companies. Therefore, the focus of companies should be redirected from performance measurement to performance management.

It is not surprising finding that all monitored companies use traditional financial measures, however surprising is that modern financial indicators base on value management are still used rarely. In customer area measures such as complaints and customer satisfaction are already used routinely, on the contrary customer retention, which for example Nenadal (2004) identify as advance degree of excellence of performance measurement in relation to customer, monitor less than a third of surveyed companies. The same situation occurs in the area of internal processes where all companies measure operational processes but approximately only third of them define measures in innovation processes. In employee performance area three quarters of companies monitor labor productivity, but measures like employee satisfaction, employee retention or employee skills are disproportionately less used. In general measures aimed at improving of performance (lead measures) like employee engagement and innovation process are currently used rarely.

According to Gomes et al. (2011) the recent dramatic environmental and market changes have fundamental influence to the performance measurement literature. The most recent literature highlight, that is necessary to approach to performance management from a more open systems perspective. Some of the relevant issues raised in the literature recently are introduced below:

- Should capture the dynamic nature of the market and environment and include it in the PMS.

- The organizational focus should be redirected from performance measurement to performance management.
- Should be changed from an internal/closed to an external/open perspective, measuring across supply chain and networks.
- Information systems and technology should be facilitators of the performance measurement and management process.
- New processes, initially developed for large organizations, should be found to implement PMS in small and medium enterprises.
- A stakeholder oriented approach should be created, balanced in its perspective.
- PMS should take in consideration the human factor, including new and innovative incentive/reward systems, and their links to performance measurement in order to involve employees in the performance measurement process.

The disappointing for the authors of the survey is that some of the main trends identified in the current literature are not recognized by the Czech managers. Notably the dynamics and flexibility of PMS, which should stimulate continuous improvement of company performance as well as focus on sustainability and all stakeholders are missing. In the surveyed companies (large manufacturing companies) we revealed only performance measures relating to the environment. In other words, still there a wide gap exists between what is used in practice and what is considered as effective in research.

Based on the analysis results further research will be conducted. The main aim will be investigate dependence of using the models on some other company activity.

### **Acknowledgements**

*This article was created with the support of SGSFES\_2015001 project.*

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## **USAGE OF INTERNATIONAL FINANCIAL REPORTING STANDARDS (IFRS) IN CZECH SMALL AND MEDIUM ENTITIES (SMES) – IS IT REALLY SO RARE?**

*Kateřina Struhařov*

### **Abstract**

In this paper the usage of International financial reporting standards (IFRS) in Czech Small and medium entities (SMEs) is analyzed. Despite the past studies from the Czech Republic, the paper aims to show that there are some Czech SMEs that may benefit from usage of IFRS. Furthermore the cost/barriers and benefits of IFRS are analyzed, as well the reasons why selected companies do not plan to adopt IFRS as primary accounting system. IFRS for SMEs is also mentioned as possible way how to widespread IFRS in the Czech Republic.

*Keywords: IFRS, SMEs, Czech Republic*

JEL Classification: M41 Accounting

### **1 INTRODUCTION**

Based on the previous studies from the Czech Republic (Bohuřov & Blařkov, 2012, Mllerov, Pasekov, & Hblov, 2010, Bohuřov & Nerudov, 2008, Bartnkov, 2012, Pasekov, Crhov, Strouhal, & Řezankov, 2014) the usage of IFRS in Czech SMEs is really rare due to many factors, mainly due to the cost connected with IFRS adoption that are overwhelming the pros of such adoption. Also Czech tax legislation is not helping to the widespread of IFRS as CZ GAAP profit or loss is needed for the calculation of corporate income tax and thus the companies need to have two accounting systems or some kind of bridge between them.

On the other hand when you check the vacant positions for accountants, IFRS knowledge is no more benefit, but it is common request for applicants. As at 22 Jan 2015 there were 79 out of 470 accountancy job offers on jobs.cz (Czech jobs server) requesting IFRS knowledge.

There are also some indications that Agrofert Group (a group of more than 200 companies which are active in food production, agriculture, chemistry, ground machinery, forestry, timber harvesting, woodworking, renewable resources and biofuels) have in 2013 started to adopt IFRS to be able to present IFRS financial statements for 2015.

In this paper I am presenting the results of my research held during my PhD. studies and resulting in my dissertation thesis with the title Usage of IFRS in Czech SMEs.

### **2 LITERATURE BACKGROUND**

#### **2.1 General IFRS information**

As defined by International Accounting Standards Board (IASB): “International Financial Reporting Standards (IFRS) is a single set of accounting standards, developed and maintained by the IASB with the intention of those standards being capable of being applied on a globally consistent basis—by developed, emerging and developing economies—thus providing investors and other users of financial statements with the ability to compare the financial

performance of publicly listed companies on a like-for-like basis with their international peers.”

“Up to 2000, IFRS were only supported by the international accounting standards Committee (IASB). In 2000, the European Commission announced a plan to adopt IFRS as a regulatory tool for the European accounting. Immediately after this decision in 2000, a number of countries, such as the Netherlands and Austria, allowed companies to use IFRS as an alternative for the local standards in order to smoothen the changeover to IFRS in 2005. Some other countries, such as France, Belgium, Germany and Italy, already permitted listed companies to follow IFRS before the decision by the EC in 2000. As a result, a number of European companies were already using IFRS before it became mandatory in 2005. These companies are called ‘early adopters’.” (Renders, A., & Gaeremynck, A., 2007, p.49-50). Since 1 January 2005 all companies listed on a regulated market in the Member States of the European Union, are required to prepare their consolidated financial statements under IFRS.

As at April 2014 IFRS was adopted in 105 jurisdictions, around 60 per cent of the 105 jurisdictions that require IFRS for all or most domestic publicly traded companies also require IFRS for some domestic companies whose securities are not publicly traded, generally financial institutions and large unlisted companies. Over 90 per cent of the 105 jurisdictions that require IFRS for all or most domestic publicly traded companies also require or permit IFRS for all or most non-publicly traded companies. (IASB, 2014). In 2008 IFRS were allowed to be used in the United States.

In the Czech Republic, no specific plan for the harmonization of financial reporting (PricewaterhouseCoopers, 2010) has been announced. The European Union's requirements were integrated into Czech accounting legislation.

As at April 2014 the IFRS consisted of Conceptual Framework, individual standards (28 IAS and 14 IFRS) and interpretations (8 SIC and 18 IFRIC).

## **2.2 IFRS for SMEs**

Since July 2009 IFRS for SMEs is available as alternative for small and medium entities (defined as entities with no public accountability and that publish general purpose financial statements for external users). IFRS for SMEs is based on the same principles as full IFRS. However, these principles were in many cases simplified to meet the needs of SMEs as well as to make the costs for the preparation of the financial statements reasonable (IASB, 2010, PwC, 2009, KPMG, 2010).

The publication of IFRS for SMEs was connected with great expectations in many countries. However it has shown, that IFRS for SMEs did not have so big success as planned by IASB and other supporters. It has been adopted by many countries with lower economic performance and weak accounting systems. On the other hand in countries that are economically strong and have a relatively high quality financial reporting system the IFRS for SMEs adoption has been associated with certain distrust. (Bohušová & Blašková, 2011).

Unlikely the adoption of full IFRS, the adoption of the IFRS for SMEs at EU level was rejected in new accounting Directive in June 2013 as it was concluded that introducing the IFRS for SMEs would not appropriately serve the objectives of simplification and reduction of administrative burden (For instance, the Directive does not require preparation of a cash flow statement, whereas this is mandatory under the IFRS for SMEs.). Nevertheless, Member States are able to permit or require the IFRS for SMEs as their accounting standard for all or some of their unlisted companies provided that the Directive is fully implemented and the standard is modified to comply with any accounting requirement of the Directive that departs

from the IFRS for SMEs. In order to comply with the simpler regime introduced by this Directive, IFRS for SMEs may be available only as a voluntary option for small companies in jurisdictions where the standard is used. (EU, 2013).

The Czech Republic has not adopted the IFRS for SMEs and the adoption is not under consideration in the nearby future (IFRS, 2013).

### **2.3 Differences between CZ GAAP and IFRS, IFRS for SMEs**

Contrary to IFRS, CZ GAAP is a national, rule-based accounting system and this is one of the reasons for differences between these two accounting systems (in IFRS the transaction is booked based on the substance over form principle, in CZ GAAP it has to be booked based on the documents that relate to the transaction). The other reasons for differences to be mentioned is the lack of conceptual framework in CZ GAAP (to define basic elements of financial statements as well to serve the users of financial statements to understand main assumptions of accounting system) and linkage of CZ GAAP to Czech tax legislation. In Appendix 1 list of typical differences between CZ GAAP and IFRS can be found.

Nerudová (2009) analyzed the linkage between tax and accounting. Using categories defined by Lamb, Nobes, and Roberts (1998) she analyzed individual elements of financial statements and accounting principles. From her analysis tax leads or dominates in Depreciation for majority of SMEs (accounting depreciation = tax depreciation), in Lease classification (one of the most significant difference between CZ GAAP and IFRS) and in Research and Development cost. Also the financial information presented by majority of Czech SMEs are mainly prepared for tax offices, not for other users of financial statements like investors, shareholders and other stakeholders.

Strouhal, Paseková, and Müllerová (2011) discussed the compatibility levels between IFRS, IFRS for SMEs and CZ GAAP. The results of Similarity and Dissimilarity Analysis (using Jaccard's, Roger-Tanimoto and Lance-Williams coefficient) proof the close linkage between big set of IFRS with separate standard IFRS for SMEs (JC 0,8621). Czech accounting system is slightly closer to IFRS for SMEs (JC 0,5667) than to full IFRS (JC 0,5455).

Hinke and Hrdý (2012) discussed using answers of 116 companies from Czech Republic the possible improvement of the quality of financial statements if IFRS or IFRS for SMEs rules would have been implemented in the Czech Republic. Based on their research they have concluded, that implementation of IFRS rules would improve the fair and true view of financial statements prepared by Czech companies as well as results of financial analysis. They also stated that it would be better to prepare financial analysis from high-quality data than to use financial statements prepared under CZ GAAP and make additional corrections to eliminate wrong accounting principles.

One more drawback of Czech accounting regulation that has to be mentioned is the lack of separation the ongoing major activity from the other operations. Effect from discontinued operations that do not constitute a future potential shall be reported apart from other effects Halíř (2010).

### **2.4 Voluntary IFRS adoption**

Proponents of accounting harmonization consider there are many potential benefits to using a common set of accounting standards throughout the world. They include improved transparency, comparability, and quality in financial reporting, leading to lower preparation costs, more efficient investment decisions and cheaper cost of capital for companies (EU 1606/2002). Prior to the mandatory adoption of IFRS, European company executives

provided several reasons why companies would change from national standards to IAS or U.S. GAAP (KPMG, 2000). They are (in order of importance):

1. the possibility of increasing the availability of capital;
2. the quality of the standards;
3. the preferences of institutional investors;
4. the possibility of lowering the cost of capital; and
5. the preferences of analysts.

Studies of voluntary adopters have found mixed evidence as to whether these benefits have been realized (Al-Basteki, 1995, Dumontier & Raffournier, 1998, El-Gazzar, Finn, & Jacob 1999, Murphy, 1999, Garc'ia & Zorio, 2002, Tagesson, Dahlgren, Gamlen, & Hakansson, 2003, MS Guerreiro, Rodrigues, & Craig, 2008, Tarca, Morris, & Moy, 2013).

## **2.5 Benefits/cost of reporting under IFRS**

Benefits of reporting under IFRS were already mentioned - IFRS as a global standard has had a tremendously beneficial impact for global investors, who lacked all comparability in the pre-IFRS days. Several academic studies have shown that the introduction of IFRS has contributed to lowering the cost of capital (Daske, Hall, & Leuz, 2008 among others) while other authors describe the institutional reasons for the IFRS adoption worldwide (Judge, Li & Pisker, 2010, Lasmin, 2011). Companies that have high levels of international activities are among the group that would benefit from a switch to IFRS. Companies that are involved in foreign activities and investing benefit from the switch due to the increased comparability of a set accounting standard (Thomas, 2009, Bradshaw et al., 2010).

Mládek (2010) summarized the potential benefits of IFRS for Czech companies. The primary benefit is that IFRS opens the door to capital market. Also the ability to prepare IFRS financial statements can help the companies to gain better loan conditions mainly from foreign banks. IFRS also increases reputation of the company, this can be beneficial in business deals or in the situation when the company is looking for foreign investors. Some financial managers prefer IFRS data for budgeting, investment decision and for better illustration of financial aspects of the company. They also prefer to book the transaction based on their substance and not based on the tax rules and regulation that sometimes doesn't fit to the company's business.

Application of IFRS requires a high level of professional knowledge by the accounting staff of any entity trying to apply these standards (Mechelli, 2009). To find accounting experts, is still quite a big problem in Europe. Neither the crisis has changed the situation; a company will always need a skillful and experienced accountant. The research conducted by Robert Half International under the title Global Financial Employment Monitor of May 2009 showed that 51% of companies in the Czech Republic and up to 60% of companies in Europe have difficulties finding experts in this field (Robert Half International, 2009). This was confirmed by research performed by Hinke and Hrdý (2012) when 54% of respondents have heard about IFRS but were not able to define the main differences between IFRS and CZ GAAP, only 16% of respondents have participated on IFRS trainings. The IFRS knowledge in companies that responded to their survey have among the financial managers and accountants also controllers, who are responsible to perform business analyses in the companies and declared the usage of IFRS.

Beyond the problem of the IFRS education, the companies willing to adopt IFRS have to face significant implementation costs (IT costs, costs for renegotiating contracts, etc.). According

to Jermakowicz and Gornik-Tomasyewsky (2005) implementation of IFRS brings not only a change in format of financial statements, accounting policies, and much more detailed reporting information, but also great changes in company that IFRS implements. These changes require financial costs and the human resources and they may take up to 24 months before implementation is ready and mostly it requires the creation of a new accounting system besides an existing accounts used for the statutory purposes. Mládek (2010) commented the need to keep double bookkeeping, from his point of view, when companies use sophisticated IT systems for bookkeeping, the attributes of individual records can be set in order to enable the company to report under CZ GAAP as well as under IFRS.

## **2.6 Benefits/cost of reporting under IFRS for SMEs**

After the issuance of IFRS for SMEs there were also some studies regarding this new standard performed (e.g. Ikäheimo, 2010, Haller & Löffelmann, 2008, Müllerová, Paseková, & Hýblová, 2010, Bohušová & Blašková, 2012, Albu et al., 2013, Bartůňková, 2012). Majority of these studies have concluded that the cost of IFRS for SMEs adoption would exceed the benefits, and that SMEs are not very interested in giving fair and true view of their finance, the tight linkage of accounting and the tax was confirmed.

Ikäheimo (2010) in his study proposed a classification of finish SMEs. Majority of them are defined as the “looser firms” which are and will be local in the future and have no intention to growth. For these “looser firms” the IFRS adoption has no sense and the cost will greatly exceed the benefits. He has also defined the “born to be global firms” represented by the businesses that are international or tent to be international. For this group of companies can the implementation of the IFRS for SMEs be very beneficial. Even if these companies are not the majority of companies in Finland they are likely to have an important role in the economy.

## **3 RESEARCH QUESTIONS AND METHODOLOGY**

Based on the literature background and my own experience I have decided to follow the Ikäheimo classification and will focus on usage of IFRS only in Czech SMEs where it can be expected that it is beneficial for them (so called “born-to-be global firms”). In this category the majority of companies are those, who are international or who tend to be international. As the data about the company’s strategy are not publicly available I have decided to make the assumption that companies with more than 50% of foreign ownership can be considered as part of “born-to-be-global firms”, in these companies also the institutional reason for IFRS adoption can be expected. As at September 2013 there were 4 335 active Czech SMEs meeting the criteria of foreign ownership (based on the data from SW Albertina). 48% of these entities are based in Prague, the capital city, rest is spread over the Czech Republic. 50% of these companies are within the category of micro entities, 29% are medium and 21% are small entities with employees more than 50 and less than 250 employees. According to category of their business, 1368 firms were representing wholesale and trade, 1 255 other services and 1 056 industry.

On this group of companies I have tried to answer following research questions:

1. The usage of IFRS in Czech SMEs is low not only due to the tax barriers, lack of resources and IFRS knowledge (as already confirmed by previous studies), but also due to inaccurate estimation of costs/benefits of IFRS usage.
2. The tax obstacles is still the most important barrier for the widespread of IFRS in Czech SMEs.
3. There are Czech companies that do benefit from usage of IFRS.

4. IFRS for SMEs as an easier alternative to full IFRS can be the way for Czech SMEs to adopt IFRS.

For answering the research questions logical, empirical as well as statistical methods were used. The data were gathered from the SW Albertina, survey with on-line questionnaire and available companies' financial statements and notes on justice.cz.

### 3.1 The sample and survey

From the population of 4 335 entities there were 2 557 entities with contact information available. These were selected as entities to be contacted to answer the questionnaire. The questionnaire was on-line and there were 3 e-mails in period September 2013 to March 2014 circulated to sample companies.

There were 70 responses to the questionnaire obtained, out of these responses were 57 complete and these were used for the evaluation and qualitative research.

The respondents were representing all sectors of economy, 82% out of 57 companies were respondents from industry, wholesale and services, the three sectors that are the most important among Czech SMEs.

Regarding the size of respondents, there were 7 micro, 38 small and 12 medium entities.

28 respondents were using IFRS (mainly in the form of IFRS reporting), 29 had no experience with IFRS at all. Those who were using IFRS were doing it mainly because it was required by the owner, lenders of finance or due to legislation needs (all can be seen as institutional reasons for IFRS reporting), some mentioned also decision of management. 29 respondents did not use IFRS.

## 4 EVALUATION OF RESEARCH DATA AND DISCUSSION

To answer research question 1 - *The usage of IFRS in Czech SMEs is low not only due to tax barriers, the lack of resources and IFRS knowledge (as already confirmed by previous studies), but also due to inaccurate estimation of cost/benefits of IFRS usage* – the major cost or barriers and benefits of IFRS were analyzed. Firstly, the respondents were asked to mark important costs or barriers and benefits of IFRS, see in Tab.1. There were 3 benefits and 5 costs marked by more than 50% respondents as important. The important cost/barriers and benefits are in line with the literature with the exemption of the ability to get finance.

Tab. 1: Summary of benefits and cost/barrier marked by respondents as important. Source: prepared by author.

<b>Benefits</b>	Nr. of respondents who marked as important (out of 57)
Better ability to compare financial data	39
Easier reporting within group	38
Better usage of financial data in the company	28
Increased prestige for business partners	23
Increased attractiveness of company	20
Needed if IPO planned	15
Increased possibility to get external finance	10
Helps to increase equity	6
<b>Costs/barriers</b>	

Administrative burden connected to IFRS	36
Change of processes and IT that is needed to implement IFRS	36
Lack of IFRS knowledge	30
Cost of IFRS adoption	30
Difference between statutory and IFRS profits or losses	29
The need to be informed about new IFRSs	28
Complexity of requirements for IFRS notes	25
Fair value concept used in IFRS	21

Afterwards, using Chi-square test for 2x2 tables, it was analyzed if the assessment of importance of each listed cost/barriers and benefits differs for respondents already using IFRS and those who have no experience with IFRS.

For  $\alpha = 5\%$  the  $H_0$ : *The expectation of costs/barriers do not differ for respondents already using IFRS and for those not using IFRS* can be rejected for the Cost of IFRS adoption and for the Administrative burden connected to IFRS, where these barriers/costs are assumed to be much more important by companies not using IFRS than those who already have implemented IFRS.

It shall be also mentioned that only for barrier Lack of the IFRS knowledge importance for IFRS users was higher than importance for non-users, who see this barrier as the least important from all barriers evaluated. See Tab.2 for more details.

Tab. 2: Costs/barriers of IFRS. Source: prepared by author using XLS Statistics.

% of respondents	Do use IFRS and assume it is important	Do not use IFRS and assume it is important	P-value of Chi-quadrat test (2x2tables)
Lack of IFRS knowledge	69%	46%	0,092152545
Cost of IFRS adoption	42%	86%	0,001681297
Administrative burden connected to IFRS	56%	84%	0,026388661
Change of processes and IT that is needed to implement IFRS	63%	76%	0,308818942
Difference between statutory and IFRS profits or losses	48%	67%	0,182593912
The need to be informed about new IFRSs	52%	54%	0,884399297
Fair value concept used in IFRS	48%	53%	0,756548888
Complexity of requirements for IFRS notes	50%	52%	0,879249972

For  $\alpha = 5\%$  the  $H_0$ : *The expectation of benefits do not differ for respondents already using IFRS and for those not using IFRS* can be rejected for Increased possibility to get external finance, Increased prestige for business partners, Easier position when gaining EU grants.

However the detailed analysis has shown that the benefits expectation of IFRS non-users are much more optimistic than of those who IFRS already use. The IFRS users see as most important benefit Easier reporting within group, Better ability to compare financial data and Better usage of financial data in the company. See Tab.3 for more details.

Tab. 3: Benefits of IFRS. Source: prepared by author using XLS Statistics.

% of respondents	Do use IFRS and assume it is important benefit	Do not use IFRS and assume it is important benefit	P-value of Chi-quadrat test (2x2tables)
Helps to increase equity	11%	16%	0,642718259
Increased possibility to get external finance	8%	33%	0,023540058
Easier reporting within group	73%	76%	0,810755084
Increased prestige for business partners	33%	71%	0,015677648
Increased attractiveness of company	41%	59%	0,267046906
Better usage of financial data in the company	62%	46%	0,265838464
Easier position when gaining EU grants	0%	43%	0,000164118 (Fisher's exact test P-value = 0,000278435)
Better ability to compare financial data	77%	79%	0,848263944
Needed if IPO planned	32%	30%	0,906958047

The inaccurate expectation was confirmed for 2 significant barriers/costs of IFRS. In the case of benefits the test has shown the different expectations as well, when non users have seen more benefits than IFRS users. Even if the benefits of IFRS are being seen as more positive by IFRS non-users, the inaccurate expectation of cost by this group of respondents leads to the negative attitude to the IFRS adoption. The attitude to costs/barriers is in line with previous studies, the attitude to benefits and overall not willingness to adopt IFRS shall be further analyzed in the future.

To answer research question 2 - *The tax obstacles is still the most important barrier for the widespread of IFRS in Czech SMEs* the respondents were asked about the possibility to adopt IFRS as allowed by Czech accounting legislation if they are part of group preparing consolidated IFRS statements, this possibility was applicable for 42 respondents. The tax obstacles were mentioned by 16 respondents, however 19 respondents mentioned complexity of IFRS as the reason for not adopting IFRS as primary accounting system, therefore the  $H_0: f_{Tax\ obstacles} > f_{Other}$ , where  $f$  is frequency, shall be rejected, see Tab.4 for more details. This conclusion is not in line with previous studies and shows that even the tax is quite big problem for some respondents, others mentioned the complexity of IFRS as the reason for not planning to adopt IFRS.



Tab.4: IFRS usage evaluation. Source: prepared by author.

	Do use IFRS	Do not use IFRS
Used this possibility or will use in nearly future	4	1
Would use if there is no need to transform financial results to CZ GAAP for the purposes of CIT	11	5
Do not plan at all due to complexity and more strict rules for IFRS financial statements mainly notes	9	10
Other	1	1

To answer research question 3 - *There are Czech companies that do benefit from usage of IFRS* - the evaluation of IFRS usage of those 28 respondents who has experience with IFRS was done.

Out of 28 respondents using IFRS only one evaluated the usage of IFRS as negative, 10 had positive experience and 17 was neutral in the evaluation, the major reasons for the evaluation of usage IFRS are stated in Tab.5.

Tab.5: The possibility to adopt IFRS as primary accounting system as allowed by Czech accounting legislation. Source: prepared by author.

Negative	1	IFRS information are used only by the owner who is listed, the administrative burden connected to IFRS reporting is high and there is a high percentage of making errors.
Neutral	17	IFRS information are used only by the mother company, we do not need them at all. It is the requirement of our owner and we have used to it. Reporting system was already set up and it is not such administrative work to be performed in addition to our normal processes during closing.
Positive	10	Lower cost for the preparation of consolidated accounts. Increase of prestige of the company. Better financial information. Better management evaluation of entities in the group based on same reporting system.

Based on the information from respondents the  $H_0: f_{Positive} > 0$ , where  $f$  is frequency, can be accepted and it can be confirmed, that there are some companies, who may benefit from usage of IFRS. These companies meet the definition of born-to-be global by Ikäheimo. One of typical feature of these companies is that they or their ultimate mother prepare consolidated financial data, that IFRS is used for management evaluation and that they found IFRS to help them to increase prestige of the company outside Czech Republic. Also the respondents with positive evaluation of IFRS confirmed that IFRS provides better financial information which is in line with study of Hinke and Hrdý.

To answer research question 4 - *IFRS for SMEs as an easier alternative to full IFRS can be the way for Czech SMEs to adopt IFRS* – the respondents were asked if they know IFRS for SMEs and if they think it is an easier alternative to full IFRS and can be the way for Czech SMEs to adopt IFRS. Only 9 respondents out of 57 were aware of IFRS for SMEs. Out of all respondents 7 agreed with the statement, 3 disagreed, the rest had no idea. Therefore the  $H_0: f/n \text{ Agree} > 50\%$ , where  $f/n$  is relative frequency shall be rejected. As the IFRS for SMEs was not supported by EU, the literature did not find the IFRS for SMEs meeting SMEs needs and also the research has shown low awareness of IFRS for SMEs, IFRS for SMEs will not be for future research considered as the possibility for Czech SMEs.

## 5 CONCLUSION

In this paper the IFRS usage in Czech SMEs was discussed. As it was indicated by the research, there are some companies that may benefit from the usage of IFRS. It was also shown that there are Czech small and medium sized companies using IFRS for reporting purposes. To adopt IFRS as primary accounting system is however not planned by majority of respondents, not only due to tax barriers but also due to complexity of IFRS and the higher requests for financial statements and notes preparation. As part of my research the expected cost/barriers and benefits of IFRS were studied, except of easier ability to gain additional finance (in form of loan as well as capital increase) all other cost/barriers and benefits mentioned in literature were assessed as important by respondents. The different attitude to assessment of cost/barriers and benefits by IFRS users and non-users were confirmed for some of them. What is surprising is that the IFRS non-users see the benefits of IFRS more positively than IFRS users, but still the costs are more important for them and therefore are not willing to adopt IFRS, this has to be further analyzed in the future. Regarding IFRS for SMEs this study has shown that there is low awareness about this standard and that IFRS for SMEs shall not be further seen as the way to widespread IFRS in Czech SMEs.

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## **Appendix 1**

List of typical differences between CZ GAAP and IFRS:

- Content of a full set of financial statements – in CZ GAAP only statement of financial position (balance sheet), income statement and Notes are mandatory for all accounting entities. In IFRS, entities shall present (other than statement of financial position, income statement and Notes) also statement of comprehensive income, statement of changes in equity and cash flow statement.
- Fair value – in CZ GAAP only some specific assets shall be revaluated using fair value (financial instruments or by company transformations). In full IFRS intangible assets, property, plant and equipment and investment property may be revalued. Derivatives, selected biological assets and most securities must be revalued. Fair value remeasurement is required on the initial measurement of all financial instruments and for business combinations except for formations of JVs and business combinations under common control. In IFRS for SMEs revaluation of intangible assets and property, plant and equipment is forbidden, other usage of fair value depends on the availability of fair value, if cost and effort to assess fair value are significant the cost method has to be used.
- Revenue recognition – in CZ GAAP legal form prevails, in IFRS the substance of the transaction is relevant. The recognition criteria have to be met in IFRS and there is a possibility to use the percentage of completion method for booking revenues from long-term projects.
- Borrowing costs – in CZ GAAP the entity can decide if borrowing costs will be expensed or capitalized. In full IFRS the borrowing costs shall be capitalized, in IFRS for SMEs all borrowing cost shall be expensed.
- Intangible assets – in IFRS recognition criteria has to be followed, in CZ GAAP the useful life of the asset shall be over one year and the purchase value of asset shall be over the stated limit to recognize the asset.
- Research and development cost – in full IFRS research costs are expensed as they are incurred. Development costs are capitalized and amortized only if stringent recognition criteria are met. In IFRS for SMEs research and development cost are expensed as they occur. In CZ GAAP research and development costs can be capitalized only if the asset is generated to be sold.
- Fixed assets valuation – in IFRS unlike in CZ GAAP demolition and dismantling cost shall be part of the value of the fixed asset.
- Recognition criteria for long-term assets – in IFRS criteria based on the economic benefits have to be met (resource controlled by the entity as a result of past events and from which future economic benefits are expected to flow to the entity), in CZ GAAP the useful life of the asset shall be over one year and the purchase value of the asset shall be over the stated limit to recognize the asset.
- Assets held for sale – specific category in IFRS, which is included in inventories, in CZ GAAP assets held for sale are not defined and until they are sold, are included in long-term assets.
- Amortization of goodwill – in CZ GAAP goodwill is amortized over 5 or 15 years, in IFRS for SMEs goodwill shall be amortized over 10 years, in full IFRS goodwill is not amortized but tested annually for impairment.

- Financial lease – in CZ GAAP the assets acquired under finance lease are not presented in the financial statements. In IFRS the leased assets are included in the financial statements as well as the liabilities and financial costs connected.
- Investment property - as defined by IFRS as property held by owner to earn rentals or for capital appreciation but not in the ordinary course of business. It shall be measured at depreciated cost less accumulated amortization or fair value. In CZ GAAP there is no specific guidance. Investment properties are presented within property, plant and equipment.
- Grants accounting – in full IFRS and CZ GAAP the grants for the purchase of assets lower their purchase value, in IFRS for SMEs grants are included in revenues.
- Provisions recognition – in IFRS certain criteria have to be met to recognize the provisions (present obligation exists, it is probable that the entity will be required to transfer economic benefits in settlement and the amount of the obligation can be estimated reliably), in CZ GAAP there are some provisions that do not meet these criteria.
- Extraordinary items – extraordinary items are prohibited in IFRS. In case of changes in the accounting policies IFRS restates comparatives and prior-year opening retained earnings. In CZ GAAP unusual operations with regard to the normal activities of an entity and cases of random events, changes in accounting methodology and corrections of material prior-period errors are included in extraordinary items.
- Impairment rules – in IFRS a detailed guidance for the calculation of impairment is provided, in full IFRS impairment shall be assessed regularly at each reporting date, in IFRS for SMEs only if there are any indications of impairment. In CZ GAAP no such guidance is available.
- Reclassification – some items in the Financial Statements have to be classified in different categories in IFRS than in CZ GAAP, e.g. activation, changes in inventory, foreign exchange differences, corporate income tax receivable or payable etc.

## **AFFILIATES OF LARGEST ENTERPRISES IN THE CZECH REPUBLIC: A SPATIAL PERSPECTIVE**

*Jan Suchacek*

### **Abstract**

The significance of large enterprises can be barely denied. Contrary to the enterprise headquarters, branches of individual enterprises attract considerably smaller attention. Geographies of enterprises largely comply with existing settlement systems on the one hand and mirror socioeconomically differentiated landscape on the other. The main objective of this article consists in the analysis and interpretation of location factors determining the collocation of the first-tier affiliates of one hundred largest Czech enterprises. Size of the enterprise is measured by its turnover. First-tier affiliates are understood as those following immediately after headquarters in the framework of enterprise hierarchy. The whole issue will be assessed predominantly from qualitative perspective. While spatially-orientated studies usually tend to the focus on head offices, branches of individual enterprises are typically neglected or even omitted. It should be taken into consideration that overall qualities and performances of enterprises are derived not only from their head offices but also from their affiliates.

*Keywords: location factors, geographies of enterprises, affiliates, headquarters, regions, Czech Republic, Czech companies, foreign companies*

JEL Classification: R10, R19, R30, L20, L29

### **1 INTRODUCTION**

Location decision-making substantially co-forms not only contemporary but also future socioeconomic landscape. Basically, we deal with two perspectives: first, there is a specific demand side represented by enterprises and investors. These entities demand certain characteristics and qualities of territories. Second, location conditions of individual territories constitute a specific supply side. Final collocation of investments naturally displays plentiful interplays between above mentioned supply and demand sides. Contrary to general economic categories, supply and demand we focus on bear a distinct spatial dimension.

In practice, location decision-making is rather uneasy process as it is dependent on particular spatio-temporal context. Any larger generalizations are not desirable just for the sake of different nature of utilized methods, differentiated quality of data, specific features of individual economic branches etc. (see also Aksoy & Marshall, 1992, Bevan, Estrin & Meyer, 2004, Corbridge, Martin & Thrift et al, 1994, Shephard & Barnes et al, 2003, Suchacek, 2013 or Johnston, Gregory & Smith et al, 1994).

This article aims at the analysis and interpretation of location factors delimitating the collocation of the first-tier affiliates of one hundred largest Czech enterprises. Sizes of individual enterprises are measured via their turnover. First-tier branches are perceived as those following immediately after headquarters in the framework of enterprise organizational hierarchy. The whole problem will be grasped primarily from qualitative point of view. In recent years, head offices of large enterprises attracted intense, albeit yet insufficient attention (see Lyons, 1994, Meyer & Sinani, 2009 or Suchacek & Baranek, 2011). However, local and regional studies are usually devoid of branches of individual enterprises. Put succinctly,



organizational structures of largest enterprises do matter and individual affiliates represent an indispensable part of these structures.

## **2 SOME THEORETICAL ASPECTS OF THE GEOGRAPHY OF ENTERPRISE**

No enterprise is located in the vacuum; on the contrary, there are numerous place-specific attributes and interrelations with enterprise surroundings. This includes suppliers, customers, local, regional and state institutions, legal system, quality of environment, quality of the labor, investment incentives and many others.

As mentioned by Maier and Tödting (1997), relations of enterprises to their milieu are considerably determined by spatial differentiation of input factors including land, labor, capital, natural resources, know-how or technologies. And the same hold true for output side, which involves geographically differentiated approach to the markets and customers. Enterprise outputs are naturally often dependent on existing settlement structure. Both input and output sides are also affected by increasingly popular soft factors (see Suchacek, Seda, Friedrich & Koutsky, 2014).

Not surprisingly, location decision-making is rather complex and quasi-irreversible process. This fact applies to large enterprises with even higher intensity. There are only little doubts that large enterprises are of great importance in relation to local and regional economies and development. This fact is frequently accentuated by both economists and geographers (see for instance Massey, 1995, Holland, 1976, Markusen, 1985, van Dijk & Pellenbarg, 1999, Vanhove & Klaasen, 1987, Frobel, Heinrichs and Kreye, 1980 or Dunning & Lundan, 1994).

Massey (1995) brought the conception of spatial division of labor. She claims that place's character is the result of specific combination of past layers of socioeconomic events occurring there. That is why it is important to regard wider socioeconomic context. According to that concept, space is relative rather than absolute category and is penetrated by socioeconomic hierarchical relations. Massey (1995) shows that management and R&D functions tend to locate in large cities and metropolitan territories, while the other – mainly old industrial or underdeveloped areas – are 'entrusted' to perform other, mostly manufacturing functions.

Maier and Tödting (1997) point out that geography of enterprise or the spatial distribution of enterprise's structures and functions becomes increasingly important as there exist systematic relations between the regional hierarchy and the hierarchy of particular branches within large enterprises. Not surprisingly, territories, in which headquarters functions are concentrated, occupy the best position on the socioeconomic ladder. On the contrary, the position of individual branches is describable as sensitive one and this basically concerns affiliates of all tiers.

Moreover, Massey (1995) or Fothergill and Guy (1990) found that the closure of enterprise branch is quite frequently based on its position within enterprise organizational hierarchy rather than on its productivity. Naturally, manufacturing branches are the most vulnerable ones. Massey (1995) suggests that manufacturing within the enterprise should not be divided from headquarters and R&D functions. Moreover, the whole hierarchy of working positions should be kept in one region as management decisions that concern affiliates in geographically or functionally distant regions typically do not take into account spatially specific circumstances. Economies of numerous regions are thus actually controlled externally. Indeed, the problem of 'external control' became rather relevant mainly in recent

years. The development of many localities and regions is not under exclusive control of respective territorial managements any longer.

Very often, affiliates represent so-called 'Cathedrals in the Desert'. These branches are labeled as 'Cathedrals' because they use much more advanced technologies than the rest of the enterprises in the analyzed peripheral region. And these cathedrals lie in the desert as they are fully subordinated to the headquarters collocated typically in rather distant leading regions and are to a large degree isolated from the other firms in peripheral region. Thus, peripheral regions enjoy only limited benefits from the presence of these affiliates.

As a consequence of previously depicted tendencies, we are increasingly entitled to use the notion of mesoeconomics, which is created primarily by large multinational corporations and their organizational hierarchies. Mesoeconomics describes the economic arrangements, which are based neither on the microeconomics of buying and selling and supply and demand, nor on the macroeconomic aggregate indicators. In other words, strict division of economics into macroeconomics and microeconomics is often a figment. Taking into account their economic-political power, large enterprises in a way formed a new category within economics (see also Holland, 1976).

### **3 MATERIALS AND METHODS**

The pivotal objective of the survey was the analysis and interpretation of factors influencing enterprise first-tier affiliates location. Our survey has been accomplished through exploratory research in 2011. The whole research was of qualitative character and data were gathered by means of electronic and telephone questioning.

Basic sample for qualitative part of this research consisted of 190 companies. This was caused by their iterative occurrence in top 100 databases as well as by liquidation of some of them. Altogether 53 valid questionnaires returned to the research team, which means that rate of return reached roughly 28 %. The questionnaire first reached top managers of individual enterprises via e-mail. In case, the manager of enterprise did not respond, he or she was contacted through telephone call and after an explanation of the research purpose he or she received questionnaire via e-mail again.

The survey itself was accomplished by means of structured questionnaire. Likert scale ranging from -3 to +3 proved to be the most pertinent one for such kind of research. The higher number means the higher intensity of the phenomenon concerned. Thus, for instance -3 denotes full disagreement, while +3 full agreement and 0 is a mediocre value. This scale was used in the majority of questions. The obtained results were subsequently transformed to the percentage, which proved to be useful for further comparisons and interpretations. Some of the questions in the framework of structured questionnaire were formulated as open, which facilitated obtaining certain specific information. It should be mentioned that utilized methods as well as rate of return affect the results of this research.

### **4 RESULTS AND DISCUSSION**

Our research brought several interesting results. While 76 % of the questioned largest enterprises had foreign owners, remaining 24 % were kept by their Czech counterparts. And it turned out that just ownership matters as evaluation of decisive factors influencing the location of first-tier affiliates perceptibly differs in view of Czech and foreign enterprises.

This concern factors such as ‘proximity to suppliers’ preferred by Czech enterprises and ‘proximity to customers’ stressed on the contrary by foreign owners. This reveals different motivations for the location of these companies.

Tab. 1: Decisive factors influencing the location of affiliates. Source: author

Average % evaluation and rank according to Czech companies		Factors influencing affiliates' location according to Czech and foreign companies	Average % evaluation and rank according to foreign companies	
1.	88.3	<b>Infrastructure</b>	86.8	2.
2.	86.6	<b>Geographical location</b>	87.3	1.
3.	76.6	<b>Proximity of suppliers</b>	78.5	6.
4.	76.0	<b>Agglomeration economies/advantages</b>	79.0	5.
5.	75.0	<b>Quality of entrepreneurial milieu</b>	77.5	7.
6.	73.3	<b>Proximity of customers</b>	80.3	3.
7.	71.6	<b>Availability of raw materials</b>	75.5	10.
	71.6	<b>Availability/quantity of work force</b>	76.5	8.
	71.6	<b>Low wage demand</b>	76.0	9.
8.	70.0	<b>Local work force quality</b>	79.8	4.
9.	68.3	<b>Closeness/concentration of related industries</b>	71.5	11.
	68.3	<b>Proximity of competitors</b>	71.5	
	68.3	<b>Price of land</b>	69.2	14.
10.	66.6	<b>Image/prestige of the place</b>	69.6	13.
11.	61.6	<b>Willingness of managers to move</b>	71.0	12.
12.	61.2	<b>National policies</b>	68.2	15.
13.	60.0	<b>Nearness of decisive authorities</b>	69.2	14.
14.	56.6	<b>Public administration system</b>	69.2	
15.	55.0	<b>Quality of environment</b>	55.0	17.
16.	46.6	<b>Determined historically</b>	60.3	16.
17.	43.3	<b>Cultural facilities</b>	45.2	18.
18.	38.3	<b>Sport facilities</b>	44.2	19.

It is worth noticing also ‘local work force quality’ factor, which is one of the most important from the standpoint of foreign companies, while according to Czech companies the factor proved to bear only medium relevance. This has much to do with more progressive or

sophisticated branches of the economy, on which foreign enterprises focus. This is indirectly confirmed by relatively higher importance of the factor named as ‘availability of raw materials’ in view of Czech companies. It cannot be omitted that average assessment of factors according to foreign enterprises is generally higher than that in case of Czech ones. Apparently, the qualitative distinction tends to follow the axis Czech – foreign companies.

As for the course of the location of the first-tier affiliates, calculations turned out decisive in 92 % of all cases. Intuition plays only a minor role and concerns to a smaller or larger degree only 8 % of all decision-makings related to the first-tier branches. This in a way complies with multitude informational layers covering the landscape we live in. At the same time, one cannot underestimate the role of managerial as well as other routines in the process of location decision-making.

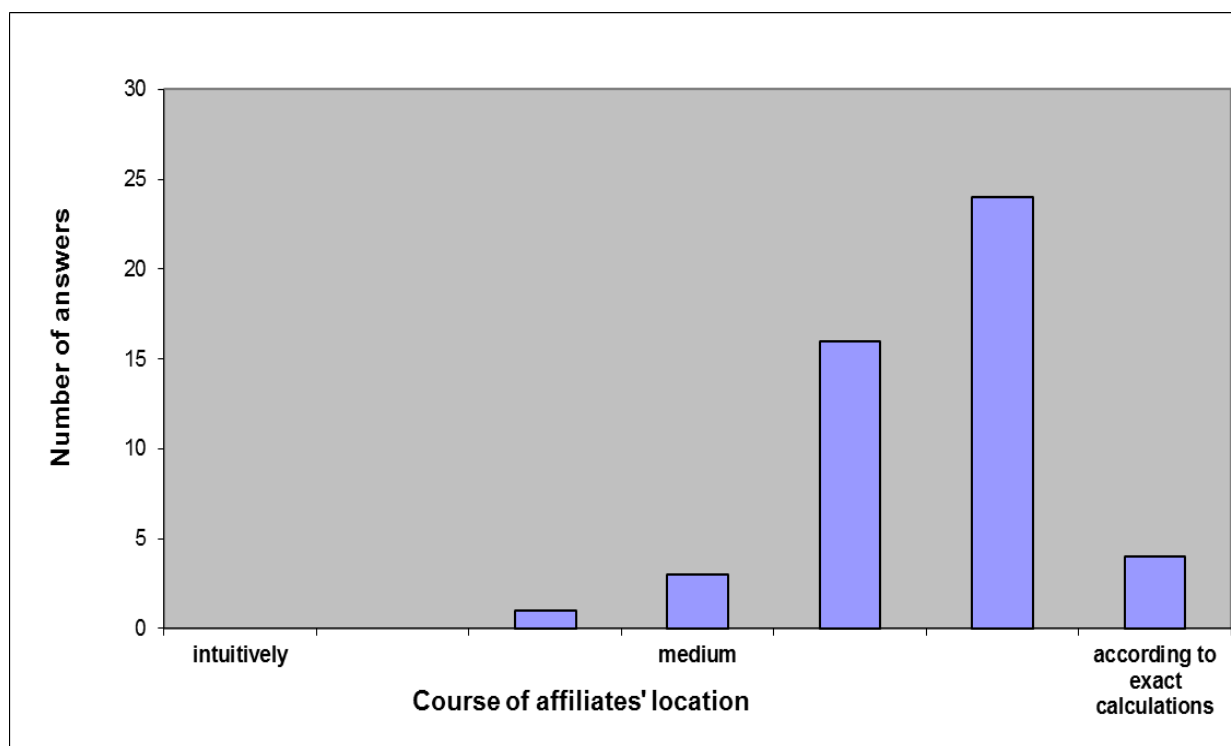


Fig. 1 – Course of the location of the first-tier affiliates. Source: author

Next interesting domain is represented by expectations and experiences categories, i.e. to what extent initial expectations during the establishing and further running of the enterprise meet the reality. In 6 %, approximately the half of all matters turned out to be in accordance with initial expectations. Majority of matters ran in compliance with expectations in 92 % of cases and just according to 2 % of respondents everything proved to be entirely ok. When evaluating these results, one should bear in mind that enterprise managements may partly tend to the overestimation of their own capabilities.

Next question was related to the difference in the affinity with territories where headquarters and branches are collocated. Generally speaking, largest companies confirmed higher affinity with territories, where their head offices are located and the value reached 74.2 %. In case of the territories, where first-tier affiliates can be found, the respective value was 73 %. This difference can be described as not high yet perceptible.

Previous researches (see for instance Suchacek & Baranek, 2011) showed that capital city is by far the most attractive place for the location of headquarters, while other territories are literally ‘sentenced’ to act as hosts for the affiliates. The main disadvantages of territories out of the capital city were as follows: low purchasing power (67 %) and insufficient infrastructure (33 %).

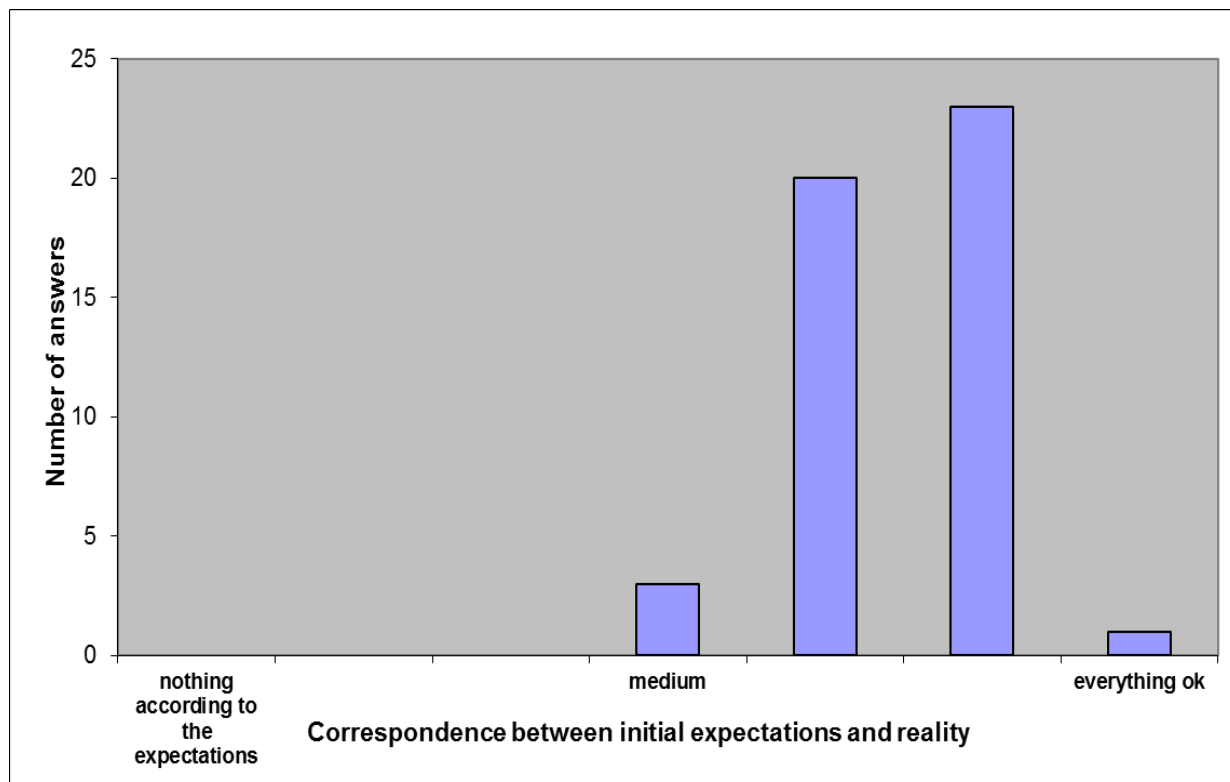


Fig. 2 – Locational expectations and experience. Source: author

As for the promising places out of the capital city, Brno, which is the second largest town as to the population size, turned out the most perspective town for possible location of head office for 31.2% of questioned. Ostrava, Czech Republic’s No. 3 town from the population point of view, reached the value 23.5%. Next position is occupied by Hradec Králové that reached 17.6% and Olomouc, which was treated as a suitable place for performing central functions by 11.8 % of these enterprises. Surprisingly, Plzeň as the fourth most populous town in the country reached mere 5.9%, which was accounted for by town’s non-central geographical location.

## 5 CONCLUSIONS

There are many factors, which affect the location of affiliates of largest enterprises in the Czech Republic. Not surprisingly, infrastructure and geographical location turned out to be the most important ones, which is in consonance with previous researches. However, the list of location factors, which are considered relevant by foreign companies differ from that of their Czech counterparts. When establishing affiliates, location decision-making of largest companies goes upon calculations, the role of intuition-based activities is not so important. And not surprisingly, largest companies are less congruous with territories, where their affiliates are located. Last but not least, there is undoubted challenge related to the future

research on location factors driving the collocation of both headquarters and affiliates as the development of the economy is increasingly a turbulent one.

### **Acknowledgment**

*The paper is supported by the SGS project at the Faculty of Economics, VŠB-Technical University of Ostrava SP2015/111. This support is greatly appreciated.*

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## **MANAGERIAL ACCOUNTING TOOLS AND CLUSTERS FROM THE COMPANIES ACCORDING TO THE USED INSTRUMENTS**

*Libuše Svobodová*

### **Abstract**

The presented article is based on the questionnaire survey, which was conducted in 2014 in the Czech Republic. There were involved 295 Czech enterprises in the study. Questionnaire investigation was focused on the tools used in managerial accounting in the interviewed enterprises. Specifically, there were questions involved on the monitoring of costs, the creation and usage of calculations, plans and budgets, capacity utilization and efficiency, efficiency evaluation and monitoring of economic results and evaluation of financial analysis. The last part was dedicated to identification data.

In the evaluation there were involved physical persons and also small, medium and large legal entities. It is expected that SMEs use less tools of managerial accounting than large companies. It is also expected that it is possible to divide companies according to used instruments to representative clusters.

A detailed research together with the analysis and critical assessment of accessible materials will enable to identify the main objectives in the field of study. The analysis of the initial state will consequently enable to identify the key factors and knowledge.

*Keywords: Efficiency, Evaluation, Identification, Managerial Accounting, Survey, Utilization*

JEL Classification: L25, M21, M40

## **1 INTRODUCTION**

Managerial accounting is an integral part of the enterprises. Managerial accounting information include: information on the costs of an organization's products and services, calculations, budgets, performance reports and other information which assist managers in their planning and control activities.

Managerial accounting should be also defined as management accounting or in the strict sense as cost accounting.

A fundamental purpose of managerial accounting is to enhance firm value by ensuring the effective and efficient use of scarce resources. Thus, managerial accounting systems should provide information that improves employees' abilities to make organizationally desirable decisions, thereby enabling employees to achieve the organization's goals and objectives (Caplan, 1988; Horngren et al., 2000). Additionally, managerial accounting systems should provide information that helps align the interests of employees with owners by directing employee effort and attention to activities that benefit the organization (Atkinson et al., 1997; Lambert, 2001). Viewed in this light, the information produced by a managerial accounting system serves two important roles in an organization: to provide some of the necessary information for planning and decision-making, and to motivate individuals (Zimmerman, 2000).



## **2 THEORETICAL BACKGROUND**

Lazar and Matuskova (2012) focused on the variable and fixed costs. Kupkovic and Toth (2004) focused in their article on Activity Based Costing as on new managerial method of costing, budgeting and accounting system, practice and technic, which represent causal relationship between creation of outputs and activities that would consume enterprise sources. Tapura et al. (2015) focused on Cost-based calculations, Balanced Scorecard approach, Payback methods and other management accounting methods for safety-related decision-making.

Knapkova et al. (2014a) focused on the utilization of balanced scorecard and the effect of its use on the financial performance of companies in the Czech Republic. An extensive questionnaire survey carried out by the Faculty of Management and Economics of TBU in Zlin (a total of 350 enterprises in the Czech Republic) revealed that the BSC is used by approximately 13% of enterprises. A company's size affects the use of BSC, which was confirmed by chi-square, and therefore we can state that the use of BSC grows with a company's size.

Knapkova et al. (2014b) found in the same study that the use of benchmarking in the Czech Republic is still relatively low and there are not differences among companies with different specialization and different age and their use of benchmarking. It was proved that larger companies use benchmarking to a greater extent than smaller companies.

On Balanced Scorecard focused also Gavurova (2011, 2012).

Janecek and Hynek (2007) firstly focus on the efficiency of firms in a knowledge economy. They continue with next article (Janecek and Hynek, 2010) focused on the using of indicators counted for various groups of businesses as return on assets, return on sales, level of leverage factor, intensity of capital turnover and mainly return on equity. Authors compared efficiency of users and non-users Economic Value Added (EVA) concept. Camska and Scholleova (2014) concentrate on valuation of entities. Stamfestova (2014) focused in the article on business performance management in manufacturing companies in the Czech Republic. Mohelska, Sokolova (2011) focused on the competence and roles of territorial administration. Seidler (2011) wrote about responsible management of the correct way to prosperity companies. Suchanek et al. (2013) presented the article focused on the influence of Quality management on corporate performance. Siska (2009) wrote How to evaluate economic successfulness of an enterprise.

Scorte et.al. (2013) done the research in the hospitality industry. 65.93% of the managers surveyed believe that the accounting information provided by the managerial accounting are very useful in decision making; between the managers' profession and experience and their perception of the importance and usefulness of the accounting information there is a correlation that is to be understood differently, in our opinion, in relation to the nature of the information provided by the financial accounting and that provided by the management accounting; in 68% of the firms in the sample there is a management accounting system; at the level of the sample there is a more or less intense correlation between the firm's size measured by turnover and the frequency of use of accounting information by categories, but this assertion cannot be extended to the total population; with a probability of 95%, it is verified the fact that between the size of the firms, measured by total assets and the frequency of use of accounting information on costs there is also a correlation at the level of all firms in the total population; in a proportion of 95%, the managers that consider important and useful the information provided by the management accounting are open and have a positive attitude regarding the implementation of a cost accounting information system.

Abdel-Kader and Luther (2006) done in the research in British food and drinks industry. Direct costing is widely practised and important, by contrast with activity-based costing and full absorption costing. The balanced scorecard and other non-financial performance measures are perceived to be important but never or rarely used by 40 per cent of companies. It will be important to compare the results from Great Britain with the results from the Czech Republic in 2014.

Molina et. al. (2014) focused on the balanced scorecard in the connection with the levels of organizational climate, employees' commitment, job satisfaction and job dedication. The results indicate a clear relationship with the satisfaction of employees within the organization; it shows that the BSC implementation is significantly related to positive employees' affective reactions.

Study from Akinyomi (2014) examines the relationship between firm size and activity-based costing system implementation in Nigerian manufacturing sector. From the review of literature and data analysis, it becomes glaring that a positive relationship exists between firm size and activity-based costing system implementation in the Nigerian manufacturing sector. Large size firms tend to be favorably disposed to activity-based costing system implementation.

In the presented paper there will be not done the detailed description and review of the managerial tools used in the companies. It is not the goal of the article. The detailed review done for example Langfield-Smith (1997) or Sprinkle (2003). Coman et al. (2012) focused on managerial accounting as a source of information for an efficient management in SME.

### **3 GOALS AND USED METHODS**

The article is based on primary and secondary sources. The primary sources are represented more. They are represented by the results from the conducted questionnaire investigation and by ideas of the author. The secondary sources comprise professional literature, information collected from professional press, legal regulations, websites, discussions or previous participations in professional seminars and conferences relating to the chosen subject. Then it was necessary to select, classify and update accessible relevant information from the numerous published materials that would provide the basic knowledge of the selected topic.

The goal of the paper is to present selected results from the questionnaire investigation done by the author of this paper. The sub goal is aimed to confirm or refute two hypothesizes. It is expected that SMEs use less tools of managerial accounting than large companies. It is also expected that it is possible to divide companies thanks to used tools to representative clusters.

## **4 RESULTS FROM THE QUESTIONNAIRE INVESTIGATION**

### **4.1 Description of the project**

In 2014, a survey was conducted among nearly 300 businesses. Firstly was conducted pilot testing of questionnaires in early spring 2014. Secondly was done the current survey. Concretely were gained 295 questionnaires together. Three of them were not possible to use for next evaluation. The partial results will be presented in the presented article. The survey involved 77% of SMEs and 23% of large enterprises from all regions of the Czech Republic. The second question of the questionnaire was focused on the tools that are used in the managerial accounting by the Czech enterprises. Next questions were involved on the monitoring of costs, the creation and utilization of calculations, plans and budgets, capacity utilization and efficiency, efficiency evaluation and monitoring of economic results and

evaluation of financial analysis. The last question was aimed on the utilization of the technologies in the connection with managerial accounting. For example were named accounting software, specialized software, MS Office or other software used for processing of the managerial accounting.

#### **4.2 Results from the questionnaire**

In the graphs below there are presented the results from the question aimed on the tools of managerial accounting and its utilization in the Czech companies. The results are divided on the small and medium enterprises, on the large ones and together.

Into evaluation there were involved:

- Direct costs
- Indirect costs
- Type calculation formula
- Calculation (full costs)
- Calculation (variable costs)
- Activity Based Costing
- Controlling
- Benchmarking
- Balanced Scorecard
- Economic Value Added, Market Value Added
- Quality Management
- Just in Time
- Others

The presented graphs are divided on the monitoring of costs and utilization of the calculations and the second one on the tools of strategic management used in the involved companies. Both graphs clearly illustrate and confirm the first hypothesis. The small and medium-sized enterprises use less tools of managerial accounting than large ones. The only one tool that small and medium-sized companies use more than large companies is monitoring of direct costs. On the other hand it is possible to expect that large companies use other identification of the costs that they use for next processing.

The results from calculations show that businesses mainly used for determination of the calculation simpler and less complicated methods. When we focus on the calculation in more detail, 37% of large companies used calculation of full costs. On the other hand SME used mostly the type calculation formula. Totally is mostly used the calculation of full costs. It is possible to state that it is mostly the easiest type of calculation in the companies. The calculation of variable costs is used only by 10% respondents. Concretely is it 8% of SME and 18% of large ones. The less used calculation method in both groups and also overall is Activity Based Costing. Furthermore, it may be noted that Activity Based Costing uses only 4% SME, for large it is 21%. A smaller percentage of utilization of mentioned tools by SME can be explained by the complexity of the methods for some businesses and also lack of personnel.

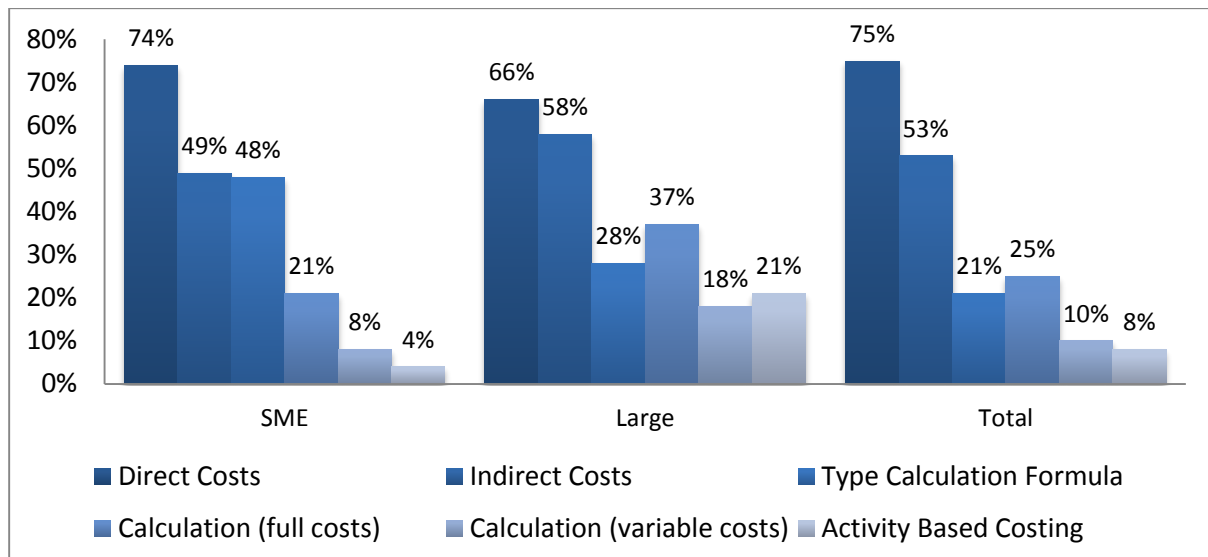


Fig. 1 – Used costs and calculations in SME, large companies and total. Source: own elaboration

The following chart is dedicated to strategic management and its tools. It was expected that SMEs companies will use less the tools of managerial accounting such as Controlling, Benchmarking, Balanced Scorecard, Economic Value Added or Market Value Added, Quality Management or Just in Time than large companies. Balanced Scorecard is the less used managerial tool by the respondents. The reason should be the sophistication of this method. The managers need to classify 4 perspectives. The first one is financial situation of the company, customer perception, internal business processes and learning and growth of the company. Only 1% of SME uses this method and 15% of the large companies. Concretely it were 2 SME and 10 large businesses. The biggest difference in the results is in the controlling, 39%. Large companies have mostly the specialists and departments that are focused on this field. On the other hand 28% of the SME use controlling as managerial function like planning, organizing, staffing and directing when control in management means setting standards, measuring actual performance and taking corrective action. The number of companies dealing with controlling is represented by 107 respondents. 62 of them are SME and 42 large companies. The same can be noted for benchmarking. 8 SME uses those method and 20 large ones. Benchmarking is totally represented by 28 companies. It was not expected that SME will calculate the Economic Value Added. It is due the necessity of information from the financial accounting. The companies that use tax records instead double-entry bookkeeping can not calculate it. The reason is that Economic Value Added is based on financial accounting statements such as balance sheet and income statement. The tax record use other statements based on different data such as income and expenses and not revenues and costs. The calculation of Economic Value Added is not easy due the opportunity costs that are not easy to quantify for a lot of accountants. Positive answer was from 12 SME that they calculate it and 16 large companies. Totally are by utilization of EVA or MVA again 28 companies such as by Benchmarking. Last two methods were Quality Management and Just in Time. Quality Management is used in 47 SMEs and 30 large enterprises. Just in Time and its benefits uses only 18 SMEs and 15 large enterprises.

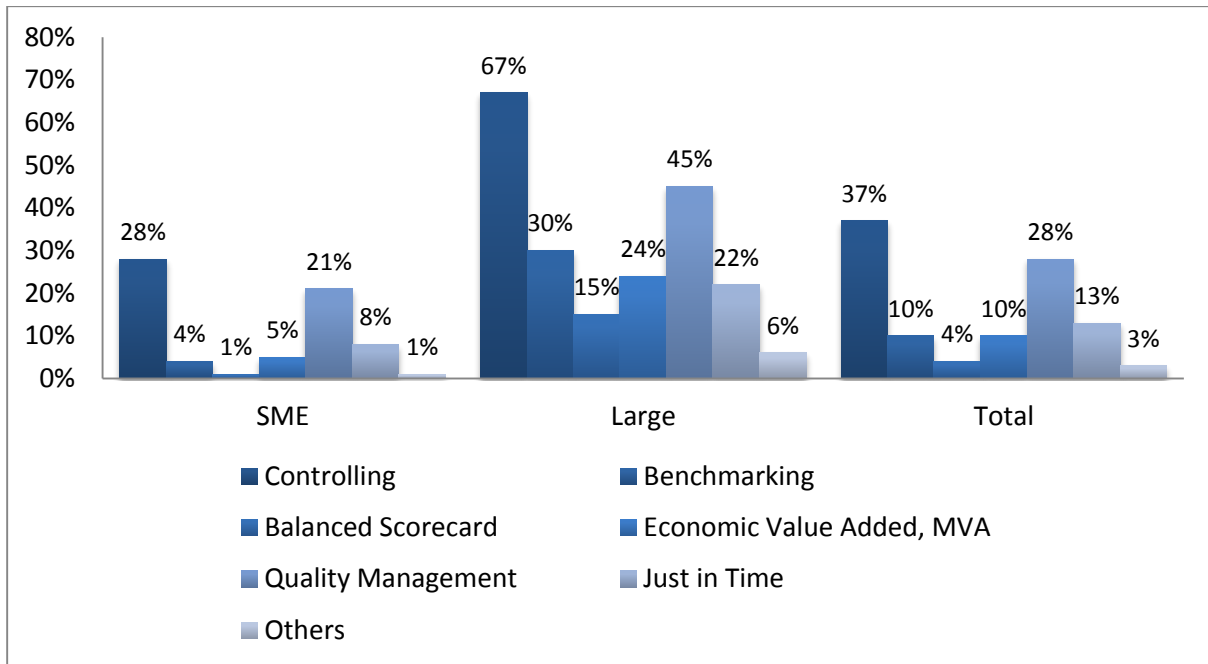


Fig. 2 – Used tools from Strategic Management in SME, large companies and total. Source: own elaboration

Other issue that should be solved can be the clusters of the companies on the basis of the utilization of the managerial tools mentioned above. It is expected that some SME will have one cluster and next clusters will be composed of all types of companies. After detailed statistic processing it is possible to present that there are three clusters of the companies. The second one is compounded mostly from small enterprises. Second two are comprised from all types of the companies.

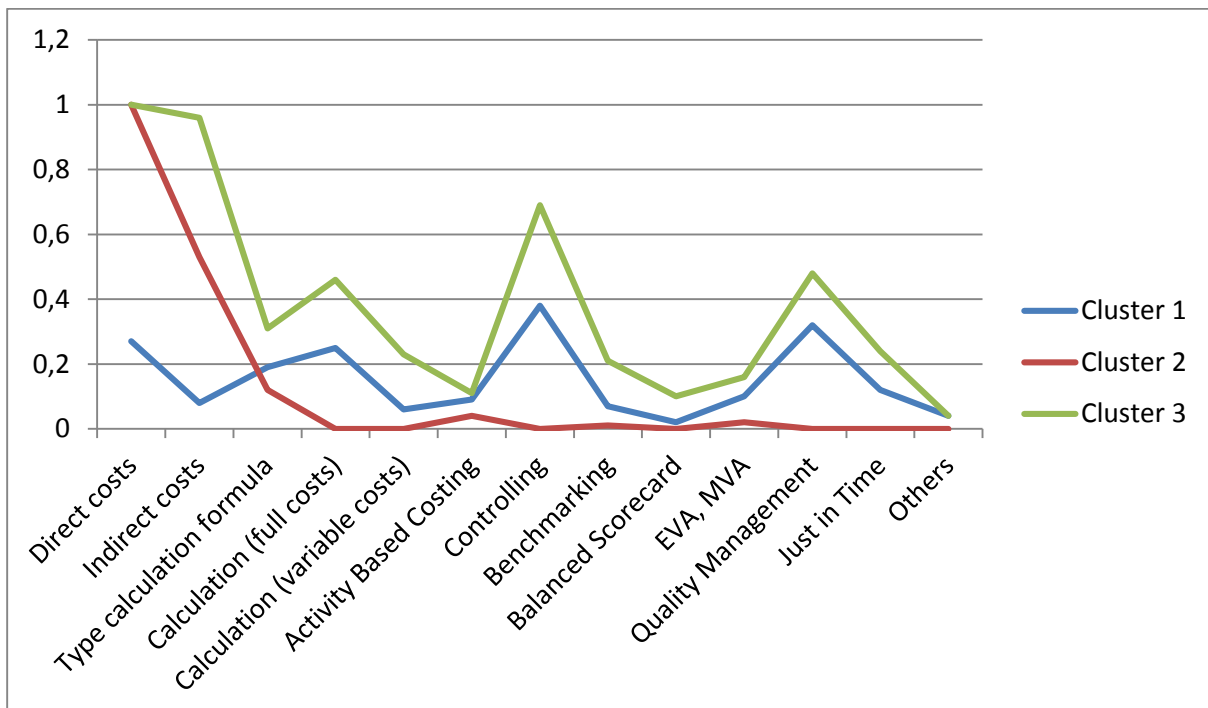


Fig. 3 – Clusters of the companies and used tools. Source: own elaboration

Distribution of clusters is supported by the number of enterprises in the poison. The first cluster is comprised from 101 companies, second from 90 and the last one from 104 businesses. This division is satisfactory for any further statistical processing.

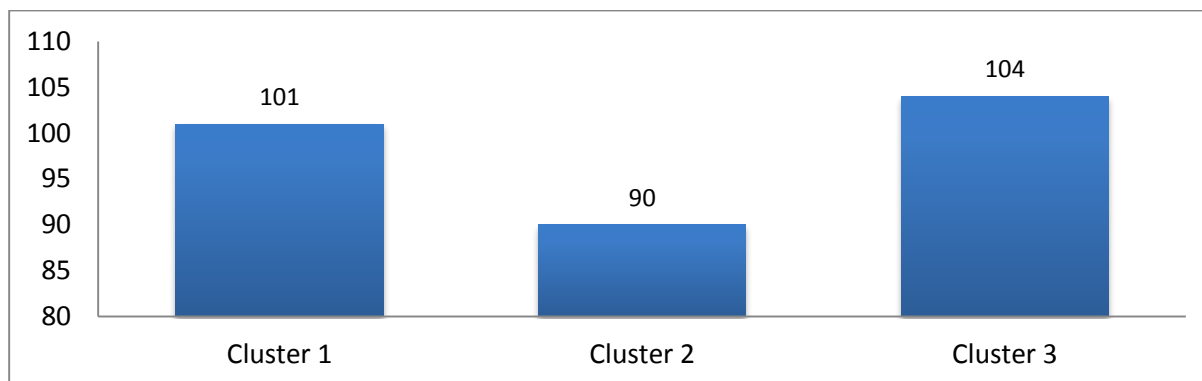


Fig. 4 – Numbers of companies in clusters. Source: own elaboration

The composition of clusters and used tools is presented in the next table.

Tab. 1 – Composition of clusters and used tools. Source: own elaboration

	Cluster 1	Cluster 2	Cluster 3
Direct costs	27%	100%	100%
Indirect costs	8%	53%	96%
Type calculation formula	19%	12%	31%
Calculation (full costs)	25%	0%	46%
Calculation (variable costs)	6%	0%	23%
Activity Based Costing	9%	4%	11%
Controlling	38%	0%	69%
Benchmarking	7%	1%	21%
Balanced Scorecard	2%	0%	10%
EVA, MVA	10%	2%	16%
Quality Management	32%	0%	48%
Just in Time	12%	0%	24%
Others	4%	0%	4%

In the cluster 1 it is possible to expect that companies uses other classification of costs than direct or indirect. There were some large and also medium companies that give no positive answer on the monitoring of the direct and indirect costs. Or it is possible to deduce that businesses understood the question differently. In this group are controlling, Quality management, calculation of full costs, direct costs and type calculation formula the highest utilization. The second cluster is composed primarily of small companies that uses direct and indirect cost, 12% type calculation formula, 4% Activity Based Costing, 2% EVA or MVA and 1% Benchmarking. The last cluster is composed from the companies that use the most tools from the managerial accounting. 100% companies use direct costs and 96% indirect costs. Next high value is dedicated to controlling. Almost 50% are used Quality Management

and calculation (full costs). 31% use type calculation formula, 24 Just in Time a 23 calculate by variable costing, 21% has benchmarking. Next methods are EVA, MVA, Activity Based Costing, Balanced Scorecard or others.

## **5 DISCUSSION**

The results were mostly expected. With entrepreneurs we could discuss more about the classification of costs, which was mentioned earlier.

The next step might be to analyze the results of further questions in the investigation. Enterprises can be again divided into SME and large or as the clusters according to business entities that have been proposed in the article.

The question can also be if businesses do not use the tools of managerial accounting due to insufficient resources, capacity, complexity or because of indifference or ignorance of this area.

## **6 CONCLUSION**

The results of the survey confirmed both hypotheses. The presented graphs in figure 1 and 2 clearly illustrates and confirms the hypothesis that small and medium-sized enterprises use tools of managerial accounting less than large enterprises. The only one tool that small and medium-sized companies use more than large businesses is monitoring of the direct costs. Insufficient use of instruments of managerial accounting may be a lack of capacity, lack of data and difficulties in needed monitoring and processing data. Small businesses in the Czech Republic use managerial accounting tools, but they may not fully realize it.

The figure 3 and 4 and table 1 are dedicated to the results of the second hypothesis. The second hypothesis was focused on the clusters of the companies on the basis of the used or unused managerial tools. The results allowed us to create three clusters. One is comprised from the small companies. The second two are composed from all three types of companies, small, medium and large ones. The distribution is statistics significant due to the numerical distribution in all three clusters.

If we compare the results with the studies referred to in the second part of this article, we will get not quite the same results. Abdel Kader and Luther (2006) reported that up to 40% of the companies in the analysis of the sample in Great Britain used the Balanced Scorecard. In the Czech Republic is an average of 4% during the analysis of the sample. Knapkova et. al. (2014a) presented in their study that almost 13 % of the companies use this tool. In the comparison to studies with Akinyomi (2014) can be confirmed that even in the Czech Republic large size firms tend to be favorably disposed to activity-based costing system implementation. Knapkova et. al. (2014) presented that it was proved that larger companies use benchmarking to a greater extent than smaller companies. Benchmarking use 4 % of SME and 30 % of large companies based on the results of the questionnaire investigation done at Faculty of Informatics and Management so we should confirm the same trend.

## **Acknowledgements**

This paper is written with financial support from specific university research funds of the Czech Republic Ministry of Education, Youth and Sport allocated to the University of Hradec Králové Faculty of Informatics and management, project no. 2110/2015.

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## **PREDICTABILITY OF INDIVIDUAL FACTORS WITHIN AN ENTERPRISE BUDGETING AND PLANNING SYSTEM – PRESENTATION OF SURVEY RESULTS**

*Vendula Šocová, Boris Popesko*

### **Abstract**

This paper presents the initial results of a questionnaire focused on the ability of enterprises to forecast the behavior of the external environment and its influence on their budgeting processes. Traditional budgeting and planning systems have often been criticized for their inability to accurately predict the behavior of revenue streams, costs, profits, sales volumes and other indicators often affected by the behavior of the external environment. These budgets, based on annual accounting periods, frequently clash with a rapidly moving business environment and frequent changes in the market. The objective of the study presented herein was to obtain empirical evidence on the capability of Czech enterprises to predict the behavior of primary budgetary elements, such as profits or sales volumes. The results of the study are based on a survey of 145 medium- and large-sized enterprises in the Czech Republic. The findings are compared with those of a similar study performed in the USA and Canada in 2009.

*Keywords: Budgeting, planning, forecast.*

JEL Classification: M1, M41

### **1 INTRODUCTION**

Budgeting and planning represent fundamental management accounting tools used worldwide by different types of organization. The traditional theory on budgeting and planning was described in detail in management accounting books written by Drury (2000) and Kemp and Dunbar (2003). These sources state that traditional short-term budgets are mostly based on annual accounting periods and are connected with forecasting elementary financial indicators. Many authors state that the basis of traditional budgeting is mechanical transformation of a non-financial forecast into financial statements, without taking into account the real needs of an organization (Doyle, 2003). Doyle (2003) also states that most important limitation of traditional budgets is inflexibility and an inability to take on board changes in a business environment that occur throughout a year. Strong criticism of traditional budgeting mechanisms was voiced by Hope and Fraser (2003). Their critique primarily focused on the inability of traditional budgeting to assist in gauging the performance of an organization. Such criticism of traditional budgeting systems resulted in new, modern budgeting methods being introduced, such as Activity-Based Budgeting (Drury, 2000) or Beyond Budgeting (Hope and Fraser, 2003). These methods tend to do away with traditional annual budgets for each department, instead setting up a decentralized system based on selected performance indicators.

The study herein attempts to verify if the behavior of certain financial and non-financial budgetary factors demonstrate limited predictability, which is a prerequisite of modern budgeting approaches. The paper verifies the assumption that dynamic changes in the business environment exert a significant influence on the capability of organizations to accurately predict features of budgets such as revenue streams, costs and profits. This study

was based on a survey of 145 medium- and large-sized industrial companies based in the Czech Republic.

## **2 LITERATURE REVIEW**

Budgeting and planning is considered a fundamental feature of management accounting by many authors (Drury, 2000; Garrisson et al., 2009; Kemp and Dunbar, 2003). While planning is thought of as the design of a desired outcome and developing effective ways to bring it about (Ackoff, 1981), budgets are viewed as detailed plans (Drury, 2000) or as plans turned into currency units (Král, 2010).

Traditional management accounting (Drury, 2000; Garrisson et al., 2009; Kemp and Dunbar, 2003) divides the budgeting process into four consequent steps, as follows: i. preparing the budget, which includes gathering the data and information needed to create budgets; ii. constructing basic budgets and aggregate corporate budgets; iii. verifying the budget and identifying deviations; iv. removing final phase deviations.

Many studies highlight the various issues related to traditional budgeting systems. Drury (2000), for instance, explains the conflicting role of a budget, which is caused by the intended use of the same for several purposes, such as motivation and planning. Bourne (2005) refers to budgeting and planning as an annual ritual for numerous companies that do not consider adding any value to the process. The solution proposed by Bourne (2005) is to understand the strengths and weaknesses of budgeting and use additional mechanisms, thereby eradicating such weaknesses. Managers in research (Oldiges, 2003) generally agree that budgeting is inefficient and ineffective, even though the majority of respondents only estimate the volume of resources defined when budgeting. While 78 percent of the companies surveyed planned to change their system for budgeting, another 12 percent actually planned to cease budgeting entirely (Ricards, 2006). Libby and Lindsay (2010) investigated the use of research budgets in medium- and large-sized companies in the USA and Canada. This research led them to conclude that the majority of the companies intended to continue using budgets for purposes of managing the company, and did not intend to abandon them despite the issues encountered. 20 percent of respondents claimed that budgets were not used in corporate governance.

Growing dissatisfaction with traditional budgeting methods led to the development of alternative budgeting methods, examples being Beyond Budgeting and Zero-Based Budgeting. Beyond Budgeting is a modern budgeting system that emphasizes performance measurement, decentralization and mutual trust between management and organizational units, based on clearly defined performance indicators. This represents an extra-budgetary approach, which is essentially a rapid and flexible response to constantly changing market conditions (Hope and Fraser, 2003). Beyond Budgeting is committed to simplifying budgets and refraining from their use as a tool of motivation, in relation to which it is recommended to apply principles of intercompany and intracompany comparison (Hradecký, Lanča & Šiška, 2008). The principles of Beyond Budgeting offer up a new coherent management model. It assumes that front-line managers are able to regulate their own performance, whereas senior executives play a supportive role. They challenge and guide, but decisions are made locally within a clear governance framework based on principles, values and boundaries. (Hope & Fraser, 2003)

Zero-Based budgeting takes a very different approach from other methods, and starts out by determining which functions are necessary to achieve the required goals (Ojugo & Rymer, 1999). It focuses on thoroughly evaluating or reevaluating the organization's current or planned programs, units or activities, in order to determine if each should be instigated or continued. (Smith, 2010) Between sales volumes and the level of overheads, no linear

relationship is assumed based on past data (Dropkin, Halpin & La Touche, 2007). It is necessary to carry out accurate analysis of the impact made by sales volume on the cost of energy consumption, maintenance, and so on. The same procedure is then determined above all the costs (Ogden, 1978).

### **3 METHODS**

Data was collected via a web-based questionnaire. Firstly, data from the ALBERTINA database was analyzed. Medium- and large-sized companies from the industrial sector were chosen, excluding service and trade organizations. The contact information for individuals or companies was acquired from the afore-mentioned database. Initially, the people selected from the database, in most cases the financial directors, were contacted by telephone. If willing to participate, they received an email containing a link to the on-line survey.

The authors approached 1,139 companies, of which 513 agreed to take part in the survey. In total, 145 questionnaires were filled in, meaning a return rate of 28 percent, the high amount of which is attributed to initial contact being made by telephone. Therefore, in relation to the 1,139 originally contacted, the number of questionnaires filled in equals 12.6 percent.

As stated above, the main aim of the study was to analyze the predictability of different budgetary factors. Hence, the main question in the poll was: “When constructing a budget (or forecast), how easy is it to predict whether the following factors shall change during the period covered by the budget?”

- a. Market actions by key competitors (e.g. pricing, new product/service introductions, marketing programs, etc.)
- b. The business unit’s revenues (i.e. customer demand and prices)
- c. Customer preferences and tastes
- d. Technical developments or advancements in the industry impacting the design of new products
- e. Availability of required input materials purchased from suppliers

The answers given by respondents were expressed on a 6-step scale as follows:

*1 = Easy to predict*

*2 = Mostly predictable*

*3 = Slightly predictable*

*4 = Relatively difficult to predict*

*5 = Difficult to predict*

*6 = Impossible to predict*

The structure of the questions and research methodology were inspired by a similar survey performed in North America in 2009 (Libby and Lindsay, 2010).

### **4 RESULTS**

The first poll focused on the predictability of market actions by key competitors (e.g. pricing, new product/service introductions, marketing programs etc.). The results are displayed below:

Table 1 – Predictability of market actions by key competitors; source: own

	Freq.	%
1 = Easy to predict	8	5.71
2 = Mostly predictable	38	27.14
3 = Slightly predictable	35	25.00
4 = Relatively difficult to predict	31	22.14
5 = Difficult to predict	18	12.86
6 = Impossible to predict	10	7.14
Total	140	100.00
Median		3
Standard deviation		1.34
Average		3.31

As can be seen, no general trend is discernable in the distribution of answers. The tendency is towards answers on the scale relating to the higher predictability of this budgetary factor, rather than towards those stating difficulties in prediction.

The second question was on the predictability of revenues (i.e. customer demand and prices). The results are given below:

Table 2 – Predictability of revenue of a business unit; source: own

	Freq.	%
1 = Easy to predict	4	2.78
2 = Mostly predictable	108	75.00
3 = Slightly predictable	19	13.19
4 = Relatively difficult to predict	7	4.86
5 = Difficult to predict	6	4.17
6 = Impossible to predict	0	0.00
Total	144	100.00
Median		2
Standard deviation		0.79
Average		2.33

The majority of companies responded that revenues tend to be predictable. Over 90% of considered their revenue as predictable in differing amounts.

The third question was on customer preferences and tastes. The results are displayed below:

Table 3 – Predictability of customer preferences and tastes; source: own

	Freq.	%
1 = Easy to predict	6	4.20
2 = Mostly predictable	82	57.34
3 = Slightly predictable	44	30.77
4 = Relatively difficult to predict	7	4.90
5 = Difficult to predict	4	2.80
6 = Impossible to predict	0	0.00
Total	143	100.00
Median		2
Standard deviation		0.78
Average		2.45

Almost 58 per cent of respondents answered that customer preferences are largely predictable. Only eight per cent considered the possibility of anticipating the requirements of their customers as unpredictable. The next question dealt with technical developments or advancements in industry impacting the design of new products.

Table 4 – Predictability of technical developments or advancements in industry impacting the design of new products; source: own

	Freq.	%
1 = Easy to predict	14	9.72
2 = Mostly predictable	64	44.44
3 = Slightly predictable	46	31.94
4 = Relatively difficult to predict	11	7.64
5 = Difficult to predict	7	4.86
6 = Impossible to predict	2	1.39
Total	144	100.00
Median		2
Standard deviation		1.02
Average		2.58

Technical development impacting the design of new products was mostly foreseeable for almost half the respondents.

The final question addressed how predictable the availability of input material was from suppliers.

Table 5 – Predictability of availability of input material from suppliers, Source: own

	Freq.	%
1 = Easy to predict	29	20.14
2 = Mostly predictable	98	68.06
3 = Slightly predictable	13	9.03
4 = Relatively difficult to predict	1	0.69

5 = Difficult to predict	3	2.08
6 = Impossible to predict	0	0.00
Total	144	100.00
Median		2
Standard deviation		0.71
Average		1.97

From respondents, it is clear that the availability of input material from suppliers was largely predictable for most companies.

After performing analysis on the predictability of individual budgetary features, comparison was made with results of a survey performed in 2009 by Libby and Lindsay (2010), with a sample of Canadian and US companies. The following table compares the average median and standard deviation for all five questions:

Table 6 – Results compared with US and Canadian survey; source: own

	Median	St. deviation	N
This survey (2014)	2.2	0.9	144
US survey (2009)	3.0	0.6	78
Canadian survey (2009)	2.8	0.7	110

Comparing the two polls revealed several interesting things. Firstly, the average median of the answers showed that the Czech companies recorded significantly greater predictability of individual budgetary components than those from the USA and Canada. Therefore, these Czech businesses find it much easier to predict the future evolution of the factors influencing the budgets. Secondly, the standard deviation in answers is higher in the Czech sample than the American and Canadian sample, which could be interpreted as a greater diversity in answers in the Czech sample.

## **5 DISCUSSION AND CONCLUSION**

Budgeting and planning practices are facing dramatic changes in the contemporary business environment. Traditional annual budgets, which have been used for control purposes, are frequently criticized for their limitations, and in some cases have been replaced by more flexible systems focusing on increasing performance. The cause of this trend is the lack of flexibility of traditional budgets as they are incapable of representing a relevant system for gauging performance. The limitations of traditional budgets and growing dissatisfaction with budgeting systems have been widely discussed in many studies (Neely et al., 2003; Eckholm & Wallin, 2000). Hope and Fraser (2003) accurately stated that budgets often hold firms back from being flexible and adaptive in an increasingly unpredictable environment.

While the Hope and Fraser (2003) highlighted the increasing unpredictability of the business environment, problems related with rapid changes within it were enhanced by the financial crisis in 2008. Based on these circumstances, the expectations of the study were that the predictability of individual features of budgets would be relatively low and that companies as the whole would have difficulty accurately predicting future events.

Surprisingly, the result of the survey showed relatively high predictability for company revenues and material input prices, as well as the availability of input material from suppliers. Both were easily predictable in more than 75% of cases. Least predictability was indicated in the ability to predict the behavior of competitors. An unexpected result concerned the predictability of customers' demands, which was easily predictable in more than 60% of cases.

Another unexpected finding was the greater predictability of the external environment in the Czech sample, in comparison with the study performed in Canada and the USA in 2009. The answer could lie in the fact that many Czech companies act as suppliers to other EU companies, which sells the product on retail market hence they are much more able to easily negotiate future events. This signifies that Czech companies work in a far more predictable environment.

The study presented herein gives an overview of companies' abilities to predict the various features of a budget, and could contribute towards discussion in the field. Despite several limitations, such as the size of the sample surveyed and the subjectivity of the poll, the results indicate the current approach of firms to the budgeting process.

### **Acknowledgement**

*The authors are grateful to the Internal Grant Agency of FaME TBU No. IGA/FaME/2014/011 (Usage Modern Method of Budgeting Based on Performance Indicators KPI) for its financial support to carry out this research.*

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## **SEARCHING FOR PATTERNS IN COMPETITIVENESS RESEARCH DATA COLLECTION**

*Peter Štetka, Štefan Majtán*

### **Abstract**

The main goal of this paper is similar to its title: to identify (search for) patterns in competitiveness research - Barometer24 – data collection, currently conducted by authors of this paper and cooperating universities from Poland, Slovakia, Czech Republic, Finland and Spain. To achieve this goal we analyzed relations between 48 Barometer 24 questionnaire questions, focused on company competitiveness, on the sample of 660 companies operating in Slovakia, by using statistical toolbox – correlation and regression analyzes. The research outcome is divided into four patterns categories (1) credibility, (2) performance, (3) operational skills, and (4) pricing and brand management patterns; subsequently synthesized in the final General Competitiveness Pattern (GCP).

*Keywords: Competitiveness, Company Competitiveness Barometer, Competitive advantage, competitive potential, competitive positioning*

JEL Classification: L10, L20

### **1 INTRODUCTION**

The previous studies concerning competitiveness have been confirming the importance of the process of competitiveness growth in the economy. However, there are many theories about the level of research on the company's competitiveness, but they have a tiny practical utility. (Flak & Głód, 2014, p. 86) The given approach, which is presented in this article, makes an attempt to break this trend and at the same time to propose a practical and applicable approach to the study of the competitiveness of enterprises at the European level. In other words, the main objective of this paper is to propose a method for estimating determinants of enterprise competitiveness, based on the Competitiveness Integrated Model (Flak & Głód, 2012, pp. 50-72) and the method of measuring company's competitiveness, so called Company Competitiveness Barometer, shortened CCB (Flak & Głód, 2014, pp. 12-14).

This paper also presents: the main basis of the CCB and the importance of the concepts included in this model; the definition of the competitiveness determinants and its elements; the use of the Competitiveness Integrated Model until now and the current status of research under the CCB framework; outline of the research development based on the CCB model; and partial outcomes of CCB measurements, based on 660 Slovak companies - respondents.

Presented paper has a diagnostic and scheme design character. Therefore, all the presented results were used in the diagnostic dimension. Design issues were based on the prognostic method (Bieniok, 2001, pp. 68-75).

## 2 MODELING AND MEASURING THE COMPETITIVENESS

Based on existing knowledge synthesis, described in the literature, we can claim that competitiveness is often associated with product price, quality, productivity, production costs, as well as competitive advantage. (Lombana, 2006, p. 33) However, competitiveness can be also understood as an ability to compete. Companies compete in order to survive market competition. (Gorynia, 2002, p. 48) It may as well mean the ability and way of coping or dealing with competition. One can define competition mechanisms and tools for a long-term and a short-term perspective. (Pierścionek, 2005)

Therefore competitiveness is related to evaluation of competitors' business outcomes, as well as their abilities to gain future profits in a changeable micro-environment. (Bossak & Bieńkowski, 2004, p. 19) We consider this definition as the most significant one among all mentioned, what is adequately reflected in our research design. We deal with the company competitiveness as the set of company's multidimensional features, determining its ability to compete. (Flak & Głód, 2012, p. 44) Competitiveness is an abstract and universal concept. It has some constitutional elements, which are also included in the following Competitiveness Integrated Model (Flak & Głód, 2014, p. 13), shown in Figure 1.

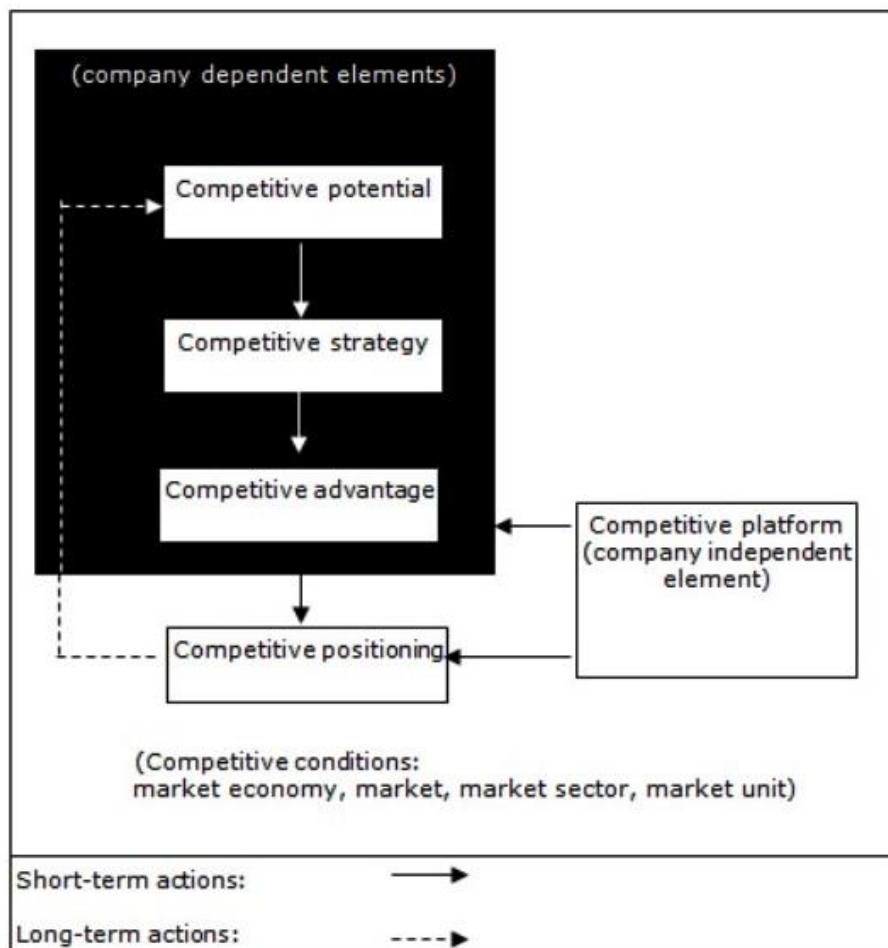


Fig. 1 - The integrated model of company competitiveness. Source: Flak & Głód (2012, p. 57)

Flak (2014, pp. 115 – 116) described this model as follows: The first element is the competitive potential, signifying the resources that enterprise has or should have to be able to use them to build, maintain and strengthen its competitiveness. These are, in a broad sense, possibilities of the company resulting from its tangible and intangible capital. Competitive potential of the company is at the same time the relative multidimensional concept.

Company uses the competitive potential through its strategy of competition, which is an adopted action program aimed at achieving a competitive advantage towards the entities from the competitive environment (microenvironment), serving the basic objectives of the enterprise. The competitive advantage is also the company's ability to deliver the tangible and intangible assets to the customer via the market.

The company's competitive advantage is a relative multidimensional concept. As the result of competitive advantage, the company's competitive positioning is obtained. It can be measured by the means of synthetic market and economic results of the enterprise, resulting from the extent of utilization of the enterprise's capacity to compete. Also the competitive positioning of the company is a relative multidimensional concept.

What influences and determines the activity of the company is its environment. In the Integrated Model of Competitiveness, the environment is called a platform of competition and denotes a set of characteristics of macro and microenvironment in which company operates. Features of the macroenvironment are the same for every company operating in a given sector, while the characteristics of microenvironment may be different for each company. (Flak & Głód, 2012; Flak & Głód, 2014)

Hypotheses concerning the relationship between the competitive potential and the strategy of competition; as well as the strategy of competition and competitive advantage, were verified in the model author's previous publications (Flak and Głód, 2014, pp. 15- 16).

We apply this model through Barometer24 research tool. It's based on the questionnaire method, reflecting directly on the mentioned five integrated competitiveness model areas: competitive potential (12 questions), competitive strategy (10 questions), competitive advantage (8 questions), positioning (6 questions), and the competition platform (9 questions).

We have chosen only such factors influencing on company competitiveness, which knowledge of the components of these given areas of competitiveness of the enterprises is mostly widespread among employees of this concrete company. However, the majority of the research questions do not require any detailed financial information, personal or technical from the respondent. The research tool is available on <http://www.barometer24.org>. Methodology of the Barometer24.org has two independent algorithms to calculate the results. The first is used for statistical calculations using the collected data from the respondents. The second algorithm is used to indicate the respondent, after completing the questionnaire, the degree of competitiveness of the company he or she represents is ready to be checked out automatically. The second algorithm deserves attention because its operation can be checked immediately after completing the questionnaire on Barometer24.org. Additionally, it concerned the method of calculating the measure of the competitiveness of the audited company (from 0 to 300 points, the more points the company is more competitive) and was based on three assumptions:

- there is no theoretical existing model of answers, which would be not only absolutely correct in any sector of economy (the platform of competition), but also actual by the longer period of time- defining the characteristics of the most competitive companies, (Olaf & Głód, 2012, p. 44)

- comparing the competitiveness of companies may take place only in a relative, (Olszewska et al., 2004, p. 507)
- the features of the most competitive companies in the sector are focused basically on some of their own particular features , but there is a low probability that these firms with extreme traits would belong to the most competitive ones. (Bień et al., 1997, pp. 143 – 144)

### **3 SEARCHING FOR COMPETITIVENESS PATTERNS**

To achieve the main goal of this paper, which is to identify patterns in competitiveness research - Barometer24 – data collection, we analyzed relations between 48 Barometer24 questionnaire questions, focused on company competitiveness, on the sample of 660 companies operating in Slovakia. The results are divided into four patterns categories 3.1 Credibility patterns, 3.2 Performance patterns, 3.3 Operational skills patterns, and 3.4 Pricing and brand management patterns. The last part of this chapter (3.5) is focused on synthesis of these four patterns categories into the final General Competitiveness Pattern (GCP).

#### **3.1 Credibility patterns**

The first kind of patterns we found in our competitiveness research data collection (barometer24) analysis is related to company's credibility; based on the survey question no. 2: *"How high is creditworthiness of your company?"*. Possible answers were in scale from very low (1 pt.) to very high (5 pt.).

According to our correlation and regression analysis, where credibility factor is a dependent variable (Y), is company credibility tightly linked to these factors – independent variables (X) ( $p\text{-value} < \alpha$  if  $\alpha = 0,05$ ):

- Operational cash ability:  $r^2 = 0,483$ ; based on the survey question no. 1: *"How do you evaluate the level of your recent cash ability in relation to the demand of your business features?"*. Possible answers were in scale from very low (1 pt.) to very high (5 pt.).
- Operational management quality:  $r^2 = 0,400$ ; based on the survey question no. 8: *"How many details are being recorded about projects, enterprises and processes in your company?"*. Possible answers were in scale from none (1 pt.) to all of them (5 pt.).
- Work experience:  $r^2 = 0,323$ ; based on the survey question no. 9: *"What is the work experience level of employees who significantly influence your company activities?"*. Possible answers were in scale from very low (1 pt.) to very high (5 pt.).
- Pricing strategy:  $r^2 = 0,329$ ; based on the survey question no. 23: *"What is the main goal of your general prices strategy?"*. Possible answers were: (1 pt.) to survive difficulties, (2 pt.) to increase profits in short period, (3 pt.) to increase profit in long period, (4 pt.) to maximize the market share.
- Company's liquidity:  $r^2 = 0,377$ ; based on the survey question no. 31: *"What is the level of cash flow in your company (is your company able to pay short-term obligations)?"*. Possible answers were in scale from very low (1 pt.) to very high (5 pt.).
- Market share:  $r^2 = 0,408$ ; based on the survey question no. 33: *"What is a level of a market share indicator of your products or services?"*. Possible answers were in scale from very low (1 pt.) to very high (5 pt.).

- Profitability:  $r^2 = 0,445$ ; based on the survey question no. 34: “What is a level of profitability in your company (are incomes higher than costs)?”. Possible answers were in scale from very low (1 pt.) to very high (5 pt.).
- Rentability of equity:  $r^2 = 0,367$ ; based on the survey question no. 36: “What is a level of equity profitability (a relation of a profit to investments) in your company?”. Possible answers were in scale from very low (1 pt.) to very high (5 pt.).

### 3.2 Performance patterns

The credibility patterns weren't the only patterns and links we found in our competitiveness research (barometer24) data collection. By analyzing the whole survey data collection, we found also very specific relations between company performance indicators (internal correlation), and between this group of indicators and other factors (external correlation), some of them already mentioned in previous part of this paper. Probably the most specific knowledge we gained from this part of research is that these internally correlated performance indicators are externally correlated with same factors at almost the same rate of correlation.

This group of internally correlated company performance indicators is consisted of: (1) Cash Flow level, based on the survey question no. 31; (2) Market share, based on the survey question no. 33; (3) Profitability, based on the survey question no. 34; and (4) Rentability of equity, based on the survey question no. 36. Internal correlation rate of these indicators is specified in the following correlation matrix.

Tab. 1 – Performance indicators correlation matrix

$(r^2)$	Cash Flow level	Market share	Profitability	Rentability of equity
Cash Flow level	1			
Market share	0,36718	1		
Profitability	0,46892	0,39984	1	
Rentability of equity	0,38323	0,34435	0,48912	1

On behalf of these findings we constructed Integrated Performance Indicator (shortened IPI), based on these four partial indicators by using normalized weights. In the next step we performed a correlation and regression analysis between IPI – as a dependent variable (Y) - and other factors included in barometer24 survey – as independent variables (X). The analysis outcome confirmed links between company performance and ( $p\text{-value} < \alpha$  if  $\alpha = 0,05$ ):

- Operational cash ability:  $r^2 = 0,393$ ; based on the survey question no. 1, mentioned also as an independent variable in 3.1 Credibility patterns.
- Credibility:  $r^2 = 0,445$ ; based on the survey question no. 2, mentioned as dependent variable in credibility patterns analysis.
- Operational management quality:  $r^2 = 0,358$ ; based on the survey question no. 8, mentioned also as an independent variable in 3.1 Credibility patterns.
- Work experience:  $r^2 = 0,312$ ; based on the survey question no. 9, also mentioned as an independent variable in 3.1 Credibility patterns.
- Pricing strategy:  $r^2 = 0,349$ ; based on the survey question no. 23, also mentioned in 3.1 Credibility patterns as an independent variable.

### **3.3 Operational skills patterns**

The third kind of pattern findings we found in our competitiveness research data collection (barometer24) analysis is related to company's operational skills: (1) operational management quality and (2) work experience, both mentioned in previous parts of this chapter. These two operational skills indicators are mutually ( $r^2 = 0,3582$ ) and are also correlated with the same factors, almost at the same rate. To unify these relations we used the same approach as by IPI's construction (already mentioned in 3.2 Performance patterns), but this time we constructed IOSI – short for Integrated Operational Skills Indicator.

Furthermore we performed a correlation and regression analysis between IOSI – as a dependent variable (Y) - and other factors included in barometer24 survey – as independent variables (X). The analysis outcome showed links between company's operational skills and ( $p\text{-value} < \alpha$  if  $\alpha = 0,05$ ):

- Partially mentioned Credibility:  $r^2 = 0,378$  and Performance:  $r^2 = 0,336$  by explaining these relations with both operational skills indicators separately.
- Constructive feedback:  $r^2 = 0,468$ ; based on the survey question no. 6: “How often the constructive conclusions are drawn after finishing successful projects or other activities?”. Possible answers were in scale from never (1 pt.) to always (5 pt.).
- Employees creativity:  $r^2 = 0,398$ ; based on the survey question no. 7: “What is a creativity level of employees who mostly influence on activities in your company?”. Possible answers were in scale from very low (1 pt.) to very high (5 pt.).

### **3.4 Pricing strategy and brand management patterns**

Credibility, profitability and operational skills patterns weren't the only patterns we found in this research. The fourth (still significant) kind of patterns we found is related to company's pricing strategy; based on the survey question no. 23, already explained in 3.1 Credibility patterns. According to our correlation and regression analysis, where pricing strategy is a dependent variable (Y), is pricing credibility tightly linked to these factors – independent variables (X) ( $p\text{-value} < \alpha$  if  $\alpha = 0,05$ ):

- Credibility:  $r^2 = 0,329$ ; based on the survey question no. 2; previously explained in 3.1 Credibility patterns.
- Integrated Performance Indicator (IPI):  $r^2 = 0,332$ ; characterized in 3.2 Performance patterns. Specifically: (1) Cash Flow level  $r^2 = 0,275$ , based on the survey question no. 31; (2) Market share  $r^2 = 0,343$ , based on the survey question no. 33; (3) Profitability  $r^2 = 0,349$ , based on the survey question no. 34; and (4) Rentability of equity:  $r^2 = 0,274$ , based on the survey question no. 36.
- Brand management:  $r^2 = 0,348$ ; based on the survey question no. 16: “Are there any activities focused on creating a strong brand of your company (or your goods)?“ Possible answers were no (1 pt.) and yes (2 pt.).

As we can see, pricing strategy level is linked not only to credibility and performance factors, but also to the brand management implementation. That's why we further analyzed this specific factor. This analyzes outcome led us to conclusion that companies with implemented brand management (Y) have also other common characteristics (X) ( $p\text{-value} < \alpha$  if  $\alpha = 0,05$ ):

- Marketing competences development:  $r^2 = 0,306$ ; based on the survey question no. 13: “Is there a rapid development of marketing competences in your company?”. Possible answers were no (1 pt.) and yes (2 pt.).

- Public Relations (PR) activities:  $r^2 = 0,428$ ; based on the survey question no. 14: “Are there any Public Relations events in order to achieve publicity of your company?”. Possible answers were no (1 pt.) and yes (2 pt.).
- Market research and targeting:  $r^2 = 0,417$ ; based on the survey question no. 19: “Does your company use modern marketing research methods in order to reach your target groups of clients?”. Possible answers were no (1 pt.) and yes (2 pt.).
- Benchmarking and cost-cutting:  $r^2 = 0,337$ ; based on the survey question no. 21: “Does your company use the benchmarking method in order to decrease costs of manufacturing products or services?”. Possible answers were no (1 pt.) and yes (2 pt.).
- Brand impact:  $r^2 = 0,308$ ; based on the survey question no. 21: To what extent have a brand influence on your clients purchasing decisions?”. Possible answers were in scale from very low (1 pt.) to very high (5 pt.).
- Pricing strategy:  $r^2 = 0,315$ ; already mentioned above.

### **3.5 Competitiveness patterns synthesis**

In previous parts of this chapter were presented links between some competitiveness factors, mostly focused on (1) credibility, (2) profitability, (3) operational skills and (4) pricing. These factors can be described by significant correlation not only inside the pattern group (internal correlation), but also between these four groups of competitiveness factors (external correlation). For better understanding of these patterns we created the General Competitiveness Pattern (shortened GCP), shown in Figure 2. This general pattern links all these significant factors in one formula through five branches (relations) ( $p\text{-value} < \alpha$  if  $\alpha = 0,05$ ):

- Credibility x Pricing strategy :  $r^2 = 0,329$
- Credibility x Operational skills :  $r^2 = 0,340$
- Performance x Pricing strategy :  $r^2 = 0,349$
- Performance x Operational skills :  $r^2 = 0,358$
- Performance x Credibility :  $r^2 = 0,445$

Secondary relations recognized in General Competitiveness Pattern (GCP) are linked to Pricing strategy (x Brand management:  $r^2 = 0,348$ ) and Operational skills (HR performance factors - x Employees creativity:  $r^2 = 0,398$  & x Constructive feedback:  $r^2 = 0,468$ ).



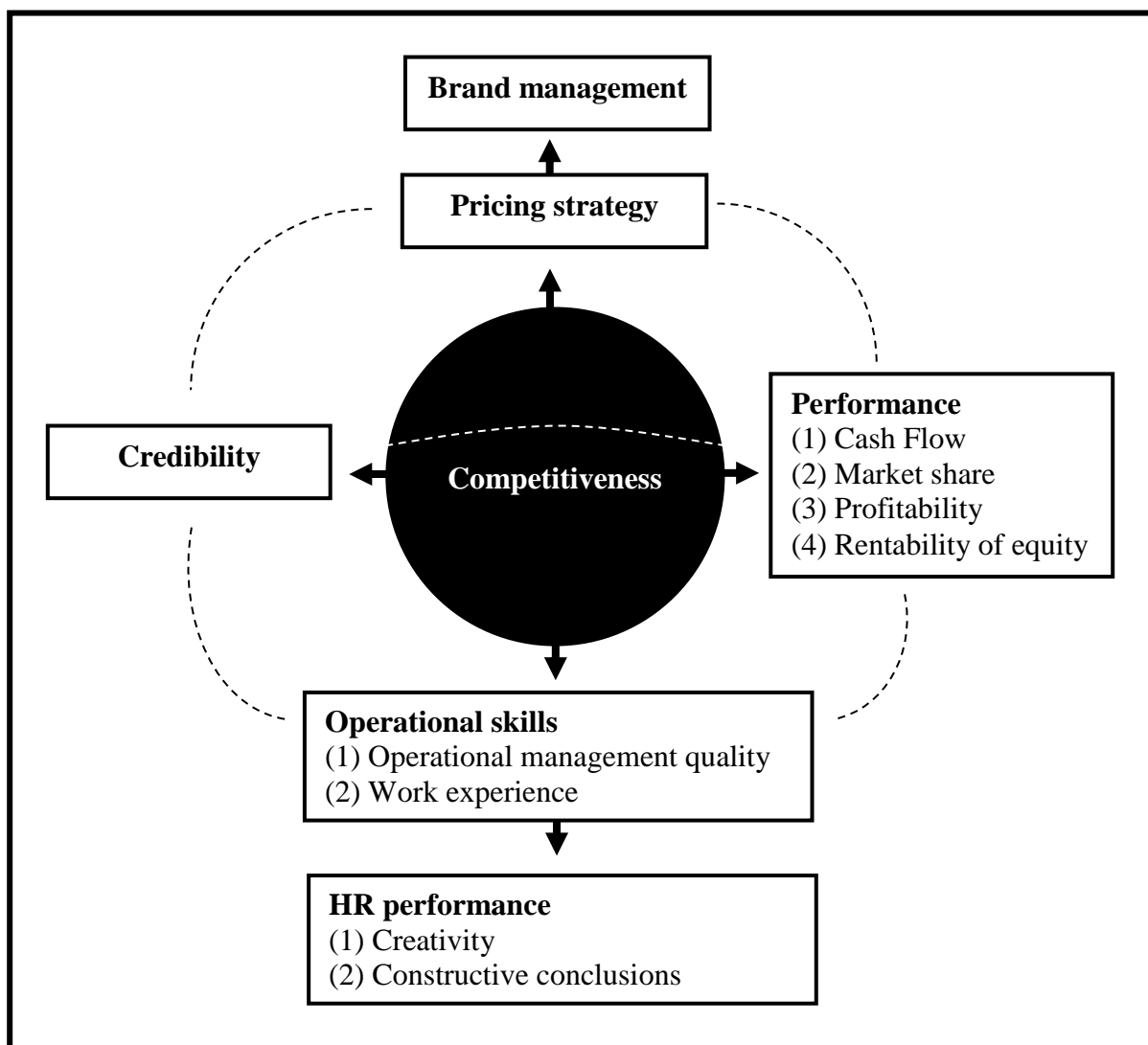


Fig. 2 – General Competitiveness Pattern (GCP)

## 4 DISCUSSION

### 4.1 Credibility and performance

According to our research outcomes, there is strong proportional relationship between the firms credibility and its performance. By its own definition, business credibility is the amount of trustworthiness or expertise that a company has in the eyes of its clients, customers, business partners, and financial resources. Credibility is often a combination of the company's credit profile and its reputation. If it is lacking one or the other, then the company may be viewed as having poor credibility. On the other hand, if the company excels in both areas, it will likely be viewed as a credible company that is worth doing business with. (Krueger & Brazeal, 1994)

The role of credit in business credibility is crucial. It refers mostly to its ability to properly pay its liabilities on time. The identification and quantification of credit rating is based mostly on financial and economic ratio indicators, consisting at least of one of the performance indicators – Cash Flow, profitability and Rentability of Equity. (Kráľovič & Vlachynský, 2006)

While a company's credit rating is one factor in its overall credibility, its reputation is equally important in how potential customers, clients, business partners and financial resources view the company. The link between this dimension of business credibility and the business performance we see is covered by the firms market share.

#### **4.2 Business performance and human resources**

Early efforts to link HR practices to business performance generally focused on a single practice or area of HR. For example, business performance was found to be stronger where the industrial relations climate was more favorable (e.g., lower levels of grievances and conflict, better employee attitudes) and where the use of labor-management cooperation programs was greater (Cutcher-Gershenfeld 1991; Katz, Kochan & Gobeille 1983; Katz, Kochan & Weber 1985). This work was conducted at the plant level of analysis (and typically in unionized settings). Other work, at the firm level of analysis, reported that business performance was stronger in firms emphasizing pay for performance in managerial compensation (Gerhart & Milkovich, 1990) and in firms using more valid employee selection procedures (Terpstra & Rozell, 1993).

Subsequent research expanded the conception and measurement of HR to include an array of practices. To some extent, "AMO theory" (Boxall & Purcell, 2003) has evolved as a model to help guide choice of HR practices to study. AMO refers to ability-motivation opportunity (Appelbaum et al., 2000; Bailey, 1993; Huselid, 1995; Ichniowski et al., 1996). Under the AMO model, HR practices are expected to influence business performance via the workforce's ability (e.g., using selective hiring, training), motivation (e.g., using pay for performance), and opportunity to contribute (e.g., using teams, suggestion systems). At the plant level, key studies showing links between HR practices and performance were conducted by Arthur (1994), MacDuffie (1995), and Ichniowski, Shaw & Prensushi (1997) in manufacturing and in the service sector by Batt (2002).

At the company level, an early and influential study was conducted by Huselid (1995), followed by Delery & Doty (1996). For reviews of these and related studies, see Becker and Gerhart (1996), Boxall and Purcell (2003), and Gerhart (1999). The empirical work generally reports the same finding: the choice of HR practices is related to business performance, often strongly. For example, Gerhart's (1999) review found that a one standard deviation increase in HR system practices (relative to the mean) designed to enhance workforce ability, motivation, and opportunity to contribute was associated with roughly 20 percent better company financial performance. Consider that this finding means that firms one standard deviation above the mean are at 120 % of mean performance, while those one standard deviation below the mean are at 80 percent of mean performance, making for a  $120/80 = 50$  percent advantage of being +1 standard deviation versus -1 standard deviation. This is a large difference.

Based on these facts, we can state that our findings – close relation between HR performance and business performance – correspond to above mentioned previous research outcomes. Therefore human resources can be considered as valid and reliable source of business competitiveness.

#### **4.3 Strategic pricing**

One of our research findings is that the level of pricing is in close relation to both – business performance and credibility. This analysis outcome is not very surprising. The reason why is the essential impact of product price on company sales; its revenues, cash flow and profit (as the difference between revenues and costs). But it's not just the price level influencing the

business competitiveness; it's also the applied pricing approach. It seems that companies using strategic pricing are more competitive than others. They are characterized by higher level of performance indicators (cash flow, profitability and market share), but also by better financial condition – perceived credibility. So what exactly do we understand by “strategic pricing”?

Strategic pricing sets a product's price based on the product's value to the customer, or on competitive strategy, rather than on the cost of production. This approach recognizes that people often make purchasing decisions based more on psychology than on logic, and that what's most valuable to the customer may not be what's most expensive to produce. (Martin, 2012) What customers are willing to pay for a product may be vastly more, or less, than a company would charge if it simply priced based on cost. Discovering what consumers value about the product and how much they value it can let a company increase its price or might suggest that a new product has no chance of turning a profit. For every 1 percent of price increase customers are willing to pay, companies receive 7 to 8 percent higher profits. In this model the product's price is usually set by a marketer or salesperson rather than by the operations and development team. (Meza & Sudhir, 2005)

This approach allows companies to gain more revenues by analyzing the current demand and by identifying the equilibrium between the perceived product value and company costs.

## **5 CONCLUSION**

The main goal of this paper was to identify patterns in competitiveness research - Barometer24 – data collection, currently conducted by authors of this paper and cooperating universities from Poland, Slovakia, Czech Republic, Finland and Spain. But before presenting research outcomes, it was necessary to set some information about the Barometer24 research tool, describe its main characteristics and the approach used in creating this complex competitiveness measuring tool. All these information are included in chapter 2.

To achieve our goal we analyzed relations between 48 Barometer24 questionnaire questions, focused on company competitiveness, on the sample of 660 companies operating in Slovakia, by using statistical toolbox – correlation and regression analyzes. Not all of these questions – meant as competitiveness factors – were interlinked between each other. In fact, we found only 9 factors significantly linked together. These factors could be divided into four patterns categories (1) credibility, (2) performance, (3) operational skills, and (4) pricing. All of them are tightly connected by 5 branches (Credibility x Pricing strategy; Credibility x Operational skills; Performance x Pricing strategy; Performance x Operational skills; and Performance x Credibility). These 5 branches linking 4 kinds of patterns form our synthesized and final General Competitiveness Pattern (GCP).

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## **COMPARISON OF PERCEPTION OF EXTERNAL INFLUENCES ON FAMILY BUSINESSES IN THE SLOVAK REPUBLIC AND IN SELECTED EUROPEAN COUNTRY**

*Elena Šúbertová, Zuzana Meszárošová*

### **Abstract**

The paper will focus on the evaluation of business environment in two member states of the European Union (EU) - Slovak Republic (SR) and Republic of Malta (MT). The subject of closer interest is a family business in the SMEs category. The essence of the research is to obtain reliable and up to date knowledge of the family business in these two countries. The article will contribute to raising awareness of external business environment for SMEs, particularly for family business in selected countries. The paper also determines differences between family and non-family SMEs businesses in the Slovak Republic, so we can distinguish a family business as a separate category of business for the purpose of promoting and statistics. There are number of incentives for family businesses in various countries, e.g. through preferential tax rates in case maintaining business to the next generation, incentives for family start-ups, training, mentoring and support for research and development. Based on the results we suggest the recommendations to improve the business environment for SMEs focusing on family business in both countries.

*Keywords: business environment, Malta, Slovak Republic (Slovakia), competitiveness of a company, business support, external and internal factors small and medium-sized enterprises, family business,*

JEL Classification: M21, P51

### **1 THEORETICAL BACKGROUND OF CONDITIONS FOR ENTERPRISES**

The entrepreneurial environment in the Slovak Republic as whole can be characterized especially in the last four year by negative evaluation and therefore also an insufficient support for development activity. Successful entrepreneurship generally and family business especially is a key activity to the development of the economy in many countries, in Slovakia and Malta, too. We would like to identify the reserves of exist business environment for family business in the SMEs category in both countries. The academic community is also involved in the discussions about actual problems of appropriate conditions for development of small and medium sized enterprises. The university teachers were interested in some aspects of external and/or internal conditions for SMEs: Ďuriš, T. analysed the problems with appropriate business conditions for SMEs in the USA (2009).

Veber, J. et al. (2012) analysed the problems with entrepreneurship of small and medium sized enterprises. The internationalization of small and medium sized enterprises in the Czech Republic is analyzed in publication of Šimberová, I. (2014). Human potential in small and medium sized enterprises was characterized in output of Plchova, J. (2012). Social responsibility in SMEs was characterized in article of authors Dyer, W.-Whetten, D. (2006). The evaluation of the disparity of conditions for entrepreneurship in the Slovakia and in other countries of the world is written in publication of Pilkova, A. et al. (2014) and in our publications Šúbertová, E. (2011), Šúbertová, E.- Kinčáková, M. (2014). Special evaluation of family business in Austria was interested Mandl, I. (2008), in the United Kingdom studied the history of family buseiness Coll, A. (2003), in the Czech Republic analyzed family businesses

Koráb, V. (2008), Šíp, V. – Hanzelová, A. - Mihalisko M. (2008), in the Republic of Malta Fenech K.J. (2013) and in the Slovak Republic: Strážovská, Ľ. - Strážovská, H. - Krošláková, M. (2008). Tekelová, Z. was interested in importance of SMEs in Republic of Malta in the European Union (2011). The selected important independent world organizations every year realized evaluation of business environment for entrepreneurs in selected countries about their indicators.

## **2 METHODS AND METHODOLOGY**

The main goal of this paper is to show conditions for economic activities of the SMEs in the Slovak Republic and in Republic of Malta, analyzed their business environment generally in the period from year 2014 to year 2015 and to suggest such solutions for future which should lead to market competitiveness. We compared indicators used by World Economic Forum and The World Bank.

For our analyses, we are using the standard methods of research work, such as analysis and synthesis, comparison, induction, deduction, and generalization. We also applied statistics methods. We used our primary data from the year 2013 for identification of the present financial situation in the SMEs. The database contains the data from 212 questionnaires SMEs in Slovakia and 53 questionnaires from SMEs Malta, which have a status of family businesses. The questionnaire is structured in order to submit it to the fullest a representative sample and to ensure simple transfer of the information to the database. The questionnaire was distributed electronically as well as personally. Of 700 SMEs approached in Slovakia, 212 questionnaires were completed, which means 30.29 % return rate. In Republic of Malta questionnaires were consulted for personal involvement and later electronically distributed to 150 enterprises, out of which 53 replied, what corresponds to 35.33 % of the total number of approached SMEs. The sample is divided almost 50/50 for family and non-family businesses in Malta and the Slovak Republic.

The World Economic Forum evaluates annually countries based upon their *Global Competitiveness Index* (GCI). WEF evaluated 144 countries for year 2014-2015 in 12 major groups (pillars) - the worst evaluation is 1, the best is 7. Following are evaluations and rankings for Slovakia and Malta. The latest evaluation in 2014/15 ranked Slovakia 75<sup>th</sup> with 4.1 points. Comparatively, in 2010/11 Slovakia had rank 60 with 4.25 points, showing fall down by 15 positions. Therefore, a qualitative improvement across almost all entrepreneurial indicators of environment would be required in order to sufficiently support the entrepreneurial activity in the Slovak Republic. The best ever was year 1995, when Slovakia was ranked 35<sup>th</sup>.

The most negative evaluations are in 2014/15 these areas: public institutions, especially in inefficient government bureaucracy, corruption, and political instability. The worst evaluated funding option is the access to funding through initial public offerings, which reflects practically non-existent stock exchange in the Slovak Republic. The big problems have new and growing small and medium sized enterprises. Low evaluations are also in low enforcement of law, low effectiveness of public finance, low trust of public in politicians. On the other hand, positive evaluations are in low import barriers, openness to foreign investments, low risk of terrorism, high density of spread of Internet. However, some of these positives may have negative influence on domestic entrepreneurs, for example low import duties (low excise tax).



Evaluation based upon their Global Competitiveness Index is better for Malta as Slovak Republic. Malta has the biggest problem with small market size, but has very good evaluation in technological readiness, health and primary education and goods market efficiency.

Tab. 1: Evaluation of global competitiveness for Slovakia and Malta  
By indicators in the years 2014-2015 by World Economic Forum  
Source: <http://reports.weforum.org/global-competitiveness-report-2014-2015/economies/#economy=SVK>  
<http://reports.weforum.org/global-competitiveness-report-2014-2015/economies/#economy=MLT>

<b>Evaluation: Rank and Score</b>	<b>Rank (min. 1 – max. 7) 2014-15 Slovakia</b>	<b>Score (out of 144 countries) 2014-15 Slovakia</b>	<b>Rank (min. 1 – max. 7) 2014-15 Malta</b>	<b>Score (out of 144 countries) 2014-15 Malta</b>
<b>Indicators</b>				
1. Public institutions	4,6	110	4,5	40
2. Infrastructure	4,2	64	4,9	37
3. Macroeconomic environment	5,2	45	4,7	65
4. Health and primary education	5,5	84	6,4	20
<b>Sub index A: Basic requirements (20 %)</b>	<b>4,6</b>	<b>70</b>	<b>5,1</b>	<b>35</b>
5. Higher education and training	4,6	56	4,9	42
6. Goods market efficiency	4,4	66	4,7	31
7. Labour market efficiency	3,9	97	4,3	54
8. Financial market development	4,5	39	4,6	36
9. Technological readiness	4,4	52	5,6	21
10. Market size	4,0	58	2,5	126
<b>Sub index B: Efficiency enhancers (50 %)</b>	<b>4,3</b>	<b>51</b>	<b>4,4</b>	<b>44</b>
11. Business sophistication	4,0	65	4,5	36
12. Innovation	3,2	78	3,6	45
<b>Sub index C: Innovation and sophistication factors (30 %)</b>	<b>3,6</b>	<b>73</b>	<b>4,0</b>	<b>41</b>
<b>GCI – Global Competitiveness Index</b>	<b>4,1</b>	<b>75</b>	<b>4,4</b>	<b>47</b>

The World Bank compares in its evaluation 10 groups of indicators and evaluates 189 countries. Slovakia was ranked 37<sup>th</sup> in year 2015, which is the better position as in 2014 or 2013 (46<sup>th</sup> position). Very negative evaluation – below 100<sup>th</sup> position – were in “Taxes” (too many and too fast changes in tax legislation), low protection of investments combined with low speed in building of highways (infrastructure), which means problems for moving of goods in international trade. Positives were in business registration, mostly due to functional „cadastre portal“ and „single points of contact“.

Evaluation based upon The World Bank is better for the Slovak Republic as Malta. Malta has the biggest problem with getting credit, but has very good evaluation in paying taxes, trading across borders and protection of minority investor.

Tab. 2: Evaluation of Slovak and Malta competitiveness  
According to The World Bank in the year 2015

Source: <http://www.doingbusiness.org/data/exploreeconomies/slovakia>  
<http://www.doingbusiness.org/data/exploreeconomies/malta>

<b>Evaluation : Score</b>	<b>Score (out of 189 countries) Slovakia</b>	<b>Score (out of 189 countries) Malta</b>
<b>Indicators</b>		
1. Starting a business	77	136
2. Dealing with Construction Permits	110	109
3. Getting to electricity	100	114
4. Registering property	11	83
5. Getting Credit	36	171
6. Protection of Minority Investors	100	51
7. Paying Taxes	100	26
8. Trading Across Borders	71	43
9. Enforcing Contacts	55	107
10. Resolving insolvency	31	86
<b>Evaluation Doing Business 2015</b>	<b>37</b>	<b>94</b>

### **3 THEORETICAL BACKGROUND OF SMALL AND MEDIUM-SIZED FAMILY BUSINESS**

#### **3.1 Basic historical data of Malta and external environment of SMEs**

British rule in Malta lasted until 1964 when the island became independent. The Maltese adopted the British system of administration, education and legislation. Ten years later, in 1974, Malta became a Republic within the British Commonwealth.

The British military presence on the island officially came to an end on March 31, 1979. Until the 1960s, the Maltese economy depended mostly on the British services and the Naval Dockyard. After independence, industry and tourism advanced at a fast pace, and today Malta and Gozo have established an industrial and services economy and flourishing tourist enterprises. In 1990, Malta applied for membership of the European Union and formally joined the EU in May 2004. In 2008, Malta adopted the Euro as its currency.

The island is located in the Mediterranean Sea, a hundred kilometres from Sicily and close to Tunisia. The population of the country on the basis of the census of 2010, more than 417 000 inhabitants, with respect to the area of the island is very densely populated.

The market of the country is too small to attract foreign investment only because of domestic demand. Despite a given "handicap" means the position of the country strategy and appealing, especially for a good start to the European continent and North African markets.

Malta as a member of the EU adopted 10 principles of the European Charter for Small Enterprises (SBA - Small Business Act) to enhance the competitiveness of small businesses. The report states that the implementation of aid Maltese enterprises is not as successful. The Brussels bureaucracy is too high, and therefore these enterprises have the same problems as enterprises in Slovakia. For small businesses over the past years has been difficult to achieve a return on capital and ensure sustainable business development. Small businesses are too vulnerable to lack of resources, especially financial. Their size certainly does not mean a higher business risk. Bankers are too biased, as well as suppliers behave towards SMEs rather carefully.

Professor Giovanna Debono under the auspices of the Council for Science and Technology in Malta (MCST - Malta Council for Science and Technology) developed a study confirming the trend of innovative SMEs in the country. Studies show that a particular family SMEs are very proud of their products, try to make original and does not duplicate competition.

### **3.2 Family Business in Malta**

Malta is missing structured and researched sources of information relating to the economic, social and other contributions of family business. They are characterized by spreading of family values, by culture of responsible behaviour, long-term investments and generally focusing on long-term returns and interest in the whole business. There is no official definition of a family in Malta. Therefore, we will build on the knowledge of family business.

Most Maltese enterprises belong to a category of small and medium enterprises. Based on the report from the European Commission in 2013, almost 95% of the total number of enterprises is classified as micro-enterprises and the majority of them are considered to be a family business. Maltese SMEs account for 73 % of value added compared with 58 % in the EU. This heightened importance of SMEs is reflected in all size classes, although the differences in the proportions between Maltese SMEs and the EU average are largest for microenterprises followed by mid-sized companies.

Small businesses are active in a wide range of activities from traditional services or craft products, to emerging high-tech activities. Around 85% of Maltese companies are family-owned. The following table illustrates the structure of the business in the non-financial business sector in Malta in 2013.

Tab. 3 - Basic figures of SMEs in Malta in 2013

Source: Eurostat Fact Sheet (2014), found - based on Structural statistics figures, it has been elaborated by EIM – Enterprise Information Management

Category of enterprise	Enterprises			
	Malta		EU 28	Malta – EU 28
	Number	Share (%)	Share (%)	Differences in share (%)
Micro	28 905	94.6	92.4	+ 2,2

Small	1 298	4.2	6.4	- 2,2
Medium-sized	291	1.0	1.0	0,0
<b>SMEs</b>	<b>30 494</b>	<b>99.8</b>	<b>99.8</b>	<b>0,0</b>
Large	54	0.2	0.2	0,0
Total	30 548	100	100	0,0

SMEs in Republic of Malta have main part of SMEs micro enterprises, and big part is family business. SMEs had in 2014 more than 58.1 % share of value added and 66.9 % share on employment. The differences between Malta and countries of EU 28 are only in share of micro and small enterprises.

### 3.3 Family Business in Slovakia

In Slovakia is similar situation as in Malta. Since 2002, small businesses have still been the dominant category in Malta and in Slovakia economy as well. Their business is growing, a significant increase was observed mainly in micro - sized enterprises.

Tab.4: Fundamental differences between family micro-sized enterprises and enterprises  
Source: Subertova, E. – Kincakova ,M. (2014) found

Characteristic feature	Family business, mainly micro - sized enterprises	Enterprise
Founder(s)	Family member	Owner
Major financial decisions – e.g. loan, leasing, etc.	Family members together	Owner (maybe with manager)
Work during weekends and (statutory) holidays	Mostly yes	Mostly no
Categories owner-manager-employee	Mostly identical	Mostly different
Internal guidelines	Verbal agreements	Written documents
Mutual trust among employees	Stronger	Weaker
Transfer of experience	Complete	Limited
Conflicts – interlinking of personal lives and work, transfer of problems between workplace and family	Yes	To a lesser extent
Interest in continuing company's activities after retirement	Mostly yes	Mostly no

There is no official definition of a family in Slovakia. Therefore, we will build on the knowledge of family business.

Tab. 5 - Basic figures of SMEs in Slovakia September 30, 2014  
Source: Slovak Business Agency, Bratislava, own calculation

Category of enterprise	Enterprises			
	Slovakia		EU 28	Slovakia – EU 28
	Number	Share (%)	Share (%)	Differences in share (%)
Micro	547 007	96,9	92.4	+4,5

Small	14 234	2,5	6.4	-3,9
Medium-sized	2 762	0,4	1.0	-0,6
<b>SMEs</b>	<b>564 003</b>	<b>99.8</b>	<b>99.8</b>	<b>0,0</b>
Large	630	0.2	0.2	- 0,2
Total	564 633	100	100	0

Slovak SMEs have main part of SMEs micro enterprises, and big part is family business. SMEs had in 2014 more than 53 % share of value added and 72 % share on employment. The differences between Malta and countries of EU 28 are only in share of micro enterprises.

#### **4 RESEARCH OF PARTICULAR EXTERNAL BUSINESS FACTORS IMPACT ON FAMILY BUSINESS IN SLOVAKIA AND MALTA**

##### **Hypothesis 1**

Factors of macroeconomic policy influence family and non-family businesses in analyzed countries in the same way, i.e. there are no significant differences between family and non-family businesses in terms how they are influenced by macroeconomic policies in the Slovak Republic and in Republic of Malta.

The hypothesis will be tested by further statistical methods - ANOVA (Analysis of Variance). Thanks to the method we can determine whether there is a relationship between the type of business (family / non-family) and the influence of factors external environment. Problematic issues evaluated using P (Sig. /  $\alpha$ ) or F - costing values. If  $P$  (Sig. /  $\alpha$ )  $\leq 0.05$ , the null hypothesis was rejected and vice versa.

##### **Hypothesis 1.1**

There are no significant differences between family and non-family businesses in the Slovak Republic regarding the impact of macroeconomic policy factors on success of a company.

Tab. 6 Results of testing hypotheses H1.1 by sample SMEs in Slovak Republic  
Source: Zuzana Meszárošová - own calculations and processing

<b>Perceptions of the factor impacts</b>	<b>Source</b>	<b>Variance</b>	<b>F</b>	<b>Sig.</b>
Disposable income	Between groups	6.782	4.179	0.017
	Within the group	1.623		
Unemployment in the country	Between groups	0.850	0.599	0.551
	Within the group	1.420		
Inflation	Between groups	0.744	0.636	0.530
	Within the group	1.169		
Economic conditions for SMEs	Between groups	1.837	1.919	0.149
	Within the group	0.957		

There is a difference between family and non-family businesses in the Slovak Republic in terms of variance in the perception of the factor "Disposable income". Significance (Sig.) is 0.017, which is less than 0.05. F (the value of the test criteria) is calculated as the variance

between groups and variance within groups. Other factors have the same impact on the success of the family business as well as in non-family businesses.

### **Hypothesis 1.2**

There are no significant differences between family and non-family businesses in Republic of Malta regarding the impact of macroeconomic policy factors on success of a company.

Tab. 7 Results of testing hypotheses H1.2 by sample SMEs in Malta Republic  
Source: Zuzana Meszárošová - own calculations and processing

<b>Perceptions of the factor impacts</b>	<b>Source</b>	<b>Variance</b>	<b>F</b>	<b>Sig.</b>
Disposable income	Between groups	0.572	0.663	0.423
	Within the group	0.863		
Unemployment in the country	Between groups	1.422	1.887	0.181
	Within the group	1.633		
Inflation	Between groups	0.782	0.578	0.454
	Within the group	1.353		
Economic conditions for SMEs	Between groups	2.775	3.376	0.077
	Within the group	0.822		

Significance (Sig. /  $\alpha$ ) is higher than 0.05 for all factors. Based on the results we evaluate the family and non-family businesses in Malta perceive the impact of macroeconomic policy factors on the success of the company equally.

### **Hypothesis 2**

Legislative and political environment factors influence family and non-family businesses in analyzed countries the same way, i.e. there are no significant differences between family and non-family businesses in the terms how they are influenced by legislative and political environment. The hypothesis will be tested again using statistical methods - ANOVA (Analysis of Variance). Thanks to the method examines the relationship between the type of business (family / non-family) and the influence of factors in a group of legislative and political environment. Results of analyzes using P (Sig. /  $\alpha$ ) or F - costing values. If P (Sig. /  $\alpha$ )  $\leq$  0.05, the null hypothesis is rejected.

### **Hypothesis 2.1**

There are no significant differences between family and non-family businesses in the Slovak Republic in terms of the impact of legislative and policy environment factors on success of the company.

Tab. 8 Results of testing hypotheses H1.2 by sample SMEs in Slovak Republic  
Source: Zuzana Meszárošová - own calculations and processing

<b>Perceptions of the factor impacts</b>	<b>Source</b>	<b>Variance</b>	<b>F</b>	<b>Sig.</b>
Stability of business environment	Between groups	2.387	1.825	0.164
	Within the group	1.308		
Levy system	Between groups	0.690	0.660	0.518
	Within the group	1.044		
Tax system	Between groups	0.073	0.066	0.936
	Within the group	1.108		

Frequent changes in legislation	Between groups	0.568	0.500	0.607
	Within the group	1.136		
Bureaucracy	Between groups	0.932	0.905	0.406
	Within the group	1.030		
Criminality	Between groups	1.972	1.281	0.280
	Within the group	1.539		

There is no difference in the values of variance in the perception of legislative and political environment factors between family and non-family businesses in the Slovak Republic. The significance level (Sig.) is higher than 0.05 in all cases.

### **Hypothesis 2.2**

There are no significant differences between family and non-family businesses in Republic of Malta in perception in the impact of legislative and policy environment factors on success of a company.

Tab. 9 Results of testing hypotheses H1.2 by sample SMEs in Malta Republic  
Source: Zuzana Meszárošová - own calculations and processing

<b>Perceptions of the factor impacts</b>	<b>Source</b>	<b>Variance</b>	<b>F</b>	<b>Sig.</b>
Stability of business environment	Between groups	2.387	1.825	0.164
	Within the group	1.308		
Levy system	Between groups	0.690	0.660	0.518
	Within the group	1.044		
Tax system	Between groups	0.073	0.066	0.936
	Within the group	1.108		
Frequent changes in legislation	Between groups	0.568	0.500	0.607
	Within the group	1.136		
Bureaucracy	Between groups	0.932	0.905	0.406
	Within the group	1.030		
Criminality	Between groups	1.972	1.281	0.280
	Within the group	1.539		

There is no difference in the perception of factors in legislative and political environment between family and non-family businesses in Malta. We consider both at the higher level of significance (Sig.) than 0.05 in all cases.

## **5 DISCUSSION**

Opinions on the importance of external factors of the business environment are different for each country. According to Slovak companies in terms of the measured mean values the most important factors in the external environment are:

- Contribution System - 4.15;
- The tax system - 4.13;
- Bureaucracy - 4.12;
- Frequent changes in legislation - 4.02;
- Competition in the market - 3.91;
- Entry fee - 3.86.

Based on the identified standard deviation of the external business environment factors demonstrate that there is significant difference in the sample surveyed businesses in areas such as the seasonal effect (1.33), disposable income of the population (1.29), the price of raw materials and energy (1.27), crime (1.25), consumer preferences (1.21).

We can say that the views of the foregoing factors, for example, differ depending on the regional localization of business activities. Researched companies, however, have the same views, for example, the issue of globalization processes in Slovakia, the market competition, the levy system and bureaucracy.

The most important factors of the external business environment in Malta from the perspective of enterprises on the basis of measured mean values are:

- Competition in the market - 4.41;
- The price of raw materials and energy - 4.14 (particularly energy);
- Disposable income of the population - 4.07;
- Other economic conditions for SMEs (eg., Globalization) - 3.97.

Enterprises evaluate the factors as those that most affect the success or failure of their business. All companies perceive the indicators like (there is a small standard deviation between them) except prices of raw materials and energy, where the deviation is higher, which may be associated with a business venture.

Standard (authoritative) deviation factors external business environment has shown that there is a difference in the evaluation of surveyed businesses in areas such as infrastructure (1.70), crime (1.43), climatic conditions (1.38), and bureaucracy (1.35). Opinions at the factors are likely to be different because of the different activities, business needs and resources associated with a business focus. Businesses have the same views contrary example. other economic conditions for SMEs (globalization) and competition in the market and the disposable income of the population.

## **CONCLUSION**

Most of external macroeconomic factors are perceived by family and by non-family businesses in Slovakia and in Malta similarly. Only one factor – disposable income of the population – is perceived differently in Slovakia and in Malta. Family and non-family businesses in Malta recognize the impact of macroeconomic policy factors on the success of the company equally.

Among the external factors, family businesses in Slovakia assign the highest importance to taxes and other mandatory payments (social and health insurance, etc.). In Malta, the highest importance is assigned to market competition, to cost of raw materials and energy and to disposable income.

We found that legislative and political environment factors are affecting family and non-family businesses in the same way in both countries. The results of the test may be related to the fact that so far there is no separate legislative scheme for a family business in any of the analyzed countries.

Slovak businesses see the biggest barriers in complex and frequently changing tax system, legislative barriers, but also strong competition, political instability, and unavailability of funds. As to the government intervention in creation of a business environment so important for businesses, the companies would prefer simplification of reporting system, simplification of funding, promoting "Made in Slovakia". Equally important for Slovak businesses are the



technical requirements to improve product quality, consumer protection, environmental protection, promotion and awareness of support programs.

In Malta, interventions in consumer protection are considered very important, as well as environmental protection, promotion and awareness of support programs, establishment of learning/training institutions for young entrepreneurs. Maltese enterprises indicated importance of and protection of competition, regulation of labour relations and promote exports.

### **Acknowledgement**

The contribution is a partial output from the grant project KEGA number 042EU-4/2014.

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## **COMPARISON OF TWO SELECTED METHODS IN EVALUATING OF INVESTMENTS IN TRANSPORT INFRASTRUCTURE**

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### **Abstract**

The paper is focused on a comparison of two selected approaches to solve investment portfolio optimization problems for projects related to transport infrastructure modernization. For the projects that are aimed at transport infrastructure modernization it holds that the projects are usually very expensive and financed by public financial sources (state budget, European Union funds and so on). However, public financial means are limited. That is the reason why it is necessary to choose such projects that bring the maximum benefit. The benefit cannot be assessed only from the financial point of view, other benefits are also often important. Our motivation to write the contribution was the paper in which goal programming was used to optimize the investment portfolio; in the paper goal programming is recommended for solving such types of the problems and some doubts about using linear programming are formulated. To compare the results got by linear programming with the results achieved by goal programming we employ STEM method that enables the multi-criteria linear optimization of the solved problem. The paper presents the results got by both approaches. The results of the optimization experiment using STEM method verify that both methods can achieve the same results. That means the reservation about linear programming discussed in the original paper is not valid for the all situations.

*Keywords: investment decision-making, goal programming, linear programming*

JEL Classification: C61

### **1 INTRODUCTION – OUR MOTIVATION TO WRITE THE ARTICLE**

Investment projects belong to key projects that are realized in order to achieve bigger future effects to the exclusion of current consumption. According to the publication (Scholleová, 2012) each investment activity has the following characteristic attributes – long-term impact, high capital requirements, relative irretrievability of the decision, time factor and risk.

Investment can be made on macroscopic or microscopic level. Investment projects in transport infrastructure belong to the first group of investment projects that means to the projects having an impact on the national economy.

Apart from vast society-wide impacts there is problematic irretrievability of investments in transport infrastructure. That is the reason why private financial sources are used only seldom and public financial sources are usually used.

Currently, the main attribute regarding to public financial sources that are earmarked for investment is that the sources are limited. Administrators of transport infrastructure must often solve a problem which projects should be supported and which projects should be postponed. Simultaneously with this problem the demand for tools that could be employed to make the decision process as objective as possible comes into existence.

Our immediate motivation to write the paper was the paper (Ahern & Anandarajah, 2007) which is focused on a selection of investment projects related to modernization of transport infrastructure in Ireland. After its publication a Czech translation appeared; the paper was

translated for the administrator of Czech railway infrastructure – The Railway Infrastructure Administration, state organization (SŽDC). One can conclude on the basis of the Czech translation that the selection of suitable investment projects is an actual problem in the Czech Republic.

The paper (Ahern & Anandarajah, 2007) is focused on using goal programming for investment decision process. Known approaches that are based on mathematical decision-making models are analyzed in the introductory chapters. In connection with them the authors of the paper (Ahern & Anandarajah, 2007) cite publications (Lee, 1972) or (Ignizio, 1985) that criticized using typical linear mathematical models to solve such type of the problems; the authors rather suggest applying models of goal programming. By the typical linear models we mean the models with a single optimization criterion. In such typical linear models it is not possible to have positive and also negative deviations from limiting values that are incorporated in constraints of the mathematical model and that must be kept unconditionally. In the case of the goal programming models it is possible to have such negative and positive deviations from the limiting values.

The authors of the paper (Ahern & Anandarajah, 2007) proposed a goal programming model to optimize an investment portfolio. In general, goal programming models try to minimize the deviations from a predefined target state (or target states). In the model described in (Ahern & Anandarajah, 2007) a situation with several target states occurs and the task is to minimize the weighted sum of the negative deviations from these partial values. The reason for minimizing the negative deviations is obvious. To explain it, it is necessary to realize the meaning of the positive and negative deviations. The positive deviation represents achieving a better value of the target state than expected; the negative deviation corresponds to the opposite effect. It is clear that it is desirable to achieve better values than the target state is (the positive deviations from the expected values) and therefore it is not necessary to limit (or minimize) the positive deviations. Therefore the negative deviations are crucial from the point of view of the optimization process. Generally it holds that goal programming models are nonlinear (Jablonský, 2007). However, there is an approach the enables to transform such nonlinear goal programming model into a linear mathematical model – see Section 3.

Because we have been concerned with linear programming over a long period, we decided to find out if the results got by a suitable linear mathematical model differ from the results achieved by a goal programming model.

## **2 STATE OF THE ART**

Generally it holds that we can encounter two groups of problems when talking about investment decision-making.

The first group of the problems is formed by the problems when we need to decide whether a planned investment should be realized or not. In this case we decide about advantageousness of the planned decision – that means we want to know if the investment is advantageous or not.

However, in our paper we pay attention to solving the second group of investment decision-making problems. In this case we must create a portfolio of investment projects that should be realized. In the following text the problem will be called investment portfolio optimization. In practice we encounter such type of the problem in situations when an infrastructure administrator has not enough money (or enough capacity) to realize all the planned investment projects.

As mentioned in the introductory chapter of our paper, decision-makers request to have at least partial tools for decision-making support; the tools should enable to validate the correctness of their decision. We think that due to the fact that investment means are often limited suitable tools to solve our problems are methods that can choose the projects with respect to given limitations and enable to maximize a chosen criterion (or chosen criteria). Mathematical programming, especially linear programming and goal programming represent suitable tools for solving the problem.

The original paper (Ahern & Anandarajah, 2007) describes possibilities of goal programming methods for investment portfolio optimization. The authors of the paper think that goal programming is better than single-criterion linear programming because it can take account of more aspects that we must take into consideration in investment decision-making. The authors deduce it on the basis of the publications (Lee, 1972) or (Ignizio, 1985). Both publications criticize two essential lacks of linear programming – it enables to optimize only a single criterion and is not able to handle flexible constraints. On the other hand, the publication (Romero, 1991) admits a partial equivalence of both approaches.

The approach that is presented in the paper (Ahern & Anandarajah, 2007) is not the sole approach that is based on goal programming. The publication (Wey & Wu, 2007) also employs goal programming for investment portfolio optimization; the results got by goal programming are combined with other approaches.

In connection with investment portfolio optimization we can also mention the paper (Macura et al., 2012), that contains a lot of references regarding other possible approaches that can be used to solve the problem. Apart from mathematical programming we can mention the following approaches:

- Cost Benefit Analysis – for example (Berechman & Paaswell, 2005) or (Van Wee, 2007),
- Multi Attribute Utility Theory (Tsamboulas, 2007),
- Analytic Hierarchy Process (Caliskan, 2006),
- Analytic Network Process (Shang et al., 2004) or (Macura et al., 2011).

### **3 DESCRIPTION OF USED METHODS**

In the chapter we would like to describe both approaches based on mathematical programming; the results got by both methods will be compared in the paper. We begin with the goal programming model that was used in the paper (Ahern & Anandarajah, 2007) and after describing it we will present STEM method that enables multi-criteria linear optimization. We chose STEM method because the method does not request to specify priorities of the individual criteria. Moreover, STEM method does not force us to set criterion weights subjectively. The objectivity of criterion weight settings makes the method efficient.

Let us formulate the problem we want to solve. The problem formulation is partially identical for both methods; therefore we start with it.

Let us consider the following problem. The infrastructure administrator defined a set  $I$  of projects that the administrator wants to realize in future. For each project  $i \in I$  investment costs  $n_i$  of the project realization are given. We must know how much money the administrator can invest in a given time period; let us denote the administrator's budget  $N$ . It is clear that it is meaningful to solve the problem if the condition  $\sum_{i \in I} n_i < N$  holds. Let

us define a set  $J$  of benefit categories and for each project  $i \in I$  we must quantify its partial benefit  $p_{ij}$  of the project  $i \in I$  in the benefit category  $j \in J$ . Our goal is to decide about which projects should be realized so that the total benefit of their realizations is maximized.

Because of the total benefit resulting from realization of the selected projects is expressed via using different quantities in both applied methods, we do not concretize the optimization criterion now. That is the reason why it is not possible to compare the results got by both methods through optimization criterion values; we can compare both methods through the projects that are chosen to be realized.

Our decision about choosing the project for its realization is modelled using variables  $x_i$ . The variables can take values 0 or 1 with the following meaning. If  $x_i = 1$ , then the project  $i \in I$  should be realized; if  $x_i = 0$ , then the project  $i \in I$  should not be realized.

### 3.1 Models of goal programming

Let us formulate a general form of the goal programming model according to (Jablonský, 2007). The general goal programming model has the following form:

$$\min f(x, d) = \sum_{i=1}^k |d_i| \quad (1)$$

subject to:

$$\sum_{j=1}^n a_{ij} x_j \leq b_i \quad \text{for } i = 1, \dots, m, \quad (2)$$

$$\sum_{j=1}^n c_{ij} x_j + d_i = g_i \quad \text{for } i = 1, \dots, k, \quad (3)$$

$$x_j \geq 0 \quad \text{for } j = 1, \dots, n, \quad (4)$$

$$d_i \in R \quad \text{for } i = 1, \dots, k. \quad (5)$$

In the task  $k$  partial benefits appear; the partial benefits are expressed by the group of constraints (3). Our goal is to get to the pre-defined values of the partial benefits as close as possible – the goal is defined through function (1). The group of constraints (2) represents other constraints occurring in the task. The groups of constraints (4) and (5) define domains of definition for all the variables used in the model.

It is clear that model (1) – (5) is not linear because of objective function (1) and the group of constraints (5). To transform the model into the linear model, it is recommended to replace each real variable  $d_i \in R$  by a pair of variables  $d_i^+ \geq 0$  and  $d_i^- \geq 0$  that model the positive and negative deviations from the target values  $g_i$ . Please note that the original variables  $d_i \in R$  model the deviations from the predefined values  $g_i$  in constraints (3). Model (1) – (5) can be transformed into the linear form:

$$\min f(x, d^+, d^-) = \sum_{i=1}^k (d_i^+ + d_i^-) \quad (6)$$

subject to:

$$\sum_{j=1}^n a_{ij}x_j \leq b_i \quad \text{for } i = 1, \dots, m, \quad (7)$$

$$\sum_{j=1}^n c_{ij}x_j - d_i^+ + d_i^- = g_i \quad \text{for } i = 1, \dots, k, \quad (8)$$

$$x_j \geq 0 \quad \text{for } j = 1, \dots, n, \quad (9)$$

$$d_i^+ \geq 0 \quad \text{for } i = 1, \dots, k, \quad (10)$$

$$d_i^- \geq 0 \quad \text{for } i = 1, \dots, k. \quad (11)$$

Models (1) – (5) and (6) – (11) represent the general form of the goal programming models without any connection to the task we solve in the paper. However, the model used for solving our task is based on the general model presented above.

According to the paper (Ahern & Anandarajah, 2007), the goal programming mathematical model requires the definition of the weights of the individual partial benefits. Let us denote the weight of the partial benefit  $j \in J$  by the symbol  $w_j$ . The goal programming mathematical model for investment portfolio optimization has the following form:

$$\min f(x, d^+, d^-) = \sum_{j \in J} w_j d_j^- \quad (12)$$

subject to:

$$\sum_{i \in I} n_i x_i \leq N, \quad (13)$$

$$\frac{\sum_{i \in I} p_{ij} x_i}{\sqrt{\sum_{i \in I} p_{ij}^2}} - d_j^+ + d_j^- = \frac{\sum_{i \in I} p_{ij}}{\sqrt{\sum_{i \in I} p_{ij}^2}} \quad \text{for } j \in J, \quad (14)$$

$$x_i \in \{0; 1\} \quad \text{for } i \in I, \quad (15)$$

$$d_j^+ \geq 0 \quad \text{for } j \in J, \quad (16)$$

$$d_j^- \geq 0 \quad \text{for } j \in J. \quad (17)$$

Function (12) represents the optimization criterion – the total negative deviation of the achieved values from the requested benefit values for all the projects and for all the benefit categories. The requested values of the benefits for the individual benefit categories you can find on the right side of constraints (14). The requested benefit value in the given category arises from the sum of the benefits of all the projects in the given category; the authors probably want to achieve the maximum effect in all the benefit categories. Constraint (13) ensures that the administrator's budget  $N$  is not exceeded. The group of constraints (14) forms a logical link between the constraints and the objective function (using the constraints we can calculate the deviations). The groups of constraints (15), (16) and (17) define domains of definition for the variables used in the mathematical

model. Using the formula  $\frac{\sum_{i \in I} p_{ij}}{\sqrt{\sum_{i \in I} p_{ij}^2}}$  the values of the coefficients and the right sides

of the constraints are normalized for each benefit category.



### 3.2 STEM method

STEM method – see for example (Fiala, 2006) – is a method that enables to solve linear mathematical models with several objective functions. The goal of the method is to find a good compromise solution. The basic principle is that we calculate ideal values of the objective functions at first and then we minimize weighted deviations of the compromise solutions from the ideal values of the objective functions.

STEM method requires cooperation between the investigator and the contract owner. The contract owner must assess whether the achieved solution is acceptable. In the frame of the solving process two steps alternate – a computational step and a decision-making step. Within the computational step the investigator carry out necessary optimization calculations and within the decision-making step the contract owner assess the acceptability of the results. If the contract owner thinks that the results are acceptable then the solving process is terminated. If the contract owner is not satisfied with the results, he must inform the investigator about possibilities of worsening the value of one or more criteria. The admissible worsening of some objective criterion values can lead to improving of other objective criterion values. The solving process is terminated if an acceptable compromise solution has been achieved or if there is no way how to improve the achieved compromise solution.

The solving process of STEM method can be described by the following steps:

1. The investigator calculates the optimal values according to the individual objective criteria (that means he must solve the mathematical model using the individual objective functions; the number of the calculations corresponds to the number of the objective functions in the mathematical model).
2. The investigator computes the weights of the individual criteria according to the formula:

$$w_i = \frac{z_{ii} - \min_{j=1, \dots, k} z_{ij}}{z_{ii}} \frac{\alpha}{\sqrt{\sum_{i=1}^n c_{ij}^2}}, \quad (18)$$

where:

$z_{ij}$ ... an element of the matrix of the optimization criterion values for the optimization according to the individual optimization criteria ( $z_{ij}$  is the optimization criterion value  $j = 1, \dots, k$  in the case of the optimization according to the optimization criterion  $i = 1, \dots, k$ ).

$c_{ij}$ ... an element of the matrix of the optimization criterion coefficients ( $n$  is the number of the variables appearing in the task).

The value  $\alpha$  in formula (18) is computed according to the formula:

$$\sum_{i=1}^k \frac{z_{ii} - \min_{j \in J} z_{ij}}{z_{ii}} \frac{\alpha}{\sqrt{\sum_{j \in J} c_{ij}^2}} = 1. \quad (19)$$

For practical computations we must calculate the value of  $\alpha$  using formula (19) and then we can compute the weights according to formula (18). If the contract owner is satisfied with some values of the optimization criteria, then the weights of such criteria are equal to 0.

If the condition  $w_i > 0$  holds for more than one value  $i = 1, \dots, k$ , the investigator adds a new variable  $d \geq 0$  to the model and solves the model with the new optimization criterion:

$$\min f(x, d) = d. \quad (20)$$

For the variable  $d$  it holds in this case:

$$d = \max_{i=1, \dots, k} \left\{ w_i \left( z_{ii} - \sum_{j \in J} c_{ij} x_j \right) \right\}. \quad (21)$$

The original system of the constraints must be supplemented by constraints of type:

$$w_i \left( z_{ii} - \sum_{j \in J} c_{ij} x_j \right) \leq d \quad \text{for } i = 1, \dots, k. \quad (22)$$

If the condition  $w_i > 0$  holds only for a value  $i = 1, \dots, k$ , the investigator uses the model with the optimization criterion:

$$\min f(x) = \sum_{i=1}^k w_i \left( z_{ii} - \sum_{j=1}^n c_{ij} x_j \right). \quad (23)$$

The sum in the objective function can have only one non-zero term. The original system of the constraints is supplemented by constraints ensuring that the optimization criterion values with the weight equal to 0 will not be worsened. The repetitive application of step 2 may cause that the achieved values of some objective criteria may worsen. In such cases a new constraint must be created to ensure that the worsened value will be satisfied.

After putting the model together (both models are linear) the investigator solves the model.

3. The investigator presents the results got in step 2 to the contract owner; the contract owner must assess the results. If the solution is not acceptable for the contract owner and some values of the objective criteria can be worsened, then the contract owner defines the admissible worsening of the objective criterion values. If the contract owner is satisfied with all the achieved values of the objective criteria or it is not possible to accept the worsening of some objective criterion values in order to improve the values of other objective criteria which are not acceptable, go to step 5; if not, go to step 4.

4. According to the contract owner's requests the investigator adjusts the values of the partial criteria in the constraints and returns to step 2.

5. If the contract owner is satisfied with all the values of the optimization criteria, the investigator can state that the last achieved solution is the compromise solution and can be recommended to the contract owner. If the equality  $d = 0$  is true after solving the model with objective function (20) then we got the optimal values for all the optimization criteria; if not, there is not any compromise solution.

In the next chapter we will apply the theoretical pieces of knowledge described in chapter 3 to the investment portfolio optimization problem. Due to the fact that the authors of this contribution do not have input data from any real investment projects to compare both methods, input data for the optimization experiments was taken from the original paper (Ahern & Anandarajah, 2007).

## 4 NUMERICAL EXPERIMENTS

Let us consider the following problem. Four projects ( $i = 1, \dots, 4$ ) dealing with the modernization of transport infrastructure are planned. The realization of the projects has the benefit in four categories of the partial benefit categories ( $j = 1, \dots, 4$ ). For each project the values of the partial benefits were quantified. The administrator's budget is equal to 200 million of EUR.

The project P1 represents the modernization of Cork suburban transport, the project P2 the modernization of the Limerick – Rosslare railway line, the project P3 the modernization of Navan – Drogheda railway line and the project P4 Limerick – Ballybophy railway line.

Detail information about the planned projects is included in Table 1.

Tab. 1 – Detail information about the planned projects. Source: Ahern & Anandarajah (2007)

Project	Investment costs [mil. EUR]	The benefit category			
		Financial benefit [mil. EUR]	User benefit [-]	Qualitative goal no. 1 [-]	Qualitative goal no. 2 [-]
P1	123,64	6,29	8,34	3	4
P2	33,44	4,06	3,68	3	3
P3	109,87	3,38	4,13	2	1
P4	28,94	3,5	3,14	2	3
The weight of the benefit category *		0,249	0,287	0,256	0,208

*\*The values that are required by the goal programming model.*

The benefit categories included in Table 1 were taken from the paper (Ahern & Anandarajah, 2007). In this paper we explain the process of defining the partial benefits in detail.

### 4.1 The solving using the model based on goal programming

The linearized mathematical model of goal programming was taken from the paper (Ahern & Anandarajah, 2007) with some small modifications.

Let us denote:

$x_i$  ... the binary variable representing that the project  $i = 1, \dots, 4$  will ( $x_i = 1$ ) or will not be ( $x_i = 0$ ) realized,

$d_j^+$  ... the nonnegative variable representing the positive deviation from the goal value of the particular criterion  $j = 1, \dots, 4$ ,

$d_j^-$  ... the nonnegative variable representing the negative deviation from the goal value of the particular criterion  $j = 1, \dots, 4$ .

For our solved example the linearized mathematical model of goal programming (12) – (17) has the following form:

$$\min f(x, d^+, d^-) = 0,249d_1^- + 0,287d_2^- + 0,256d_3^- + 0,208d_4^- \quad (24)$$

subject to:

$$123,64x_1 + 33,44x_2 + 109,87x_3 + 28,94x_4 \leq 200, \quad (25)$$

$$\frac{(6,29x_1 + 4,06x_2 + 3,38x_3 + 3,5x_4)}{\sqrt{6,29^2 + 4,06^2 + 3,38^2 + 3,5^2}} - d_1^+ + d_1^- = \frac{6,29 + 4,06 + 3,38 + 3,5}{\sqrt{6,29^2 + 4,06^2 + 3,38^2 + 3,5^2}}, \quad (26)$$

$$\frac{(8,34x_1 + 3,68x_2 + 4,13x_3 + 3,14x_4)}{\sqrt{8,34^2 + 3,68^2 + 4,13^2 + 3,14^2}} - d_2^+ + d_2^- = \frac{9,34 + 3,68 + 4,13 + 3,14}{\sqrt{8,34^2 + 3,68^2 + 4,13^2 + 3,14^2}}, \quad (27)$$

$$\frac{(3x_1 + 3x_2 + 2x_3 + 2x_4)}{\sqrt{3^2 + 3^2 + 2^2 + 2^2}} - d_3^+ + d_3^- = \frac{3 + 3 + 2 + 2}{\sqrt{3^2 + 3^2 + 2^2 + 2^2}}, \quad (28)$$

$$\frac{(4x_1 + 3x_2 + x_3 + 3x_4)}{\sqrt{4^2 + 3^2 + 1^2 + 3^2}} - d_4^+ + d_4^- = \frac{4 + 3 + 1 + 3}{\sqrt{4^2 + 3^2 + 1^2 + 3^2}}, \quad (29)$$

$$x_i \in \{0;1\} \quad \text{for } i = 1, \dots, 4, \quad (30)$$

$$d_j^+ \geq 0 \quad \text{for } j = 1, \dots, 4, \quad (31)$$

$$d_j^- \geq 0 \quad \text{for } j = 1, \dots, 4. \quad (32)$$

The solving of created model (24) – (32) was carried out in optimization software Xpress-IVE. The achieved solution verified the solution given in the paper (Ahern & Anandarajah, 2007). The optimal investment portfolio is formed by the projects P1, P2 a P4.

#### 4.2 Solving using STEM method

We will proceed according to the theoretical background given in Section 3.2. For all the optimization calculations the software Xpress-IVE was used as well.

The variables  $x_i$  have the same meaning as given in Section 4.1. The variable  $d$  represents the deviation, which we will calculate according to formula (21).

Step 1 – the calculation of the optimal values of the particular optimization criteria.

The solved mathematical model has the following criteria:

$$\max f(x) = 6,29x_1 + 4,06x_2 + 3,38x_3 + 3,5x_4, \quad (33)$$

$$\max f(x) = 8,34x_1 + 3,68x_2 + 4,13x_3 + 3,14x_4, \quad (34)$$

$$\max f(x) = 3x_1 + 3x_2 + 2x_3 + 2x_4, \quad (35)$$

$$\max f(x) = 4x_1 + 3x_2 + x_3 + 3x_4. \quad (36)$$

The system of the constraints has the following form:

$$123,64x_1 + 33,44x_2 + 109,87x_3 + 28,94x_4 \leq 200, \quad (37)$$

$$x_i \in \{0;1\} \quad \text{for } i = 1, \dots, 4. \quad (38)$$

Because our example includes four optimization criteria (33) – (36), within the realization of the first step four optimization calculations were carried out. The solutions achieved in the particular optimization calculations are summarized in Table 2.

Step 2 – the calculation of the weights of the partial benefits and forming the mathematical model that minimizes the maximum weighted deviation from the optimal values for the individual optimization criteria.

From the calculated solutions we can create the matrixes  $Z$  and  $C$  :

$$Z = \begin{pmatrix} 13,85 & 15,16 & 8 & 10 \\ 13,85 & 15,16 & 8 & 10 \\ 13,85 & 15,16 & 8 & 10 \\ 13,85 & 15,16 & 8 & 10 \end{pmatrix}, \quad C = \begin{pmatrix} 6,29 & 4,06 & 3,38 & 3,5 \\ 8,34 & 3,68 & 4,13 & 3,14 \\ 3 & 3 & 2 & 2 \\ 4 & 3 & 1 & 3 \end{pmatrix}.$$

Tab. 2 – The achieved values of the individual optimization criteria. Source: The authors according to Xpress-IVE

The benefit category (the individual optimization criterion)	The achieved value (the value of the optimization criteria)	The financed projects
The financial benefit [mil. EUR]	13,85	P1, P2, P4
The user benefit [-]	15,16	P1, P2, P4
The qualitative goal no. 1 [-]	8	P1, P2, P4
The qualitative goal no. 2 [-]	10	P1, P2, P4

To calculate the weights of the individual benefits we must calculate the value  $\alpha$  at first. We will substitute it to equation (19). We can write:

$$\frac{13,85 - 8}{13,85} \frac{\alpha}{\sqrt{6,29^2 + 4,06^2 + 3,38^2 + 3,5^2}} + \frac{15,16 - 8}{15,16} \frac{\alpha}{\sqrt{8,34^2 + 3,68^2 + 4,13^2 + 3,14^2}} + \frac{8 - 8}{8} \frac{\alpha}{\sqrt{3^2 + 3^2 + 2^2 + 2^2}} + \frac{10 - 8}{10} \frac{\alpha}{\sqrt{4^2 + 3^2 + 1^2 + 3^2}} = 1.$$

After the calculation the previous equation, we got the solution  $\alpha = 22,107$ . In the next process we must calculate the weights of the individual benefits according to formula (18). In our case we have:

$$w_1 = \frac{13,85 - 8}{13,85} \frac{22,1073}{\sqrt{6,29^2 + 4,06^2 + 3,38^2 + 3,5^2}} = 0,386,$$

$$w_2 = \frac{15,16 - 8}{15,16} \frac{22,1073}{\sqrt{8,34^2 + 3,68^2 + 4,13^2 + 3,14^2}} = 0,431,$$

$$w_3 = 0,$$

$$w_4 = \frac{10-8}{10} \frac{22,1073}{\sqrt{4^2 + 3^2 + 1^2 + 3^2}} = 0,183.$$

Because it holds  $w_i > 0$  for several values  $i=1,\dots,4$  we must add the new variable  $d \geq 0$  and we create the mathematical model with optimization criterion (20). The group of constraints (22) must be also added to the original system of the constraints. We will get the following mathematical model:

$$\min f(x, d) = d$$

subject to:

$$123,64x_1 + 33,44x_2 + 109,87x_3 + 28,94x_4 \leq 200, \quad (39)$$

$$d \geq 0,386 (6,29x_1 + 4,06x_2 + 3,38x_3 + 3,5x_4), \quad (40)$$

$$d \geq 0,431 (8,34x_1 + 3,68x_2 + 4,13x_3 + 3,14x_4), \quad (41)$$

$$d \geq 0,183 (4x_1 + 3x_2 + x_3 + 3x_4), \quad (42)$$

$$x_i \in \{0;1\} \quad \text{for } i = 1,\dots,4, \quad (43)$$

$$d \geq 0. \quad (44)$$

In model (39) – (44) constraint (22) for the third particular optimization criterion is not included. The constraint is not important in our example because the weight of this particular optimization criterion is equal to 0.

Now we can solve mathematical model (39) – (44). After solving it we got the value  $d = 0$  and  $x_1 = 1$ ,  $x_2 = 1$ ,  $x_3 = 0$  and  $x_4 = 1$ . It follows from the results that the optimization calculation can be terminated (it is not possible to get better results). The optimal investment portfolio includes the projects P1, P2 and P4.

## 5 CONCLUSION

The presented paper is focused on the comparison of the results achieved by two different exact approaches that can be employed to optimize the investment portfolio. Our motivation to write the contribution was the paper published in the journal *Transport Policy*; the paper dealt with using goal programming for solving the problem. The paper also cites some authors who discuss some disadvantages of single-criterion linear programming if it is used for the investment portfolio optimization. After reading the paper one can think that goal programming is the sole tool for solving such problems. However, linear programming methods enable us to form models with several optimization criteria. Therefore we decided to verify whether a selected approach known in linear programming (for testing we chose the multi-criteria approach based on STEM method) can be used to solve the problem and to compare the results got by both methods. Using the concrete example taken from (Ahern, Anandarajah) we demonstrated the results got by the individual approaches do not differ one another (from the point of view of the selected projects). That shows we can verify the reservations about the single-criterion linear programming for investment portfolio optimization published in the original paper. However, such statement is not true in comparison with the results obtained by multi-criteria linear programming.

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## **IMPACT OF SOVEREIGN RISK ON CHINA'S FINANCIAL MARKET**

*Thi Ngan Pham, Lin Qi*

### **Abstract**

This paper reviews how and by what means the sovereign risk in Euro-zone affected China's financial market before and after the outbreak of European debit crisis based on the data from the four major financial markets of China between 2008 and 2012 and the long-term credit rating of the 17 Euro-zone countries released by the three major international rating agencies, which is used as the substitution variable of the sovereign risk in Euro-zone. According to the empirical test result, the European debit crisis has significantly intensified the impact of the sovereign risk in Euro-zone on the fluctuation of the co-exceedance in China's financial market. The further study suggests that China's financial market is more sensitive to sovereign outlook reversion than to sovereign rating changes of Euro-zone under the circumstances of European debit crisis. However, the sovereign rating released by Fitch and Moody can also exert significant critical effect of speculative-grade on China's financial market. The study also suggests that the sovereign rating changes of PIIGS have exerted significantly greater critical effect of speculative-grade on China's financial market than on other peripheral Euro-zone countries, but the sovereign outlook reversion of PIIGS has done exactly the opposite. The empirical test result of this paper has enriched the theory of financial crisis conduction and provided information basis for the development of policies to guide the opening and stabilization of China's financial market.

*Keywords: European debit crisis; Sovereign risk; Sovereign credit ratings; China's financial market*

JEL Classification: D53

## **1 INTRODUCTION**

Along with the continuous spillover of the European debit crisis around the world and the deepening of China's financial reform, the co-movement among the financial markets from home and abroad are increasing and international financial turbulence is more likely to pose impact on China's financial market and economic development. Therefore, financial security is increasingly becoming a focus of concern for China's academicians (Li Xiangyang, 2009; Luyan, 2011). In order to deal with this issue, this paper studies the impact of the sovereign risk in Euro-zone to verify if it has increased the volatility of China's financial market using European debit crisis as a natural experiment and further looks into its inherent transmitting mechanism based on the sovereign ratings and outlook of different countries in Euro-zone released by the three major international rating agencies.

The international conduction of financial crisis has long been a top subject to be studied by academicians around the world. As a result of financial liberalization and globalization, financial crisis may pose impact on the financial market of the crisis-hit countries (Gande & Parsley, 2005; Sgherri & Zoli, 2009; Fender et al., 2012) and spill over to other crisis-free countries through the financial markets such as foreign exchange market (Eichengreen et al., 1995 and 1996; Cerra & Saxena, 2002; Dungey & Martin, 2004; Hui & Chung, 2011;

Friewald et al., 2012), stock market (Bae et al., 2003; Forbes & Rigobon, 2002; Ito & Hashimoto, 2005; Chiu et al., 2012) and bond market (Favero & Giavazzi, 2002; Dungey et al., 2006; Calice et al., 2011; Bernoth & Erdogan, 2012), thus bringing about imported economic crisis dragging down the economic growth and resulting in financial market disruption (Cerra & Saxena, 2002; Dungey & Martin, 2004; Gerlach et al., 2010). Therefore, financial crisis can serve as a unique natural experiment to study how economic crisis is transmitting among different financial markets in the context of economic globalization, as well as an indicator to measure the openness of a country's financial market.

The sovereign credit ratings released by the three major international rating agencies is the common indicator used by academicians to measure financial crisis (Brooks et al., 2004; Grammatikos & Vermeulen, 2012). However, no consensus is now reached by academicians around the world on the effect of the sovereign credit ratings released by different credit rating agencies and different types of credit ratings (ratings and outlook) released by the same rating agency. The early study of how the change of sovereign credit ratings had affected financial market would merely depend on the sovereign credit ratings released by a single rating agency (e.g. S&P or Moody's) or the simple summation of the ratings released by different rating agencies (Sy, 2004; Hooper et al., 2008), but different credit rating agencies have different influence on financial market (Alsakka & ap Gwilym, 2010 and 2012; Afonso, 2011) as they follow different standards to release sovereign credit ratings (Löffler, 2005). According to previous study, negative sovereign credit ratings have substantial spillover effect (Brooks et al., 2004; Ferreira & Gama, 2007; Hooper et al., 2008; Hill & Faff, 2010). After studying the financial market in Europe between 2007 and 2010; Arezki et al., 2011) pointed out that the sovereign credit rating downgrade could pose significant spillover effect not only on the crisis-hit countries but also the other members of the European Union. In contrast, some other studies have also suggested that outlook and watchlist have greater influence upon financial market (IMF, 2010b; Hill & Faff, 2010; Kim & Wu, 2011). According to the empirical results of Afonso (2011), the sovereign credit ratings, particularly the outlook, released by the three major rating agencies between 1995 and 2010 posed significant spillover effect on the bond market of 24 European countries.

Although many existing literatures have revealed that the change of sovereign credit ratings can really pose significant impact on developed economies (Gande & Parsley, 2005; Ferreira & Gama in 2007; Hooper et al., 2008; Attinasi & Nickel, 2009; Grammatikos & Vermeulen, 2012), nearly none of them have provided insight on how the sovereign risk of Euro-zone countries have posed impact on the financial markets of developing countries, particularly China, in the context of European debit crisis. Therefore, we have conducted empirical study of this issue based on the sample of the four major financial markets in China in order to empirically prove the impact of European debit crisis and its conduction path that has led to the fluctuation of co-exceedance in China's financial market, and provide information basis for the policy-making of China regarding the prevention of global financial crisis in the context of the change of the sovereign credit rating in Euro-zone caused by European debit crisis so as to ensure sustainable development of financial market.

Therefore, we have studied how the sovereign credit rating changes in different Euro-zone countries are affecting the extreme fluctuation of economic return in the 4 major financial markets (monetary market, bond market, stock market and foreign exchange market) of China, sampled for the study, between January 2, 2008 and December 31, 2012 by Multinomial-logit model using the long-term sovereign credit ratings of the 17 Euro-zone countries released by the three major international credit rating agencies as the substitution variable of the sovereign risk in Euro-zone. Furthermore, in view of the different openness and spillover effect of

different financial markets of China and taking into account the chronological order in which the European debit crisis broke out and proceeded and the characteristics of sovereign credit ratings, we have studied the different conduction paths through which the sovereign credit ratings (rating and outlook) of different Euro-zone countries (all the Euro-zone countries, Euro-zone periphery countries and PIIGS) released by the three major rating agencies (S&P, Moody's and Fitch) affected the financial market of China before and after the breakout of European debit crisis.

We have made contributions to the study of the impact of sovereign risk in different ways by this paper. Firstly, we have studied how the sovereign rating changes and sovereign outlook reversion of different Euro-zone countries released by the three major credit rating agencies have affected the fluctuation of the co-exceedance in financial market based on the sample of China's financial market. The study has provided new evidence of the impact of the financial crisis on the fluctuation of economic return in the financial market, as well as information basis for China's policy-making for the maintenance of sustainable development of financial market in the context of financial crisis. Secondly, we empirically studied the conduction paths through which the sovereign risk change in Euro-zone affected the financial market of China before and after the breakout of European debit crisis and provided fresh view for further study of the conduction mechanism of financial crisis which affects financial markets, particularly those of emerging economies, by improving the theory of conduction path of financial crisis. Thirdly, the existing literatures deal with the issue of the impact of sovereign risk with a focus on its transnational conduction in a single market or spillover among developed economies, but we have enriched the literatures regarding the study of the impact of sovereign risk by subdividing the sovereign credit ratings in Euro-zone and taking them into account in the study of cross-market conduction effect.

This paper consists of six sections: Section 1 is an introduction to the paper; Section 2 gives the definitions of the variables and describes the empirical models used in the paper; Section 3 reviews the empirical test of the impact of the sovereign risk change in Euro-zone on the fluctuation of co-exceedance in China's financial markets; Section 4 describes the further study of how and by what means the sovereign rating change and outlook reversion in Euro-zone have affected China's financial market; Section 5 provides conclusions and suggestions for policy-makers to deal with the impact of sovereign risk.

## **2 METHODOLOGY**

### **2.1 Assessment of the sovereign risk in Euro-zone**

A sound and effective substitution variable for the sovereign risk in Euro-zone should be able to distinguish the sovereign credit ratings of different Euro-zone countries released by S&P, Fitch and Moody's and identify the positive and negative impacts brought about by sovereign rating changes and outlook reversion. In contrast to the previous studies ( Favero & Giavazzi in 2002; Arezki et al. in 2011 ), we have used the "modified" method of event-study analysis to assess how the sovereign rating changes and outlook reversion of the 17 Euro-zone countries have affected China's financial market. For example, the upgraded rating of a country in a certain period is valued 1 and the degraded rating of a country in a certain period is valued -1, and similarly, the positive outlook after change is valued 1, the negative outlook after change is valued -1 and the unchanged outlook is valued 0. In addition, a country which is included by a rating agency into the positive watch list is valued 0.5 and a country which is included by a rating agency into the negative watch list is valued -0.5 because the sovereign watch list can provide important information basis for us to predict the sovereign rating

changes of a country in future. We have, therefore, created impulse dummy variables of country  $i$  in period  $t$  in Euro-zone depending on these values. In order to study the spillover effect of the sovereign risk impact of all the Euro-zone countries, Euro-zone periphery countries and PIIGS, we added up all the above impulse dummy variables and obtained the comprehensive assessment index  $SID_t = \sum_{i=1}^I ID_{it}$  of all the Euro-zone countries, Euro-zone periphery countries and PIIGS, i.e. the impact of European debit crisis in a period during which the sovereign rating changes or outlook reversion of several countries are made is expressed by the value obtained by adding up the values of all these countries.

We have defined the speculative-grade critical interval of sovereign rating to span from “BBB (Baa2)” to “B(B2)” in this paper to study if the speculative-grade critical effect of the sovereign rating in Euro-zone in the context of European debit crisis is affecting China’s financial market, because sovereign rating adjusted until it is at or close to speculative-grade will cause extra impact, i.e. “speculative-grade critical effect”, on financial market (Arezki et al. in 2011). We stopped treating a sovereign rating as one that had been changed until it was at or close to speculative-grade when it was degraded (or upgraded) beyond speculative-grade.

## **2.2 Sample selection and data sources**

In order to study how the impact of the sovereign risk in Euro-zone affected China’s financial market before and after the breakout of European debit crisis, we have used the sovereign rating of the 17 Euro-zone countries released by the three major international rating agencies as an index to assess the sovereign risk during European debit crisis. The data of the long-term sovereign credit rating made by the three major international rating agencies are sourced from Bloomberg database and collated by the author of the paper. The data of China’s financial market are sourced from Wind database. All the data of financial market are the close price on business day. The samples used in this paper were taken from January 2, 2008 to December 31, 2012 and all the samples are divided into two groups which were either taken before or after April 1, 2010 (In March 2010, financial problem broke out consecutively in Portugal, Ireland, Spain and Italy. European debit crisis began to spill over to other Euro-zone countries from Greece and evolved from a sovereign debit crisis in a single country into a debit crisis covering all the Euro-zone and finally into a global sovereign debit crisis (financial crisis).) so as to allow us to easily identify if the sovereign risk in Euro-zone has caused “infectious effect ” on China’s financial market and if such effect changed before and after the breakout of European debit crisis.

We have further grouped the sovereign countries in Euro-zone into crisis-hit countries and crisis-free countries to help study if the sovereign rating changes of Euro-zone countries in different groups can affect China’s financial market in a differently way. The crisis-hit countries in Euro-zone includes Portugal, Ireland, Italy, Greece and Spain expressed as PIIGS and other 12 countries around Euro-zone which suffered limited impact from European debit crisis are expressed as *Periphery*. PIIG is made up of the initial letter of the English name of the five countries: Portugal, Ireland, Italy, Greece and Spain. As “PIIGS” looks like “PIG”, it is literally translated into “European Pigs” by some scholars.)

## **2.3 Empirical model and variables**

Following the methodology introduced by Bae et al. (in 2003) , we used Multinomial-logit model in the paper to study if the sovereign rating changes in Euro-zone have posed impact on the fluctuation of co-exceedance among China’s financial markets. The market exceedance

is defined as the value of return where the return in the single market is higher than 95% quintile of its overall distribution or lower than its 5% quintile. The specific Multinomial-logit model is as follows:

$$P(Y_t = i|x_t) = \frac{e^{g_i(x_t)}}{\sum_{j=0}^k e^{g_j(x_t)}} \quad i = 1, \dots, k \quad (1)$$

Where  $g_i(x_t) = \ln \frac{P(Y_t = i|x_t)}{P(Y_t = 1|x_t)} = \alpha + x_t' \beta = \alpha + \beta_1 Y_{t-1} + \sum_{j=1}^L \beta_2^j SID_{t-1}^j$ , in which L is the number of categories of Sovereign credit ratings in Euro-zone;  $SD_t^j$  is the index used to comprehensively measure the change of the sovereign credit ratings measured by the method of “modified” event-study analysis. In view of the time difference between the rating release and the operation of China’s financial market, we used the 1-phase lagged data of the sovereign credit rating in Euro-zone to conduct regression analysis in this paper. In the explanatory variable,  $Y_t = 1, \dots, k$  is the index to measure the fluctuation of the co-exceedance among financial markets, which is defined as such that a value equal to 1 is set when there is fluctuation of co-exceedance in one financial market, a value equal to 2 is set when there is fluctuation of the co-exceedance in two financial markets and a value equal to 3 is set when there is fluctuation of the co-exceedance among no less than three financial markets at the time of  $t$ . The coefficient estimate  $\beta_2^j$  of sovereign credit rating is used in the model to directly verify the correlation between the change of sovereign credit rating and the fluctuation of the co-exceedance among China’s financial markets.

In order to verify how the impact of the sovereign risk in Euro-zone affected China’s financial market before and after the breakout of European debit crisis, we have established the following regression model:

$$Z_t^i = a + \Phi(L)Z_t^i + \sum_{j=1}^L b^{ij} SID_{t-1}^j + \varepsilon_t^i \quad (2)$$

Where  $Z_t^i$  is the return matrix of the N-dimension asset price in the financial market i at time t. We have chosen stock market, monetary market, bond market and foreign exchange market to describe the spillover effect among different financial markets in China. Index Sh, Index Sz and Index Zxb from those financial markets generally reflecting the trend of China’s stock market are chosen in this paper to serve as the index to measure China’s stock market. We have chosen Shibor (Shibor\_1m) for a week as the substitution variable of China’s monetary market because it is the index to effectively measure the liquidity of China’s monetary market (Yi Gang in 2008; Guo Jianwei in 2008). As the bond market consists of treasury bond market and corporate bond market, we have chosen inter-bank fixed rate treasury bond as the proxy variable for treasury bond market while using corporate bond index on Shanghai stock market to assess corporate bond market. We have chosen Euro exchange rate (Eurormb) and USD exchange rate (Usdrmb) as the proxy variable of China’s foreign exchange market because EU and US are China’s first and second trade partners respectively and the sovereign debit crisis broken out in Euro-zone this time. In order to ensure the stability of explanatory variable of vector auto-regression model (VAR), we have stabilized the above variable. SHCOMP, SIASA, SSE SME COMPOSITE, USD exchange rate and Euro exchange rate have been converted into Logarithmic yield, expressed respectively as Rate\_Sh, Rate\_Sz, Rate\_Zxb, Rate\_Euro and Rate\_Usd. The treasury bond market is measured by the difference

of the 1-year and 10-year treasury bond yield with inter-bank fixed interest rate, i.e. the interest spread of treasury bond yield. However, we have adopted first difference in this paper for the interest spread of treasury bond yield which has unit root (see the description about statistics in Section 2.4) to measure the change of the interest spread of treasury bond yield (D\_Bench). Corporate bond market is measured by the difference of the logarithmic yield, i.e. the interest spread of corporate bond yield (Firm\_Spread), of the indexes of both the corporate bond and the treasury bond on Shanghai Stock Market.  $\varepsilon_t^i$  is the white noise process subject to i.i.d.

### **3 EMPIRICAL RESULT AND ANALYSIS**

The regression result (Due to limited space, the Multinomial-logit regression result of how the sovereign ratings of all the Euro-zone countries, Euro-zone peripheral countries and PIIGS affected the fluctuation of the co-exceedance among China's financial markets before the breakout of European debit crisis is omitted here. The complete regression result will be available on request by e-mail. ) of how the change of the sovereign credit ratings of all the Euro-zone countries, Euro-zone periphery countries and PIIGS has affected the fluctuation of co-exceedance among China's financial markets is given respectively in three parts in Table 3. The estimate of how the sovereign credit rating changes and outlook reversion in Euro-zone affected the fluctuation of the co-exceedance among China's financial markets after breakout of European debit crisis is given in the first 4 columns of the table. According to the regression results, the estimate coefficient of the sovereign credit rating changes and outlook reversion during European debit crisis appeared more negative than it did before the breakout of European debit crisis, indicating that the fluctuation of co-exceedance among China's financial markets has become more sensitive to the sovereign risk in Euro-zone since the massive outbreak of European debit crisis, and the sovereign rating at or close to speculative grade after change in the context of European debit crisis can more significantly cause fluctuation of co-exceedance among China's financial markets.

However, the sovereign rating changes of different Euro-zone countries affected the fluctuation of co-exceedance among China's financial markets to different degrees. The sovereign ratings of Euro-zone periphery countries or PIIGS caused fluctuation of co-exceedance among China's financial market when they were at or close to speculative grade after change, but that (at speculative grade) of PIIGS can pose more significant critical effect of speculative grade on the fluctuation of the co-exceedance among China's financial markets, and the sovereign outlook reversion of Euro-zone countries, peripheral Euro-zone countries or PIIGS are more likely to cause fluctuation of the co-exceedance among China's financial markets according to the table. This indicates to some extent that sovereign outlook reversion is more influential than sovereign rating changes (Hill & Faff, 2010; Kim & Wu, 2011).

Table 3 - Multinomial-logit regressions on co-exceedance among China's financial markets

Variables	European debit crisis					
	Rating Changes		Outlook Reversion		Speculation Grade	
	2	3	2	3	2	3
<b>Euro-Zone</b>						
Total	-0.912	-1.402*	-0.896	-1.168	-1.026	-2.378**
S&P	-0.032	-0.583**	-0.147	-0.426	-0.0454	-10.080***
Moody's	14.120***	-2.415	-32.540***	-0.390	13.320***	12.760***
Fitch	-1.601*	-1.419	25.770***	-2.597*	-15.410***	-16.190***
<b>PIIGS</b>						
Total	-0.797	-1.927***	-26.790***	-28.210***	-1.156	-2.652**
S&P	-14.130***	-20.270***	-0.0320	-4.795***	-0.091	-20.160***
Moody's	16.990***	-2.405	-30.900***	0.269	13.320***	12.760***
Fitch	-1.153	-1.357	-0.128	-19.180***	-15.410***	-16.190***
<b>Periphery</b>						
Total	-0.536	-0.989	-0.235	-0.537	-0.061	-15.730***
S&P	11.450***	-0.680***	-0.148	-0.500*	-0.061	-15.730***
Moody's			-33.410***	-0.955		
Fitch	-15.580***	-0.456	27.180***	29.240***		
N	139	139	139	139	139	139

Note: (1) \*means significant below 10% ( $p < 0.1$ ), \*\* means significant below 5% ( $p < 0.05$ ), \*\*\* means significant below 1% ( $p < 0.01$ )

## 4 FURTHER STUDY: IMPACT OF DIFFERENT CONDUCTION

### PATHS

So far, we have verified that the sovereign risk change of all the Euro-zone countries, Euro-zone periphery countries and PIGGS in the context of European debit crisis has substantially caused fluctuation of co-exceedance among China's financial markets, but we do not know by which means the sovereign risk change in Euro-zone has transmitted its effect to China's financial market, if it transmitted its effect through different paths before and after the breakout of European debit crisis and if the sovereign risk changes in Euro-zone periphery countries and GIIPS posed impact on China's financial market in a substantially different way. Therefore, we further looked into the inside of China's financial market by sub-dividing China's financial market into four segments: stock market, money market, foreign exchange market and bond market and conducted relevant empirical study based on the sovereign credit ratings released before and after the breakout of European debit crisis and the classification of different sovereign credit ratings.

#### 4.1 Sovereign outlook reversion

The sovereign outlook reversion has significantly affected the fluctuation of the co-exceedance among China's financial markets, but by what means did it spread its effect? Especially, did it spread its effect in a significantly different way from different Euro-zone countries before and after the breakout of European debit crisis? This section deals with the

empirical study of these subjects.

Table 4 - VAR regressions on sovereign outlook reversion (Apr.,2010 to dec.2012)

variables	Stock market			Monetary market	Exchange market		Bond market	
	Rate_Sz	Rate_Sh	Rate_Zxb	Shibor_1m	Rate_Usd	Rate_Euro	D_Bench	Firm_Spread
<b>Euro-Zone</b>								
Total	0.0016*	0.0014**	0.0017*	-0.0344***	-0.0001**	0.0009**	0.0004	0.0000*
S&P	0.0017*	0.0013*	0.0017*	-0.0364***	-0.0001*	0.0008*	0.0003	0.0000*
Moody's	0.0010	0.0013	0.00049	0.0169	-0.0002	0.0017	0.0015	0.0000
Fitch	0.0023	0.0017	0.0032	-0.0804*	0.0000	0.0004	-0.0007	0.0001
<b>PIIGS</b>								
Total	0.0054**	0.0041**	0.0059**	-0.0941***	-0.0002*	0.0025**	0.0025	0.0001
S&P	0.0042	0.0037	0.0052	-0.1250***	-0.0003*	0.0028**	-0.0005	0.0002
Moody's	0.0077	0.0062	0.0047	0.0450	-0.0004	0.0042*	0.0112	-0.0000
Fitch	0.0069	0.0036	0.0087	-0.1250	0.0002	0.0002	0.0040	-0.0000
<b>Periphery</b>								
Total	0.0018	0.0016*	0.0018	-0.0424**	-0.0001**	0.0010**	0.0001	0.0001**
S&P	0.0024*	0.0019*	0.0023*	-0.0473**	-0.0001*	0.0010*	0.0007	0.0001*
Moody's	-0.0007	-0.0000	-0.00041	0.0063	-0.0002	0.0009	-0.0010	0.0000
Fitch	0.0010	0.0021	0.0017	-0.0991	-0.0000	0.0011	-0.0040	0.0003
N	670	670	670	670	670	670	670	670

Note: (1) \*means significant below 10% (p<0.1), \*\* means significant below 5% (p<0.05), \*\*\* means significant below 1% (p<0.01)

The estimate result of the vector auto-regression of how the sovereign outlook reversion in Euro-zone in the context of European credit crisis has affected the four financial markets of China is given in Table 4. The sovereign outlook reversion in Euro-zone in the context of European credit crisis affected China's financial market in a significantly different way than it did before the breakout of European credit crisis, and still more did the sovereign outlook reversion in Euro-zone PIIGS. According to further study, three of China's four financial markets—stock market, foreign exchange market and money market—are most sensitive to the sovereign outlook reversion in Euro-zone. The negative sovereign outlook in Euro-zone raised the level of Shibor\_1m while adversely affecting China's stock market (Rate\_Sz, Rate\_Sh and Rate\_Zxb), resulting in declining of stock indexes and further shrinking of market liquidity. In foreign exchange market, the sovereign outlook in Euro-zone affected USD exchange rate and Euro exchange rate in a totally different way. The negative sovereign outlook in Euro-zone caused appreciation of Euro (positive Euro rate) while depreciating USD (negative USD rate). The ultimate impact posed by Such change on China's export depends on the number of export commodities priced in USD and Euro relative to the total export and the relative appreciation and depreciation of USD and Euro. Unlike that in Euro-zone and Euro-zone periphery countries, the Euro-zone sovereign outlook reversion of PIIGS didn't pose substantial impact on the interest spread of the corporate bond in China's bond market. Besides, neither the sovereign outlook reversion in the Euro-zone countries, Euro-zone peripheral countries or PIIGS could affect the change of the interest spread of China's corporate bond. This indicates to some extent that the sovereign risk of the crisis-hit countries can not affect the sovereign risk (measured by the interest spread of China's corporate bond) of crisis-free countries through their sovereign outlook reversion.

The findings of the study also show that the Euro-zone sovereign outlook released by different rating agencies has affected China's financial market in a significantly different way.



The sovereign outlook reversion of all the Euro-zone countries, Euro-zone periphery countries and PIIGS released by S&P could pose significant impact on China's financial market. Of all the sovereign outlooks of Euro-zone released by Mood's, only those of PIIGS could affect the Euro exchange market of China while only the sovereign outlook released by Fitch could substantially affect the money market of China. Besides, the sovereign outlook of peripheral Euro-zone countries released by either Mood's or Fitch could not affect China's financial market. The above evidence shows that we should pay attention to the sovereign outlook released by S&P and improve risk management in respond to the sovereign outlook reversion released by S&P in order to improve China's financial regulation and management efficiency and maintain the stability of China's financial system.

## 4.2 Sovereign rating changes

The sovereign rating change in Euro-zone can significantly affect the fluctuation of the co-exceedance among China's financial markets, but by what means has it spread its effect? Did it spread its effect in a significantly different way among different Euro-zone countries before and after the breakout of European debit crisis? Especially, will the sovereign rating change in Euro-zone pose significant critical effect of speculative grade on China's financial market? This section deals with the empirical study of these subjects.

The estimate result (Due to limited space, the regression result of VAR model for the sovereign rating changes in the Euro-zone before the breakout of European debit crisis is omitted here. The complete regression result will be available on request by e-mail. The regression analysis of the Euro-zone sovereign rating changes is not made due to lack of the data collected before the breakout of European debit crisis about the Euro-zone sovereign rating for whcih the initial change was made until it was at or close to speculative grade after 2010.) of the vector auto-regression of how the sovereign rating changes in Euro-zone and the sovereign rating at or close to speculative-grade after change in the context of European credit crisis have affected the four financial markets of China is given in Table 5 and Table 6 respectively.

Table 5 VAR regressions on sovereign rating change (Apr.,2010 to dec.2012)

variables	Stock market			Monetary market	Exchange matker		Bond market	
	Rate_Sz	Rate_Sh	Rate_Zxb	Shibor_1m	Rate_Usd	Rate_Euro	D_Bench	Firm_Spread
<b>Euro-Zone</b>								
Total	0.0019*	0.0013	0.0024**	-0.0316**	-0.0000	0.0012**	0.0030	0.0000
S&P	0.0023	0.0017	0.0033**	-0.0441**	-0.0001	0.0013**	0.0019	0.0000
Moody's	0.0005	0.0003	0.0003	-0.0087	-0.0000	0.0010	0.0037	0.0000
Fitch	0.0037	0.0026	0.0032	-0.0294	0.0000	-0.0000	0.0075	-0.0000
<b>Periphery</b>								
Total	0.0028	0.0023	0.0031*	-0.0423*	-0.0001	0.0016**	0.0003	0.0000
S&P	0.0041*	0.0029	0.0041*	-0.0710**	-0.0002*	0.0014	0.0007	0.0000
Moody's	0.0006	0.0010	0.0004	-0.0090	-0.0000	0.0020	-0.0025	0.0001
Fitch	0.0003	0.0022	0.0034	0.0440	0.0003	0.0018	0.0058	0.0002
<b>PIIGS</b>								
Total	0.0023	0.0012	0.0032*	-0.0411	-0.0000	0.0013	0.0076**	-0.0000
S&P	0.0021	0.0016	0.0058**	-0.0496	-0.0000	0.0028**	0.0056	-0.0000
Moody's	0.0005	-0.0003	0.0002	-0.0129	-0.0001	0.0009	0.0108*	0.0001
Fitch	0.0053	0.0027	0.0026	-0.0658	-0.0000	-0.0014	0.0072	-0.0002
N	670	670	670	670	670	670	670	670

Note: (1) \*means significant below 10% ( $p < 0.1$ ), \*\* means significant below 5% ( $p < 0.05$ ), \*\*\* means significant below 1% ( $p < 0.01$ )

According to Table 5, the sovereign rating change in Euro-zone in the context of European credit crisis had limited effect on China's financial market compared to its behavior before the breakout of European credit crisis. Especially, the sovereign rating change in Euro-zone PIIGS had the least effect on China's financial market. According to further study, three of China's four financial markets—stock market, foreign exchange market and money market—are most sensitive to the sovereign rating change in Euro-zone and the downgrade of sovereign rating in Euro-zone can adversely affect China's stock market, especially the SMEs board market (*Rate\_Zxb*). This indicates that innovative SMEs are more sensitive to the impact of Euro-zone sovereign risk than the well-established enterprises on the main board. Besides, The downgrade of sovereign rating in Euro-zone raised the level of *Shibor\_1m*, resulting in adverse effect on the liquidity of China's money market. In foreign exchange market, like the negative sovereign outlook, the downgrade of sovereign rating in Euro-zone caused appreciation of Euro (positive Euro rate) while only the downgrade of sovereign rating in Euro-zone peripheral countries can substantially cause depreciation of USD (negative USD rate). The sovereign rating change in Euro-zone (rather than PIIGS) posed little impact on the interest spread of the corporate bond and treasury bond in China's bond market. The study result also shows that sovereign rating change made by S&P for the Euro-zone countries, Euro-zone peripheral countries and PIIGS can significantly affect China's financial market (rather than bond market). Only the sovereign rating change of PIIGS released by Moody's can affect the change of interest spread of China's treasury bond while the sovereign rating changes in Euro-zone released by Fitch have little effect on China's financial market.

According to the above study, the significantly smaller impact posed by the sovereign rating change in Euro-zone than that posed by sovereign outlook reversion on China's financial market is probably contributable to the different effect posed by the sovereign rating changes of different grade in Euro-zone on China's financial market, resulting in a generally view that the sovereign rating change in Euro-zone posed smaller impact on China's financial market than that posed by sovereign outlook reversion in Euro-zone. In order to further study such difference, we further looked into the inside of the specific grade of sovereign ratings and particularly studied if the sovereign ratings in Euro-zone can pose extra impact on China's financial market when they are at or close to speculative grade, or speculative-grade critical effect, after change.

Table 6 - VAR regressions on speculative-grade critical effect (Apr.,2010 to dec.2012)

variables	Stock market			Monetary market	Exchange market		Bond market	
	<i>Rate_Sz</i>	<i>Rate_Sh</i>	<i>Rate_Zxb</i>	<i>Shibor_1m</i>	<i>Rate_Usd</i>	<i>Rate_Euro</i>	<i>D_Bench</i>	<i>Firm_Spread</i>
<b>Euro-Zone</b>								
<b>Total</b>	<b>0.0085***</b>	<b>0.0056**</b>	<b>0.0070***</b>	<b>-0.0839*</b>	<b>-0.0003</b>	<b>0.0020</b>	<b>0.0116*</b>	<b>0.0000</b>
<b>S&amp;P</b>	<b>0.0054</b>	<b>0.0030</b>	<b>0.0074</b>	<b>-0.1020</b>	<b>-0.0003</b>	<b>0.0046**</b>	<b>0.0049</b>	<b>-0.0000</b>
<b>Moody's</b>	<b>0.0065</b>	<b>0.0050</b>	<b>0.0069</b>	<b>-0.0442</b>	<b>-0.0003</b>	<b>0.0019</b>	<b>0.0260**</b>	<b>0.0003</b>
<b>Fitch</b>	<b>0.0155***</b>	<b>0.0101**</b>	<b>0.0138**</b>	<b>-0.1090</b>	<b>-0.0001</b>	<b>-0.0016</b>	<b>0.0029</b>	<b>0.0000</b>
<b>Periphery</b>								
<b>Total</b>	<b>0.0133**</b>	<b>0.0092**</b>	<b>0.0155***</b>	<b>-0.0823</b>	<b>-0.0006*</b>	<b>0.0018</b>	<b>0.0036</b>	<b>-0.0000</b>
<b>S&amp;P</b>	<b>0.0082</b>	<b>0.0038</b>	<b>0.0073</b>	<b>-0.1970</b>	<b>-0.0011**</b>	<b>0.0045</b>	<b>0.0133</b>	<b>0.0000</b>
<b>Moody's</b>	<b>0.0236***</b>	<b>0.0175**</b>	<b>0.0290***</b>	<b>0.0090</b>	<b>-0.0005</b>	<b>0.0009</b>	<b>0.0025</b>	<b>-0.0001</b>
<b>Fitch</b>	<b>0.0055</b>	<b>0.0047</b>	<b>0.0075</b>	<b>-0.0464</b>	<b>-0.0000</b>	<b>-0.0010</b>	<b>-0.0095</b>	<b>-0.0001</b>
<b>PIIGS</b>								
<b>Total</b>	<b>0.0071*</b>	<b>0.0045</b>	<b>0.0067*</b>	<b>-0.0944*</b>	<b>-0.0001</b>	<b>0.0023</b>	<b>0.0170**</b>	<b>0.0002</b>
<b>S&amp;P</b>	<b>0.0057</b>	<b>0.0037</b>	<b>0.0104</b>	<b>-0.0852</b>	<b>0.0000</b>	<b>0.0065**</b>	<b>0.0016</b>	<b>-0.0002</b>
<b>Moody's</b>	<b>-0.0023</b>	<b>-0.0013</b>	<b>-0.0043</b>	<b>-0.0692</b>	<b>-0.0002</b>	<b>0.0024</b>	<b>0.0373***</b>	<b>0.0005</b>

<b>Fitch</b>	<b>0.0196***</b>	<b>0.0123**</b>	<b>0.0164**</b>	<b>-0.1340</b>	<b>-0.0002</b>	<b>-0.0019</b>	<b>0.0078</b>	<b>0.0002</b>
<b>N</b>	<b>670</b>	<b>670</b>	<b>670</b>	<b>670</b>	<b>670</b>	<b>670</b>	<b>670</b>	<b>670</b>

*Note: (1) \*means significant below 10% ( $p < 0.1$ ), \*\* means significant below 5% ( $p < 0.05$ ), \*\*\* means significant below 1% ( $p < 0.01$ )*

According to the regression result in Table 6, the sovereign ratings in Euro-zone can pose significantly critical effect of speculative grade on China's financial market, particularly the bond market, while posing effect on other markets in generally the same way as the sovereign outlook reversion in Euro-zone did on China's financial market. However, taking into account different rating agencies, we found out that S&P had little influence on all the financial markets except the foreign exchange market which was the only market subject to the influence of S&P. The sovereign rating of Euro-zone and PIIGS released by Fitch can exert significant critical effect of speculative-grade on China's stock market when it is at or close to speculative grade after change. The study result also shows that the sovereign rating released by Fitch can exert greater effect of speculative grade on China's financial market as it can significantly affect not only China's stock market through Euro-zone peripheral countries but also China's bond market through Euro-zone and PIIGS. This indicates that the sovereign rating changes of Euro-zone have exerted more complicated impact on China's financial market than sovereign outlook reversion and we should distinguish the sovereign ratings released by different rating agencies when dealing with the adverse impact of European debit crisis on China's financial market, particularly when the sovereign ratings are at or close to speculative grade after change.

## **5 CONCLUSIONS AND SUGGESTIONS**

We comprehensively reviewed the impact of Euro-zone sovereign risk before and after the breakout of European debit crisis on China's financial market in this paper using European debit crisis as a natural experiment based on the quantification of the sovereign credit ratings changes released by the three international rating agencies between January, 2008 and December, 2012. We have also studied if the Euro-zone sovereign risk before and after the breakout of European debit crisis posed significantly different impact on China's financial market in the context of the three international rating agencies' announcement of the sovereign ratings and outlook of different Euro-zone countries and, therefore, provided a panoramic view of the linkage and information path between international financial crisis and China's financial market.

According to the empirical result in this paper, the sovereign risk in Euro-zone can really cause the fluctuation of co-exceedance among China's financial markets, especially in the context of European debit crisis. This indicates that China's financial market is more vulnerable to the impact of the unrest of international financial market under the circumstances of financial globalization and China's financial regulatory authorities should be cautious about financial security which is facing increasingly harsh challenges. We have further identified that the sovereign outlook reversion, especially that released by S&P, in Euro-zone has posed more serious impact on China's financial market than sovereign rating changes by analysis using sovereign ratings in Euro-zone released by rating agencies as a proxy variable of the sovereign risk in Euro-zone. However, the sovereign rating in Euro-zone released by Fitch and Moody's can also pose significant critical effect of speculative-grade on China's financial market when it is at or close to speculative grade after change. We believe that the difference is caused by the fact that the sovereign outlook reversion, which is more

forward-looking than sovereign rating changes, reflected the anticipation made by the three international rating agencies about the sovereign risk change in Euro-zone countries in a period to come. Therefore, sovereign outlook reversion can pose more intensive and widespread impact than sovereign rating changes. We have also discovered that the sovereign rating of PIIGS changed by the three international rating agencies posed more significant critical effect of speculative grade on China's financial market than on the Euro-zone periphery countries, but the sovereign rating changes of the Euro-zone periphery countries have more serious impact than those of PIIGS. Besides, the stock market, monetary market and foreign exchange market among China's four major financial markets are most sensitive to the impact of the sovereign risk in Euro-zone, except bond market which react to the sovereign outlook reversion and the sovereign rating changes in a different way, i.e. the sovereign outlook reversion has impact on corporate bond market while sovereign rating change has impact on treasury bond market.

To better understand the effect of European sovereign risk to Chinese financial markets, we should further study how this risk affect the real economy, especially the investment and financing activities of the microeconomic corpus, through the financial markets in the future research.

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## **DIRECTORS' EDUCATION DEGREE AND CORPORATE SOCIAL DISCLOSURE: EVIDENCE FROM VIETNAM**

*Trang Cam Hoang*

### **Abstract**

Using the published annual reports of the firms listed on Ho Chi Minh Stock Exchange (HOSE) and Hanoi Stock Exchange (HNX) in Vietnam, this study examines the relationship between directors' education degree and corporate social disclosure (CSD) of Vietnamese listed firms. CSD is measured based on the Global Reporting Initiative (GRI) Sustainability Reporting Guidelines (G3.1 version). The result shows a significantly positive relationship between the high level of education among directors and CSD. Evidence from this study extends the existing CSD literature on emerging economies and providing valuable insights to Vietnamese policy makers in better understanding Vietnamese listed firms' CSD practices to develop and improve the reporting framework.

*Keywords: board of directors, education degree, corporate social disclosure, Vietnam.*

JEL Classification: G39, I23, M14

### **1 INTRODUCTION**

Although such stakeholders' scrutiny is much stronger in developed nations, recent empirical studies have shown an increasing trend of corporate social responsibility disclosure, of which CSD in this paper is an integral part, in the annual reports of firms in developing countries (Haji, 2013).

The understanding of CSD practices in Vietnamese firms is still poor because it is perceived as philanthropic activities. Bui (2010) also shows that the main reasons why Vietnamese firms pay almost no attention to CSD is because they do not understand how a firm impacts on society, they lack financial resources and a legal framework. These factors have discouraged firms from adopting CSD in their corporate policies. However, when Vietnam joined the World Trade Organization (WTO) in 2007, firms elevated the status of CSD because of its importance with foreign customers and partners. In spite of an increasing trend of CSD in Vietnamese firms recently, there has not been the research examining the effect of directors' education degree in the board of directors on CSD in Vietnamese listed firms. Therefore, this study intends to narrow the research gap to examine this effect.

### **2 LITERATURE AND HYPOTHESIS**

Previous studies mainly examine the impact of gender directors on corporate social responsibility or corporate social performance. Research already suggests that firms with a higher percentage of female board members have a higher level of charitable giving (Wang & Coffey, 1992; Williams, 2003), enhanced work environments (Bernardi et al., 2006; Johnson & Greening, 1999) and better corporate social performance (Hafsi & Turgut, 2013).

Vietnam is the focus of this study, but only one study (K. A. Vu et al., 2011) has examined the impact of corporate governance on voluntary disclosures, including the social disclosure of 45 Vietnamese listed firms in 2008. Controlling for the influence that ownership structure can



have on voluntary disclosures, they find low disclosure levels among Vietnamese listed firms. State ownership is negatively related and managerial ownership is positively related to the disclosure level. Moreover, larger firms are positively associated with voluntary disclosure.

Director education degree is viewed as an indicator of directors' knowledge, cognitive orientation and skill base (Hambrick & Mason, 1984). Previous researches document that the high level of education among directors on the boards results in a greater ability to adopt new ideas and to accept innovations (Carmen et al., 2005; Guthrie et al., 1991; Wally & Baum, 1994), a broader view and larger breadth of understanding (Post et al., 2011). The high level of education among directors on the boards possess more diverse knowledge bases and the perspectives necessary to develop and evaluate solutions to complex problems (Milliken & Martins, 1996; Van der Walt et al., 2006). An educated director can have a broader perspective and superior pattern of thinking and, thus, is more likely understand the wider interests of various stakeholders (Welford, 2007).

From the advisory perspective of governance, the idea that directors' knowledge directly affects corporate social performance and CSD has roots in resource dependence theory (Pfeffer & Salancik, 1978). Resource dependence theorists argued that a firm's socially improved relationships with its constituencies may bring economic benefits and is probably the central tenet in managers' quest for socially responsible activities. Resource dependence theory offers the rationale for the board's function of providing critical resources to the firm including legitimacy, advice, and counsel (Hillman & Dalziel, 2003). Additionally, society nowadays is demanding that the economic development of firms be concomitant with their moral development (Labelle et al., 2010). The moral development of a firm can be classified according to the degree to which its social responsibility is recognized and blended with its economic mission. Directors' knowledge offers the firm support in understanding and responding to its environment (Boyd, 1990) that can help it better manage CSD issues and practices.

Hence, this study anticipates that boards with a higher proportion of directors who have an advanced degree (masters degree or above) exhibit more concern about, and give more attention to, CSD.

Hypothesis: Firms whose boards have a higher proportion of directors with an advanced degree exhibit more CSD.

### **3 METHODOLOGY**

#### **3.1 Measuring CSD**

Content analysis is used to measure CSD because it has been used extensively in the field of corporate social responsibility (Abeysekera & Guthrie, 2005; Haniffa & Cooke, 2005). The relevant information in annual reports are used to examine the CSD practices of Vietnamese listed firms because Corporate Social Responsibility reports or sustainability reports did not exist in the year of the analysis. Annual reports are the central source of corporate communications to investors and other stakeholders, and are widely used by firms for various social disclosures (Abeysekera, 2012; Campbell, 2000). To ensure consistency, only one of the authors coded all the annual reports and a set of basic coding rules was constructed to ensure reliability and validity. This was repeated after two weeks (Haji, 2013) in order to avoid the possibility that the first and the second scoring might influence each other (Weetman & Ghazali, 2006).

This study uses the Global Reporting Initiative (GRI) 3.1 index, the social indicators in particular, to measure CSD practices in Vietnam. Currently, the GRI is the most widely used framework to assess and measure Sustainability Reporting, including CSD (Hopkins, 2012). The social indicators in the GRI 3.1 index identify key performance aspects surrounding labour practices, human rights, society, and product responsibility. They consist of four aspects, including 15 items of labour practices and decent work indicators (LA1 to LA15), 11 items of human rights indicators (HR1 to HR11), 10 society indicators (SO1 to SO10), and 9 product responsibility indicators (PR1 to PR9). Please see Appendix for more details on the social indicators in the GRI 3.1 index.

An un-weighted disclosure quantity index is used to examine the presence of the different items of the checklist using binary scores. This approach is consistent with CSR disclosure studies in emerging capital markets (Haji, 2013; Haniffa & Cooke, 2005; Khan et al., 2013). The disclosure of an item within the check list in the annual reports is scored (1), while the non-disclosure of an item within the check list in the annual reports is scored (0). The scores for each item are then added to compute a total disclosure score for a particular firm. The CSD score (CSD\_INDEX) for each firm is measured by the ratio of actual items disclosed, divided by the maximum possible items that could have been disclosed. Therefore, firms are not penalised for nondisclosure of an item if it is deemed to be irrelevant to their business activities.

### **3.2 Measuring directors' education degree**

Using annual reports, this study compiled the list of directors about directors' education (i.e., degree attained) for the listed firms for the boards in the sample. Firm websites were perused for any information the reference materials could not supply. The directors' education degree (EDU) in this study was measured by the proportion of directors with advanced degrees (i.e., masters degree or above) among the boards in the sample.

### **3.3 Control variables**

This study controls for firm characteristics such as return on assets (ROA), auditors (AUDIT), state ownership (STATE), foreign ownership (FOREIGN) and stock exchange location (STOCK\_EX) which have been shown to influence CSD in previous studies (e.g., Cormier et al., 2011; Purushothaman et al., 2000; K. A. Vu et al., 2011; K. B. A. H. Vu, 2012). Studies document that ROA, measured by net profit over the total assets of firm, is related to CSD (e.g., Haniffa & Cooke, 2005; Lu & Abeysekera, 2014). Additionally, it is on the basis that highly reputable audit firms, such as the 'Big Four' auditing firms, are likely to improve their perceived audit quality by encouraging their clients to participate in disclosing more information (Ahmad et al., 2003; Craswell & Taylor, 1992). AUDIT is a dummy variable that is one if the audit firm is one of the Big Four audit firms and zero otherwise.

The government of Vietnam owns a significant amount of shares in listed firms, especially some strategic industries (K. A. Vu et al., 2011), and the influence of state ownership on CSD has been widely discussed in the literature (Amran & Devi, 2008; Haji, 2013; K. A. Vu et al., 2011), hence STATE, measured by the percentage of shareholding owned by the state, is also a control variable in this study. Prior studies also note that foreign ownership is related to voluntary disclosure, including CSD (Haniffa & Cooke, 2005; K. A. Vu et al., 2011), so FOREIGN is the other control variable, measured by the percentage of shareholding owned by foreign investors. Vu (2012) finds that the stock exchange location of each firm is an explanatory factor for Vietnamese voluntary disclosure practices. In particular, firms listed on the Ho Chi Minh stock exchange are reported to engage in significantly more voluntary disclosure practices than firms listed on the Hanoi stock exchange. Therefore, STOCK\_EX is

used as a control variable in this study, taking one if the firms are listed on Ho Chi Minh stock exchange and zero for firms listed on the Hanoi stock exchange.

### 3.4 The relationship between directors' education degree and CSD

This study tested the hypothesis regarding the effects of directors' education degree on CSD, using an OLS estimator. The regression function is:

$$CD\_INDEX_i = \alpha_0 + \alpha_1ROA_i + \alpha_3AUDIT_i + \alpha_4STATE_i + \alpha_5FOREIGN_i + \alpha_6STOCK\_EX_i + \varepsilon_i \quad (1)$$

Where: CSD\_INDEX<sub>i</sub> = firm i's a CSD index; EDU<sub>i</sub> = firm i's the directors' educational attainment.

As the purpose of this study is to examine the effect of directors' education degree on CSD, the main focus here is the coefficient on EDU. If directors with an advanced degree results in more CSD as contended in our hypothesis, then the coefficient on EDU should be positive and significant in the regression.

### 3.5 The sample

This study examines the annual reports during the year ended 31 December 2013 to capture the extent of CSD of Vietnamese listed firms. The annual reports are retrieved from HOSE and HNX's websites and company websites. Firms in the finance sector operate under tighter regulatory environment and are possibly subject to other disclosure requirements forcing several previous CSR studies to not consider them along with non-finance firms (Haji, 2013; Haniffa & Cooke, 2005). Hence, banks and financial institutions are excluded in this study. A random sample of 100 firms listed on HOSE and HNX was selected. Data required for the directors' educational attainment are hand-collected from the 2013 annual reports and on firm websites.

## 4 RESULTS

Table 1 summarises the score of CSD (CSD\_INDEX) and its four subcategories information (i.e labour practices, human rights, society, and product responsibility). The score of CSD (CSD\_INDEX) ranges from 6.67 per cent to 53.33 per cent with a mean of 22.27 per cent, which reveals that the score of CSD of listed firms in the sample are low. This is because CSD practices are relatively new in Vietnam (K. A. Vu et al., 2011). Our result is consistent with Vu et al. (2011)'s examination of the quantity of voluntary disclosure, including social disclosure in Vietnam. Related to CSD's four subcategories information, the highest disclosure level is for Labour practices and decent work indicators (mean of 36.84 per cent) and the lowest is Human rights indicators (3.21 per cent). The number of firms disclosing items regarding the human rights aspects is the lowest, which is consistent with Lu and Abeysekera's (2014) study on listed firms in China, because these aspects are socially sensitive in Vietnam and there are less social support mechanisms and poorly implemented frameworks to protect workers' human rights (Azizul Islam & Jain, 2013).

Tab. 1 - The score of CSD (CSD\_INDEX) and its four subcategories. Source: own analysis from annual reports of Vietnamese listed firms.

	Max	Min	Mean	SD
CSD_INDEX	0.5333	0.0667	0.2227	0.1021

Labour practices and decent work indicators (15 items)	0.8667	0.0667	0.3684	0.167
Product responsibility indicators (9 items)	0.6667	0.2222	0.3509	0.1183
Human rights indicators (11 items)	0.6364	0	0.0321	0.1015
Society indicators (10 items)	0.5	0	0.0985	0.1161

Table 2 describes the mean, standard deviation, minimum and maximum of the independent variable and the control variables used to analyse the impact of directors' educational attainment on CSD in the sample of 100 Vietnamese listed firms. The proportion of directors with advanced degrees (i.e., masters degree or above) among the boards in our sample ranged from 0 to 80%, with an average of 23.84%. Related to the control variables, only 21 (21 per cent) of the 100 firms in the sample use the Big Four auditing firm. The mean of ROA is 0.08, which is similar to the 0.07 reported by Vu et al. (2011) for a sample of 45 Vietnamese listed firms in 2008. The Ho Chi Minh Stock Exchange includes 84 (84 per cent) of the 100 listed firms in the sample. Because of the 49 per cent maximum foreign ownership ceiling in Vietnamese listed firms, the average percentage of foreign ownership (FOREIGN) in this sample is quite low (14.58 per cent with a range of zero to 49 per cent). The average percentage of state ownership (STATE) is 24.72 per cent (with a range of zero to 79.07 per cent).

Tab. 2 - Descriptive Statistics for independent and control variables. Source: own.

<b>Variables</b>	<b>Max</b>	<b>Min</b>	<b>Mean</b>	<b>SD</b>
<b>Independent variable</b>				
EDU	0.8	0	0.2384	0.2241
<b>Control variables</b>				
AUDIT	1	0	0.21	0.4094
ROA	0.3356	-0.1689	0.0794	0.0727
STOCK_EX	1	0	0.84	0.3685
FOREIGN	0.49	0	0.1458	0.1549
STATE	0.79	0	0.2472	0.2212

This table shows the summary statistics for the independent and control variables used in this paper. The final sample consists of 100 firms listed on the Hochiminh and Hanoi stock exchanges for the 2013 sample. EDU = the directors' educational attainment measured by the proportion of directors with advanced degrees (i.e., masters degree or above) among the boards in the sample; AUDIT = 1 if firm's auditor is a Big 4 and 0 if otherwise; ROA = net profit over the total assets; STOCK\_EX = 1 if the firms listed on HOSE and 0 for firms listed on HNX; FOREIGN = the percentage of shareholding owned by foreign investors; STATE = the percentage of shareholding owned by the state.

Table 3 shows the pairwise correlation coefficients between all combinations variables. As expected, the directors' educational attainment (EDU) is significantly and positively correlated with CSD\_INDEX with coefficients of 0.231.

Tab. 3 - Correlation matrix. Source: own.

		1	2	3	4	5	6	7
1	CSD_INDEX	1.000						
2	EDU	0.231*	1.000					
3	AUDIT	0.249*	0.208*	1.000				
4	ROA	0.205*	0.099	0.064	1.000			
5	STOCK_EX	0.225*	0.075	0.024	0.246*	1.000		
6	FOREIGN	0.098	0.127	0.172	0.531*	0.338*	1.000	
7	STATE	0.025	0.349*	0.264*	0.029	-0.162	-0.145	1.000

\* p value  $\leq 0.05$ . Please see below Table 2 for description of each variable.

This study checks the variance inflation factor (VIF) for the regression analysis and finds that the maximum VIF is 1.59, which is less than 10 for all the regression models, so multicollinearity does not seem to be a problem in the empirical models tested in this study (Gujarati & Porter, 2009).

To confirm whether or not heteroscedasticity exists, this study uses the Breush-Pagan test. If the p-value is not significant, then the null hypothesis not rejected, and that is the variance of the residuals is constant. If the p-value is significant, then the null hypothesis would be rejected, suggesting the presence of heteroscedasticity. The test shows that that p-value is significant ( $p = 0.019$ ) and the null hypothesis is rejected, indicating the presence of heteroscedasticity (untabulated results). To correct the possible influence of heteroscedasticity, this study uses ordinary least squares (OLS) regression with heteroscedasticity robust standard errors (White, 1980) to test the impact of the directors' educational attainment (EDU) on CSD (CSD\_INDEX).

Table 4 provides the result of the test of the hypothesis where CSD\_INDEX is the dependent variable, and EDU is the independent variable. The table shows that the coefficient estimate of EDU are positive and significant (p-value of 0.035), which suggests that firms whose boards have a higher proportion of directors with an advanced degree exhibit more CSD, confirming the hypothesis.

Tab. 3 - The impact of the directors' educational attainment on CSD. Source: own.

	EDU	AUDIT	ROA	STOCK_EX	FOREIGN	STATE	Constant
Coeff.	0.096	0.063	0.308	0.054	-0.111	-0.053	0.162
p-value	0.035	0.014	0.063	0.012	0.214	0.347	0.000
Significance	**	**	*	**			***

$R^2 = 0.175$ , F statistic = 4.64, p-value = 0.000, N = 100.

\*, \*\* and \*\*\* denote significance levels at 10%, 5% and 1%, respectively.

The results for the control variables shown in Table 4 indicate there is a significant positive association (p value = 0.014) between AUDIT and CSD\_INDEX which suggests that CSD is higher for firms audited by the Big Four audit firms, which is consistent with prior studies

(Craswell, 1992; Inchausti, 1997; Uwuigbe & Egbide, 2012). ROA shows the positive and significant coefficient (p value = 0.063), which suggests that firms that perform better financially are associated with more CSD, which is consistent with the literature (Khan et al. 2013; Lu and Abeysekera 2014; Haniffa & Cooke, 2005). Interestingly, STOCK\_EX is positively and significantly (p value = 0.012) associated with CSD\_INDEX, which indicates that firms listed on HOSE are reported to engage in significantly higher CSD than firms listed on HNX. This is consistent with Vu (2012) who examines the determinants of voluntary disclosure for Vietnamese listed firms. FOREIGN and STATE are not significantly related to CSD, as in prior studies (Haniffa & Cooke, 2005; Lu & Abeysekera, 2014).

## 5 CONCLUSIONS

This paper investigates the effect of the directors' educational attainment on CSD of 100 Vietnamese listed firms in 2013. The result provides evidence supporting the hypothesis (i.e. firms whose boards have a higher proportion of directors with an advanced degree exhibit more CSD). Based on resource dependence theory (Pfeffer & Salancik, 1978), members of the board of directors is considered as an important strategic resource for organization and contribute to CSD. Directors' knowledge is likely to establish and enhance a firm's external legitimacy and to improve its relationships with relevant stakeholders. Therefore, directors with an advanced degree have a positive impact on CSD.

The results of this paper, which demonstrate the current CSD practices of Vietnamese listed firms, will benefit regulators in better understanding firms' CSD practices to improve the current guidelines on the CSD of Vietnamese listed firms.

### APPENDIX: Social Indicators in the GRI 3.1 index

<b>Labor Practices and Decent Work Performance Indicators</b>		
<b>Employment</b>	LA1	Total workforce by employment type, employment contract, and region, broken down by gender.
	LA2	Total number and rate of new employee hires and employee turnover by age group, gender, and region.
	LA3	Benefits provided to full-time employees that are not provided to temporary or parttime employees, by significant locations of operation.
	LA15	Return to work and retention rates after parental leave, by gender.
<b>Labor/Management relations</b>	LA4	Percentage of employees covered by collective bargaining agreements.
	LA5	Minimum notice period(s) regarding operational changes, including whether it is specified in collective agreements.
<b>Occupational health and safety</b>	LA6	Percentage of total workforce represented in formal joint management-worker health and safety committees that help monitor and advise on occupational health and safety programs.
	LA7	Rates of injury, occupational diseases, lost days, and

		absenteeism, and total number of work-related fatalities, by region and by gender.
	LA8	Education, training, counseling, prevention, and risk-control programs in place to assist workforce members, their families, or community members regarding serious diseases.
	LA9	Health and safety topics covered in formal agreements with trade unions.
<b>Training and education</b>	LA10	Average hours of training per year per employee by gender, and by employee category.
	LA11	Programs for skills management and lifelong learning that support the continued employability of employees and assist them in managing career endings.
	LA12	Percentage of employees receiving regular performance and career development reviews, by gender.
<b>Diversity and equal opportunity</b>	LA13	Composition of governance bodies and breakdown of employees per employee category according to gender, age group, minority group membership, and other indicators of diversity.
<b>Equal remuneration for women and men</b>	LA14	Ratio of basic salary and remuneration of women to men by employee category, by significant locations of operation.

<b>Human Rights Performance Indicators</b>		
<b>Investment and procurement practices</b>	HR1	Percentage and total number of significant investment agreements and contracts that include clauses incorporating human rights concerns, or that have undergone human rights screening.
	HR2	Percentage of significant suppliers, contractors, and other business partners that have undergone human rights screening, and actions taken.
	HR3	Total hours of employee training on policies and procedures concerning aspects of human rights that are relevant to operations, including the percentage of employees trained.
<b>Non-discrimination</b>	HR4	Total number of incidents of discrimination and corrective actions taken.
<b>Freedom of association and collective bargaining</b>	HR5	Operations and significant suppliers identified in which the right to exercise freedom of association and collective bargaining may be violated or at significant risk, and actions taken to support these rights.
<b>Child labor</b>	HR6	Operations and significant suppliers identified as having significant risk for incidents of child labor, and

		measures taken to contribute to the effective abolition of child labor.
<b>Forced and compulsory labor</b>	HR7	Operations and significant suppliers identified as having significant risk for incidents of forced or compulsory labor, and measures to contribute to the elimination of all forms of forced or compulsory labor.
<b>Security practices</b>	HR8	Percentage of security personnel trained in the organization's policies or procedures concerning aspects of human rights that are relevant to operations.
<b>Indigenous rights</b>	HR9	Total number of incidents of violations involving rights of indigenous people and actions taken.
<b>Assessment</b>	HR10	Percentage and total number of operations that have been subject to human rights reviews and/or impact assessments.
<b>Remediation</b>	HR11	Number of grievances related to human rights filed, addressed and resolved through formal grievance mechanisms.

<b>Society Performance Indicators</b>		
<b>Local communities</b>	SO1	Percentage of operations with implemented local community engagement, impact assessments, and development programs.
	SO9	Operations with significant potential or actual negative impacts on local communities.
	SO10	Prevention and mitigation measures implemented in operations with significant potential or actual negative impacts on local communities.
<b>Corruption</b>	SO2	Percentage and total number of business units analyzed for risks related to corruption.
	SO3	Percentage of employees trained in organization's anti-corruption policies and procedures.
	SO4	Actions taken in response to incidents of corruption.
<b>Public policy</b>	SO5	Public policy positions and participation in public policy development and lobbying.
	SO6	Total value of financial and in-kind contributions to political parties, politicians, and related institutions by country.
<b>Anti-competitive behavior</b>	SO7	Total number of legal actions for anti-competitive behavior, anti-trust, and monopoly practices and their outcomes.
<b>Compliance</b>	SO8	Monetary value of significant fines and total number of non-monetary sanctions for non-compliance with laws



		and regulations.
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<b>Product Responsibility Performance Indicators</b>		
<b>Customer health and Safety</b>	PR1	Life cycle stages in which health and safety impacts of products and services are assessed for improvement, and percentage of significant products and services categories subject to such procedures.
	PR2	Total number of incidents of non-compliance with regulations and voluntary codes concerning health and safety impacts of products and services during their life cycle, by type of outcomes.
<b>Product and service labeling</b>	PR3	Type of product and service information required by procedures, and percentage of significant products and services subject to such information requirements.
	PR4	Total number of incidents of non-compliance with regulations and voluntary codes concerning product and service information and labeling, by type of outcomes.
	PR5	Practices related to customer satisfaction, including results of surveys measuring customer satisfaction.
<b>Marketing communications</b>	PR6	Programs for adherence to laws, standards, and voluntary codes related to marketing communications, including advertising, promotion, and sponsorship.
	PR7	Total number of incidents of non-compliance with regulations and voluntary codes concerning marketing communications, including advertising, promotion, and sponsorship by type of outcomes.
<b>Customer privacy</b>	PR8	Total number of substantiated complaints regarding breaches of customer privacy and losses of customer data.
<b>Compliance</b>	PR9	Monetary value of significant fines for non-compliance with laws and regulations concerning the provision and use of products and services.

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## **BUSINESS PROCESS MANAGEMENT – NEW RESULTS OF QUANTITATIVE RESEARCH IN CZECH REBUBLIC**

*David Tuček, Martin Mikeska*

### **Abstract**

Solution to the issue of process management in this article was created from the original results of the quantitative research evaluating aspects of process management in context of company strategies in Czech enterprises which was carried out in 2006 with regard to the extension of its further utilization. Followed by the interest of the professionals in practice the research continued and was re-implemented in 2012, with the interviews completed in 2013. The main goal was to assess how the usage of process management components has changed, as well as the aspects of process management, i.e., comprehensive views and statements on the issues of the management of business processes, namely goals, factors, components, support and benefits of the process management in the Czech Republic. New trends in process control are shown, especially the importance of basic documents in BPM projects, processing internal control documentation and the emergence of new standards in the BPM especially in production companies. To meet the goals of this article a new methodology is proposed for comprehensive processing and evaluation of similar quantitative surveys applicable to analysing the use of process management in enterprises, based not only on descriptive statistics but also cluster analysis and statistical induction methods.

*Keywords: Business Process Management, quantitative research, the aspects of process management.*

JEL Classification: M21 Managerial Economics

### **1 TRADITIONAL – FUNCTIONAL MANAGEMENT**

Traditional –functional management model is based on a hierarchical decomposition of the organizational structure. Its final result is the division of the enterprise on individual departments and sections up to the individual functional sites. This means that each department has largely separate agenda, power and responsibility. Concept of functional management mainly solves the question of division of labour in the enterprise and also workers' specialization and their competences.

The functional approach often leads to the ambiguous assignment of competences with regard to responsibility for the outcome of the process as a whole, because it does not perceive the process as a whole. The process as a whole often runs across all functional organizational structure (Tuček, Tučková and Hájková, 2013). Where the process runs over the various departments of the company, this situation may cause problems in the transfer of results between individual activities. The purpose of the process approach (Šimonová, 2009) is to uncover the processes that are often covered by "non-functional" functional organizational structure, to clean them from activities that do not add value for the customer and bring them into focus.

## **2 BUSINESS PROCESS MANAGEMENT - DEFINITION**

Business Process Management (BPM) is becoming a hot topic for the scientific community solving a variety of research in the field of BPM as well as for the business sector constantly dealing with problems resulting from dynamic changes in the market. A process approach, which is the basis of BPM, is often referred to as a philosophy that is the cornerstone of the work organization in the company and the foundation of all business operations and activities (Šmída, 2007). The process approach allows organizations to eliminate the biggest disadvantages of a traditional functional approach that cannot be considered as an approach appropriately flexible for changes in the corporate environment, variety of procedures, or excessive substitution of workers.

Process management by Šmída (2007, p. 30) represents: “systems, procedures, methods and tools of permanent ensuring of maximal performance and continuous improvement of business and inter – business processes that are based on a clearly defined strategy of the organization. Its goal is then to meet determined strategic goals.” This author understands the term process approach as the basis for the organization of work, namely as a basis of all business activities in the company. It indicates a process approach as an approach that responds to changes in a corporate environment and simultaneously flexibly responds to customers’ requirements.

### **Afterwards process management as a managerial approach leads to:**

- Integration of fragmented activities into value-chained processes;
- Reduction of unnecessary activities, duplications, approvals, waiting, etc.;
- Unambiguous focus on the customer process;
- Harmonization of processes and strategies of the company;
- Collaboration across individual departments of institution (companies, plants, workshops or individual workplace) due to process teams.

The objective of business process management can be defined (Lewellyn and Armistead, 2000) as the development and optimization running of the organization to ensure effective, efficient and economical reaction to customer requirements. A process-driven company is focused on the outcome of its activities, or the added value for the customer who paid for them. Such company is more flexible and able to respond more quickly to market changes and customer preferences.

BPM principles are applicable in the other areas, e.g., in.:

- the quaternary sector (Tučková, 2012);
- some energy efficiency models for the mini-load AS/RS, for the support of the design process of warehouses (Lerher, Edl and Rosi, 2013; Lehrer et al., 2010);
- logistics processes (Trebuňa, Fil’a and Pekárková, 2013).
- services such as health care systems (Tučková, Fialová and Strouhal, 2012);
- management controlling system of companies (Zámečník, 2014).

Regarding the process measurement performance, some authors, such as Rajnoha and Chromjaková (2009) or Popesko (2010) recommend implementation of Activity-Based-Costing (ABC) method in the enterprise. In the context of cost for the business processes, some of companies notices the causes of the cost remanence but it is not them able to predict. In the context of the emergence of cost behaviour and cost remanence are growing much

faster, these costs are not analysed and are allocated without a difference to individual groups performances. Businesses should strive to limit the causes of the occurrence and extent of exposure, and therefore focus only on the volume of outputs as the sole criteria of variability is restrictive. Variability of costs should be assessed for individual cost items in relation to the analysis of the correlation of variables. Managers should not forget that in a situation where company will be able to assign costs to a specific activity, and in practice it often happens that the analysis of the activity ceases to be necessary, because it is given little attention, and the company loses the opportunity to rigorously control costs (Novák and Popesko, 2014).

Additionally, implementation of calculation based on processes and activities causes also non-quantified effects such as:

- transparency and rationalisation of performed activities and processes,
- more responsible proceeding of enterprise work,
- identification of enterprise's competitive advantages or disadvantages,
- information support for strategic management and goal oriented management,
- assignment of overhead costs to performance on case-by-case basis,
- support of price policy and production-sales program optimization (Rajnoha and Chromjaková, 2009; Popesko and Novák, 2011).

First of all, in this chapter we would like to evaluate the reasons which lead enterprises to exploit elements of process management in their working practices. The aim of Process Management is to develop and to optimise the daily running of an enterprise in a way which defines these work-related procedures (i.e., processes) as a unified flow or cascade of activities throughout the enterprise, where for each and every process its inputs are clearly defined as are the outputs or results, and where the associated responsibilities and personal responsibilities are assigned for each and every process or activity, while establishing a system for the measurement of the performance of these processes and tracking and evaluating each and every process (Vyskočil et al., 2010).

These activities must be realised (i.e., implemented) so that:

- The quality of production will be maintained through given measurement parameters.
- All available resources shall be optimally exploited (Zavadský and Zavadská, 2014).
- All of the performance indices of the enterprise have been improved continuously throughout in line with previously agreed and known and measurable criteria (Vukovič, 2005).

The market forces of today's business processes development have begun to place an important emphasis on business process quality. Evidently, the quality of a business process model highly influences the deployed business process. This motivated several researchers to propose metrics to evaluate the quality of business process model.

In fact, the concept of quality metrics was initially introduced to examine software quality. According to Cardoso et al. (2006), a quality metric is a quantitative scale and a method that can be used to determine the value taken by a characteristic of a software product. Exploiting the maturity of software quality metrics, several researchers adapted several metrics from the field of software engineering for business process models (Gruhn and Laue, 2006; Khelif et al., 2012).



This, however, means that there is a need to describe just what distinguishes or characterises a process, which is a so-called “management process”. This means that such a process has:

- A defined, ranked set of steps to be taken and appropriate responsibilities allocated.
- A set of measurable parameters derived from customer demands or requirements, or internal standards – “owners” of the process/es.
- A permanent process team who meet regularly with the aim of seeking improvements to the process/es.
- An annual plan which contains the requisite outputs/outcomes/results for each and every key process, as well as appropriate budgets and demands on resources.
- A mechanism for the regular and interim controls of the process/es performance.
- Procedures and resources (i.e., the process team) for the resolution of problems associated with the process/es (Šimonová, 2009).

## **2.1 Short History of Business Process Management**

We can begin with the principles. Managers are often confronted, even in renowned magazines, with several similar terms and concepts which may be confusing or at least their correct content and principles may be misinterpreted on the basis of inaccurate information. What do the terms Business Process Management (BPM) and Business Process Reengineering (BPR) mean? What is their application in practice? In this subheading we would like to acquaint the reader briefly but precisely with these terms and their content.

From the point-of-view of management and Business Process Management development, authors such as King, Fingar, Smith, etc., have offered various conceptions in order to comprehend the connections and differences between them. King, for instance, has distinguished between four development waves BPM (Šmída, 2007).

He has mentioned the following in his publications:

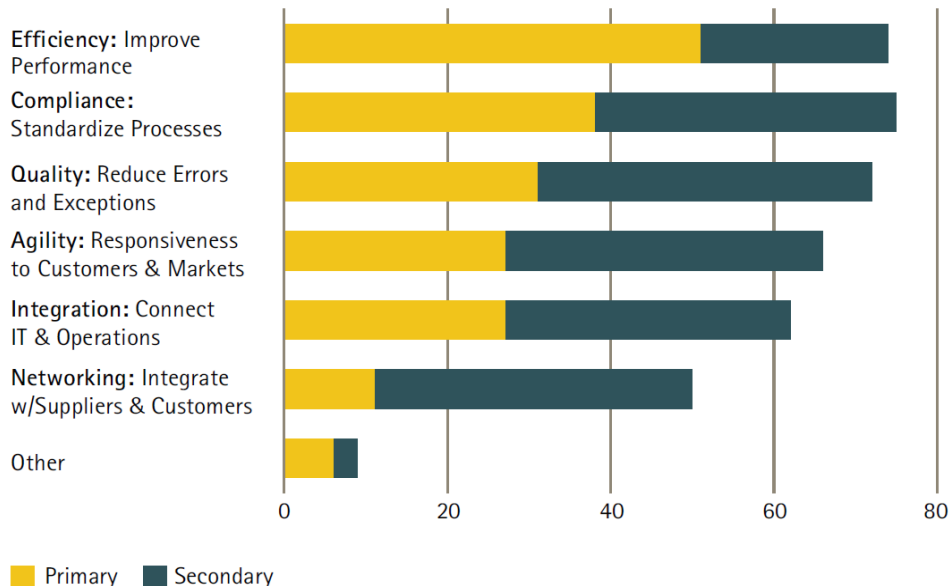
- 1) the first wave of BPM – was concentrated on constant improving of the processes and coincides in many ways with the philosophy of TQM (Total Quality Management), a philosophy which leads to an increase in productivity, a simultaneous increase in quality and increased customer satisfaction while decreasing losses caused by poor quality production.
- 2) the second wave of BPM - consisted of a focus on Business Process Reengineering, or in short Reengineering. This is regarded as the second wave involving the trend of management leading towards essential, radical and fundamental changes in the organization of applied work procedures or technologies. The achievement is not merely incremental but has a radical rise in organization productivity as the expected result.
- 3) the third wave of BPM – the authors (Fingar and Smith, 2002) refer to activities leading to the creation of a process focused organization. This involves the application of main component procedures or process management consisting of the following:
  - key process determination including the appointing of process possessors and customers;
  - within the process description, their mapping and process map formation (a company process model) for recording process system management;

- the application of process maps (models) for cost intensity evaluation and increases in their efficiency;
- continual process improvement and measuring of efficiency;
- quality in the enterprise is mainly understood as the demand for quality standards which lead off the process model;
- competence management is comprehended as the system enabling fulfilment of roles in individual processes (both management and key processes) by those who have appropriate knowledge and abilities for them (Cambal et al., 2013).

## 2.2 World Research Results about Business Process Management

F.e Accenture asked, responders (companies Fortune 500) about a common value driver across all six main drivers of BPM. These six are: The three internal drivers of efficiency, compliance and integration (of employees and with internal systems), and the three external drivers of agility, quality and networking (with external stakeholders). Thus, Acenture first asked the participants in this current survey to provide a free-text answer to the question “Why is your organization pursuing Business Process Management?” The answers highlighted that internal drivers for BPM still dominate with aims such as increased corporate efficiency, process-related risk management and improved process-oriented gathering of requirements for software development projects. (Rosemann et al., 2013) Some results you can see in Fig. 1.

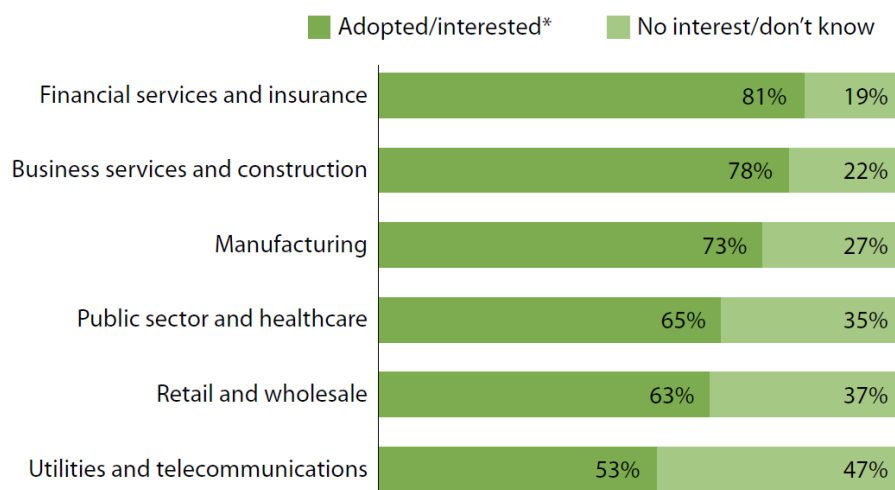
Fig. 1 - Drivers for Business Process Management Initiatives Source: Accenture © 2013.



While most software categories reported slow growth during the so-called “Great Recession,” many BPM suite vendors posted healthy revenue gains and increased demand for their offerings say Richeardson. Some argue that BPM — the discipline and the technology — emerged as one of the heroes during the downturn, helping enterprises boost productivity and gain efficiency and greater control over key operational processes. In short, BPM and BPM suites proved their mettle during the storm.<sup>1</sup> Some of the hardest-hit sectors, including

financial services and insurers, had the strongest appetites for BPM suites throughout the recession (see Figure 2).

Fig. 2 - BPM Adoption Is Strongest In The Hardest-Hit Sectors. Source: Forrester Research, Inc., © 2010



Base: 485 enterprise IT decision-makers

### 3 BUSINESS PROCESS MANAGEMENT – QUANTITATIVE RESEARCH

#### 3.1 Objectives and hypothesis formulation

The whole research areas cannot be described in this chapter. That is the reason why the focus is only on the utilization level of business process management and its individual components in Czech companies with focus on objectives that managers wish to achieve by BPM implementation and factors that are combined with a process-oriented company. Seven goals of this research were define in accordance with the research in 2006 so that it would be possible to realize the comparison in time in different application areas of process management as following:

*C 0. To propose a methodology for processing and evaluation of quantitative survey that is applicable to analysis of the process management usage in the companies.*

*C 1. On the selected basic set, examine to what extent Czech companies use process management.*

*C 2. Clarify the objectives and procedures that are important for Czech companies when using process management components.*

*C 3. Specify the view on the usage of process management components in Czech companies by comparing the levels of components usage and principles of corporate process management in various sectors along with the size and with the focus mainly on manufacturing companies.*

*C 4. Evaluate which process segmentation is preferred by the company (i.e., for example segmentation according to ISO 900X, BSC, Porter or others) and to highlight the process areas in which the rated companies hide their imperfections.*

*C 5. Determine to what extent respondents use software for supporting of process management.*

*C 6. Evaluate concrete benefits and barriers that are present in the companies while using process management. Compare each sector, i.e., variously sized enterprises (see C 2).*

*C7. Analyse changes in individual process management areas (support of human capital, factors, components, etc.) between the years 2006 and 2013.*

### **3.2 Methodology of data collection and subsequent evaluation**

We conducted extensive research aimed at the utilization level of business process management in Czech manufacturing companies in 2006 and in 2012/2013. The research was focused on several aspects of business process management. In this research, aspects of BPM are understood with the meaning of managers' views and opinions on management of business processes (Business Process Management). The research specialized in the area of goals, factors, components, support, benefits of and barriers to process management. The authors explored the extent to which Czech manufacturing companies use business process management. We focused on the logistics processes too. The utilization level of BPM in Czech companies was determined by self-assessment of managers and according to the actual utilization of BPM components. The research has also clarified the goals and procedures that are important for Czech companies in the use of BPM components and found the extent to which the addressed companies use a software support of process management. Last but not least, the research also focused on identifying the benefits that the company achieved by BPM implementation and also on identifying barriers which the Czech companies faced in the BPM implementation. The results of the research, particularly the first part intent on the objectives and factors of BPM support, are the subject of this article. Part of the paper consists also in comparison of the results of previous research conducted in 2006 (Tuček and Zamečník, 2007) and the current research. The comparison of these findings allows identifying trends of business process management in Czech companies for the past 6 years.

The quantitative research was conducted through a questionnaire survey. The sample included manufacturing companies that have more than 5 employees and their turnover was higher than 0 in 2012/13. A limit on the minimum number of employees (5) was determined based on the experience of previous survey implementation, which showed that small businesses do not use business process management or any of its components. A sample of 300 firms was chosen at random. The return of questionnaires was 144, which is 48%. To minimize the risk of acquiring an insufficient number of completed questionnaires, at first, the authors addressed key employees of selected companies by phone and then the questionnaire was sent.

When processing questionnaire results, all 144 companies were included.

Tab. 1 - Distribution of respondents by number of employees. Source: own analysis.

<b>Characteristics of a company</b>		<b>Number of evaluated companies</b>	
	<b>Number of employees</b>	<b>Absolute frequency</b>	<b>Relative frequency</b>
Micro companies	1 -19	36	25%
Small companies	20 – 49	20	13.89%
Medium-sized companies	50 – 250	43	29.86%
Large companies	250 and more	45	31.25%
<b>TOTAL</b>		<b>144</b>	<b>100%</b>

The aim of this research was to explore attitudes, opinions and judgments of managers of Czech companies to individual aspects of business process management. A scaling method based on the principle of quantifying qualitative data was used in this research. The reason for this usage is that managers' responses involve subjective statements, which must be subsequently converted using a verbally, numerically or graphically expressed scale. Specifically the Likert scale method was used. Likert scales are used to indicate the degree (level) of agreement or disagreement with the specified statements, on which it is subsequently possible to deduce the attitudes and opinions of respondents (Rytíř et al., 2006).

Within this research (in 2013) we chose a more comprehensive evaluation of reliability and validity of the entire survey. The descriptive statistics was an appropriate beginning for our survey interpretation. As a part of the description, relative representation in the responses was detected and the basic characteristics of location and variability were identified. Median was chosen as an ordinal mean value ( $\tilde{x}$ ) and discrete ordinal variance (dorvar) was used as the characteristic of variability.

Calculation of both variables was implemented according to VŠE © 2014.

At ordinal variable, median category (Me) belongs to measures of position. It is the category for which the cumulative frequency (P) is 0,5 or higher, while for the previous category the cumulative frequency was less than 0,5. This means that  $P_{Me-1} < 0,5$  and  $P_{Me} \geq 0,5$ .

Furthermore, the median  $\tilde{x}$  can be calculated, more specifically, according to the formula:

$$\tilde{x} = Me - 0,5 + \frac{0,5 - P_{Me-1}}{P_{Me}} \quad (1)$$

For variability rate of the basic set, we may use so called dorvar ordinal scattering (discrete ordinal variance) (VŠE © 2014), determined by the formula:

$$dorvar = 2 \sum_{i=1}^K P_i (1 - P_i) \quad (2)$$

This rate expresses the exact difference of all pairs. While rewriting the interval from 0 to 1, we will get normalized norm. dorvar ordinal scattering for which the following formula is applied:

$$\mathbf{norm. dorvar} = 2 \times \mathbf{dorvar} / (\mathbf{K} - 1), \mathbf{norm. dorvar} \hat{I} <0;1>$$

Moreover, we calculated another typical characteristics, a mode (modus), as the most frequent value. Such calculated characteristic can be further commented and taken as a "classical" mean value, more specifically, as the median and the variability, i.e., scattering.

Median determines the location of the center of all answers whereas this ordinal version of median does not simply come from an ordered set of values but it calculates center based on the ratio/significance for each category (according to formula specified in the link above). Values "Dorvar" are defined as the differences between all pairs (again across evaluative representation for each category) and it may be taken as a scattering, too. Higher value of dorvar means more diverse representation of answers and lower value represents the same opinion only with minor deviations from the centre.

## **4 RESEARCH RESULTS**

### **4.1 Who supports the use of techniques and tools of Business Process Management?**

One of the objectives of this research was (within the question 3 in the questionnaire) to investigate who supports the usage of techniques and tools of process management from the point of view of human factors – this is interconnected with the question what implementation processes do businesses chose while implementing process management. Subsequently this is related to the fact that either they want to save more and implement changes only after training or they want to spend more with “seemingly more expensive” but often more effective support of consultants.

The following question was aimed at finding out how companies implement various tools and techniques of process management. The purpose was to determine the extent to which businesses use during the BPM implementation and BPM components their own employees, BPM training courses and consulting companies. In the case of using consulting companies, managers were asked about the area for which the consulting company services were used. Managers, who had answered in the first question that process management is an unknown term to them, did not respond to this question, i.e., the question was answered by only 75% of respondents in the year 2006 (Tuček, Tučková and Hájková, 2013). Respondents had an option of multiple choice answers. The results therefore cannot infer the exact number of businesses using the various interest groups.

Summary results of this question in 2006 are displayed in the following figure and table (Fig. 4 and Tab. 5), from which it is clear that companies implementing BPM tools and techniques use mainly the experience of own employees and knowledge gained in BPM training courses (almost 85% of all responses). Only 15% of responses concerned the possibility of using services of consulting companies. Only 8 of the 22 managers who confirmed the use of external companies specified in greater detail the specialization of the consultancy used (Tab. 2). Most often it was a consultancy focused on improving production processes, specifically, e.g.:

- Problem-solving methodology
- QMS
- Poka –Yoke
- Logistics
- Improvement of production processes
- SMED

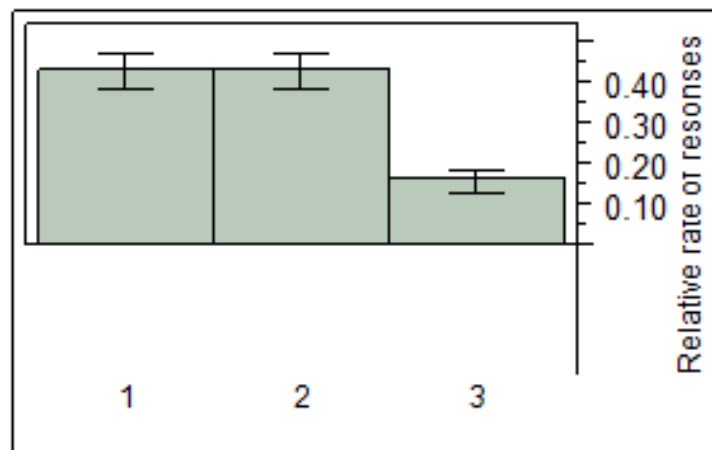


Fig. 3 - Interest group (year 2006). Source: Tuček and Zámečník, 2007.

Tab. 2 - Legend to the previous graph with quantified confidence intervals (year 2006).  
 Source: Tuček and Zámečník, 2007.

Code	Interest group	Number	Proportion of answers	Lower interval	Upper interval
3A	Own employees only	61	42.36%	0.34592	0.505272
3B	BPM training courses	61	42.36%	0.34592	0.505272
3C	Consulting company	22	15.28%	0.103109	0.220491

Confidence intervals (for reliability estimation of  $1 - \alpha = 0.95$ ), multiple answers

The effect of company size on this question appears to be significant. However, it should be noted that the question was not answered by managers for which the BPM is an unknown term, i.e., managers of mostly micro and small enterprises. Since the use of consulting services can be very expensive, it is not surprising that these services are used almost exclusively by medium-sized and large enterprises (Tab. 3). Even more surprising is the fact that micro enterprises make greater use of external consultants in comparison with BPM training courses (Tuček, Tučková and Hájková, 2013).

Tab. 3 - The effect of company size on the use of interest groups in 2006. Source: Tuček and Zámečník, 2007.

Code	Interest group	Micro	Small	Medium-sized	Large	Total
3A	Own employees only	16.39%	14.75%	37.70%	31.15%	1
3B	BPM training courses	4.92%	11.48%	26.23%	57.38%	1
3C	Consulting company	9.09%	0.00%	45.45%	45.45%	1

In comparison with the results of the previous research, there has not been any significant change.

In 2013, a strong dependence was shown between two factors, namely between who supports the use of techniques and tools of process management and the sizes of enterprises (with

respect to the value of  $p\text{-value} = 0,005$  and value of GK gamma over 0,6 which suggests a relatively strong dependence – both of these are listed in Annex C). KT 3 in Annex D additionally illustrates that the categories of small businesses almost entirely rely on the experiences of own employees. On the other hand, a significant majority of huge companies rely on the services of consultants (consultancy companies operating in the company). In the case of industry itself, no dependence was proven.

In the category of large companies, the services of external consultants in 2013, similarly as in 2006, included the following areas:

- Implementation of the requirements of ISO 9001 or ISO 14001, i.e., consultation in retaining the quality management system (Quality Management System – QMS), EFQM;
- Continuous professional training relevant to the selected process areas (e.g., focusing on process teams or problem-solving methodology);
- However companies often focus their interest primarily on process improvement from key and management groups: e.g., finance, manufacturing and sales, logistics, organizational structure and its optimization in relation to process oriented;
- Similarly as in 2006, respondents mentioned external consultancy focused on quality management system;
- Moreover there appeared also consulting based on economic, accounting, legal, and software basis, selected methods of industrial engineering (SMED, poka-yoke), furthermore consulting of design, development, production and sales, robotics, health and safety conditions, fire safety, etc.

## **5 CONCLUSION: THE MAIN REASONS FOR IMPLEMENTING BPM**

Evaluation of question no. 6 contributes to better clarification of an opinion on how process management is perceived by managers. Simultaneously it illustrates the previous questions on what aims are monitored by managers by using process management. Generally, process management is perceived as a strategic change which affects the processes. As the most significant reasons for this change, in 2006 managers specified the following:

- High inefficiency of the process identified (at the level of 0,64)
- Reorganization of the company requiring a different flow of the process (at the level of 0,60).

After the implementation of changes (processes) through process management, the managers considered these reasons as being medium significant:

- Lack of competitiveness of the company;
- Change in IT support process;
- The need to provide a new product or service.

Fig.3 also shows that acquisition factor or merger in the enterprise (asserted during the growth of the company or during acquisition of new companies, i.e., by merging with other company) proved as a little significant (at the level of 0,40). Other elements were reported by managers only marginally.

How has this understanding changed after approximately 7 years?

As it is evident from Table 1, three same reasons have been revealed in the top four list and these were with the highest importance:



- Identification of high inefficiency of the process;
- Reorganization of the company requiring a different process development;
- Lack of competitiveness.

The first place according to importance went to a change of IT support process. It has the highest value of median factor and the lowest for dispersion:  $\tilde{x} = 3,854$ . As can be observed, dispersion is still relatively high (dovzar = 1,204) and modus  $\hat{x} = 4$  refers to the high importance of IT change for managers.

Tab. 4 - The concept of process management (in 2013) –descriptive statistics. Source: own processing.

Answers option	X6.1 Inefficient business processes	X6.2 Reorganization of the company	X6.3 Insufficient competitiveness	X6.4 Change in IT support process	X6.5 Providing of a new product or service	X6.6 Acquisition or merge
Median value	3,500	3,500	3,521	3,853	2,947	2,500
OR	1,290	1,380	1,411	1,271	1,204	1,396
NOR	0,645	0,690	0,706	0,635	0,602	0,698
modus	4	4	4	4	3	1

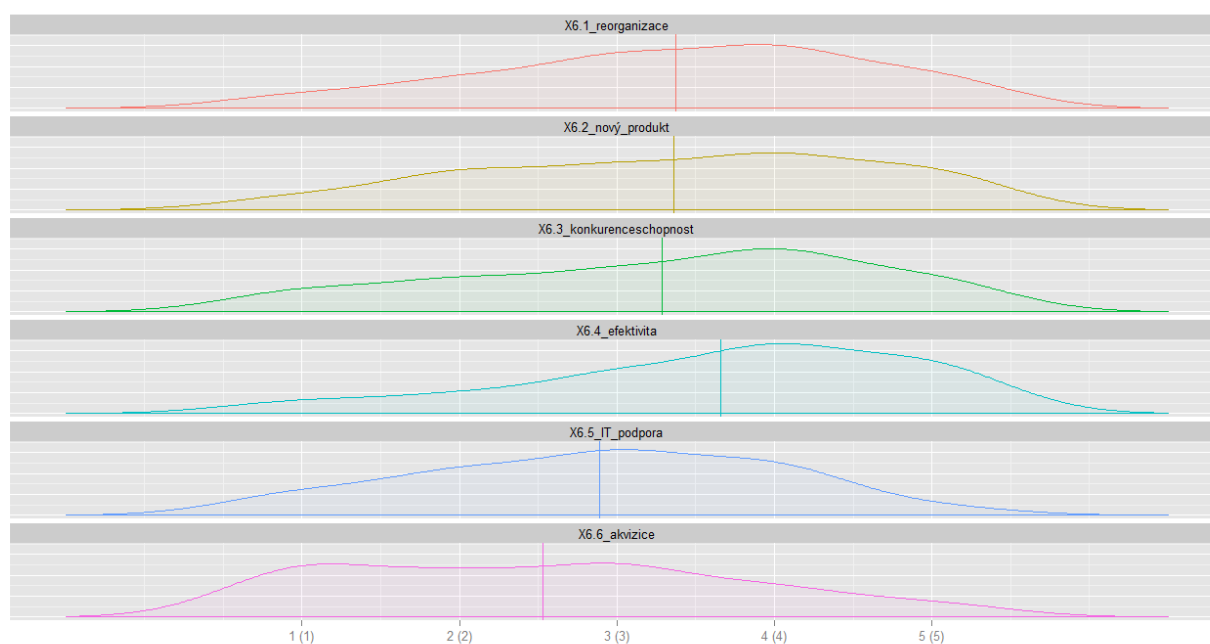


Fig. 4 - The concept of process management (in 2013) –graphical representation. Source: own processing.

Due to the median and modus values given in Tab. 4 and due to the density of responses emerging from graphical representation that is a part of the table, it can be stated that the process with high inefficiency is of a slightly lower importance. Acquisition or merger in the

company (asserted during the growth of the company or during acquisition of new companies, i.e., by merging with other company) has emerged as irrelevant, similarly as in year 2006.

In the case of reorganization of the company that required different process behaviour, the following factors have been demonstrated:

The size of the company and its effect can be interpreted by a statistical hypothesis. It is possible to confirm the alternative hypothesis H1, i.e.: “The size of the company according to the number of its employees (and turnover) is significantly associated with the fact that managers understand and evaluate the impacts of business processes due to reorganization of the company.”

This is the evaluation regarding the second largest sector of process management, i.e., essential components. Its usage in the company feasibly meets the real process management principles. Process engineers sometimes name its summarization as the “Ten commandments”. Its application means real and actual usage of the process approach in practice.

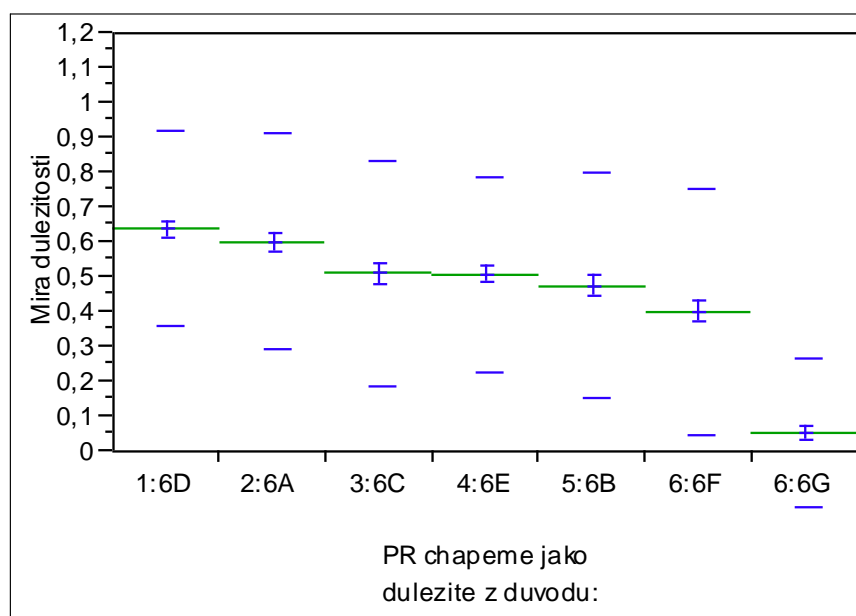


Fig. 5 - Process management approach (2006). Source: Tuček and Zámečník, 2007.

Tab. 5 - Reliability intervals (for estimation reliability  $1 - \alpha = 0,95$ ). Source: Tuček and Zámečník, 2007.

Process management is perceived as important by managers due to these reasons::	Average	Standard deviation	Lower int.	Upper int.
1:6D – inefficient business processes	0,638258	0,280258	0,59000	0,68651
2:6A – reorganization of the company	0,602273	0,308831	0,54910	0,65545
3:6C – lack of competitiveness	0,511364	0,322300	0,45587	0,56686
4:6E – change in IT support process	0,507576	0,277907	0,45972	0,55543
5:6B – providing a new product or service	0,475379	0,325242	0,41938	0,53138
6:6F – acquisition or merge	0,401515	0,351873	0,34093	0,46210
6:6G – other reasons	0,054924	0,214713	0,01795	0,09189

The questionnaire also included the so called control questions, which should confirm some claims of the managers. Examples of these may be found in the second block (Area II) of the questionnaire, i.e., the seventh and eighth questions related mainly to the active usage of the components in process management. These components should be used when managers answered the first question that their company fully or partially uses process management. In other words, the real usage of process management components in our companies is presented in the following paragraphs. Managers reported their opinion on the given topic also in other questions and their opinions were often methodically correct. However, for practical usage only answers for two questions are relevant. These components were formulated as the “Ten Commandments” and were included into the most important components that are essential for practical usage of process management in the company. Specifically, these are the components that were defined on the basis of qualitative and quantitative surveys in 2006 (Tuček and Zámečník, 2007).

If we compare the development of the first survey in 2006, it is clear from Fig. 5 that the highest importance is attached to the following principles:

- management of authorities that is seen as a system enabling to assign a role in individual processes (key and managerial) by such employees who have adequate knowledge and skills (at the level of 0,74);
- information technology in the company that leads to support of processes (at the level of 0,72).

In 2006, in the category of small businesses the lower importance was shown in the usage of information technologies for process support (at the level of 0,65), while in investigating large businesses in 2006, it was the principle with the largest weight.

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## **PERFORMANCE OF TOURISM IN THE CZECH REPUBLIC**

*Zuzana Tučková, Zuzana Jurigová, Monika Palatková*

### **Abstract**

The growing living standards of people along with the value of leisure time have caused that tourism has become a matter of a wider range of people. It has become one of the most dynamic and fastest growing industries and compared to industries such as automobile or chemical industry, area of tourism can be perceived at the same level. Its development is often associated with the economic growth, development of transport, infrastructure, growing living standards along with the related motivation to travel. Not only for these reasons is tourism taken as a key element of the national economy. It touches a number of sectors and through these sectors it penetrates to a variety of human activities. Vital role of tourism resides in its influence on region since it affects the flow of investment, job creation and it increases the qualification of workforce along with promotion of business activities. For these reasons, managers and stakeholders have to quantify performance and competitiveness of tourism in each destination in order to make it sustainable for future business activities. The purpose of this conference paper is to assess the above mentioned position of tourism by economic factors within the Czech Republic. Though, the paper investigates the performance of tourism in the Czech Republic through selected economic indicators. These economic indicators do not only describe performance of tourism in the Czech Republic but moreover they should give an insight into the relevance of the tourism industry in the Czech Republic and its overall position.

*Keywords: tourism, competitiveness, outbound, inbound, Czech Republic, performance*

JEL Classification: L8

### **1 OBJECTIVE AND METHODOLOGY**

Main objective of this paper is to provide the reader with basic economic indicators of tourism in the Czech Republic since such elaborated summarization of basic Czech tourism indicators is theoretically missing. These indicators serve as measuring performance tool of Czech tourism. Firstly, general importance of tourism is described as a preface to subsequently used economic indicators. With respect to methodology of this paper, researched data are based on own research using relevant expert sources, namely Tourism Satellite Account of the Czech Republic, Czech Statistical Office, Czech National Bank and Economic Data Search Tool by The World Travel and Tourism Council. These data are subsequently analysed and grouped into transparent tables.

### **2 THE IMPORTANCE OF TOURISM**

According to the WTO (World Trade Organization): “tourism comprises the activities of persons travelling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business and other purposes“. (Holloway and Taylor, 2006, p. 6)

Travelling exists as long as humanity itself, but tourism, as we understand it today, began to develop in the 17th and 18th century. It dealt with journeys of noblemen and young apprentices for work experience. Here the first mention about the guiding is also evident.

Tourism in its massive form appeared in the second half of the 19th century. However, its greatest expansion achieved its highest point after the WW II and especially in the last three decades. (Petru, 1999, p. 5) Due to various political changes and consequently a greater freedom, freer movement of people, a desire to travel, to discover new places and to relax, tourism has become one of the fastest growing sectors in the recent years. The formation and development of tourism is associated with satisfaction of two main basic needs - the need for rest/relaxation and the need for knowledge. Over time these needs expanded and today these needs have expanded into more forms. It is also perceived as a kind of fashion and a way of life style. The tourism industry in general includes: boarding services, accommodation services, transport, information, money exchange, services of travel agencies, sports and recreational services, cultural and social tourist services, entertainment services, congress services, spa services, rural tourism services and other activities associated with these services. (Čertík et al., 2001, p. 16).

Tourism is divided into many sectors and it has become increasingly more involved in the formation of GDP and the employment on one side and on the other side it also participates in the preservation of cultural, artistic and historical monuments. (Kiráľová, 2003, p. 9)

In various literature sources, there may appear different definitions of tourism. For instance, in 1942 Hunziker and Krapf defined tourism as “the sum of the phenomena and relationships arising from the travel and stay of non-residents, insofar as they do not lead to permanent residence and are not connected with any earning activity”. (Hunziker and Krapf, 1942). Horner and Swarbrooke (2003) describe tourism as the activity concerning other areas such as accommodation, food and beverage or transportation. In other words, tourism dependence on other economic activities is very strong and this field can not be taken separately. Horner and Swarbrooke (2003) add that the relationship between tourism, leisure services and accommodation or food services is interconnected. However, tourism is taken as an activity, leisure is taken as a time-framed concept and accommodation along with food and beverage belongs to category of ensuring services. Collins (1994) perceives tourism as a company that offers goods and services such as cinema or theater to people during their free time. From this point of view, Collins combines all three, previously mentioned, areas of tourism.

Nowadays the official definition of tourism is given by the World Travel Organization which characterizes tourism as “a social, cultural and economic phenomenon which entails the movement of people to countries or places outside their usual environment for personal or business/professional purposes. These people are called visitors (which may be either tourists or excursionists; residents or non-residents) and tourism has to do with their activities, some of which imply tourism expenditure.” (UNWTO, 2007)

Tourism characteristics must fulfil basic attributes and subsequently the tourism can be formulated into this definition:

- Freedom of movement
- Free resources
- Free time (Palatková a Zichová, 2011, s. 13)

Tourism is a matter of examination from different science fields. It can be examined from economic, geographic, social, psychological or even pedagogical point of view creating disciplines which focus on tourism from different perspectives. These perspectives can be namely tourism economy, tourism psychology, and tourism geography or tourism sociology. People also use different terms to describe tourism, however these are equal to tourism. They might refer to tourism as recreation, relaxation, touring, dispersion or distraction.



## **2.1 Specifications of tourism**

Tourism is not an exception and as well as all other sectors, it has some specific characteristics.

### **The main specifications are:**

- Tourism development is influenced by political and administrative conditions
- Tourism product is not possible to make in advance
- Connection between location and its quality
- Seasonality
- Tourism market is influenced by national resources and by unpredictable sources
- High share of human labour
- Close relation between demand and supply
- Demand relies on disposable income, free time of people and price level of offered services (Jakubíková et. al, 2009, p. 22)

Due to these various specifications of tourism, tourism is categorized into several forms. The categorization can be for example domestic (tourism involves only residents of the country to travel within the country, Slovaks travelling only in Slovakia) or inbound tourism (foreigners coming to the country, e.g. French coming to Slovakia), transit (represented by passing of tourists through a country which is not a destination with a stop) or outbound tourism (involves residents travelling to different countries, e.g. Slovaks travelling to France, Kunešová, 2004, p. 5). Further tourism can be categorized according to the balance of payment (active vs. passive), taking part through the year (year-long, seasonal) or according to sustainability (mass, ecological). Far more classification of tourism describing its purpose exist, however these are the most frequent ones.

## **2.2 The importance of tourism in national economics**

To assess tourism impact on the Czech national economy, two complex tools can be used. Firstly, the balance of payment (BP) recording international tourism of the Czech Republic and secondly, the official and/or unofficial tourism satellite account (TSA) dealing with the set of indicators, esp. tourism impact on the GDP and employment. The official tourism satellite account is created by the Czech statistical office (CSO) while the unofficial tourism satellite account is developed by the World Travel and Tourism Council (WTTC).

Different methods can be used to evaluate the impact of tourism, accepting the fact that tourism can affect the physical, socio-cultural and economic environment in positive as well as in negative way. According to Freyer (2001, p. 316–353), five approaches how to assess tourism impact can be defined:

1. Statistical assessment (statistical monitoring as a basis for further approaches).
2. Economic and financial assessment (economic aspects of tourism).
3. Individual assessment (personality with needs, motivation and consumption/consumer behaviour).
4. Socio-cultural assessment (socio-cultural impact of tourism on the residents and visitors).
5. Global assessment based on the balance of payment (Czech National Bank) and tourism satellite account (Czech Statistical Office and/or WTTC).

Focusing on economic and financial assessment, the magic quadrangle can be used as the basic framework covering the principal macroeconomic indicators, namely GDP / GNI

(economic growth), (un)employment, stable price level (inflation) and external economic balance.

Thus, the analysis of tourism impact on the Czech national economy is primarily the analysis of tourism and the mentioned macroeconomic indicators. Apart from the four mentioned indicators, tourism impact on public budget (receipts and expenditures), capital investment, social development indicators, physical environment, regional development, international trade, exchange rate, foreign direct investment and other fields can be analysed to achieve complex view on tourism impact. Despite of possible complex of connected fields of research and analysis, the set of five indicators has been chosen for purposes of this paper.

The direct, indirect and induced tourism impact has to be distinguished. At present time the Czech official TSA calculates the direct impact either on GDP or on employment only. The unofficial TSA (WTTC) calculates the direct, indirect and induced impact. The direct contribution to GDP/employment is generated by branches that are in direct contact with the visitors (hotels, tour operators, airlines, restaurants and other). The total contribution to GDP/employment means a total of direct, indirect and induced contribution. The indirect contribution to GDP/employment is connected with capital investment, government collective spending and supply-chain effects (purchases of domestic goods and services directly by different branches of the Travel & Tourism sector are taken as inputs to their final tourism output). Induced contribution to GDP/employment covers the additional contribution to GDP/employment generated by spending of employees either directly or indirectly employed by Travel & Tourism (WTTC, 2014).

Tab. 1 - Key economic indicators for the Czech Republic. Source: World Economic Forum. (2013)

Population (millions), 2013	10.9
Surface area (1,000 square kilometers)	78.9
Gross domestic product (US\$ billions), 2013	192.2
Gross domestic product (PPP, US\$) per capita, 2013	18.288
Visitors in 2013 (million)	8.77

### **3 ANALYSIS OF TOURISM IN THE CZECH REPUBLIC**

#### **3.1 Travel & Tourism direct and total contribution to GDP**

GDP represents the financial value of all finished goods and services produced within a country's borders in a specific time period. Though, GDP is usually calculated on an annual basis. It includes all private and public consumption, government outlays, investments and exports less than imports that occur within a defined territory. The direct GDP covers the products/activities produced in the direct branches connected with tourism industry. The indirect GDP is produced in related branches, usually the suppliers to the direct branches. The methodology uses the official services classification of products/activities and related branches (e. g. NACE, SNA – CPC, ISIC).

The data of the CSO and WTTC can be used to analyse the tourism impact on the GDP. The framework methodology is the same and it is based on the IRTS 2008 (International Recommendations for Tourism Statistics) and TSA: RMF 2008 (Tourism Satellite Account: Recommended Methodological Framework). The difference is that the CSO calculates the

TSA with the usage of national accounting whereas WTTC uses the econometric modelling. Surprisingly, the data of the direct tourism impact on GDP are very close to each other as shown in table 1 and table 2.

Tab. 2 - Direct and indirect Travel & Tourism contribution to GDP in the Czech Republic (WTTC) Source: own table based on the Economic Data Search Tool (WTTC)

<b>Czech Republic</b>	<b>1990</b>	<b>1995</b>	<b>2000</b>	<b>2005</b>	<b>2008</b>	<b>2010</b>	<b>2013</b>	<b>2020</b>
<b>Travel &amp; Tourism Direct Contribution to GDP</b>								
US\$ bn	0,483	1,757	2,191	4,351	6,662	5,816	5,636	7,725
Real growth (%)	-10,5	-7,6	18,6	7,9	-3	-0,3	1,4	2,2
% share	2,4	3	3,7	3,3	2,9	2,9	2,8	3
<b>Travel &amp; Tourism Total Contribution to GDP</b>								
US\$ bn	1,368	5,157	6,562	12,801	20,18	17,26	16,65	22,24
Real growth (%)	-8,4	-4	20,8	7,2	0,6	-4,1	1,6	1,9
% share	6,9	8,9	11,1	9,8	8,9	8,7	8,4	8,9

In 2013 the value of goods and services produced by direct branches reached 2,8 % of total GDP produced in the Czech Republic. The total impact of tourism on the GDP was amounted to 8,4 %. Despite the absolute growth of GDP generated in Travel & Tourism, relative share and importance of tourism in the Czech economy is rather diminishing. One reason is the financial and economic crises affecting tourism in the Czech Republic. In a long-term period, the (export) tourism performance lags behind the (export) performance of other branches in the Czech economy. The estimation for 2020 envisages a slight increase of tourism contribution to 3,0 % and 8,9 % respectively.

Similar trend of reducing the economic impact of tourism on GDP is clearly visible in table 3. The maximum reached in 2004 (3,6 %) was diminishing and since 2010 the direct tourism contribution calculated by the CSO has remain at the share of 2,7 %. The conclusion regarding weakening significance of tourism in the Czech economy is underlined by the development of tourism taxes. The total tourism taxes dropped by 30 % in 2004 – 2010 due to slow down of tourism demand and due to “the optimisation” of taxing.

Tab. 3 - Direct Tourism contribution to GDP in the Czech Republic (official TSA)

<b>Czech Republic</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011<sup>1</sup></b>	<b>2012<sup>2</sup></b>
GDP (total) in CZK bn	2 596	2 814	2 987	3 226	3 539	3 693	3 630	3 779	3 845	
Tourism taxes in CZK bn	10,8	18,6	17,4	15,5	16,8	17	15,9	12,9	13,5	14,1
Tourism taxes in CZK bn	90,8	102,3	99,1	100	103,1	103,5	104,3	100,3	102,3	102,6
Tourism ratio on GDP (%)	3,5%	3,6%	3,3%	3,1%	2,9%	2,8%	2,9%	2,7%	2,7%	2,7%

<sup>1</sup>)Semi-definitive data, <sup>2</sup>) Preliminary data

Source: own table based on the TSA of the Czech Republic (CSO)

### 3.2 Travel & Tourism direct and total contribution to employment

Jobs creation and tourism is a real issue in modern tourism theory. Commonly, the positive impact of tourism on the number of jobs is emphasized. However, it is emphasized without admitting that the quality of tourism jobs is simply lower compared to other branches (e. g. information technologies, banking or financial operation). Nevertheless, the effect of tourism as a job creator not only at the national, but also at the regional and local level is significant (table 3).

Similarly to the GDP the direct, indirect and induced effects of tourism on employment are monitored. WTTC (table 4) calculates almost 250 thousand direct working places generated in tourism in the Czech Republic. Total number covering direct, indirect and induced working places exceeds 510 thousand. Approximately, 5,5 % of employees in the Czech economy are engaged in Travel & Tourism directly and the total contribution of tourism to employment surpassed 10 % in 2013.

Tab. 4 - Direct and indirect Travel & Tourism contribution to employment in the Czech Republic (WTTC) Source: own table based on the Economic Data Search Tool (WTTC)

<b>Czech Republic</b>	<b>1990</b>	<b>1995</b>	<b>2000</b>	<b>2005</b>	<b>2008</b>	<b>2010</b>	<b>2013</b>	<b>2020</b>
<b>Travel &amp; Tourism Direct Contribution to Employment</b>								
Real growth (%)	-9,7	-8,2	13,1	11,1	0,6	0,4	3,2	-0,1
% share	3,5	4,5	5,5	5,2	5,3	5,3	5	5,6
'000	190	225,1	260,4	248,9	265,2	260,9	248,4	286,4
<b>Travel &amp; Tourism Total Contribution to Employment</b>								
Real growth (%)	-8,1	-7,3	15,9	5,8	1	-4,6	3,4	-0,5
% share	7,8	10,1	12,5	11,4	11,1	10,9	10,3	11,2

The highest absolute and relative tourism impact on employment was recorded approximately in 2000. Since then, the importance of tourism is slightly decreasing. The estimation of WTTC expects moderate increase in 2020 to 5,6 % in direct impact and 11,2 % in total impact.

Tab. 5 - Direct Tourism contribution to employment in the Czech Republic (official TSA) Source: own table based on the TSA of the Czech Republic (CSO)

<b>Czech Republic</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011<sup>1</sup></b>	<b>2012<sup>2</sup></b>
Number of people employed in tourism ('000)	237,8	236,6	236,7	235,9	236	241,2	239,5	235,6	232,5	231,1
Tourism ration on total employment - people employed	4,8%	4,8%	4,7%	4,6%	4,5%	4,6%	4,6%	4,7%	4,6%	4,6%
Number of working places in tourism ('000)*	233,5	232,9	233,7	231,5	233,5	236,4	236,6	232,1	229,2	227,7
Tourism ration on total employment - jobs (%)	4,7%	4,7%	4,7%	4,6%	4,5%	4,5%	4,6%	4,6%	4,6%	4,5%

<sup>1</sup>)Semi-definitive data, <sup>2</sup>) Preliminary data

\*Number of jobs in full-time equivalents

For analysing of the quantity and quality of employment in tourism, the data of the CSO can be applied. The basic data are summarized in table 5. Moreover, the insight into the employment quality in terms of education, age, gender, nationality and other attributes of tourism employment provides highly-valued information. The rate of direct employment in tourism in the Czech Republic oscillates between 4,5 – 4,8 % in last decade, but the trend is rather decreasing. According to the official TSA, 4,5 % of jobs were generated by tourism in 2012.

### **3.3 Visitor Exports (tourism income)**

According to the methodology of WTTC, visitor exports represent the expenditure within the country by international visitors for both business and leisure purposes (e. g. spending on accommodation, transport, but excluding education). Since the 90's, the dynamics of incoming tourism in the Czech Republic was high and the performance of other branches was relatively lower. The amount of visitor exports was growing up until 2000. However, the trend is negative in the last decades. In 2013, the unofficial satellite account states more than 7,6 USD bn of visitor exports with projection for further growth.

Tab. 6 - Visitor exports in the Czech Republic (WTTC) Source: own table based on the Economic Data Search Tool (WTTC)

<b>Czech Republic</b>	<b>1990</b>	<b>1995</b>	<b>2000</b>	<b>2005</b>	<b>2008</b>	<b>2010</b>	<b>2013</b>	<b>2020</b>
<b>Visitor Exports (total inbound tourism expenditure)</b>								
US\$ bn	0,407	2,796	2,887	5,574	8,532	7,682	7,645	10,916
Real growth (%)	-22,2	-2,9	3,8	9,5	-5,5	2,4	0	1,7
% share	5,3	10	8	6,6	5,8	5,8	4,9	4,8

As a supplementary source of information on visitor exports, the Czech balance of payment (Czech National Bank) can be analysed as shown in Figure 1. Concerning the importance of tourism export and import compared to the volume of export of goods and services, the peak was reached in second half of 90's. The proportion of foreign tourism receipts to export of goods got to 19 % and its proportion to export of services exceeded 50 %. Since 1996 – 1998 the weight of tourism in international trade of the Czech Republic was declining. The recent values of the mentioned indicators (2013) are amounted to 5,2 % and 31,5 % respectively. The analogous trend is relevant for tourism import (outgoing tourism).

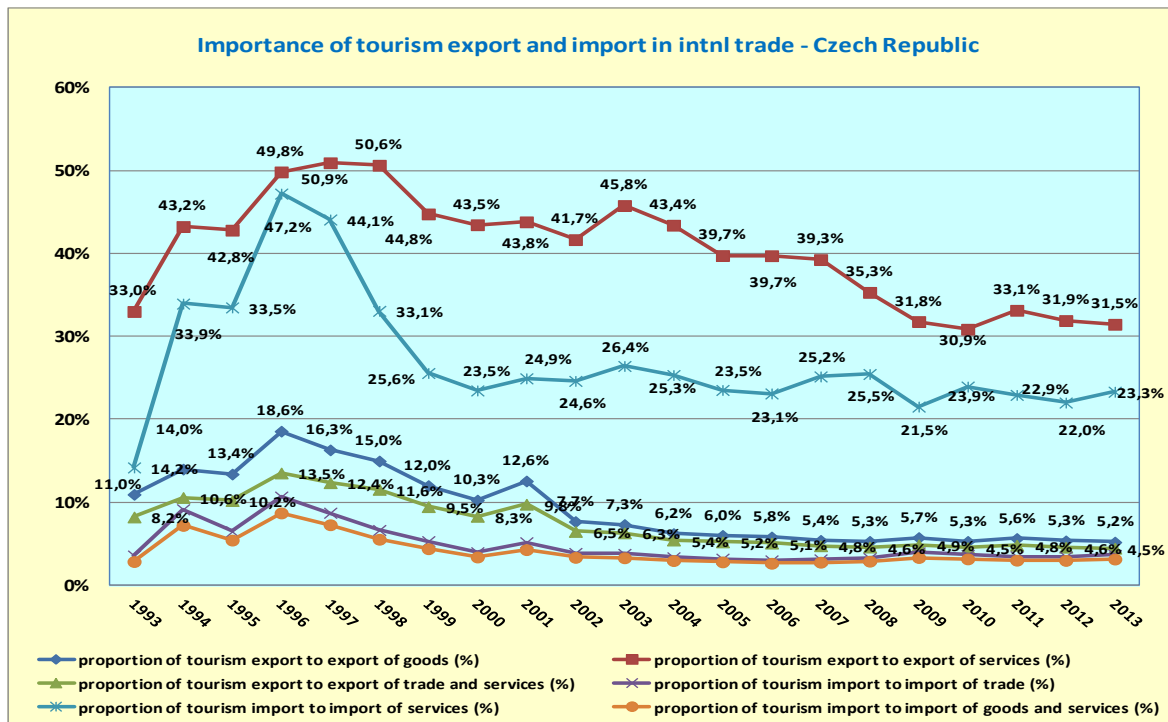


Fig. 1 - Importance of tourism export and import in international trade in the Czech Republic (1993 - 2013) Source: own figure based on data recorded in balance of payment (Czech National Bank)

### 3.4 Domestic Travel & Tourism spending

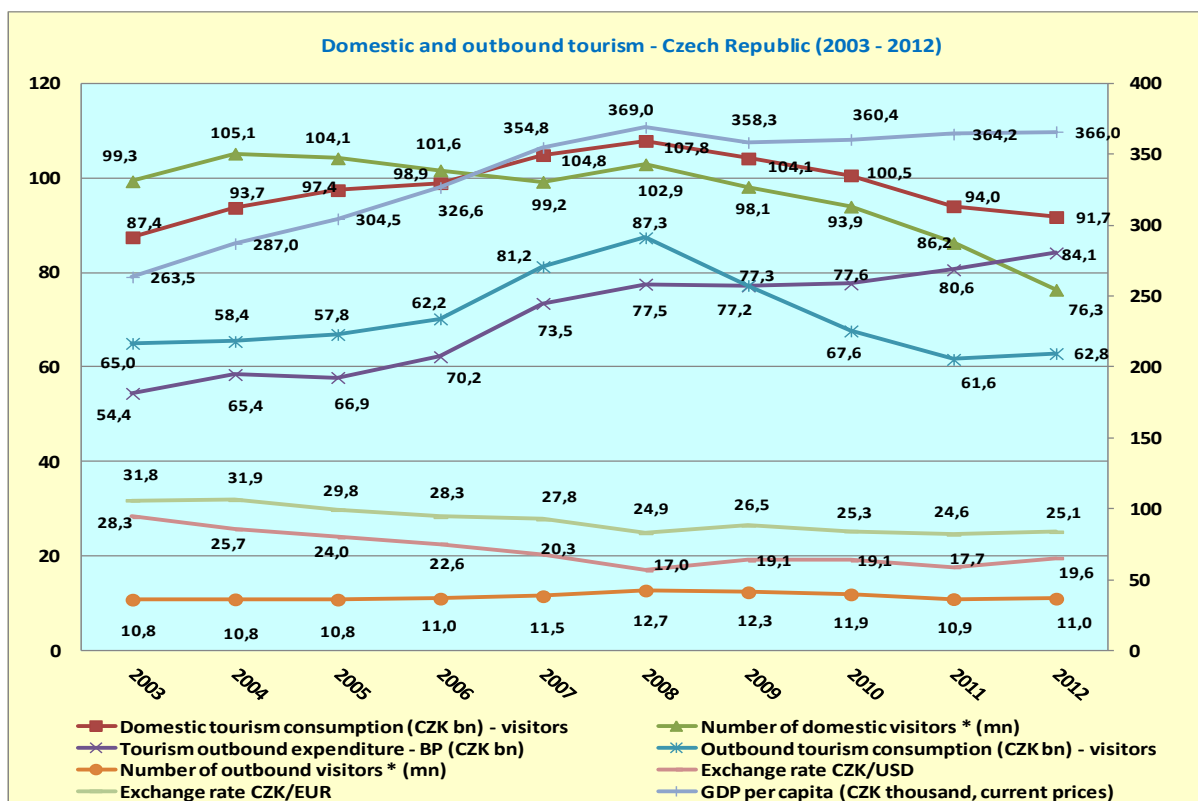
The indicator of domestic travel and tourism spending comprises spending within a country by country's residents on domestic trips and the expenditure within the economy of reference of visitors that undertake outbound trips. The outbound spending outside the country is fully aligned with the total outbound tourism and is separately recorded according to the TSA: RMF 2008.

Tab. 7 - Domestic Travel & Tourism spending in the Czech Republic (WTTC)  
Source: own table based on the Economic Data Search Tool (WTTC)

Czech Republic	1990	1995	2000	2005	2008	2010	2013	2020
<b>Domestic Travel &amp; Tourism Spending</b>								
US\$ bn	0,768	1,426	2,106	4,066	6,316	5,264	4,993	6,567
Real growth (%)	-3,3	-20	22,9	4,3	0,9	-1,8	2,7	3,3
% share	3,9	2,4	3,5	3,1	2,8	2,6	2,5	2,6

Since the 90's, dynamic change in the domestic travel and tourism spending is documented in the table 7. Thanks to the positive development of Czech economy and strengthening of the Czech crown (CZK) in 2003 – 2008, the outbound spending realized within the Czech economy increased significantly. After 2009, the domestic spending dropped to approx. 5 bn USD in 2003 due to slowing down of consumption in domestic as well as outbound tourism. The indicators of domestic and outbound tourism illustrating the development in the period 2003 – 2012 are depicted in figure 2. Domestic and outbound tourism consumption was increasing up to 2008 to 107,8 bn CZK and 87,3 bn CZK respectively. Since 2009, the financial indicators of domestic and especially outbound tourism slumped to their minimal value in 2011 and 2012 due to slackening of economic growth, increasing unemployment rate

and weakening exchange rate of CZK to EUR and USD. By contrast, the tourism outbound expenditure recorded in balance of payment was continually growing up to 84 bn CZK in 2012. Number of outbound visitors got at its maximum in 2008 (12,7 mn outbound visitors), but afterwards it declined to 10,9 mn visitors (2011). The dramatic fall can be detected in number of domestic visitors that was diminishing from 105,1 mn (2004) to 76,3 mn in 2012 esp. due to decrease of number of tourists by approx. 20 %.



\* Number of visitors = tourists + excursionists + tourists on business trips

Fig. 2 - Domestic and outbound tourism in the Czech Republic (2003 – 2012) Source: own figure based on data of CSO (incl. TSA) and Czech National Bank (BP), own figure based on data of CSO (TSA).

## 4 INBOUND AND OUTBOUND TOURISM IN FIGURES

The general view in Fig.2 shows the development of the number of tourists, excursionists and total number of inbound, domestic and outbound visitors in the Czech Republic as calculated in the official TSA. The peak in terms of number of trips and overnights in the mentioned categories of visitors was reached in 2008. The previous positive trend was interrupted by the financial and economic crises and the domestic, inbound and outbound demand had declined.

### 4.1 Inbound Tourism

The inbound basic indicators have been focused on number of arrivals and overnights in collective accommodation establishments (CAE) as well as on consumption (visitors, tourists, excursionists). Receipts recorded in balance of payment are summarized in table 8. Range of economic, political, cultural, social, and legislative and other factors influencing inbound tourism in the last decades up to now are worth of mentioning:

- defining and formalizing of the national tourism policy (Ministry for Regional Development),

- marketing activities realised by the Czech national tourism organisation (CzechTourism),
- accession of the Czech Republic in the EU (May 1<sup>st</sup> 2004),
- joining the Schengen area (December 21<sup>th</sup> 2007),
- acquisition of EU funding focusing tourism development in Czech regions,
- liberalisation of European air transport and booming operations of low cost airlines,
- financial and economic crises in 2008/2009 and their negative impact on slumping the demand abroad in following period,
- economic trouble in most of main source markets esp. in Western Europe hit by global economic crises and by internal financial imbalances,
- dynamic increase of arrivals from emerging markets (e. g. South Korea, China, Brazil, Russia, Ukraine, India) due to their growing economic power,
- strengthening of CZK to EUR and USD till 2008,
- decreasing of price competitiveness of the Czech Republic,
- increasing demands and requirements of inbound visitors on quality and structure of the tourist product,
- shift of the prevailing economic motivation influencing the demand to non-economic factors,
- adapting of Czech national legislation to European legislative acts (esp. directives and regulations),
- competition of cheaper and/or high-quality international destinations,
- development of tourist infrastructure in terms of quantity and quality in the Czech Republic (Czech regions),
- natural disasters, more specifically in the form of floods (2002),
- external influence, esp. downswing of internal demand after September 11<sup>th</sup> 2001, the potential conflict between Russia and Ukraine (2014).

Tab. 8 - Inbound tourism in the Czech Republic (2000 – 2013) Source: own table based on data of CSO (incl. TSA) and Czech National Bank (BP)

<b>Inbound tourism indicator</b>	<b>2000</b>	<b>2005</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
Inbound receipts (BP) in USD bn	2,9	4,6	7,7	7,0	7,1	7,7	7,0	7,1
Inbound consumption (CZK bn) visitors	na	138,0	136,5	125,1	113,5	114,7	119,0	x
Inbound consumption (CZK bn) tourists	na	97,1	90,8	83,8	81,1	80,6	83,8	x
Inb. consumptions (CZK bn) excursionists	na	25,4	27,3	23,8	16,3	17,5	19,4	x
Inbound visitors (mn)	na	24,7	26,6	23,3	21,9	22,8	24,1	x
Inbound tourists (mn)	na	9,4	10,1	8,8	8,6	9,0	9,5	x
Inbound excursionists (mn)	na	15,3	16,5	14,4	13,3	13,8	14,6	x
Inbound arrivals in CAE (mn)	4,9	6,3	6,7	6,0	6,3	6,7	7,2	7,3
Inbound overnights in a CAE (mn)	16,5	19,6	20,0	17,7	18,4	19,4	20,5	20,7



The regional spread of the foreign demand is one of the issues of inbound tourism to the Czech Republic since 90's. Prague is the key destination attracting 65 % arrivals and almost 60 % overnights in the collective accommodation establishments. The region of Karlovy Vary, South Moravia and South Bohemia keep between 5 – 10 % of arrivals and overnights each.

Since 90's, the inbound market portfolio of the Czech Republic has changed. Although the European markets still dominate in terms of arrivals and overnights, the new emerging markets has become the most dynamic part of the portfolio in last decade. The portfolio is much diversified, even fragmented. The biggest share (19 %) holds Germany, Russia is placed at second (10 %) position, Slovakia at third (5 %), Poland (5 %) at fourth and USA (5 %) at fifth rank. The share of Hungary is approximately 1,6 % (115 thousand arrivals).

#### **4.2 Outbound Tourism**

The principal outbound tourism indicators are listed in table 9, showing the development in period 2000 – 2013. In 2003 – 2008 the outbound demand rose dynamically thanks to the advantageous development of CZK exchange rate and prosperous development of Czech economy. The mentioned period was characterised by the quantitative changes, but also qualitative progress of the Czech outbound market mainly in terms of consumer behaviour.

After 2008, the outbound consumption and number of visitors were affected by economic and financial crisis and by worse performance of the Czech economy. The price sensitivity and income sensitivity of outbound demand is obvious, thus the economic factors influencing the outbound demand prevail over the non-economic factors. Nevertheless, during the monitored period, the Czech visitors turned into more demanding and experienced clients requiring a broad range of high-quality tourism services, esp. accommodation and transport services.

Tab. 9 - Outbound tourism in the Czech Republic 2000 – 2013 Source: own table based on data from official TSA (CSO) and Balance of payment statistics (CNB)

<b>Outbound tourism indicator</b>	<b>2000</b>	<b>2005</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>
Outbound expenditures (BP) in CZK bn	49,4	57,8	77,5	77,2	77,6	80,6	84,1	89,9
Outbound consumption (CZK bn) visitors	Na	66,9	87,3	77,3	67,6	61,6	62,8	x
Outbound consumption (CZK bn) tourists	Na	45,4	61,5	53,7	45,0	42,3	44,8	x
Out. consumptions (CZK bn) excursionists	Na	2,9	3,9	3,9	3,7	3,4	4,1	x
Outbound visitors (mn)	Na	10,8	12,7	12,3	11,9	10,9	11,0	x
Outbound tourists (mn)	Na	8,3	9,7	8,9	8,7	7,9	7,9	x
Outbound excursionists (mn)	Na	2,5	3,0	3,4	3,2	3,0	3,1	x
Outbound long trips (thousand)	2,6	4,4	5,0	4,5	4,3	4,3	4,4	4,2
Overnights on outbound long trips (thousand)	Na	38,3	46,0	39,3	38,0	34,7	36,3	35,1
Outbound short trips (thousand)	0,5	1,0	1,5	1,3	1,3	1,0	1,1	1,1

*\* Long trips = Trips at 4 or more overnights, Short trips = trips at 1 - 3 overnights  
(methodological changes in 2003, 2009 and 2011)*

*\*\* Number of visitors = tourists + excursionists + tourists on business trips*

The structure of Czech outbound destinations shows the significant share. 19 % of Czech clients travel to Croatia followed by Italy (12 %) and Slovakia (12 %). Greece, Austria and Turkey take the share of 8 % and 7 % respectively. In 2013, Czechs made 90 thousand trips to Hungary (532 thousand of overnights).

#### **4.3 Domestic Tourism**

In the last decade figures on domestic tourism indicate rather hesitating development of domestic demand. The top level of domestic demand was reached in 2008 ensued by decrease of most of the indicators. Only in 2012 and 2013 first sign of recovery can be found out. Despite of starting the positive trend, high dynamic of domestic demand can not be expected in the future. The domestic tourism has been changed primarily in qualitative way and further qualitative changes can be expected in coming years. It can be generated by increasing requirements of domestic clients as well as by increasing level of quality and widening choice of services.

## **5 CONCLUSION**

The previous analysis of chosen indicators of tourism economic importance in the Czech Republic in period 1990 – 2013 can be summarized in the following way.

The absolute figures of Czech tourism export receipts and import expenditure were continuously increasing except for some years. When looking at the dynamic of import expenditure, it is higher than the dynamic of export receipts. The relative importance of tourism in international business relations has been decreasing since the end of 90's and despite the absolute growth of GDP and employment generated by tourism in the Czech economy its relative share on total GDP and employment is diminishing. In terms of employment, the qualitative aspects have to be analysed within education, age, nationality and other qualitative attributes of employment,

The share of tourism capital investment is stagnating around 4 % in the total capita investment in the Czech Republic in long-term, but its absolute worth does not show unambiguous trend in the monitored period,

The national tourism policy 2014 – 2020 was launched and approved by Czech government, having in mind the strategic vision and strategic goal for the mentioned period. The strategic vision "Destination Czech Republic – the number one in heart of Europe" is followed by the strategic goal focusing increasing of the competitiveness of tourism at the national and regional level and maintenance of its economic performance as the result of equilibrium among economic, socio-cultural, environmental and regional development. Current tourism policy is primarily dealing with a plenty of problems and challenges. One of them are issues related to systemic development of destination marketing management – institutions, power and competencies in tourism, effective and efficient financing. More concretely, European financing and its measurability is taken as up-to-date topic since the role of tourism in regional and social development grows.

Destination marketing activities will be backed up by product development, product distribution and marketing communication. Quality of tourism services will be more based on knowledge and innovation management. Last but not least future change of tourism will be connected with the cooperation and partnership between private and public sectors in order to make the destination more competitive. To sum up all tourism challenges and future policy,

tourism will have to become more sustainable in order to preserve its function and competitiveness for future functioning.

The position of the Czech Republic in the international comparison prepared by World Economic Forum got worse since 2009 (26th rank) to 2013 (31st rank). Compared to V4 countries and to Germany and Austria, the competitiveness index TPCI of the Czech Republic achieved better evaluation than Hungary (39th), Poland (42nd) and Slovakia (54th), but substantially worse result than Germany (2nd) or Austria (3rd). In the V4 group Hungary is the immediate competitor to the Czech Republic or rather Budapest to Vienna in the city tourism market.

In-depth view into particular competitiveness indicators bring following findings on strengths (higher competitiveness rating) and weaknesses (low rating) of the Czech Republic compared to other mentioned destinations.

Competitiveness along with outbound, inbound and domestic tourism represents statistical data that compare the economic situation of tourism to other world destinations, or states. It significantly contributes to employment and GDP which is further mirrored in the overall economic situation of the Czech Republic. All three characteristics were introduced in this article in order to prove the financial importance of tourism in the Czech Republic.

### **Acknowledgement**

This article has been elaborated also as one of the outcomes of the research project IGA/FaME/2014/015.

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## **FINANCIAL RISK MANAGEMENT IN THE SME SEGMENT IN THE CZECH REPUBLIC**

*Zuzana Virglerová*

### **Abstract**

The aim of this article is to examine the level of financial risk management and the evaluation of Czech managers of their ability to manage these risks properly. In order to do so, entrepreneurs of small and medium-sized enterprises (SME) from a selected region of the Czech Republic were surveyed. The results of this survey were then compared to a similar survey conducted in a selected region of Slovakia. The results show the entrepreneurs in both countries have a similar approach to the financial risk management and share a similar opinion on their ability to manage these risks properly. However, the profitability of their companies has decreased in the current crisis what could be caused exactly by overestimating their own skills in the field of the financial risk management or the poor management of other risks impacting the financial risks afterwards.

*Keywords: Risk Management, SME, Crisis, Risks*

JEL Classification: G32, L26, O16

### **1 INTRODUCTION**

Small and medium-sized enterprises (SME) are without a doubt an essential part of every market economy (Karpak a Topcu, 2010). In line with that Henderson and Weiler (2010) state that SME could be characterised as the most important catalyst for economic growth. 99 % of all companies are from the SME segment in the European Union and the USA (Bhaird, 2010). The key of their success is their business orientation (Brockman, Jones, Becherer, 2012). Soinen, Martikainen, Puumalainen and Kyläheiko (2012) consider innovativeness, risk acceptance and active approach as the base of business orientation. Lumpkin and Dess (1996) add aggressive competitive approach and the entrepreneurs' autonomy.

The SME activity is endangered by many risks. It is vital for entrepreneurs to continually evaluate all the possible risks and to pay the same level of attention to decisions in this field as they pay to decisions in any other field. (Čunderlík and Rybárová, 2002). In fact, every decision poses a risk to a company. For example, Kramoliš (2014) stated that the companies and businesses in the Czech Republic are quite well-oriented in the field of the marketing theory of Product Life Cycle. It means they try to decrease a risk of market failure.

The conclusion of a broad international study of The Economist Intelligence Unit and Dun & Bradstreet (Riadenie odberateľských a dodavatelských rizík, 2013) is that companies that not only manage the business risks but also regularly evaluate such management obtain better results. Omitting a systematic approach forces the companies to solve problems as they appear. Whereas the management of financial risks (e.g. currency or interest rate risks) and customer credit risk is quite wide-spread, companies pay much less attention to other risks, such as supplier risks or the reputation loss risk. Nevertheless, all the above mentioned risks can influence the financial risk itself.

As a result, the aim of this article is to examine the level of financial risk management and the evaluation of Czech managers of their ability to manage these risks properly. The results of the conducted survey are then compared to the results of a similar one from Slovakia.

## 2 THEORETICAL BACKGROUND

European Commission (2011) declares the source of the European economic strength is 23 million European SMEs representing thus 98 % of the business sector. They cover two thirds of the employment contracts in the private sector and have created approximately 80 % of new jobs in the last 5 years. The definition of SME can be found in the Recommendation of the European Commission 2003/361. The main factors determining if a company belongs to the SME segment are:

1. number of employees
2. annual turnover or the annual balance sheet total.

Tab. 1 – Small and Medium-sized Enterprises According to the EC. Source: European Commission (2015)

Enterprise category	Number of employees	Turnover	Or	Balance sheet total
<b>Medium-sized</b>	< 250	≤ 50 million EUR		≤ 43 million EUR
<b>Small</b>	< 50	≤ 10 million EUR		≤ 10 million EUR
<b>Micro</b>	< 10	≤ 2 million EUR		≤ 2 million EUR

EUROSTAT (2015) defines the small and medium-sized enterprises in the following manner:

- micro enterprises: with less than 10 persons employed;
- small enterprises: with 10-49 persons employed;
- medium-sized enterprises: with 50-249 persons employed;
- small and medium sized enterprises (SMEs): with 1-249 persons employed;
- large enterprises: with 250 or more persons employed.

The focus of SME is to gain profit and minimise all the risk appearing within their activities. The risk is according to Smejkal and Raise (2006) characterised in various ways:

- as the probability or possibility of loss or failure
- as the variability of the possible results or the uncertainty of their achievement
- as the variation between expected and real results
- as the probability of any result different from the expected one
- as the situation when the quantitative magnitude of a certain occurrence is subject to a certain probability distribution
- as the danger of the negative variation from the target (so called net risk)
- as the possibility of loss or profit (so called speculative risk)
- as the uncertainty resulting from the asset value volatility (so called investment risk)
- as the average value of the loss function
- as the possibility of a specific threat prospering from a specific system vulnerability

According to Varcholová (2008), risk is a threat of loss at the certain level of knowledge of the environment. It means that from the business decision point of view, risk is compound by two elements: uncertainty and negative influence of this uncertainty on the decision subject.

Thus it is essential for companies to dedicate their resources to risk management. The aim of risk management is to identify, analyse, evaluate, solve and monitor risks possibly endangering the company.

Business risk management can be defined as a structured and disciplined approach putting in harmony the strategy, human resources, technology and knowledge in order to evaluate and manage uncertainty a company is facing in the process of creating value. It is a truly holistic and integrated process covering all the business threats and opportunities. (DeLoach, 2000).

Risk Management Guide for Small and Medium Businesses (2009) created by the organisation CPA Australia enumerates these specific risks of SME: customer risk, supplier risk, personnel risk, operating risk, reputation risk, financial risks (e.g. liquidity, credit, currency, interest rates risk etc.), competitive risk, market risk, economic risk, unexpected owner leave and many others (connected to internal scrutiny, sales, receivables, payables, purchasing etc.).

All the business risks have an impact on the financial performance of a company and could lead to a default. Eurobarometer (European Commission, 2012) focused on doing business in the European Union territory and out of it pointed out that a default risk prevent almost a half of the respondents from founding their own company.

The negative impact of various risks is multiplied in the crisis periods. The last financial crisis has significantly changed the European SME managers view on the risk management. Various studies have revealed certain mistakes that had been done during the crisis, such as poor cash flow management or insufficient financial risks management (i.e. missing early warning of a financial manager). If managers had prevented these mistakes they could have reduced or completely avoided the negative influences of crisis on their companies. (Krištofik, 2010).

In this context Siakas, Vassiliadis, and Siakas (2014) state that family businesses tend to have greater resistance toward the impacts of the financial crises due to the family ties.

### **3 RESEARCH AIM AND METHODOLOGY**

The aim of this article is to analyse risk management (above all the financial risk management and the default risk management) in companies of the Zlin region, the Czech Republic. The results of the conducted survey are then compared to a similar survey carried out in the Trenčín region, Slovakia. The results are a partial conclusion of a wider business environment survey realised at Thomas Bata University in 2013.

As for the sample size, 180 SMEs have been reached in the Zlin region. The companies' data was provided by their owners. In the Zlin region, there were 107,000 SMEs in 2012. (Ministry of Industry and Trade of the Czech Republic, 2013). In the Trenčín region, 105 companies have been reached. The regions were compared as a consequence of their territorial and economical similarities.

According to Czech Statistical Office the region of Zlin has an area of 3,964 km<sup>2</sup>, has approximately 600,000 inhabitants, the GDP per capita is around 11,720 EUR and the current level of unemployment is 8 %.

The structure of the surveyed companies is as follows: 70 % of them exist more than 10 years, 21 % between 10 and 5 years and 9 % between 5 and one year. (5-10 years missing) As for the business sector, 35 % were trade companies, 29 % industrial companies, 12 % constructing companies, 4 % transportation companies and 3 % agricultural companies. The rest is from other sectors.

The research has examined three research questions:

*Q1: The average value of financial risks is at least 30 % in the selected regions of the Czech Republic and Slovakia.*

*Q2: At least 50 % of the surveyed Czech and Slovak entrepreneurs think their company can manage financial risks properly.*

The associations were analysed by Pearson statistics for counting of data.

P-value has been compared to standard 5% confidence level. P-value that is lower than the confidence level leads to the rejection of the null hypothesis. The null claims there is no association between variables. The calculations have been performed in statistical packages XL Statistics and R. Finally, the instruments of descriptive statistics, such as percentages and averages have been used.

For better illustration, the Index of change has been calculated ( $I_{ch}$  = value of the parameter in the Czech Republic/value of the parameter in Slovakia). Value of the Index of change ( $I_{ch}$ ) in the interval (0, 0.200) demonstrates a zone of low intensity of change. The interval (0.201, 0.500) represents a moderate intensity change and the interval (0.501, above) constitutes a high intensity change of the index.

#### **4 RESULTS AND DISCUSSION**

The first research question Q1 was examined by asking the entrepreneurs to quantify the intensity of certain risks. The entrepreneurs were asked to choose from the list of risks (market risk, financial risk, operational risk, personnel risk, legal risk, security risk) the three most important ones. The following Table 2 interprets the average value of financial risks. The Figure 1 then represents the average values of all risks included in the survey.

Tab. 2 – Importance of Financial Risks for Entrepreneurs in the Czech Republic and Slovakia.

Source: own source

	Czech Republic(Zlín) 2013 in pieces/%			Slovakia (Trenčín) 2013 in pieces/%	p- value $I_{ch}$
<b>Financial risk</b>	103	57.22	53	50.48	0.3269
<b>Average value*</b>		34.00		30.10	1.130

\*average of values reported by entrepreneurs in different regions.



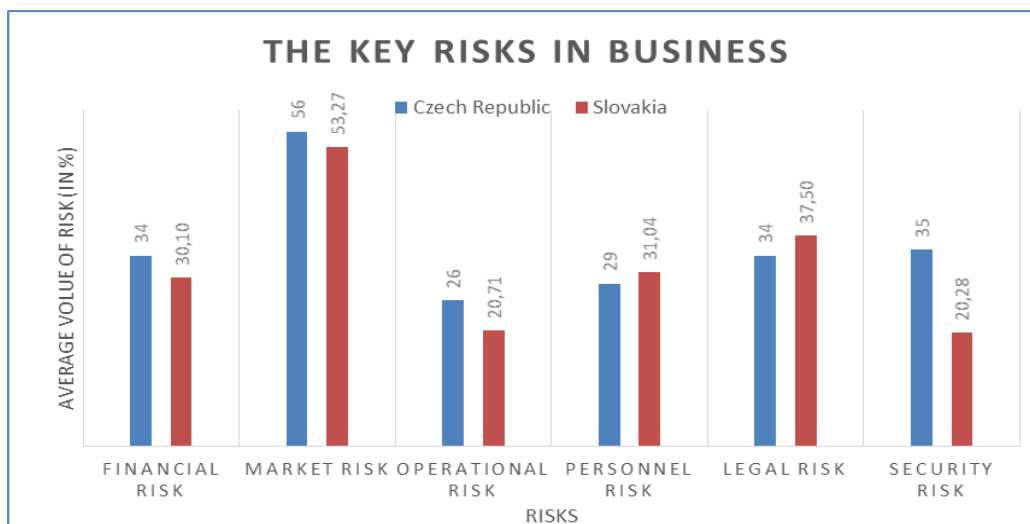


Fig. 1. – The Key Business Risks According to Entrepreneurs. Source: own source

The most important business risks which were perceived by entrepreneurs in the Czech Republic and Slovakia were as follows: market, financial and personnel risks. The financial risk was identified as a third most essential risk, which means 57.22 % (average value 34 %) of entrepreneurs in the Czech Republic and 50.48 % (average value 30.10 %) in Slovakia have chosen this risk as a key one. Thus the first research question Q1 has been confirmed.

However, the market risk is perceived as the most important by entrepreneurs of both regions. In the Czech Republic, the second most important is the security risk and the third position is occupied by the financial and legal risk. In Slovakia, the second most important is the legal and the third one is the personnel risk. The importance of the legal risk was also pointed out by Šúbertová (2011): the changes of the legislation for SME are frequent and require much attention from the small and medium companies. These often do not dispose qualified specialists able to monitor all the changes. Entrepreneurs themselves perceive the large number of changes in the legislation very sensibly and 54 % of them find the level of SME legislation changes partially or completely problematic.

Smejkal and Rais (2011) state the most frequent legal risks in organisations:

- Law-breaking practice in the process of legal actions connected to the enterprise existence
- Utilisation of inconvenient internal legal norms, contracts with suppliers, customers or employees
- Ignoring the author's rights protection
- Ignoring the personal data protection
- Breaking the general or specific legal norms regarding a certain subject
- Uninsufficient organisation properties protection, as well as insufficient protection of health, life or properties of individuals
- Incorrect actions of corporate representatives or organisation employees which can lead to a moral or financial damage for the company

Among the many risks an enterprise faces, supply or supply chain risks are especially important to manage, due to the increased importance of supply chain partners (Gottfredson et al.,2005; Narasimhan and Talluri,2009).

The Table 3 shows the opinion of the surveyed entrepreneurs on their ability to manage the financial risks in their companies properly.

Tab. 3 – Ability to Manage Properly Financial Risks in the Company. Source: own source

	<b>Czech Republic (Zlin) 2013 in %</b>	<b>Slovakia (Trenčín) 2013 in %</b>	<b>p-value</b>
<b>yes</b>	41.11	31.43	<b>&lt;0.1323</b>
<b>to the certain extent</b>	55.00	57.14	<b>0.8183</b>
<b>no</b>	0.56	0.00	-
<b>I cannot judge</b>	3.33	11.43	-

As it is obvious from the table, the opinion of the Czech and Slovak entrepreneurs is similar as for their skills to manage financial risks. 96.11 % of the Czech entrepreneurs think they can manage financial risks properly or to a certain extent properly. Their Slovak counterparts are a bit less self-confident, 88.57 % of them share the same opinion. As the p-value in both lines with relevant results is above the critical value (0.05), the null hypothesis cannot be rejected.

As already mentioned above, unprofessional management of financial risks can lead to a company default. In this context, Belás et al. (2014) declares that in the Czech Republic, up to 95 % of entrepreneurs believe their company will survive the next five years. In Slovakia, the rate was 90 % which leads to the conclusion that the level of business optimism is very similar in the Czech Republic and Slovakia. The level of business optimism in the selected regions is not related to the field, the age or the size of a company. (Belás, Bilan, Demjan, Sipko, 2015)

The examination of the third research question is the object of the Table 4.

Tab. 4 – The Current Profitability of SMEs in the Czech Republic and Slovakia Compared to the Pre-Crisis Period. Source: own source

	<b>Czech Republic (Zlin) 2013 in %</b>	<b>Slovakia (Trenčín) 2013 in %</b>	<b>p-value</b>
<b>Significant decrease (more than 20 %)</b>	23.89	30.48	<b>0.2807</b>
<b>Modest decrease (0-20 %)</b>	34.44	37.14	<b>0.7406</b>
<b>Constant profitability</b>	22.22	19.05	<b>0.7078</b>
<b>Modest increase (0-20 %)</b>	12.22	6.67	<b>0.1959</b>
<b>Significant increase (more than 20 %)</b>	3.89	3.81	-
<b>I did not run my business before the crisis</b>	3.33	2.85	-

The average decrease of the profitability in the Czech Republic was 10.44 % (calculated as a weighted average of the upper margins of the single intervals). The average decrease reached the level of 14.09 % in Slovakia. The entrepreneurs in both regions share the opinion that

their profitability rather decreased (58.33 % in the Czech Republic, 67.62 % in Slovakia). The null hypothesis was thus confirmed.

Nevertheless, this research has its limitations. First of all, the respondents could have had problems with understanding the questions or their answers could have been false. However, as pointed out by Graham and Harvey (2001) and Lins et al. (2010), it is not clear why corporate executives would take their time to respond to a lengthy survey if their intent was to be untruthful. Secondly, the survey was conducted only in one region of the Czech Republic and one region of Slovakia which restrains from generalising the results.

## **5 CONCLUSION**

The conducted research of financial risk management in the business environment of the Czech Republic and Slovakia confirmed all three formulated research question.

The first research question Q1 confirmed the Czech and Slovak entrepreneurs perceive the financial risk as one of the most important in the company. The average value of financial risks was found to be at least at the level of 30 % in both selected regions.

The second research question Q2 showed a high self-esteem of the Czech and Slovak entrepreneurs as for their abilities to manage financial risks properly. 96.11 % of the Czech entrepreneurs and 88.57 % of the Slovak entrepreneurs stated they can manage financial risks properly or to some extent properly.

The third research question Q3 compared the levels of current profitability to the pre-crisis period. It was found out the Czech as well as the Slovak entrepreneurs registered decreases in their profitability. This is not in line with the answers to the previous question. If the financial risks had been managed properly, the profitability decrease could have been prevented or at least reduced.

Comparing the situation in both countries, it can be stated that financial risks are better managed in the selected region of the Czech Republic. Not only the entrepreneurs have a higher self-confidence as for the proper management of financial risks, but also the decrease in their profitability is lower than in case of their Slovak counterparts. However, entrepreneurs of both regions share the opinion that the most important risk in their business is the market risk. Thus it seems as if the surveyed entrepreneurs did not realise the final impact of selected risks on the financial risk.

In this context Belás, Bartoš, Habánik, and Novák (2014) state that despite the better macroeconomic trends in Slovakia, the situation for doing business in the SME segment is less favourable in Slovakia than in the Czech Republic. Czech entrepreneurs compared to Slovak entrepreneurs indicate less impact of the crisis on their profitability, slightly better approach of banks to their financing, a better attitude of state to their needs, as well as lower perception of corruption and a higher degree of business optimism.

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## **A VALUE-BASED ANALYSIS OF RENTAL CONTRACTS**

*Jan Vlachý*

### **Abstract**

This paper develops a dynamic option-based model for the valuation of rental and similar lease contracts, solved by statistical simulation. Following up on a previously published general firm-theoretical approach by the author in this particular context, it shows that due to path-dependency, Monte Carlo is a suitable tool for analyzing embedded options characteristic for rental and lease relationships. Amongst other insights in a microeconomic context, it demonstrates the sensitivities of particular value drivers, including transaction costs.

*Keywords: Intangibles Valuation, Rental Contracts, Embedded Options*

JEL Classification: D46, D92, G31, L21

### **1 INTRODUCTION**

Value-based methods for assessing tangible investments are a familiar tool for most decision-makers, they form a fundamental part of management education and they are extensively used for key constituents of the strategic management process, such as capital budgeting. The essential principles of the discounted cash-flow model have been public domain for over one hundred years (Rubinstein, 2006).

Besides tangible assets, however, the value of any business may be strongly determined by intangibles. These generally constitute various rights, opportunities and obligations that can substantially boost, and sometimes diminish, the value of a company when compared to the balance of its assets and liabilities, and they may include diverse items, ranging from licences and brands to specific business skills and market share (Kogut and Zander, 1992; Ortiz, 2006). Vlachý (2009a) embraced the topic within the framework of a firm-theoretical model with direct couplings to existing valuation tools based on financial theory, in particular real options. Vlachý (2010), preceded by Vlachý and Vlachý (2008), has developed this valuation concept for the particular case of contractual assets, i.e. any value, positive or negative, constituted by an outstanding contract between a company and any other party, and shown that embedded options may substantially impact the contract's value, as well as the precedent negotiating strategy.

Financial economics describes any right, including the right or opportunity to abandon a commitment, as an option. In contrast to financial options, which are typically conceived as negotiable securities (Hull, 2012), embedded options constitute indivisible components of financial or real contracts (Moore, 2001). These defining attributes notwithstanding, they may materially impact such contracts' value and in some cases, this difference, i.e. option value, can be observed empirically (Myers, 1977; Mitchell, 1991).

This paper utilizes an isogenous method for application in commercial rental agreements, but, by analogy, also suitable for other lease situations. Its goal is to develop and analyze an option-based model of rental lease valuation and contracting, with an emphasis on their value drivers, stemming from termination clauses and transaction costs, which constitute a characteristic feature of contracts in the industry (Goddard and Marcum, 2012). In contrast to

the former papers by Vlachý (2008, 2010), it uses numerical simulation, which is a much more universal approach than searching for closed-form solutions of stochastic differential equations (Breton and Ben-Ameur, 2005).

The paper is organized as follows: First, the various contractual situations will be described and analyzed within the framework of single-step payoff functions. Further, a dynamic multi-step valuation model will be developed. Finally, selected simulation results will be discussed, illustrating how the model can bring useful insights into the nature of particular rental contract value drivers.

## 2 ANALYZING THE CONTRACTUAL TERMS

We assume two contracting parties, the seller of a service (i.e. lessor), designated S, and its buyer (tenant), designated B. The contract will be stipulated at a market-corresponding fixed price  $P$  (rental rate, €/sqm).

From the point of view of the seller, the future value of the contract  $V_S$  will be contingent on the future market rental rate  $p$  as in (1).

$$V_S = P - p. \quad (1)$$

If the buyer has an option to terminate contract (or its compliance is effectively unenforceable), the seller becomes an issuer of a call option as in (2), which is clearly a position with overall negative time value, and the contract would thus seem to be unacceptable to the seller, unless an up-front premium were charged.

$$V_S = \min\{P - p; 0\} \quad (2)$$

In contrast to financial options, it is not customary to charge up-front premiums for embedded options. Other conditions must therefore provide for an equilibrium, that could lead to negotiable terms. The equilibrium may conceivably be influenced by several factors in real-world tenancy agreements.

Apparently, the seller can charge the buyer an above-market rental rate  $R > P$  to compensate for the option value. Assuming no additional constraints, such a solution becomes highly unstable, however, because the buyer has an incentive to terminate as soon as possible (i.e. virtually immediately) and renegotiate at the market price  $P$ . He must therefore be motivated to retain tenancy, which can be achieved by a termination fine  $F$  (an income of the lessor) or any other transaction costs of moving to other premises  $C_B$ . In order for these terms to provide a stable solution, it is essential to ensure that  $F + C_B \geq R - P$ . Either of these constraints also allow for solutions at the market rental rate, i.e.  $R = P$ ; however, these are trivial, because it suffices to set a prohibitively high  $F$ , and effectively make the contract irrevocable.

The value of the contract with an embedded termination right may thus depend solely on the termination fine  $F$ , or its combination with an adjusted rental rate  $R > P$ , both of which are summarily described by (3). This is similar to a short position in an instrument that financial market practitioners usually call cancellable forward or Boston option (Rawls and Smithson, 1989; Kat, 1994).

$$V_S = \min\{R - p; F\}, \text{ assuming } R \geq P \text{ and } F \geq R - P. \quad (3)$$

In either case, the buyer's and seller's positions are symmetric, i.e.  $V_B = -V_S$ . This simple equilibrium characteristic, where both parties are expected to settle at an initial expected value of the contract equal to zero, ceases to hold once transaction costs of termination (e.g. moving, cleanup, refurbishment, commissions, vacancy) are taken into account.

For the sake of generalization, we shall allow for a transaction cost borne by the buyer  $C_B$ , as well as by the seller  $C_S$ . This results in contract value according to (4) from the point of view of the seller, (5) from the point of view of the buyer, both also illustrated under Figure 1. The technical term  $D$  in the sum (4) represents a cash-or-nothing binary (digital) call option (Reiner and Rubinstein, 1991).

$$V_S = \min\{R - p; F + C_B\} - D, \text{ where } D = C_B + C_S \text{ for } p < (R - F - C_B), \text{ else } D = 0, \text{ assuming } R \geq P \text{ and } F + C_B \geq R - P; \quad (4)$$

$$V_B = \max\{p - R; -F - C_B\}. \quad (5)$$

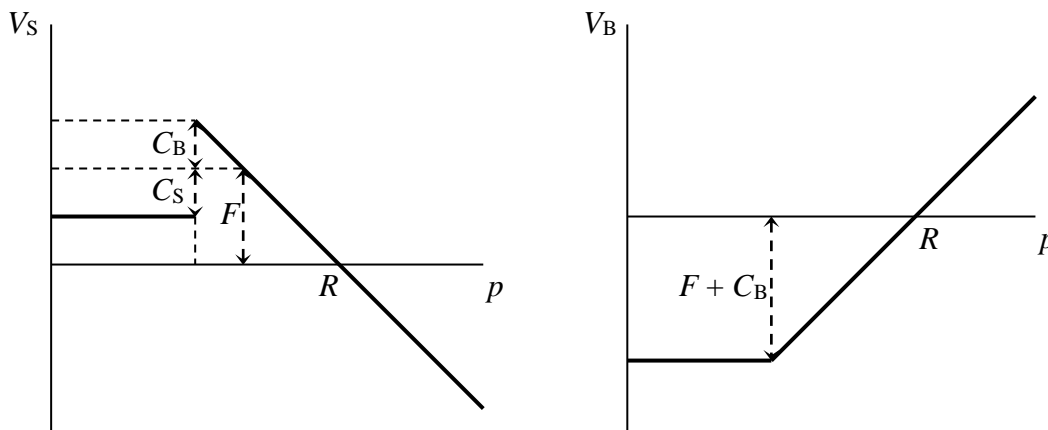


Fig. 1 – Seller's and Buyer's Payoff Functions. Source: Author

Wherever  $V_B \neq -V_S$ , as in (4) versus (5), the two different values do not constitute an equilibrium, but a negotiating margin. The expected contract value may thus possibly be positive for either or both of the parties at inception. Among other factors, the actual negotiation result will be impacted by the respective parties' capability to correctly estimate their counterparty's transaction costs.

### 3 DEVELOPING A MULTI-PERIOD VALUATION MODEL

A usual rental contract is long-term, with potential termination risk arising through its duration, contingent on the temporal development of the market rental rate, as well as its covenants. Any realistic model thus has to take a multiperiodical view, which results in a valuation situation comprising compound options.

Despite the existence of analytical solutions for particular kinds of compound options (Geske, 1979), it is much more efficient and universal to take a numerical approach. Discrete numerical analysis methods for the valuation of options can be divided into two basic categories. One is rooted in the simple and elegant backward-induction lattice model introduced by Cox, Ross and Rubinstein (1979), Rendleman and Barter (1979), and Sharpe (1978), which, in absolute terms, is currently the preferred method for evaluating miscellaneous types of options, including real and embedded options (Reuter and Tong, 2007; Smit and Trigeorgis, 2012).

The alternative, to be used in this study, exploits statistical simulation (Monte Carlo). This technique, long common for miscellaneous applications in areas ranging from Neurology to Technology to Natural Sciences (Fishman, 1996; Chan, 2013), has been initially proposed for



option valuation by Boyle (1977). Whereas it has not gained much acceptance for the valuation of most financial options, with the exception of certain types of path-dependent exotic options (Ekstrand, 2011), primarily because of its relatively high computing power demands, it bears a strong potential for the solution of particular real-option problems, as well as path-dependent embedded options (Mun, 2006; Vlachý, 2009b; Rogers, 2013; Podhraski and Berk, 2014).

The present simulation model is designed as follows: A contract is negotiated for  $n$  periods (years) at the price (rental rate)  $R$ , with the buyer holding an option to terminate at any discrete time step of the simulation  $\Delta t$ . If and when the option is exercised, the buyer pays the seller the amount  $F$ , bears an additional cost  $C_B$ , and the seller bears a cost  $C_S$ ; a new rental agreement is then contracted at the current market price and original premium, stated as a percentage of the rental price (8). Exercise (termination) by the tenant is contingent on the criterion (6), commensurate with (5).

$$p_t < R - F - C_B. \quad (6)$$

The market price  $p_t$  is generated as an opportune stochastic process; the example in Part 4 will be assuming its log-normal Brownian diffusion as described by (7), where  $\mu$  represents the price's expected periodical trend,  $\sigma$  its standard deviation (volatility), and  $\varepsilon$  a random value with normalized normal distribution.

$$p_{t+\Delta t} = p_t \exp[(\mu - \sigma^2/2) \Delta t + \sigma \varepsilon \Delta t^{1/2}]. \quad (7)$$

In order to generalize the results, the rental premium, termination fine and transaction costs are each standardised as percentage values of the rental price, using the parameters as in (8), (9), (10) and (11).

$$\pi = R / P - 1; \quad (8)$$

$$\phi = F / R; \quad (9)$$

$$\chi^B = C_B / R; \quad (10)$$

$$\chi^S = C_S / R. \quad (11)$$

The actual rate  $R$  thus becomes irrelevant (i.e. can be assumed as unit).

#### 4 REPRESENTATIVE MODEL RESULTS

The model can be used for diverse types of analysis. Besides facilitating actual contracting or providing valuation data in M&A transaction, it may also serve to quantify the various sensitivities arising from relevant contractual and market terms. An illustration of this approach will be given here in the form of structured examples, complementing the essential findings in Part 2 and offering a better insight into some of the key value drivers for rental agreements.

In each case, the mean discounted value of the simulation  $*V$  is benchmarked against the *NPV* (Net Present Value) of rental incomes, contracted for a lease with the equivalent time horizon  $n \Delta t$  at the current market price  $p_0$  with no termination rights ( $V_{\text{BENCH}}$ ). Equilibrium of particular contracted terms is then derived by numerically iterating  $*V \rightarrow V_{\text{BENCH}}$ .

All results are based on a contractual maturity  $n = 10$  (years) and the discount rate  $r = 5\%$ , no price trend is anticipated ( $\mu = 0$ ).

#### 4.1 Price premium and termination fine as functions of price volatility

This simulation derives the function  $\phi = \pi = f(\sigma)$ , leaving the other parameters unchanged at  $\chi_B = 0$ ,  $\chi_S = 0$ . In other words, it searches for appropriate levels of the termination fine if set equal to the price premium.

Tab. 1 – Contractual Terms as Function of Rental Rate Volatility. Source: Author.

$\sigma$	2%	5%	10%	20%	30%	40%	50%
$\phi = \pi$	1.7%	4.6%	9.4%	19.5%	30.5%	41.6%	52.5%

The results in Table 1 suggest that as a rule of thumb heuristic, lessors should consider price premiums and termination fines approximately equal to the rental market's expected volatility.

As indicated in Part 2, setting low or null price premiums (barring the unrealistic extreme of  $\sigma = 0$ ) necessitates stipulation of prohibitively high termination fines (for example,  $\sigma = 25\%$  and  $\pi = 0$  leads to  $\phi > 85\%$ ), which is unlikely to be commercially viable in practice, and might even be legally unenforceable (Horák, 2012). On the other hand,  $\pi > \phi$  leads to instability due to the tenant's early incentive to terminate.

#### 4.2 Impact of transaction costs

Formulas (4) and (5) indicate that seller's transaction costs do not impact termination, but they do reduce the seller's payoff on termination. On the other hand, buyer's transaction costs diminish his inclination to terminate, but, in contrast to the termination fine, do not increase the seller's payoff on termination. The four parameters therefore exhibit non-linear relationships.

These will now be examined using a reasonable volatility assumption (see e.g. Kanak and Tien, 2000) of  $\sigma = 25\%$  and, again, setting  $\phi = \pi$ . We thus derive the function  $\phi = \pi = f(\chi_S; \chi_B)$ .

Tab. 2 – Contractual Terms ( $\phi = \pi$ ) as Functions of Transaction Costs. Source: Author

$\chi_S \setminus \chi_B$	0%	10%	20%	30%	40%	50%	60%
0%	25%	24%	21%	17%	13%	9%	5%
20%	31%	28%	23%	19%	14%	10%	6%
50%	37%	32%	27%	21%	16%	11%	7%

The results in Table 2 show that increasing transaction costs  $\chi_B$  borne by the tenant decrease the premium and termination fine levels that the lessor will need to charge for the option to terminate. On the other hand, these will be substantially increased in the special case when moving costs  $\chi_B$  of the tenant are low, but replacement costs of the lessor  $\chi_S$  are high; such a proportion might be typical for some tenants in a market with very high vacancy rates (Sivitanides, 1997). In accordance with intuition, all results converge towards zero with  $\chi_B \rightarrow 100\%$  (it becomes prohibitive for the tenant to terminate).

One of the interesting findings of this simulation, that can be further investigated in game-theoretical settings (Vega-Redondo, 2003), relates to the fact that the lessor may be in a position to discriminate between different tenants based on recognition of their disparate transaction costs. This strategy can be countered by tenants not revealing, or even obfuscating pertinent cost information.

## 5 CONCLUSIONS

In this paper, we have developed and described a dynamic model for the valuation of rental and similar contracts, based on appropriate payoff functions. Besides its straightforward application for quantitative support in contracting or M&A situations, a microeconomic approach has been suggested, facilitating proper comprehension of market dynamics and value-driver sensitivities.

We have thus shown how termination rights become less valuable as a result of tenants' transaction costs on the one hand, and more valuable with increasing market volatility, as well as lessor's transaction costs, on the other hand. Further research opportunities include using outputs of the model for a game-theoretic analysis of rental contract negotiation.

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## **THE INFLUENCE OF TRANSFORMATION CHANGES ON THE SPATIAL ACCESSIBILITY OF THE ACUTE BED CARE IN THE CZECH REPUBLIC**

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### **Abstract**

The aim of this article is to define the level and the time scale of the spatial accessibility of the acute bed care providers related to the individual car transport and the public transport. The purpose is to compare the state and the structure of the network of the acute bed care providers in years 2003 and 2013 and to deduce the changes which had influence on the spatial accessibility. The method of the network analysis utilising ArcGIS software was applied for the purposes of the analysis of the spatial accessibility by cars and time tables for public transport. The time access to the seat of the acute bed care providers was designated on the basis of the selected time zones – 10, 20, 30 and 60 minutes. The outputs of the network analysis having been implemented are illustrated in the individual maps covering years 2003 and 2013 both with the individual car transport including the road network, and with the public transport. The suitable supplementation of this modelling is the definition of the spatial accessibility of the acute bed care providers for the particular number of population living permanently in the given territory according to the specific time zones. On the basis of the modelling having been implemented it can be concluded that the spatial accessibility deteriorated both with the individual car transport and with the public transport. The reason of the deterioration was especially the influence of the lower number of the acute bed care providers and the change of the structure of the providers of medical branches in year 2013 when it is compared with year 2003. The change of the spatial accessibility concerned nine regions of the Czech Republic – Ústí nad Labem, South Moravia, South Bohemia, Vysočina, Hradec Králové, Pardubice, Olomouc, Moravia-Silesia, and Zlín. When the individual car transport was used, the accessibility deteriorated for 4.75% inhabitants of the Czech Republic and when the public transport was used, the accessibility deteriorated for 15.75% Czech inhabitants.

*Keywords: Spatial accessibility, Geographic information systems, access to health care, transportation mode.*

JEL Classification: I18, R53

## **1 INTRODUCTION**

Modern transformation processes in health care in the Czech Republic began in the 1990s. They were based on the level of the health condition of the population in the context of unsuitable living habits and bad environmental situation. Due to this fact, so-called new system of health care was adopted by the government decree of 12 December 1990, starting the all-society strategy of the health regeneration. There were two central means of the health regeneration strategy – the free actions of informed citizens and community, on the one hand, and the maintenance of available and adequate state-guaranteed health care, on the other hand. The state guarantee included the provision of adequate health care independent of the financial and social situation of the patients, the accessibility of health care in space and time, the right of the patients to free choice of physicians and health care facilities, and the humane approach in health care services. In addition to other features, this part of the health care

transformation also included the creation of new, flexible financial tools, tied up to the ongoing reforms in the public administration.

The health care transformation, logically, involved its important segment – the acute bed care. Another important milestone in the transformation of health care was 1 January 2003, when transfer of property from the Czech Republic to the regions and municipalities was made based on special acts. This applied to property (including health care facilities) managed by the organisational components of state and allowance organisations as of 31 December 2002 and property, the guarantors of which were the district authorities as of 31 December 2012. Therefore, legal form of the acute bed care providers changed significantly in the Czech Republic in favour of the non-governmental sector since 1 January 2003. Nevertheless, this condition further developed in the subsequent years, causing gradual transformation of the regional and municipal allowance organisations, in particular, to business-type organisations (joint-stock companies and limited liability companies).

Current discussions, most commonly on the health care policy level that includes the acute bed care providers, involve the optimisation of the health care accessibility and the assessment of efficiency and necessity of acute beds in the individual types of medicinal branches. The assessment of economic efficiency of acute bed care can focus on the technical as well as allocation aspects, while their combination provides the best explanatory power (Vaňková, Vrabková, 2014). However, all forms of the economic efficiency assessment must consider the specific nature of health care, which is based on the individual needs and individual solutions for the treatment of a hospitalised patient. Several scientific investigations were made into the solutions leading to the improvement of economic efficiency, while enhancing or preserving the accessibility of acute bed care. For instance, both Burian (2002) and Kalábová (2014) state that good-quality health care can be ensured in an economically efficient way through intensification of the hospital activities based on the centralisation and consolidation of complementary, operating, and clinical facilities. The authors add that centralisation leads to concentration of a larger number of critically ill patients and thus to better experience, skills and knowledge, to faster introduction of protocols and methods, and to demonstrably better treatment results – reduction in the duration of hospitalisation, reduction in mortality, and more efficient utilisation of resources.

The efficiency of hospitals is, logically, reflected in the level of accessibility of acute bed care. In addition to other parameters, the accessibility is also an important factor of quality and performance of health care services. In general, the cohesion of requirements for quality and performance on the level of the system, organisational units, processes, and activities is a prerequisite of the modern form of the quality management – the Total Quality Management (Dooren, Bouckaert, Halligan 2010; Vrabková, 2012). Accessibility in health care also contributes significantly to determining the level of equity in health, being accentuated strongly in the hospital bed care conditions.

From the viewpoint of equity in health, the assessment of accessibility of hospital bed care is relevant if approached comprehensively and as seen by the patient as the customer of the health care services. The assessment of the hospital bed care accessibility can be focused either on one dimension of accessibility, or on several formats of accessibility. The most common of them comprise the spatial accessibility (sometimes called the “local” or “transportational”), time accessibility, institutional accessibility, economic accessibility, and information accessibility, see, for instance, Mužík and Szalayová (2013), Lamarch et al. (2011). A government decree became effective on 1 January 2013, which determines the parametric conditions of local (spatial) and time accessibility of health care services paid through public health insurance. The local (spatial) accessibility establishes the longest possible arrival period (in minutes) for selected branches or services as per the outpatient and

inpatient care. These mandatory parameters are guaranteed by the respective health insurance companies to their clients.

**The aim of this article is to define the level and time scale of the spatial accessibility of the acute bed care providers related to the individual car transport and public transport for 2003 and 2013.**

Spatial accessibility shows the distance the patient has to travel in order to attain the required health care. The distance (in kilometres or metres) separates the patient from the nearest or selected provider of hospital bed care. The patient travels the distance over a certain period of time using the existing transportation infrastructure, the quality of which is a general limiting factor of the spatial accessibility. It is also important for the patient what type of means of transport will or can be used to travel said distance, see private and public transport.

The assessment of spatial accessibility of acute bed care in this article was made using the network analysis and the geographic information system (GIS). Google Maps (see Chapter 2.2) also provide significant assistance in evaluating the specified time accessibility. Inspiring examples of possible solutions as well as other information covering this topic in the conditions of health care services can be found in both international and Czech publications, e.g. Comber, Brunson, Radburn (2011), Delamater (2013), Mao, Nekorchuk (2013), Vaňková, Vrabková (2015), Gong, Geng, Chen (2015).

## **2 MATERIAL AND METHODS**

### **2.1 Status and structure of providers of acute bed care in 2003 and 2013**

Fundamental changes in the organisational and legal framework of the hospital care providers were made as part of the second stage of the public administration reform as of 1 January 2003. The changes to the ownership of the hospital property and to the guarantors of the hospitals also paved the way to changing the legal form of the hospitals. At the end of 2003, there were 201 hospitals in the Czech Republic, thereof 176 hospitals with acute bed care and 25 after-care hospitals. The number dropped to 188 in 2013, there of 156 hospitals with acute bed care and 32 after-care hospitals. As regards the legal form of the hospitals, the number of hospitals having the form of allowance organisations of the regions dropped by 72%, from the original 81 allowance organisations of the regions in 2003 to 23 allowance organisations of the regions in 2013. There are no hospitals having this legal form in the following regions: Central Bohemia, South Bohemia, Karlovy Vary, Hradec Králové, Liberec, Plzeň, Zlín, and Olomouc. Hospitals in these regions were transformed to business companies, where the regions have 100% ownership in most cases.

Likewise, fundamental changes were made to the number of acute care bed between 2003 and 2013. The capacity of acute bed care in hospitals dropped by 10,230 beds, i.e. 15.87%, in comparison with 2003. The drop in the number of beds was reported predominantly at internal medicine and surgery wards as well as paediatrics and obstetrics and gynaecology. The efforts to limit the number of beds reflects the issues of restructuring of the bed care, the increase in the after-care bed numbers, the introduction of modern treatment methods (aiming at shortening the duration of hospitalisation of patients in hospitals), the economic intensity of acute bed care, etc.

For the purposes of the investigation into the accessibility of acute bed care in the CR and its comparison in 2003 and 2013, the providers of acute bed care (hereinafter also “the providers”) were determined and classified in 6 groups, see Table 1, accordance with the medical branches. The overall set of providers for both years (2003 and 2013) comprises all



providers, except for the providers of acute bed care for remand prisons and after-care (The Institute of Health Information and Statistics of the Czech Republic registers them as part of the set of acute bed care hospitals).

Table 1 shows six groups of providers:

- I. providers of acute bed care in all basic medical branches (internal medicine, surgery, gynaecology, paediatrics),
- II. providers of acute bed care in major part (3 of 4) of basic medical branches,
- III. providers of acute bed care in selected medical branches only,
- IV. university hospital (UH) – all basic medical branches (internal medicine, surgery, gynaecology, paediatrics),
- V. university hospital (UH) – major part of basic medical branches (3 of 4 basic medical branches),
- VI. university hospital (UH) – selected medical branches.

Tab. 1 – Structure and numbers of acute bed care providers in particular regions in year 2003 and 2013. Source: ÚZIS ČR, Lůžková péče 2003, 2013. Own elaboration.

	All basic medical branches (I.)		Major part of basic medical branches (II.)		Chosen medical branches (III.)		UH - all basic medical branches (IV.)		UH – major part of basic medical branches (V.)		UH – chosen medical branches (VI.)	
	2003	2013	2003	2013	2003	2013	2003	2013	2003	2013	2003	2013
PHA	0	2	1	1	11	12	5	3	1	1	0	0
STC	9	9	2	3	9	8	0	0	0	0	0	0
JHC	7	7	1	0	1	0	0	0	0	0	0	0
PLZ	4	4	2	1	4	4	1	1	0	0	0	0
KAR	4	4	0	0	1	1	0	0	0	0	0	0
UST	10	10	0	0	4	1	0	0	0	0	0	0
LIB	5	4	1	2	3	2	0	0	0	0	0	0
HRA	6	5	1	0	6	3	1	1	0	0	0	0
PAR	6	5	0	0	2	1	0	0	0	0	0	0
VYS	5	5	0	0	1	1	0	0	0	0	0	0
JHM	6	7	1	1	11	9	1	1	0	0	1	1
OLO	6	6	0	0	2	1	1	1	0	0	0	0
ZLI	5	5	1	0	3	2	0	0	0	0	0	0
MSK	10	9	1	2	8	6	1	1	0	0	0	0

*PHA - Prague; STC - Central Bohemia; JHC - South Bohemia; PLZ - Plzeň; KAR - Karlovy Vary; UST - Ústí nad Labem; LIB - Liberec; HRA - Hradec Králové; PAR - Pardubice; VYS - Vysočina; JHM - South Moravia; OLO - Olomouc; ZLI - Zlín; MSK - Moravia-Silesia.*

The number of providers dropped by 10% in 2013 in comparison with 2003. The largest decrease, by 23%, was reported in the providers of selected medical branches only (Group III). In practice, the largest decrease in the providers is evident in two regions – Hradec Králové and Ústí nad Labem (see Table 1). Further changes in the number of providers occurred between the individual groups of providers. Two hospitals in Moravia-Silesia Region can serve as an example – Podhorská nemocnice a. s. in Rýmařov and Bohumínská městská nemocnice a. s. These hospital were providing services in all basic medical branches in 2003 (Group I), but since both of them excluded paediatrics from their bed care offer in 2013, they were classified in Group II in 2013.

## **2.2 The Network analysis using the software ArcGIS**

The list of hospitals describing situation in 2003 and in 2013 was taken from the Institute of Health Information and Statistics of the Czech Republic. The first step in delimitation of areas from where a hospital is accessible (hereafter service areas) is process of geocoding. The list of hospitals contains addresses that were used for geocoding on address geographical level using Mapy.cz API. In this paper, accessibility of hospitals is described for both modes of transport – individual car transport and public transport.

Network analysis using the software ArcGIS was used for delimitation of hospital service areas. In general the main issue in this process is defining average speed of particular road segments. The Data200 has been used as data source of road network provided by State Administration of Land Surveying and Cadastre. Average speeds are defined according to combination of road category and number of lines (see the Table 2 below). Additionally, resulting average speeds were modified according to samples of results proposed by Google Maps using randomly selected 100 travel times between a hospital and a municipality. The whole network is valid for the year 2013 and contains more than 66,500 km of roads divided into highways, expressways, first, second and third class roads and main streets in municipalities. The same road network has been used for both analysed years (2003 and 2013). The service areas are divided into five zones consisting of particular municipalities. The travel time from each municipality to the closest hospital is defined as average value from cumulative travel times of road segments within this municipality. This methodology solves problems relating to approximation of polygons representing service areas. The threshold values are defined as 10, 20, 30 and 60 minutes. Average speeds of road segments, see Table 2.

Tab. 2 – Average speeds of road segments. Source: Own elaboration.

Road segment + number of lines	Average speed
Highway and expressway	105 kph
First class roads with 3+ lines	75 kph
First class roads with 2 lines	65 kph
Second class roads with 3+ lines	55 kph
Second class roads with 2 lines	45 kph
Third class roads with 3+ lines	45 kph
Third class roads with 2 lines	35 kph
Street segment with 3+ lines	35 kph
Street segment with 2 lines	30 kph

Service areas were also delimited using public transport utilising database of public transport connections (Horák et al., 2014; Ivan, Horák, 2015). This database contains connections between municipalities within 150 kilometres that are searched in valid time tables and that meet several conditions – travel time is smaller than 90 minutes; number of changes is 5 and smaller; arrival time cannot be earlier than 60 minutes before; and departure time from an origin cannot be earlier than 120 minutes before arrival. In this paper, only connections with arrival between 5 and 8 am in a working day (Tuesday) are considered. Similarly as in case of car transport, service areas are delimited by public transport travel times work on municipality level. All hospitals in the same municipality are aggregated as a single hospital. The same threshold values of travel times are defined.

Differences in service areas between 2003 and 2013 are depicted in maps below and can be also represented by number of people living in municipalities from particular service areas. Population data is valid for the year 2013 and provided by the Czech Statistical Office.

### 3 RESULTS AND DISCUSSION

The output of the accessibility analysis is shown in the maps for 2003 and 2013 in Figures 1–4. The maps show the prescribed arrival times of the acute bed care providers in the CR when using individual means of transport (car) within the road network as well as when using public transport. The individual symbols (assigned to the individual groups of providers) in the map indicate the domiciles of the providers.

The individual map outputs are complemented by Tables 3–6 that define the impact of the selected arrival time zones on the specific number of inhabitants living permanently in the given territory. The inhabitants are also divided into age groups (0–14, 15–64, 65+).

The individual time zones were evaluated using a 5-grade qualitative scale:

- excellent accessibility – arrival time max. 10 minutes;
- good accessibility – arrival time max. 20 minutes;
- aggravated accessibility – arrival time max. 30 minutes;
- poor accessibility – arrival time max. 60 minutes;
- very poor accessibility – arrival time exceeding 60 minutes.

If arrival time exceeding 90 minutes was found in the given territory, acute bed care for the inhabitants of said territory was deemed inaccessible by the authors of this article. However, this phenomenon was reported, albeit insignificantly, in the case of public transport (see Figures 2 and 4; Tables 4 and 6).

The map in Figure 1 shows the distribution of time zones of arrival times to the providers by individual transport in 2003. It is evident that excellent accessibility of the providers is found in urban settlements (mostly towns and cities) and their surroundings. This level of accessibility (see Table 3) applied to 57.14% of Czech population (6,006,435 people), while the capital of Prague participates in this result significantly. Good accessibility held for 26.3% of population in 2003 (i.e. 2,764,934 people). Aggravated accessibility applied to 1,322,990 people, i.e. 12.59% of Czech population. Poor accessibility applied to 414,437 people, i.e. 3.94% of Czech population. Very poor accessibility using individual means of transport (car) held for 3,623 people in 2003, 0.03% of Czech population.

Tab. 3 - Population in accessible areas using cars in 2003. Source: Own calculations and elaboration.

Service area (in minutes)	Population	Population in age group			% of total population	% of population in age group		
		0–14	15–64	65+		0–14	15–64	65+
1–10	6,006,435	882,725	4,053,576	1,070,134	57.14	55.96	57.02	58.62
11–20	2,764,934	433,410	1,875,298	456,226	26.30	27.48	26.38	24.99
21–30	1,322,990	200,694	895,742	226,554	12.59	12.72	12.60	12.41
31–60	414,437	60,080	282,296	72,061	3.94	3.81	3.97	3.95
60 +	3,623	546	2,508	569	0.03	0.03	0.04	0.03
Total	10,512,419	1,577,455	7,109,420	1,825,544	100.00	100.00	100.00	100.00

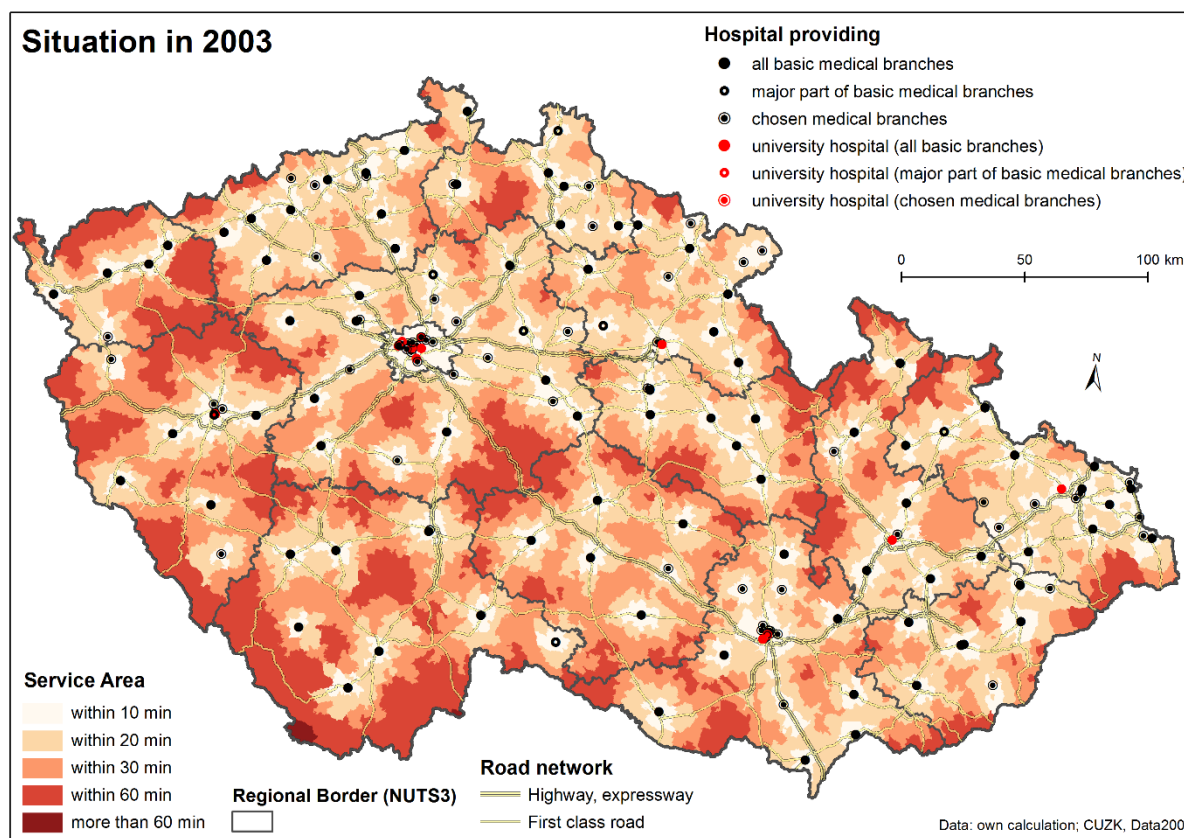


Fig. 1 – Accessibility of acute bed care providers in 2003 – individual car transport. Source: Own elaboration.

In the case of accessibility of the providers by public transport in 2003 (see Figure 2 and Table 4), it can be stated that excellent accessibility was again found in urban settlements, but in a smaller extent compared to individual transport, applying to 34.82% of population (3,660,179 people). Good accessibility held for 33.39% of population (3,509,653 people). Aggravated accessibility (max. 30 minutes) applied to 18.34% of population (1,927,483 people). Poor accessibility was found in 1,305,342 people, i.e. 12.42% of population, and very poor accessibility held for 103,998 people, i.e. 0.99% of population. Acute bed care was inaccessible by public transport for 5,764 people, i.e. 0.05% of population, in 2003.

Tab. 4 - Population in accessible areas using public transport in 2003. Source: Own calculations and elaboration.

Service area (in minutes)	Population	Population in age group			% of total population	% of population in age group		
		0–14	15–64	65+		0–14	15–64	65+
1–10	3,660,179	544,241	2,477,572	638,366	34.82	34.50	34.85	34.97
11–20	3,509,653	530,642	2,368,336	610,675	33.39	33.64	33.31	33.45
21–30	1,927,483	294,063	1,304,841	328,579	18.34	18.64	18.35	18.00
31–60	1,305,342	193,088	884,567	227,687	12.42	12.24	12.44	12.47
61–90	103,998	14,616	70,245	19,137	0.99	0.93	0.99	1.05
Inaccessible	5,764	805	3,859	1,100	0.05	0.05	0.05	0.06
Total	10,512,419	1,577,455	7,109,420	1,825,544	100.00	100.00	100.00	100.00

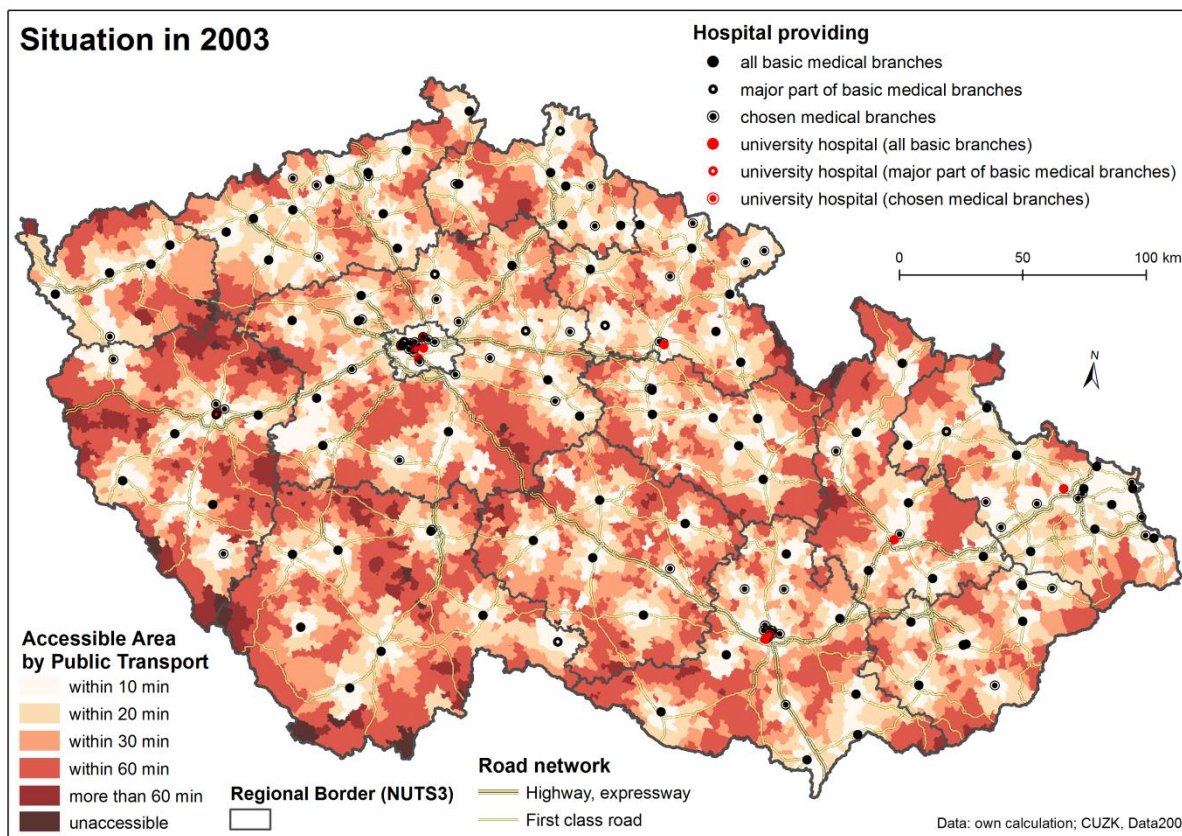


Fig. 2 – Accessibility of acute bed care providers in 2003 – public transport. Source: Own elaboration.

The accessibility of the providers using individual transport in 2013 is shown in Figure 3, while Table 5 shows the impact on the population. It can be stated that accessibility of the providers was excellent for 5,851,158 people, i.e. 55.66% of population. Very good accessibility held for 2,670,090 people, i.e. 25.40% of population. Aggravated accessibility by car was found in 1,459,563 people (i.e. 13.88% of population). Poor accessibility held for 526,746 people (i.e. 5.01% of population), and very poor accessibility was found in 4,862 people (i.e. 0.05% of population).

Tab. 5 - Population in accessible areas using cars in 2013. Source: Own calculations and elaboration.

Service area (in minutes)	Population	Population in age group			% of total population	% of population in age group		
		0–14	15–64	65+		0–14	15–64	65+
1–10	5,851,158	858,788	3,947,996	1,044,374	55.66	54.44	55.53	57.21
11–20	2,670,090	419,959	1,811,288	438,843	25.40	26.62	25.48	24.04
21–30	1,459,563	221,611	987,948	250,004	13.88	14.05	13.90	13.69
31–60	526,746	76,357	358,846	91,543	5.01	4.84	5.05	5.01
60 +	4,862	740	3,342	780	0.05	0.05	0.05	0.04
Total	10,512,419	1,577,455	7,109,420	1,825,544	100.00	100.00	100.00	100.00

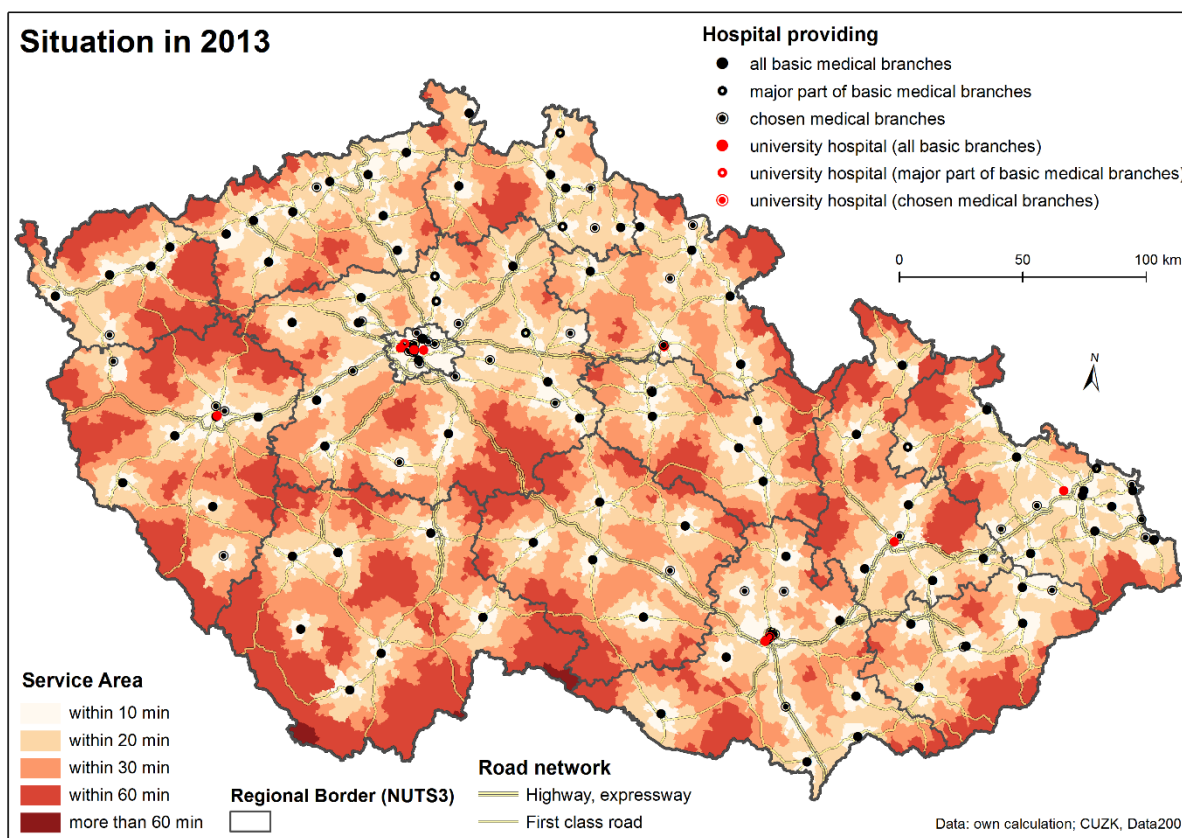


Fig. 3 – Accessibility of acute bed care providers in 2013 – individual car transport. Source: Own elaboration.

The accessibility of the providers using public transport in 2013 is shown in Figure 4, and Table 6 shows the impact on the population. It can be stated that accessibility was excellent for 3,011,391 people, i.e. 28.65% of population. Very good accessibility applied to 31.68% of population (i.e. 3,330,148 people). Aggravated accessibility held for 22.95% of population (2,412,820 people) and poor accessibility for 15.26% of population (1,604,457 people). Very poor accessibility was found in 144,631 people (i.e. 1.38% of population). Inaccessibility of the providers by public transport applied to 8,972 people (i.e. 0,09% of population) in 2013.

Tab. 6 - Population in accessible areas using public transport in 2013. Source: Own calculations and elaboration.

Service area (in minutes)	Population	Population in age group			% of total population	% of population in age group		
		0–14	15–64	65+		0–14	15–64	65+
1–10	3,011,391	450,740	2,043,957	516,694	28.65	28.57	28.75	28.30
11–20	3,330,148	504,397	2,246,731	579,020	31.68	31.98	31.60	31.72
21–30	2,412,820	363,540	1,628,718	420,562	22.95	23.05	22.91	23.04
31–60	1,604,457	236,938	1,086,151	281,368	15.26	15.02	15.28	15.41
61–90	144,631	20,571	97,857	26,203	1.38	1.30	1.38	1.44
Inaccessible	8,972	1,269	6,006	1,697	0.09	0.08	0.08	0.09
Total	10,512,419	1,577,455	7,109,420	1,825,544	100.00	100.00	100.00	100.00

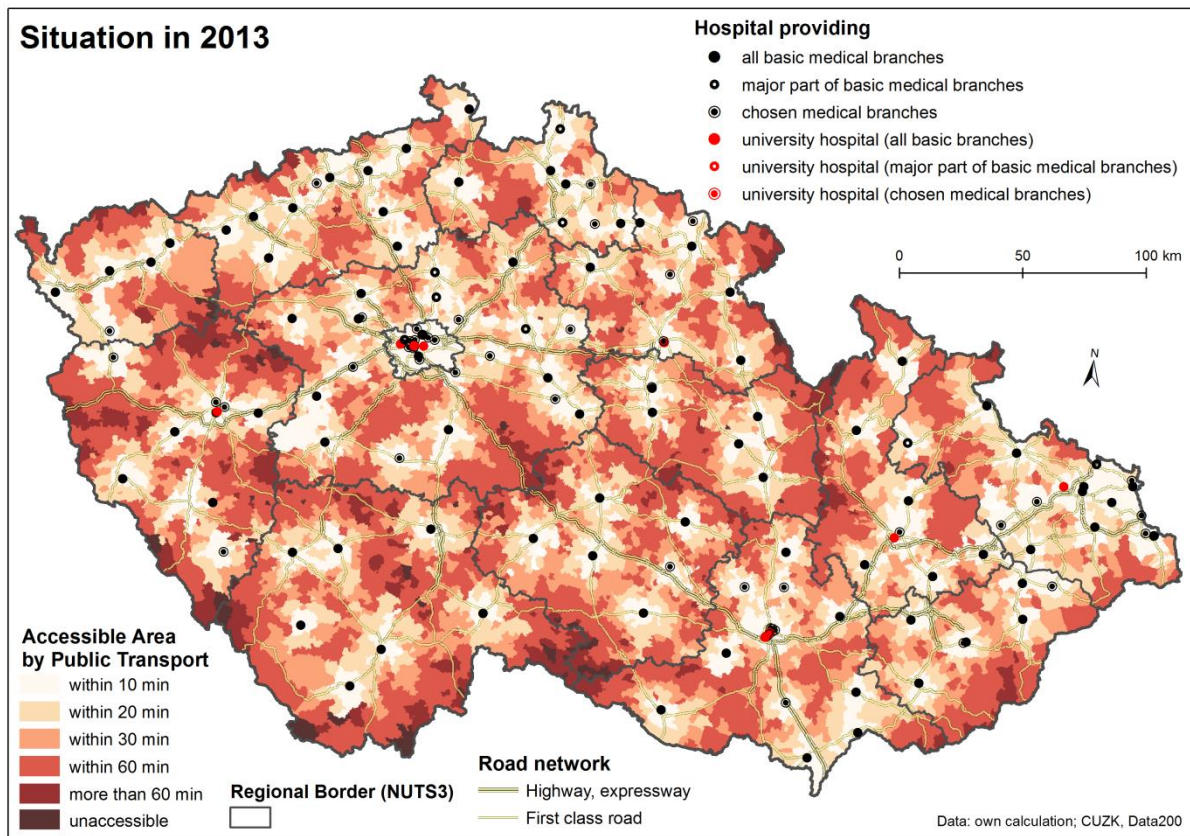


Fig. 4 - Accessibility of acute bed care providers in 2013 – public transport. Source: Own elaboration.

The above implies that, in general, the providers were better accessible using individual transport in comparison with the public transport in both years under review.

The comparison of the accessibility of the providers from the viewpoint of individual transport as well as public transport in 2003 and in 2013 shows that due to the reduction in the number of providers by 20, the accessibility aggravated in 9 regions of the CR in 2013 in comparison with 2003. The level of accessibility aggravated in the following regions: Ústí nad Labem, South Moravia, South Bohemia, Vysočina, Hradec Králové, Pardubice, Olomouc, Moravia-Silesia, and Zlín. On the other hand, the accessibility remained unchanged in the capital of Prague, in Central Bohemia, Plzeň Region, Liberec Region, and Karlovy Vary Region.

The decline in the providers in the individual regions impacted upon the spatial accessibility, depending on the location within the territory. For instance, liquidation of a provider located near another provider (e.g. in Plzeň) did not influence the spatial accessibility. By contrast, liquidation of providers having no other providers located nearby influenced the spatial accessibility heavily. For example, five providers were liquidated in Hradec Králové Region, but the aggravation of accessibility in the region was caused predominantly by the liquidation of 2 of them – Broumovská nemocnice and Nemocnice Nový Bydžov. The accessibility in Ústí nad Labem Region was influenced heavily by the liquidation of Nemocnice Louny, p. o., which provided bed care in internal medicine and surgery in 2003. The accessibility of acute bed care in South Bohemia was influenced fundamentally by the transformation of Nemocnice Dačice. This transformation took effect in three regions – South Bohemia, Vysočina, and South Moravia. Nemocnice Dačice provided acute bed care in 2003 in internal

medicine, surgery and obstetrics and gynaecology, complemented by nursing and after-care services. In 2013, the facility was transformed to after-care hospital that provides nursing services only.

Tab. 7 – The percentage of total population in accessible areas using cars or public transport in 2003 and 2013. Source: Own calculations and elaboration.

Zone	Cars 2003	Cars 2013	Public transport 2003	Public transport 2013
01–10	57.14	55.66	34.82	28.65
11–20	26.30	25.40	33.39	31.68
21–30	12.59	13.88	18.34	22.95
31–60	3.94	5.01	12.42	15.26
61–90	0.03	0.05	0.99	1.38
Inaccessible	0.00	0.00	0.05	0.09
Total	100.00	100.00	100.00	100.00

Table 7 shows that the accessibility of the providers as perceived by the persons involved (i.e. patients and visitors) aggravated in 2013 as compared to 2003, predominantly because of the reduction in the number of providers. This applies to individual transport as well as public transport in all time zones. The aggravation was more striking in the case of public transport. This phenomenon is documented in Figure 5.

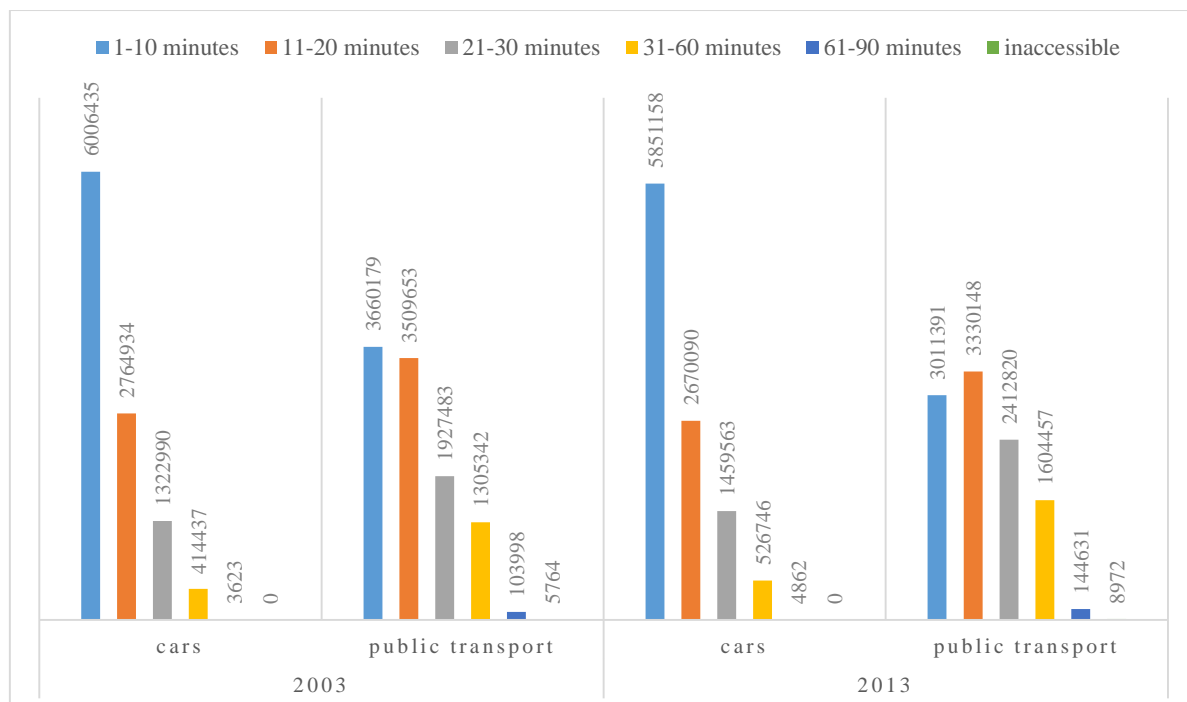


Fig. 5 – Time zones of accessibility of the providers in 2003 and in 2013 from the viewpoint of people involved. Source: Own calculations and elaboration.

It can be stated that the accessibility of the providers slightly aggravated due to organisational transformation in 2013 in comparison with 2003 in all time zones under review. The number of people dropped in shortest arrival zones, i.e. 1–10 minutes and 11–20 minutes, in comparison with 2003. By contrast, the number of people in the remaining time zones



increased. It is possible to conclude that accessibility by individual transport changed negatively for 500,242 people, while accessibility by public transport aggravated for 1,656,586 people.

The above-mentioned information implies serious discussion, which considers economic consequences of the deteriorated accessibility of the acute bed care in year 2013 in comparison with year 2003, for the parties involved (the population, the acute bed care providers, the health insurance companies, the state, the regions and the municipalities). At first sight, it is yet evident that the negative economic impact was caused by the change of the accessibility of the acute bed care provides given to citizens. This fact as a consequence increases both direct expenses spent on the transport (the fare). And indirect expenses connected with the loss of time for 1,656,586 citizens. In this connection the discussion can also be lead on pouring the expenses of the government and health insurance companies to the population.

Nevertheless, the discussion in the sense of the influence of the transformation process taking place under conditions of the acute bed care on the efficiency of the acute bed care providers ought to be lead on the basis of the results, e.g. the results of multi criteria analysis, which enable to model the technical and also allocation efficiency.

#### **4 CONCLUSION**

Acute bed care is a crucial segment of institutional health care and its general accessibility is characteristic of modern and advanced society. The acute bed care accessibility also includes its spatial variant that shows the distance the eventual patients and other involved persons have to cover to obtain this care. The distance can be covered individually or collectively, i.e. by car or by public transport.

The aim of this article was to use network analysis and time tables to determine the level and time scale of the spatial accessibility of the acute bed care providers in the Czech Republic by individual car transport and public transport in 2003 and 2013.

The comparison of the spatial accessibility in 2003 and 2013 follows the consequences of gradual transformation processes implemented in the acute bed care conditions after 2003.

The total of 5 time zones were selected and monitored from the viewpoint of individual and public transport in both years. It can be stated that acute bed care is spatially accessible by both individual and public transport in the Czech Republic. Nevertheless, accessibility is better by individual transport. Excellent accessibility of the providers holds true for 55.66% of population if using individual transport, but only for 28.65 % of population if using public transport. Good accessibility applies to 25.4% of population if using individual transport and to 31.68% of population if using public transport. Aggravated accessibility was found in 13.88% of population in case of individual transport against 22.95% of population in case of public transport. Poor accessibility by individual transport as compared to public transport was in the ratio of 5.01% to 15.26%. Very poor accessibility affects 0.05% of population if using individual transport and 1.38% of population if using public transport. Acute bed care was inaccessible for 0.09% of population if entirely dependent on public transport only.

The accessibility of the acute bed care providers changed in nine regions of the CR in 2013 in comparison with 2003. The accessibility by individual transport aggravated for 4.75% of the Czech population, while worsening for 15.75% of the Czech population when using public transport.

The design of the network of acute bed care providers in connection with the quality of the transportation infrastructure forms the level of spatial accessibility. In this context, it can be stated that both networks (providers and infrastructure) are formed by social and political priorities, regional requirements and economic potential of the actors involved, including the population.

The perspectives of the level of spatial accessibility of the acute bed care providers must be discussed and assessed together with quality and economic efficiency of this care. However, the rationalisation and transformation processes, mainly triggered by economic factors, that interfere with the number and structure of the acute bed care providers in a given territory must be implemented with respect to the transportation potential of the territory. This implies that sufficient and quality transportation infrastructure creates prerequisites allowing implementation of acute bed care intentions that lead to improving their expertise, professionalism and equipment. This means replacing the quantity by quality and providing legitimate acute bed care services for the population in a flexible and competent manner.

### Acknowledgements

*This paper was supported within „Operational Programme Education for Competitiveness – Project No. CZ.1.07/2.3.00/20.0296“ and by the Czech Science Foundation – Project No. 14-26831S.*

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## **RELATIONSHIP BETWEEN THE GROWTH-RATE OF TURNOVER OF SME'S IN RELATION TO THE AGE OF THE DIRECTORS OF THESE COMPANIES**

*Jaroslav Vrchota, Monika Maříková*

### **Abstract**

The aim of this paper is to analyze the relationship between the growth rate of turnover of small and medium-sized companies in relation to the age of the directors of these companies. The research was conducted in 2013 to 168 companies, under a grant gaju 079/2013 / S. The results using Chi-square test and Cramer's coefficient proved to be correct weak correlation between the two variables. It was also found that the company's sales growth rate reaching over 20% of managers governed mostly under 40 years old.

*Keywords: rate of turnover, manager's age, SME's*

JEL Classification: J5

### **1 INTRODUCTION**

Flexibility, the ability to react to changes quickly, are one of the most declined words of these days Smejkal & Rais, 2013). Matter of management of top managers is one of the issues addressed by each firm. The ability to lead people, motivate, organize work properly, plan and anticipate the future are just some of the skills that should be familiar to managers (O'Neill, 2011). The question remains whether young manager, ignorant of Long-term practice can be more successful than the one that directs the undertaking number of years, usually decides the same way and does not like change.

The success of the enterprise is difficult to define, it is the subjective opinion of everyone according to what each individual is considered a success. Generally, we consider it a success if it achieves the desired objectives (Plamínek, 2014). For the purposes of this paper was regarded as a successful business the one that showed growth in recent years, specifically the pace of business growth was reviewed.

### **2 THEORETICAL BASIS**

Personality is a unique combination of psychological traits that characterize an individual. Identifies ways how he experiences the world around, dealing in various situations and objectives to be reached. It is significantly reflected in the results of the work and human relationships (Šuleř, 2008). The manager is the person who achieves his/her targets with people and through them (Lojda, 2011). Definition of Yukli (1989) manager is the person who occupies a position in which performance management is expected, but without any assumptions this process actually occurs (Folwarczná, 2010).

Age together with competencies of managers is one of the key factors that may play a role (Daft, 2012). The research of the firm Kienbaum shows that lack of self-criticism and reappraisal of themselves is an important factor which young managers trip through the path to success. They lack soft skills, ability of suitable manners (Hospodářské noviny, 2012). The results highlight the power of the CEO, the tendency to consolidate the top positions under the CEO, and the greater accountability of the person in the combined position for firm

performance (Harrison, 1988). As Bateman (2013) and Panczaková (2010) stated, employers today are looking for quality above all a man age matters to them, contrary frequent criterion while choosing a future manager is that he/she must not be younger than a set limit. DMC management company based on his research published that on the age of managers when choosing a candidate does not matter as well as quotes Robbins (2013). At age matters only at specific positions, where an important medical condition is important. At the present time when many businesses are struggling to survive, employers are turning to more experienced ones, who have long practice, because there is no time to experiment in the form of young inexperienced managers who want change. The advantage of older managers is the fact that they "do not seek themselves, know what a job entails. Young managers are hardworking, tough and able to adapt (Termann, 2002).

Tab. 1 – Older versus younger managers, Source: Dohnal, 2011; Navrátil, 2014; Panczaková, 2010

Older managers (40+)	Younger managers (less than 40)
More experienced and knowledged	They bring new ideas, unusual solutions and creativity
Handle crisis situation easier	Know work with information systems better
Can utilize the potential of their subordinates better	Are ambitious
Are more loyal to the employer	Have a lot of enthusiasm and energy
Sometimes recognition of new processes may také longer	Some are „seeking themselves“
More modest, less conflict, lower life demands, higher dose of humility	Dynamics
Greater gratitude and honesty	
Better treat stress	

The crucial phase of the whole business life cycle is a period of growth. This period determines the success or failure of the organization. A key factor for success is thus considered to achieve and sustain a growth rate of business (Vochozka & Mulač, 2012). The growth rate can be expressed as an increase in the value relative to the previous period (Holman, 2005). The growth rate of turnover is one of the indicators that are used as a criterion for the success of enterprise (Kašparovská, 2006).

### 3 METHODOLOGY

The aim of this paper is to compare rate of turnover with age of the company directors and try to prove or disprove the relationship. Following definition of turnover was used for the purposes of this paper: Turnover means the total output value of economic activities carried out during a certain period of time, usually measured by total annual revenues after deduction of returned goods (Synek, 2010). Paper gauged the rate of enterprises growth. Definition of the positive or negative value of growth is essential for time comparison. The ratio of increment and the value of the baseline period give a relative growth or growth rate variable (Kubálková, 2009). The growth rate =  $O = (O_1 - O_0) / O_0$ . Directors of companies stated the business turnover growth rate (as defined above) in the survey, which was verified in the financial statements. Data were obtained within the GAJU 079/2013 /s research, which was

aimed at SMEs and process management within these companies, which followed the SMEs field research (Brezinova, 2013). Data were collected during 2014 from 198 companies (those companies were chosen to match the statistical distribution by areas of business in the Czech Republic), while the question of age, and also on the rate of growth of the company in recent years was responded and can be verified at 168 respondents. This data was divided according to the frequency into groups according to age of directors (40, 41-50, 51 and over) and according to the company's growth rate: negative or zero growth, 0.1-5%, 6-10%, 11 to 20% and more than 20%. The intervals of growth rate were taken from Williams (2012).

For further comparison, tested variables were adjusted using contingency tables. Contingency tables show how one characteristic depends on the other. Tables were set of two nominal variables  $X, Y$  (Hendl 2012). Let  $X$  acquire variants  $x_{[1]}, \dots, x_{[r]}$  and  $Y$  acquires variant  $y_{[1]}, \dots, y_{[s]}$ . Let the  $(\pi_{jk}) = P ( X=x_{[j]} \wedge Y=y_{[k]} )$  be the probability of simultaneous pair variants of the  $(x_{[j]} y_{[k]})$ ,  $\pi_j = P ( X=x_{[j]} )$  marginal probability variants  $(x_{[j]} y_{[k]})$ ,  $\pi_k = P ( Y=y_{[k]} )$  marginal probability variants  $y_{[k]}$ . (Freund, 2010)

Later a two-dimensional random range distribution  $n z$  was conducted, applicable to a two-dimensional discrete random vector  $(X, Y)$ . Identified absolute simultaneous frequency  $n_{jk}$  pair variant  $(x_{[j]} y_{[k]})$  are arranged in a contingent Table 1.

Tab. 1: Absolute frequency of the  $n_{jk}$  pair, Source: *Friedrich 2010, Lander 2014*

	<b>y</b>				
		$y_{[1]}$	. . .	$y_{[s]}$	$n_{j.}$
<b>x</b>	$n_{jk}$				
$x_{[1]}$	$n_{11}$		. . .	$n_{1s}$	$n_{1.}$
.	.			.	.
.	.		. . .	.	.
.	.			.	.
$x_{[r]}$	$n_{r1}$		. . .	$n_{rs}$	$n_{r.}$
$n_{.k}$	$n_{.1}$		. . .	$n_{.s}$	$n$

The frequency is determined from the relationship where,  $n_{j.} = n_{j1} + \dots + n_{js}$  is marginal absolute frequency of the variant  $x_{[j]}$ ,  $n_{.k} = n_{1k} + \dots + n_{rk}$  is marginal absolute frequency of variant  $y_{[k]}$ . Furthermore, simultaneous probability will be estimated using simultaneous

relative frequency  $p_{jk} = \frac{n_{jk}}{n}$ , marginal probabilities  $\pi_j$  and  $\pi_k$  are estimated using marginal

relative frequencies  $p_{j.} = \frac{n_{j.}}{n}$  a  $p_{.k} = \frac{n_{.k}}{n}$ . (Freund 2010 Budíková 2010, Walker 2013)

We test the null hypothesis  $H_0$ :  $X, Y$  are stochastically independent random variables against the alternative  $H_1$ :  $X, Y$  are stochastically dependent random variables. The test is based on

comparing the detected frequency  $n_{jk}$  and so called theoretical frequencies  $\frac{n_{j.} \times n_{.k}}{n}$  of the pair variant  $(x_{[j]}, y_{[k]})$ , which if the null hypothesis should be very similar. (Hendl, 2012)

$$K = \sum_{j=1}^r \sum_{k=1}^s \frac{\left( n_{jk} - \frac{n_{j.} \times n_{.k}}{n} \right)^2}{\frac{n_{j.} \times n_{.k}}{n}} \quad (\text{Budíková 2010})$$

The test statistic has the form:

For the test are met conditions of good approximation (80% takes the value  $\geq 5$  and the remaining 20% are below 2), then the statistic  $K$  is asymptotically conducted by the

distribution of the  $\chi^2((r-1)(s-1))$ . The critical value domain  $W = \langle \chi^2_{1-\alpha}((r-1)(s-1)), \infty \rangle$ . The hypothesis of independent variables X, Y, is rejected at the asymptotic significance level  $\alpha$  if the test statistic K is realized in the critical field W. (Walker, 2013)

The level of the measured values dependence of the nominal type is determined by use of Cramer's coefficient:

$$V = \sqrt{\frac{K}{n(m-1)}}$$

(Freund, 2010)

Where n represents the range and  $m = \min \{r, s\}$ . The coefficient takes values between 0 and 1. The closer to 1, the stronger is the measured dependence between X and Y, the closer to 0, the dependence is looser.

Tab. 2: Importance of Cramer's coefficient values, Source: Budíková 2010

0,0 - 0,1	negligible dependence
0,1 - 0,3	weak dependence
0,3 - 0,7	medium dependence
0,7 - 1,0	strong dependence

Dependence between age of the director and growth rate is determined using a form of hypotheses about the independence of the individual indicators on asymptotic significance level of 0.05.

## 4 RESULTS

Within results is investigated independence between company director's age and rate of growth of the company. Testing was done using the  $\chi^2$  test of independence with one degree of freedom. If the tested hypothesis will have been refuted, further dependence will be measured using Cramer's coefficient.

Tab. 3: Cross-tabulation of directors age and growth rate, Source: own research

	The grow rate	Age < 40	Age < 50	Age >51	Totals
Frequency	Zero or negative	6	7	15	28
Column		10,34%	12,96%	26,79%	
Row		21,43%	25,00%	53,57%	
Frequency	0,1 - 5%	8	11	12	31
Column		13,79%	20,37%	21,43%	
Row		25,81%	35,48%	38,71%	
Frequency	6 - 10 %	4	7	11	22
Column		6,90%	12,96%	19,64%	
Row		18,18%	31,82%	50,00%	
Frequency	11% - 20%	18	15	10	43
Column		31,03%	27,78%	17,86%	
Row		41,86%	34,88%	23,26%	



Frequency	víc jak 21%	22	14	8	44
Column		37,93%	25,93%	14,29%	
Row		50,00%	31,82%	18,18%	
Frequency		58	54	56	168

As we can see in Table 3 the age distribution of managers in 168 companies could be evenly divided to 54 cases. In contrast, in terms of growth rate, companies reaching growth rates of over 11% dominate compared to other groups.

In terms of zero or negative growth rate of outweigh managers older than 51 years of 53.6% compared to younger directors who are equally represented approximately 25% and 21.4%. Distribution is similar for companies achieving 5% growth rate, but there is again most managers with over 51 years of age (38.7%), followed by managers between 41 and 50 years (35.5%) and 25.8% of the directors under 40 years. The difference occurs in companies with a rate between 6 and 10%, were group represented by managers older than 51 years (50%) is again strongly followed by managers between 41 and 50 years, with 31.8%. At growth rates between 11% -20% and more than 21% is the order opposite to the previous ones in both categories dominate directors under 40 years of age, with 41.9% and 50.0% against the managers over 51 years where the distribution of 23 3% and 18.2%. Directors between 41 and 50 years maintained mid-values across the whole sample. From these data it can be concluded that a higher growth rate is achieved under the leadership of the company directors aged 40 years and younger and at the same time companies with a growth below 10% are managed by directors older than 51 years. It's assumable, based on the data in the table, that there is a certain relationship between the two variables, which is then tested using X2 test of independence with one degree of freedom on the chosen significance level  $\alpha = 0.05$ . Following hypothesis are tested.

$H_0$  = age and growth rate of the directors shall be independent

$$H_A = \text{non } H_0$$

Firstly, the conditions of good approximations were validated - at least  $80\% \geq 5$  and the remaining  $20\% \geq 2$ , see Table 3 based on theoretical frequency =  $\frac{n_j \times n_k}{n}$

It's possible to determine the expected frequency for age and growth rate, from the table below. For control purpose row and column totals are given. Table 4 was created using the Statistica software.

Tab. 4: Expected frequency for age and growth rate, Source: own research

Growth rate	Age < 40	Age 40 - 50	51 and more	Sums
Negative or zero	9,66667	9,00000	9,33333	28,0000
Up to 5%	10,70238	9,96429	10,33333	31,0000
Up to 10 %	7,59524	7,07143	7,33333	22,0000
11%-20%	14,84524	13,82143	14,33333	43,0000
More than 21%	15,19048	14,14286	14,66667	44,0000
All groups	58,00000	54,00000	56,00000	168,0000

It is evident that the conditions of a good approximation are met and in 100% cases the values  $\geq 5$ . Therefore, Pearson Chi-kv test can be used.

$$\chi^2 = \sum_{j=1}^r \sum_{k=1}^s \frac{\left(n_{jk} - \frac{n_j \times n_k}{n}\right)^2}{\frac{n_j \times n_k}{n}} \quad \chi^2=18,036 \quad df=8 \quad p=0,021$$

Since the p-value is lower than the chosen  $\alpha$ , the hypothesis of independence age and growth rates Decline  $H_0$  at significance level of 0.05. Now we try to express dependence by Cramer's

coefficient: 
$$V = \sqrt{\frac{K}{n(m-1)}} = 0,232$$

The Cramer's coefficient suggests that there is a weak dependence between monitored variables, as illustrated.

## 5 DISCUSSION

Also competencies are closely related to the age of managers. During life of managers, competencies are developing but can also disappear. Even some competencies at a certain age can not convey at all or in limited quantities, which may also have an impact on the success of management and consequently the success of the enterprise. From this follows that younger managers in this area would have an advantage (Benes, 2004), as follows also from our research. Younger directors lead companies with higher growth rates.

In 2010 in Germany, the research which was attended by 300 top managers. The results show that young managers (aged 30-39 years) often change their profession and the field in which they are employed, do not have such deficiencies in education, think more entrepreneurial and comprehensively evaluate the tasks to be performed. Research has shown that younger managers are at a given position, on average, one year shorter than older colleagues (young managers are at a given position on average 2.9 years) but perform their tasks faster and more efficiently than older colleagues, which confirms the findings of this contribution. Younger managers lead companies that exhibit faster growth rate (are more successful) (Kariérainfo 2010). This effect may be due to their greater flexibility and freedom through which they can easily be replaced by more companies and choose the most perspective.

European governments are trying due to lack of manpower to create a trend of an extension of the age limit for retirement. Effect of that factor on the effort of companies to keep senior managers was dealt by Karpinska (2013) and her team. She examined this phenomenon in the Netherlands on 238 employees. The research came to the conclusion that, contrary to all expectations, businesses prefer early retirement pension of managers, which supports our findings that older managers do not bring desired profit to the companies. In deciding whether to keep or to let senior managers go mainly personal relationships and financial requirements decide, Furunes (2011).

Study of Kunze (2013) focuses on the importance of age variability of managers in terms of business performance that managed to prove statistically in 147 companies. In contrast, and in accordance with our results, Guerin (2003) showed that managers over the age of 50 years no longer achieve such performance as younger colleagues. Similar results are confirmed by the research (Cologna, 1998) of top bank managers. It was shown that younger managers compared to the older ones achieve better results.

“For the theory of firm growth, this implies that the firm experiences constant (growth) returns to managerial resources. The rate of grow firm does not affect its managerial intensity, but the size of firms does inversely affect it. For the economy-wide theory of growth, this implies that managerial resources need not be a drag on the growth of output.” says Gander (1991). Other research in international companies looking to hire older managers as evidenced by an article from the German magazine *Manager Magazin* (E15 2013). For example the globally recognized institutions such as Procter & Gamble, Air Berlin, the European Central Bank, the Swiss bank UBS and others. A number of older managers retires and then returns back to work. The trend today is that older managers do not retire at all from the top positions shift to less lucrative positions, they become consultants or team coaches, which is for business an ideal combination of ferocity of youth and experience of older. "A new broom sweeps clean. But the old knows where the dirt is," says Alfred Odendahl, head of Bosch Management Support, himself at retirement age (Buchhorn & Klaus, 2013; E15, 2013).

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## **MEASURING CUSTOMER SATISFACTION: A LITERATURE REVIEW**

*Vu Minh Ngo*

### **Abstract**

Customer satisfaction (CS) has attracted serious research attention in the recent past. This paper reviews the research on how to measure the level of CS, and classify research articles according to their approaches and methodologies. This paper also tries to supply some insights about the state of measuring CS in Vietnam. The main objective is to provide a conceptual basic to understand existing methodologies used for measuring CS. A total of 103 articles from more than 50 journals and international conferences are reviewed. A number of important methodologies used for measuring CS are defined and classified into two different approaches based on their nature. Another important contribution of this study is to suggest some criteria which should be considered to make CS measurement as a leading indicator of the financial performance. This paper can be helpful for managers to gain basic conceptual ideas of the methodologies used for measuring CS and also the criteria which make CS measurements more likely as a driver of financial performance when they are satisfied.

*Keywords: Customer satisfaction, Measure customer satisfaction, Customer satisfaction index/ measurements, SERVQUAL, National Customer satisfaction index*

JEL Classification: C10, M30

### **1 INTRODUCTION**

In today market-oriented business environment, it can be said arguably that the question how to satisfy customers becomes the ultimate concern of most of the companies in any kind of business. Therefore, understanding customer satisfaction (CS) dimensions, measuring it and taking advantage from these measurements become the urgent need for managers and establish the mainstream in academic literature about CS in the recent past. CS is important to measure because of its significant impacts on firms' long-term performance and also customer purchasing behaviors. In the academics, consistently providing high CS is well acknowledged to be associated with higher customer loyalty and enhanced reputation (Fornell, 1992; Anderson & Sullivan, 1993; Wangenheim & Bayon, 2004). Customer loyalty is considered as the outcome of a process beginning with customer satisfaction (Oliver, 1999). There exist definitely other factors other than customer satisfaction that form the customer loyalty and retention such as personal determinism and social factors. But satisfaction is a necessary step in loyalty formation (Oliver, 1999). CS can also supply a higher barrier against switching to other competitors. Loss cost and move-in cost were positively significant related to the CS (Kim, Park & Jeong 2004). Exploring the relationship between CS and the economic return is also one of the most interesting topics. Anderson, Fornell and Lehmann (1994) attempted to explore the relationship between CS and financial returns using a national customer satisfaction index (NCSI) and ROI (return on investment). They found the significantly positive association between ROI and CS but not immediately realized. Ittner and Larcker (1998) found that CS is a leading indicator of customer purchasing behavior, growth in the number of customers, and accounting performance. Banker, Potter and Srinivasan (2000) used operating profits per available room to measure financial performance and verified its lead-lag relation with CS for 18 hotels managed by a hotel corporation. However, there were also quite

a few of studies found no positive relationship between CS and economic returns. Yu (2007) found that “higher CS leads to higher customer revenue and higher customer costs at the same time, and thus customer profits remain unaffected”. There is obviously a tradeoff and lead to the question of probability. Thus, in order to achieve more practical implications, CS measurements do not only need to respond to the evaluation of current situation but also being a leading indicator for financial performance. The main objective of this study is to review and provide the conceptual basics to understand the methodologies used for measuring CS. Also, the article suggests ideas for making CS measurements to be leading indicators of financial performance by undertaking a review of the literature in CS research. In addition, it makes an attempt to get some insights about the state of measuring CS in the practice of Vietnam market in particular.

The remainder of this paper is organized as follows. Section 2 discusses the methodology used for reviewing in this paper. Section 3 is about the statistical and citation analysis of selected articles. Section 4 provides the conceptual basic ideas about methodologies used for measuring CS. Section 5 is about discussion, suggestion of criteria to make CS measurements being leading indicators of financial performance and some insights about measuring CS in Vietnam. Section 6 is conclusion.

## **2 METHODOLOGY**

### **2.1 Research agenda**

The research agenda is about the methodology used for measuring customer satisfaction. The search key for finding articles, books, and documents related to the research agenda are: “measure/develop customer satisfaction”, “customer satisfaction measurements”, “technique for measuring customer satisfaction”, “customer satisfaction”, and “customer satisfaction proxy/index/scale”. The main aim of the research is to define the most popular methodologies which are used to measure CS which are proposed and applied in the practice. These key works help to identify the articles which are most likely to studies about measuring CS.

### **2.2 Literature search criteria**

In search of relevant articles, the search will consist of journal articles with peer reviewed, books, government publication, conference proceedings and other relevant work. The search of literature will be conducted by using major multi-purpose databases such as Web of Science (Thomson Reuters), ProQuest, Emerald, Science Direct and EBSCO. A search for more articles using the same search key words will be conducted on the Internet using Google Scholar in order to increase the coverage of the literature search. The search criterion for the publication period is up to December 2014.

### **2.3 Literature search procedure**

The initial searches revealed that a total 265 articles were found from various sources included academic and professional journals, books and other publications. Then these articles' content would be analyzed for the relevance of method or proxy used for measuring CS. When the articles were found to be relevant to the study agenda, they would be assessed in more detail of its purposes, methodologies and findings. The citation criteria were applied to get the articles which are most valuable to the research topic. Except the very recent articles and books, the articles published more than 2 years and received less than 2 citations were eliminated. After the analysis, 103 relevant articles and books were chosen.

### 3 STATISTICAL ANALYSIS OF SELECTED ARTICLES

The literature searches from various sources produced 103 articles and books whose contents substantially related to the topic of how to measure CS. The coverage of the selected articles can be classified based on the methodology used for measuring CS. There are also some articles cover related topics to CS included such as Halo effects, statistical techniques, etc. Table 1 shows the numbers of articles writing about each methodology.

Tab.1 – Number of articles for each methodology. Source: Own research

<b>Methodologies</b>	<b>Number of articles</b>
National Customer satisfaction index (NCSI)	20
Service quality (SERVQUAL)	21
MUSA method	9
Probit/Logit model	4
DEA method	4
Important Performance Analysis (IPA)	8
Cluster Analysis	5
Conceptual papers	10
Other methods	14
Other issues related to CS	8

These selected articles are from a wide spread of journals with more than 50 journals. The journals with the high volume of selected articles as to measuring CS are Total Quality Management, The Journal of Services Marketing, The Journal of Marketing, Expert Systems with Applications, European Journal of Operational Research, International Journal of Bank Marketing, and Managing Service Quality.

Except for newly published articles and books, all other articles were adequately cited, the lowest being 2 citations as like the citation criteria. Table 2 shows the number of articles for each interval of citation from the articles.

Tab. 2 – Number of articles for each interval of citation. Source: Own research

<b>Citation</b>	<b>Number of articles</b>
> 100	9
50 -100	15
30-49	17
29 - 10	31
<10	31

### 4 METHODOLOGIES FOR MEASURING CS

After undertaking a literature review, the most popular methodologies in measuring CS are defined. The objective of this section is to provide the basic conceptual ideas about the most popular methodologies.



#### **4.1 National Customer Satisfaction Index (NCSI)**

Sweden has become the first country to establish a national economic indicator reflecting customer satisfaction. Claes Fornell (1992) in the articles "A national Customer Satisfaction Barometer: The Swedish Experience" proposed a method for measuring CS in more than 30 industries and for more than 100 corporations. After the first national customer satisfaction was developed in Sweden, a number of both national and international customer satisfaction barometers and indices have been introduced such as the American Customer Satisfaction Index (ACSI) (Fornell, Johnson, Anderson, Cha & Bryant, 1996), European Customer Satisfaction Index (ECSI), Norwegian Customer Satisfaction Barometers (NCSB) (Andreassen & Lindestad, 1998), etc. The implementation of national customer satisfaction indices seems to be suitable for a sustainable evaluation of the performance of companies in an international context. (Grund & Bruhn, 2000)

In this methodology, Customer Satisfaction Index (CSI) represents its served market's - its customers'- overall evaluation of total purchase and consumption experience, both actual and anticipated (Fornell, 1992; Johnson & Fornell, 1991). Each version of NCSI can include some modifications. But all of them are based on two fundamental properties. First, the methodology must recognize that CSI is a customer evaluation that cannot be measured directly. Second, as an overall measure of CS, CSI must be measured in a way that not only accounts for consumption experience, but is also forward-looking (Anderson & Fornell, 2000). Therefore, it includes not just antecedents but also the consequences of overall CS. The antecedents of CS is based on the expectation and disconfirmation paradigm which suggest that the dispersal between expectation of performance and perceived performance can determine customer satisfaction (Yi, 1990). These antecedents are usually performance expectation of a product or service, the perceived performance and perceived value. The consequences of overall customer satisfaction are the customer behaviors such as loyalty and complaint (Fornell, 1992; Fornell, Johnson, Anderson, Cha & Bryant, 1996; Grund & Bruhn, 2000; Johnson, Gustafsson, Andreassen, Lervik & Cha, 2001; Anderson & Fornell, 2000). These antecedents and consequences are latent variables which can be measured through other manifest variable which related to them. Structural Equation Modelling (SEM) is usually the technique for finding the CS level and validating the causal relationship between CS and antecedents, consequences in this methodology. One of the most important advantages of SEM is its capacity to study the relationships among latent constructs that are indicated by multiple measures (Lei & Wu, 2007). In addition, SEM can provide separated estimates of relations among latent constructs and their manifest variables (the measurement model) and of the relations among constructs (the structural model) (Tomarke & Niels, 2005). The goal of SEM is to determine whether a hypothesized theoretical model is consistent with the data collected to reflect this theory.

#### **4.2 Service quality (SERVQUAL)**

The SERVQUAL method was suggested to evaluate CS by Parasuraman, Zeithaml, and Berry (1988). Consequently, there have been several follow-up articles and studies about the SERVQUAL method and its application. Research in service quality has also been conducted within the framework of the expectation and disconfirmation paradigm. The central idea in this model is that service quality is primarily a function of the difference scores or gaps between expectations and perceptions (Jamali, 2007). The service quality research has been dominated by the SERVQUAL instrument which is usually cluster in five group quality determinants: Reliability, Responsiveness, Assurance, Empathy and Tangible (Parasuraman, Zeithaml & Berry, 1985; Ghobadian, Speller & Jones, 1994; Curry & Herbert, 1998; Wisniewski, 2001).

However, there has been controversy in the service quality literature about the sequential order of the two constructs: CS and service quality. While authors such as Dabholkar, Shepherd and Thorpe (2000); Cronin, Brady and Hult (2000) regard perceived quality as an antecedent to satisfaction, other authors (e.g. Parasuraman et al., 1988; Bitner, 1990), however, consider CS as an antecedent to service quality. The majority of recent publications (e.g. Yavas, Benkenstein, & Stuhldreier, 2004; Carrillat, Jaramillo, & Mulki, 2007; Jamali, 2007) consider service quality as an antecedent to CS. Thus, SERVQUAL can be used as a methodology used for measuring CS. The objective of SERVQUAL methodology is usually to develop the best instrument for measuring CS. The best instrument can be defined as the best service quality constructs for predicting CS for a specific firm. Structural Modelling Equation, Factor Analysis or Multiple Regression analysis are usually used for choosing and validating the best service quality constructs among the proposed ones.

Various scholars however pointed out that SERVQUAL is not a generic measure that could be applied to any service and that it needs to be customized to the specific service under consideration (Carman, 1990; Babakus & Boller, 1992). Li, Riley, Lin and Qi (2006) proposed five quality dimensions for comparing overall CS between two largest US parcel delivery companies, the UPS and FedEx. They are availability, responsiveness, reliability, completeness, and professionalism of service. Jamali (2007) proposed a conceptual model which included not just basic service quality dimension but also others antecedents of CS such as: Equity, Attributions, Cost/benefit analysis, Emotion, etc. Chadee and Mattsson (1996) investigated the best attributes influence on the overall satisfaction of a quality dimension during tourist encounters. The quality dimensions in the article were eating out, hotel accommodation, renting a car and going on a sightseeing tour. Andaleeb and Conway (2006) used factor analysis and regression model to find the impact of service quality determinants on CS in the restaurant industry.

### **4.3 Multicriteria Satisfaction Analysis (MUSA)**

The MUSA method was first introduced by Grigoroudis and Siskos (2002). The main objectives of MUSA method are: (1) supply the evaluation of customers' satisfaction level, both globally and partially for each of the characteristics of the provided service; (2) The supply of a complete set of results that analyze in depth customers' preferences and expectations, and explain their satisfaction level; (3) The development of a decision tool with emphasis on the understanding and the applicability of the provided results (Grigoroudis & Siskos, 2002). The proposed MUSA method defines CS as the aggregation of individual judgments into a collective value function assuming that client's global satisfaction depends on a set of  $n$  criteria or variables representing service characteristic dimensions. The required data for the MUSA method is collected through a questionnaire through which the customers are asked about their perception about the overall satisfaction ( $Y$ ) and their satisfaction about the set of pre-defined criteria ( $X_i$ ). The MUSA method follows the principles of ordinal regression analysis under constraints (Grigoroudis & Siskos, 2002):

$$Y^* = \sum_{i=1}^n b_i X_i^* ; \quad \sum_{i=1}^n b_i = 1;$$

where,  $Y^*$  and  $X_i^*$ , respectively, given customers' judgments  $Y$  and  $X_i$ ;  $b_i$  is the weight of the  $i$ -th criterion and the value functions  $Y^*$  and  $X_i^*$ .

The main objective of the method is to achieve the maximum consistency between the value function  $Y^*$  and the customers' judgments  $Y$ . The result of MUSA method provide us the weighting  $b_i$  for each criteria, the value  $y^{*m}$  for each  $m$ -th overall satisfaction level and the value  $x_i^{*k}$  for  $k$ -th satisfaction level of criteria  $i$ . The main advantage of the MUSA method is that it fully considers the qualitative form of customers' judgments and preferences, as they

are expressed in a CS survey. The MUSA method avoids the arbitrary quantification of the collected information, because the coding of the qualitative scale is a result, not an input to the proposed methodology. This does not occur in a simple linear regression analysis (Grigoroudis & Siskos, 2002). Moreover, the MUSA method result also offer complete information set more than just only focused on the descriptive analysis of CS.

Arabatzis and Grigoroudis (2010) has been using MUSA method and related software for identifying the factors affecting visitors' satisfaction level, as well as the critical points that the management authority of the National Park must concentrate its improvement actions. Ipsilandis, Samaras and Mplanas (2008) in their paper used MUSA method for analyzing the satisfaction of project managers with respect to satisfaction criteria associated with four dimensions: the project's results, the operations of the programme organization, the support of the project organization and the performance of the project team. Manolitzas, Grigoroudis and Matsatsinis (2014) used multicriteria decision analysis to evaluate patient satisfaction in a hospital emergency department through the application of MUSA method. They find that the average level of complete satisfaction is low (73.4) indicating that the citizens are somehow satisfied regarding the emergency department.

#### **4.4 Ordered Probit and Ordered Logit model**

Probit and Logit model are widely used in marketing and other fields such as artificial neural networks, biology, medicine, economics, mathematical psychology (Grigoroudis & Siskos, 2010). The most advantage of Probit and Logit model is that they take the qualitative ordinal characteristics of collected data into considers. In Probit and Logit model, the customers' satisfaction levels are assumed to be dependent on set of independent variables which can be illustrated as:

$$y_j^* = x_i' \beta + \varepsilon_i$$

Where  $\varepsilon_i$  are assumed independent and identically distributed random variables as usual,  $x_i'$  is the matrix of explanatory variables,  $\beta$  is the vector of coefficients to be estimated and  $y_j^*$  is unobserved (Barboza & Roth, 2009). According to Greene (2003), what one observed is q

$$\begin{aligned} y &= 0 \text{ if } y^* \leq 0 \\ &= 1 \text{ if } 0 < y^* \leq \mu_1 \\ &\quad \vdots \\ &= j \text{ if } \mu_{j-1} \leq y^* \end{aligned}$$

Where  $y$  is customers' satisfaction level; 0, 1, 2, ...,  $j$  is the level of satisfaction;  $\mu_i$  are unknown parameters to be estimated with  $\beta$ . It should be emphasized that the value 0, 1, 2, ...,  $j$  are simply coding and do not take quantify the  $y$  variable. According to this explanation, the probability that one customer has expressed for the  $m$ -th satisfaction level, given his/her satisfaction judgments  $x_i'$  is

$$\Pr(y_j = m) = \Pr(\mu_{m-1} < y^* \leq \mu_m) = F(\mu_m - x_i' \beta) - F(\mu_{m-1} - x_i' \beta)$$

Where  $F(\mu_m - x_i' \beta)$  and  $F(\mu_{m-1} - x_i' \beta)$  is the standard normal distribution function for the Ordered Probit model and the standard logistic distribution for the Orederd Logit model.

The estimated vector of coefficients  $\beta$  can provide information about the effect of independent variables on the probability that an overall satisfaction level can happen (Barboza & Roth, 2009). The orederd probit and ordered logit models provide the probability that each level of overall satisfaction can happen with a specific sample of data. For example, Gan, Clemes, Limsombunchai and Weng (2006) used logistic regression to identify that the factors which

influenced the customer's choice between electronic banking and non-electronic banking in New Zealand are the service quality, perceived risk factors, user input factors, employment, and education. In the same stream of research, Eboli and Mazzulla (2009) also used ordinal logistic regression analysis to estimate the weight of the service aspects on the overall satisfaction. The paper showed the valid of logistics regression analysis which can be applied to the CS assessment process. The probit and logit model also can be used as the extension for the SERVQUAL method. After using SERVQUAL method for identify and validate the factors which affect to customer behavior. The logit and probit model can be used to rank the factors with regard to their impact on customer behavior (Clemes, Gan & Zhang, 2010).

#### **4.5 Other methods**

*Important-Performance Analysis (IPA).* The importance–performance analysis (IPA) is a widely used analytical technique that yields prescriptions for the management of CS. IPA is a two-dimensional grid based on customer-perceived importance of quality attributes and attribute performance (Matzler, Bailom, Hinterhuber, Renzl, & Pichler, 2004). It provides an attractive snapshot of the importance of a set of selected attributes in customers' behaviour processes and how well the products/services met consumer expectations. Thus, it can provide a clear direction for a company's future resource allocation decisions (Liu & Jang, 2009). This approach assumes that attribute performance and attribute importance are two independent variables (Matzler et al., 2004). Therefore, this approach can offer augmented assessment for other methods in term of measuring CS after valid attributes are defined.

Liu and Jang (2009) used IPA method as a first step for identifying the effects of food, service, atmospherics and other attributes on CS and behavioral intentions. Along with factor analysis and multiple regressions, this study indicates that food quality, service reliability and environmental cleanliness are three pivotal attributes to create satisfied customers and positive post-dining behavioral intentions. Matzler, Sauerwein, and Heischmidt (2003) used a revised model of IPA to investigate the asymmetric characteristics of impact of impact of the different attributes on overall satisfaction. They found that four types of factors which are basic factors, high performance factors, low performance factors, and excitement factors have different importance characteristics if concerning two different context business of high and low performance.

*Cluster Analysis.* The objective of Cluster analysis in dealing with CS is to identify Benefit Segments of Customers. In other words, the method can identify different clusters of customers who allocate importance to performance attributes in similar way within each cluster and in different way comparing with others (Vavra, 1997). For example, in the customer base, there might be a group of customers who might place a high importance on after-sale service. Another group might accord higher importance to a wide array of features. In Cluster analysis, you need to identify from previous literature the performance attribute and collect customer judgments about the importance of these attributes. Andriotis, Agiomirgianakis and Mihiotis (2008) used the framework included both factor analysis and cluster analysis to identify the right factor which influence the satisfaction of tourists to the island of Crete. The cluster analysis also produced three clusters: the "higher-satisfied", "the In-Between", and the "Lower-Satisfied". Bjertnaes, Skudal and Iversen (2013) used cluster analysis to identify response clusters of patients, based on their responses to single items about overall patient satisfaction, benefit of treatment and perception of malpractice. The study identified five response clusters with distinct patient-reported outcome scores, in addition to a heterogeneous outlier group with very poor scores across all outcomes.

*Data Envelopment Analysis (DEA).* The traditional DEA technique has long been utilized as an invaluable tool in the field of operations research and management science to solve

problems in wide range of industries as well as in not-for profit (Bayraktar, Tatoglu, Turkyilmaz, Delen & Zaim, 2012). The DEA model measures the efficiency of any Decision Making Unit (DMU) which is obtained as the maximum of a ratio of weighted outputs to weighted inputs subject to the condition that the similar ratios for every DMU be less than or equal to unity (Charnes, Cooper, & Rhodes, 1978). In DEA model for CS, a DMU is a customer which expresses judgments. The inputs are usually the attributes of overall CS which are pre-defined from the literature. The outputs are usually customer behaviors such as: overall CS, customer loyalty, customer re-purchase intention, etc. DEA method respects and takes into account the cause-effect relationship between inputs and outputs makes it suitable for measuring the result of the company's efforts to satisfy customers. DEA model provides the efficiency score which express how efficient the attributes from products/services make the customer satisfy comparing with other products or services. DEA can be used most effectively for benchmarking to compare the satisfaction level between a group of companies. Löthgren and Tambour (1999) used DEA network model to obtain measures of efficiency and productivity that account for CS of Swedish pharmacies. Estimation results from the network model and a direct productivity model (without CS) are compared and indicate that the technical efficiency is lower under the network model. Bayraktar et al. (2012) used DEA for analyzing and comparing CS and loyalty efficiency for mobile phone brands in an emerging telecommunication market, Turkey. Drawing on the perceptual responses of 251 mobile phone users, the DEA models reveal that from the top six mobile phone brands in Turkey, Nokia features as the most efficient brand followed by LG and Sonny Ericsson in terms of CS and loyalty.

There are still a lot of methods and models which can be useful for measuring CS. They are not mentioned in detail in this study concerning the less popular of these methods for both academic research and practical application in term of measuring CS. These methods can be named such as: Descriptive Statistics, Discriminant analysis, Kano model, multiple regressions, conjoint analysis, etc.

## **5 DISCUSSION AND SUGGESTED CRITERIA**

### **5.1 Different approaches**

There are two approaches for measuring CS in the selected articles with respect to the objective of the methodologies. The first approach is based on theoretical backgrounds to propose the attributes which influence CS. Then it assumes that these pre-defined attributes are the best for predicting CS. This approach pays much attention to the validation and reliability of the model with the collected data. The most important result of this approach is usually the current level of CS. In addition, the methodologies following this approach usually supply more information which is useful for practical context. This approach is standardized and has more comparative power across firms, industries or sectors. NCSI, MUSA, DEA can be classified into this approach.

The second approach focuses on finding and testing the relationship between proposed attributes and CS. This approach also based on the theoretical background to posit the attributes which affect to CS. Then it will attempt to evaluate whether these attributes have statistical significant relationship with CS. The most important result of this approach is the set of attributes which are defined as the best ones for measuring CS. This approach usually cannot estimate the current level of CS; however it can be used for developing an appropriate instrument for assessing customer about their satisfaction. This approach can be very flexible. Each firm, industry or sector has different attributes which are the most influencer to CS. Therefore, this approach can be useful to investigate the CS for a specific business context

when the comparison is not essential. SERVQUAL, Ordered Logit/Ordered Probit model, IPA, Cluster analysis can be classified into this approach.

In sum, two different approaches for measuring CS can be seen from the selected articles. The first approach is more completed and can be used as a standard for comparison. This approach focuses on getting the overall level of CS. On the other hand, the second approach is more flexible and should be used in specific business context when the attention of the manager is more about finding what makes CS.

## **5.2 Suggested Criteria**

### *The need of research on measuring CS as a leading indicator*

Among the articles about measuring CS, there were just a few ones mentioned to the purpose of measuring CS as a leading indicator for financial performance (Grigoroudis, Nikolopoulou & Zopounidis, 2008; Fornell, 1992; Fornell et al., 1996). The main objective of the most articles is to validate the relationship between service/product attributes and CS or customer behaviors (Chen, Hsiao & Hwang, 2012; Grigoroudis & Siskos, 2002; etc.). The main themes of the implications from these studies focus more on the management and marketing areas. What can be derived from these articles is that they assume the methodologies can effectively measure the CS index which can be served as a leading indicator of financial performance though it was not directly stated in most of the articles. The articles about the relationship between CS and financial performance also did not mention to the specific criteria for measuring CS as leading indicator for financial performance (Fornell, Mithas, Morgerson & Krishnan, 2006; Yu, 2007; Gómez, McLaughlin & Wittink, 2004). Ittner and Lacker (1998) measured the relationship between CS with financial measures using different types of CS measures. Although their study found that there was no significantly different result when using different CS measures, it did not mention to the criteria for the matter of leading indicator. This study also suggested doing further research on why there was unexpected negative relationship between CS measures and financial measures in some industry which can be caused by the problem of using unsuitable CS measures. For the practical implication, CS measures require capacity to drive the financial performance. As a leading indicator for financial performance, CS measurements should have a stable positive relationship with financial performance. Therefore, there should be distinguished the measurement of current CS level for management and marketing purpose and its role as a leading indicator for financial performance. Thus, taking consideration of CS measurement as a leading indicator of financial performance becomes a gap in CS research. This discussion pays more attention to the suggestion of the idea of criteria for measuring CS measurement as a driver for financial performance.

### *Suggested criteria*

*The financial measures for study.* As mentioned in the introduction, the researches on the consequence of CS are one of the most selected and concerned topics. One question raised from the topic is about which financial measurements should be used for investigating the leading effect of CS measures. The Service-Profit Chain (SPC) framework can be used to shed some light on this issue. SPC is a framework for linking service operations, employee assessments, and customer assessments to a firm's profitability (Kamakura, Mittal, de Rosa & Mazzon, 2002). There are two different approaches to the financial measures to which the SPC should aim. The first one is the original SPC framework which was proposed by Heskett, Jones, Loveman, Sasser and Schelesinger (1994). This approach focuses on customer retention and revenue. The first approach did not include the cost and investment to achieve the better customer perception. On the other hand, the second approach- Return on Quality

framework which was proposed by Rust, Anthony and Timothy (1995) takes into account the cost and investment so that the focus is probability. It is assumed that the ultimate goal of any firm towards to profitability. Hence, in order to make CS measurement as a leading indicator for profitability, the employed methodology should consider the cost spent to achieve the satisfaction of customer. Otherwise, the revenue-related financial measurements should be used to study the economic return of CS measures. The further step can be taken to investigate the profitability of CS index. Because all the aforementioned methodologies do not take the cost for improving CS into account when measuring CS, it is more realistic to study the relationship between revenue-related measures and CS measures from these methodologies.

*The overall CS.* The overall CS should be used in any methodology if its role is a leading indicator of financial performance. Overall CS reflects the cumulative evaluation of customers' experience with a firm. Compare to the transaction-specific satisfaction, overall satisfaction is more consistent through time and includes the effect of more other factors for example the past experience, the comparison with other competitors, etc. It also reduces the influence of specific unusual event on the customers' evaluation. So, this type of satisfaction has more capacity to explain the customer post-purchased behaviors. Then in turn it has much more directly influence on financial performance in comparison with transaction-specific satisfaction.

*Forward looking.* Forward looking means that CS measures should not only just measure the customer's past experience but need to have predictive capability as well. The predictive power of CS measurements can be achieved by satisfying two conditions. The first condition is that CS measures have stable positive relationship with financial measures. The second one requests that it should lead or drive financial performance. The predictive capacity can be gained through including the proxy of economic return such as customer retention and price tolerance when measuring CS (Anderson & Fornell, 2000). In addition, the methodology for measuring CS also needs to have causal relationship between antecedents and consequences of CS. The reason for this criterion rises from the need that manager need to know both what make customer satisfied and how CS level drives the customer behavior and then financial performance.

*Weighting criterion.* According to this criterion, the factors which have more influence upon the economic return should be realized and have more weight when calculating the final CS level. It should be noticed that the methodology should focus on the factors which have impacts on the economic return rather than just on the CS. If this weighting criterion cannot be done, it is more likely that CS index only measures effectively the satisfied customers but they are not willing to pay more. For example, Stauss and Neuhaus (1997) found that customers who give equal satisfaction scores have different emotions towards the service provider, different expectations concerning the service provider's future capabilities to perform, and different behavioral intentions to maintain the relationship.

*The Comparison Norm.* Most of the aforementioned methodologies use the expectation-disconfirmation paradigm for the background theory to investigate the CS. There is another paradigm which can be used as substitution for it which is called Norm of Comparison standard. The Norm standards refer to what "should be" the performance of the product, whereas the predictive expectations in the basic confirmation paradigm mean what "will be" the likely product performance (Yi, 1990). In order to link CS to customer retention which then leads to economic return, the Competitor Norm Standard should be used. The expectation do not count on the competitive feature which can cause customers who are satisfied still move to competitors whose products or services are over current customers'

expectation. The Competitor Norm Standard should be applied to measure CS level together with the perceived value to get the real CS level which is more likely to lead to the customer retention and economic return.

### **5.3 Measuring CS in Vietnam**

This paper tries to make a small survey about the use of CS measures and how CS is applied in Vietnam. The questionnaire used in the survey has two sections. The first section is about how companies in Vietnam perceive the importance of CS measures in predicting financial performance. The second focuses on how the CS measures are obtained from customers' opinions. Online surveys were sent to 650 companies which are listed on the Ho Chi Minh Stock Exchange and Hanoi Stock Exchange. 76 surveys were completed and collected for further analysis. The response rate is 12% which is relative low but can be expected for the online survey with no incentive included. The companies which participated in the survey come from wide range of different industries. This reduces the bias which can be caused by the individual characteristics of companies.

After analyzing the survey, the result shows that, most of the companies (65/76) agree that non-financial measures and especially CS are important and very important to future financial performance. But only about two-thirds in total 76 companies (51 companies) conduct the survey about CS. However, the structures used in the survey for measuring CS by these companies are mostly the simple versions which include only one or two questions about the CS level from customers. As a result, all the companies which report having CS survey do not use any sophisticated statistical methodology which are suggested in this paper. This can be explained by the fact that measuring CS is the new concept in such an emerging market as Vietnam. Vietnam started to open the economy with the aim of forming a liberalized economy with fully competitive markets for just more than 20 years after a long time under State Controlled economy. Therefore, just recently, the increasing highly competitive environment in the economy has pushed firms toward customers-focused strategy and lead to the concept of measuring CS. Another reason for not using sophisticated statistical methodologies for measuring CS can also come from the fact that the companies do not know and understand how they could be beneficial and how to use these methodologies. Being asked about the willingness to use any sophisticated methodology, most of the companies (56/76) answer that they might consider to use if they have chance to understand them basically. So that this paper can be helpful to show corporate executives the conceptual basic of the statistical methodologies for measuring CS in Vietnam.

In addition, the companies which conducts CS survey are usually belong to the business to customers (B2C) sectors such as Consumer goods, Financial and Banking service and transportation. The explanation for this can be that companies operated in business to business (B2B) sectors do not have large customer base so that they can manage CS by individually contacting with a particular customer. It is not true in B2C sectors in which companies have to deal with thousands of customers per day. This difference in measuring CS in B2B and B2C can be seen as an interesting topic for future studies.

## **6 CONCLUSION**

In order to manage CS effectively, managers need to measure it. This study attempts to review most of the popular methodologies for measuring CS such as NCSI, SERVQUAL, MUSA, DEA, Ordered Probit and Ordered Logit model, etc. For practical application, CS measurements should be used as a driver for financial performance. For this objective, this paper attempts to suggest criteria which should be satisfied to make the CS measurements as



leading indicator of financial performance. It also gives some insights about how companies in Vietnam measure CS and raises the need for studies about the difference between measuring CS in B2B and B2C companies. The limitation of this paper lies on the lack of suggestion of methods to apply these criteria in methodologies for measuring CS which can be a concern for further research on measuring CS.

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### **Appendix:**

#### **A survey about measuring customer satisfaction in Vietnam**

This survey serves for the educational purpose only - No detailed company profile is needed and revealed

#### **Which sectors is your company operating?**

1. Business to Business

2. Business to Customers
3. Service
4. Manufacturing
5. Finance and Banking
6. Healthcare
7. Real Estate
8. Mining
9. Other:

**Section 1:**

Perception of companies about customer satisfaction

**Question 1: How is the non-financial measures important to your company in term of pursuing long-term profitable objective?**

1. Very important
2. Important
3. Somehow important
4. Not so important
5. Not important at all

**Question 2: Which are the following non-financial measures which your company choose to include in your performance system?**

1. Employee satisfaction/survey
2. Productivity of employees
3. Customer satisfaction/survey
4. Staff turnover
5. New idea implementation
6. Hours of training
7. Delivery time
8. Number of complaints
9. Other:

**Question 3: How are customer satisfaction measures important to your company in term of pursuing long-term profitable objective?**

1. Very important
2. Important
3. Somehow important
4. Not so important
5. Not important at all

**Section 2**

The implementation of measuring customer satisfaction

**Question 1: Has your company already measured customer satisfaction?**

If “Yes” go to Question 2 and Question 3. If “No” go to Question 4. Question 5 is for all participants

Yes

No

**Question 2: Which kind of survey has your company used to measured customer satisfaction?**

1. Survey with one question about customer satisfaction
2. Survey with set of questions not only about customer satisfaction but also the drivers of customer satisfaction.
3. Other: ....

**Question 3: Has your company used any of following methodology to measure customer satisfaction?**

1. National Customer Satisfaction Index
2. Service quality (SERVQUAL)
3. MULTICriteria Satisfaction Analysis (MUSA)
4. Ordered Probit and Ordered Logit model
5. Important-Performance Analysis (IPA)
6. Cluster Analysis
7. Data Envelopment Analysis (DEA)
8. We do not use any one of them
9. Other: .....

**Question 4: Does your company have project of measuring customer satisfaction in the near future?**

YES

NO

**Question 5: If your company has not used any sophisticated statistical methodology, would your company consider to use them for measuring customer satisfaction?**

1. Yes, we are going to use them
2. Yes, if we can understand them basically
3. Yes, if others companies also use them
4. Yes, but we have to outsource it for other parties
5. No, we find our current methodology adequate
6. No, we do not need measure customer satisfaction
7. Other: ...

## **STOCK-MARKET LINKAGES: EVIDENCE FROM THE MAJOR FOREIGN EXCHANGE MARKETS**

*Jana Vychytilová, Miloš Král*

### **Abstract**

The main aim of this paper is to investigate the stock-market linkages between the five most regularly quoted stock market indices and to explain how the cross-market linkages have changed over time including crisis and non-crisis periods. By studying the time-series properties of the American S&P 500, the Japanese Nikkei 225, the British FTSE 100, the German DAX 30 and the European EURO STOXX 50 we find that these leading Blue-chip indexes are significantly correlated based on the parametric and non parametric correlation analysis and normality tests almost for the full sample. Empirical results report statistically significant positive correlations between the pairs of indices over the last fifteen-year period at the 95.0% confidence level. However, the strength of the relations between the pairs of indices varied in the researched years. These conclusions were reached from the correlation analysis of monthly indices relative returns from February 01 1999 to January 01 2015. The empirical evidence from the cross asset markets confirm the basic findings and are beneficial for policy-makers, shareholders and traders. In particular, the results are useful in the areas of global tactical asset allocation, evaluation of business cycles and trend analysis.

*Keywords: comovement, stock-market linkages, financial markets, performance measurement, returns*

JEL Classification: F36, F30, G15

### **1 INTRODUCTION**

The recent global financial crisis and turmoil in international financial markets, has invigorated the new debate on contagion and global financial integration. Policymakers and shareholders in emerging markets are increasingly concerned about the consequences for the domestic equity markets when companies list stock abroad while effects of cross-listing depend on the quality of intermarket information linkages. Much of this current debate on nature of today's interdependent financial markets has been aimed at significant increase in cross-market linkages after crisis periods (Domowitz, Gien and Madhavan, 1998; Dornbush, Park and Claessens, 2000).

Historically, the approaches that have been used by traders to analyze financial markets in an effort to identify and forecast the direction of price trends have been divided into two *single-market* distinct methods: fundamental analysis and technical/chartist analysis. The importance of the chartism and fundamental analysis in the foreign exchange markets may have increased over the last decade. However, forecasting styles and the overall importance attached to fundamental versus chartist analysis vary across different trading locations. Moreover, in the past few decades, when the financial markets were less volatile and tended to trade independently of one another, those popular single-market methods were rightfully so. Park and Irwin (2007) state the empirical literature on the profitability of technical trading strategies is categorized into two groups, "early" and "modern" studies. They conclude according to the characteristics of testing procedures, "early" studies indicate that technical trading strategies are profitable in foreign exchange markets and futures markets, but not in



stock markets, and that the "modern" studies indicate that technical trading strategies consistently generate economic profits in a variety of speculative markets at least until the early 1990s. Nowadays, traders need to expand their perspective to take into consideration also external factors that affect other markets, because it is not worthwhile enough to look only at each individual market by itself anymore. This can be accomplished by using *intermarket* methods that not ignore the interdependencies of the financial markets and their effects on one another and that can *retrospectively* and *prospectively* look at various markets in their own interaction. By analyzing the effects of related markets, important early warnings of impending changes in market direction can be gleaned from intermarket data well before these changes begin to show up on the charts of traders who limit the scope of their analysis to each individual market. Another main advantage of intermarket approach is that it builds on the strengths of single-market analyses, adding another dimension to the analytic framework so that the behavior of each market can be analyzed within a broader intermarket context (Mendelsohn, 2000, 2012; Oberlechner, 2001).

This contribution is oriented on intermarket investigations within the equity markets. The theoretical background of the paper is focused on cross-market linkages measurement and on contagion, cointegration and related financial markets. We also show how our investigation relates to previous research and explain the parametric/non parametric correlation methodology that we adopt to investigate stock-market linkages and comovements in major foreign stock markets. The main aim of this paper is to investigate the stock-market linkages between the five most regularly quoted stock market indices and to explain how the cross-market linkages have changed over time including crisis and non-crisis periods.

## **2 THEORETICAL BACKGROUND**

### **2.1 Cross-market linkages measurement**

Previous and current studies on contagion and intermarket investigation offer many approaches and methods to examine cross-market linkages and to measure the propagation of international shocks across countries. The more widely used processes include the cross-market correlation coefficient procedures and correlation analysis.

King and Wadhvani (1990) used processes including the cross-market correlation coefficient procedures. Arshanapalli and Doukas (1993) used recent developments in the theory of cointegration and provide new methods of testing the linkage and dynamic interactions among stock market movements. Al Awad and Goodwin (1998) examined weekly real interest rates for G-10 countries using a variety of time-series tests and their results imply leadership roles for the US in international asset markets.

Mendelsohn (2000) points out the best way to implement intermarket analysis is through the use of neural networks to excel at finding reoccurring patterns and relationships between related markets. He states, that globally related markets can be analysed with regard to their confirmation or divergence from one another over time, in response to various global and domestic economic considerations. Wang (2006) presents a new interactive model for constructing a tactical global assets allocation through integrating fuzzy scenarios clustering-based approaches it mean-variance, that serves as an alternative forecasting rebalance quantitative model to the popular global assets allocation. Hon, Strauss and Yong (2004) used the bias-correction procedure and GARCH framework to examine whether contagion occurred three and six months after September 11, 2001 shock, across 25 economies via measuring the response of international stock markets to the U.S. shock.

Katsanos (2008) states when assessing intermarket relations it is important to keep in mind that these are neither fixed nor static in time, but they fluctuate continuously in strength and time. He adds it is usually very difficult to determine which market is leading or lagging. A lead can shift over time and become a lag, with the markets switching positions as follower and leader. In addition, a weak positive correlation can sometimes become negative and vice versa. For this reason it is always prudent to look at the prevailing rate of change of the correlation between two related markets before reaching any important conclusions or trading decisions. Correlation is a relatively simple concept but absolutely mandatory in the use of investments. It basically refers to whether or not different investments or asset classes will move at the same time for the same reason and in the same direction (Katsanos, 2008).

Katsanos (2008) points out when two variables appear to be normally distributed it is better to use Pearson's correlation coefficient than Spearman's because in calculating Spearman's coefficient some information is lost because the prices are converted to ranks. The main advantage of using the Spearman coefficient is that it is not sensitive to outliers because it looks at ranks as opposed to actual values.

Aloui, Aïssa and Nguyen (2011) offer several copula functions providing the necessary flexibility to capture the dynamic patterns of fat tail as well as linear and nonlinear interdependences that can be used to model the degree of cross-market linkages.

Kim and Park (2011) used Spearman and Kendall rank correlations to examine monthly, quarterly and semi-annual returns.

Results from previous empirical studies vary depending on the methodology used.

## **2.2 Contagion, interdependence and related financial markets**

Previous empirical studies by Dungey and Martin (2007) and Fleming, Kirby and Ostdiek (1998) showed strong evidence that cross-market links are important.

Arshanapalli and Doukas (1993) discovered strong interdependence among national stock markets prior to October 1987 and furthermore, that the degree of international co-movements among stock price indices has increased substantially for the post-October 1987 period, with the Nikkei index the only exception. They found the US stock market has a considerable impact on the French, German and UK markets in the post-crash period. Moreover, they found that the response of the French, German and US markets to US stock market innovations were consistent with the view of cross-border informationally efficient stock markets. However, Arsanapalli and Doukas (1993) state the Japanese equity market performance has no links with US stock market and the stock markets in France, Germany and United Kingdom during the pre- and post-October crash period. Dungey and Martin (2007) and Fleming, Kirby and Ostdiek (1998) state that cross-market linkages have become stronger since the 1987 stock market crash while the spillovers have a relatively larger effect on volatility than contagion.

Ayuso and Bianco (2001) investigated whether there has been an increase in the degree of financial market integration during the nineties focusing on stock markets. They suggested that during the nineties there has been an increase in the degree of market integration between stock markets. Westerhoff (2003) explores multiasset market dynamics and observes high degree of comovements in stock prices too. Results from earlier empirical study of Hon, Strauss and Yong (2004) indicate the international stock markets, particularly in Europe, responded more closely to U.S. stock market shocks in the three to six months after the terrorist attack in the United States on September 11, 2001.

Caporale, Cipollini and Spagnolo (2005) test for contagion within the East Asian region and suggest a significant increase in the degree of comovement between stock returns in different countries. Andersen, Bollerslev, Diebold and Vega (2007) investigated the response of US, German and British stock, bond and foreign exchange markets to real-time US macroeconomic news. They conclude that equity markets react differently to news depending on the business cycle.

Katsanos (2008) finds out yearly correlations between the S&P 500, four major international indices DJ-30, DAX, FTSE and NIKKEI before 1996 were inconsistent and unpredictable but started to converge during the last ten- year (1996-2007) period. He points out the most incongruous relationship is that between the S&P 500 and Japan's Nikkei as it fluctuated from negative to positive values over that period of time.

Aloui et. al., (2011) state the extent of the current global crisis and contagion effects induce conducting an empirical investigation of the extreme financial interdependences of some selected emerging markets with the US markets. Additionally, they investigated strong evidence of time-varying dependence between each of the BRIC markets and the US markets during both bullish and bearish markets.

Chevallier and Lelopo (2013) assess the cross-market linkages between commodities, stock and bonds in a cointegration framework and discuss how traditional assets actually interact from a dynamic perspective. Beirne and Gieck (2014) assess interdependence and contagion across three asset classes (bond, stocks and currencies) over the period 1998-2011 using a global VAR. They find in times of financial crisis US equity shocks lead to risk aversion by investors in equities and currencies globally and in some emerging market bonds.

### **3 MATERIALS AND METHODS**

We set the basic hypothesis *PI* in our research, based on a priori intermarket idea saying all financial markets are interconnected – domestically and globally; and based on Al Awad and Goodwin (1998) results of time-series tests implying the leadership role for the U.S. in international asset markets:

*PI*. The Japanese (*N225*), British (*FTSE*), German (*DAX*) and European (*SX50*) stock market indices were positively correlated with the American stock market index (*SPX*) during the analysed period- (*PIa*): The American stock (*SPX*) and the Japanese stock (*N225*) markets were positively correlated during the analysed period; (*PIb*): The American stock (*SPX*) and the British stock (*FTSE*) markets were positively correlated during the analysed period; (*PIc*): The American stock (*SPX*) and the German stock (*DAX*) markets were positively correlated during the analysed period; (*PId*): The American stock (*SPX*) and the European stock (*SX50*) markets were positively correlated during the analysed period.

Empirical estimation of correlations between each pair of indices is challenging indeed. We expect by visual inspection of the multiple comparison chart (Fig. 2) that we find positive statistical significant correlations. The use of the correlation coefficient is essential for our analysis of multiple markets.

#### ***Data and Methodology***

We have collected monthly adjusted closing prices (dividend yields and splits are not considered in calculation) in equity markets from February 01, 1999 to January 01, 2015. Overall stock market trends we represent by using world leading Blue-chip indexes: 1) the American *S&P 500* ("*SPX*"), 2) the Japanese *Nikkei 225* ("*N225*"), 3) the British *FTSE 100* ("*FTSE*"), 4) the German *DAX 30* ("*DAX*") and 5) the European *EURO STOXX 50*

("SX50"). The data has been obtained from YahooFinance, Bloomberg and Investing.com online databases.

The data are measured in different units, therefore we use horizontal analysis to estimate monthly relative performances in the first step by

$$r_{t-1}^i = \frac{P_i(t) - P_i(t-1)}{P_i(t-1)} \quad (1)$$

where  $P$  is the market index monthly closing price adjusted for dividends and splits.

Testing for distributional assumptions and for normality in particular is another part of our statistical research. Then we use the appropriate correlation coefficient to measure the strength of association between two variables and to find out whether the variables are significantly correlated based on the correlation analysis and normality tests for the full sample.

### ***Test for normality***

Shapiro, Wilk and Chen (1968) discuss the mainly used statistics for studying alternative distributions that are  $W$  (Shapiro and Wilk Statistic  $W$ ),  $V/b1$  (standard third moment),  $b2$  (standard fourth moment),  $KS$  (Kolmogorov-Smirnov),  $CM$  (Cramer-Von Mises),  $WCM$  (weighted  $CM$ ),  $D$  (modified  $KS$ ),  $CS$  (chi-squared) and  $u$  (Studentized range). They conclude (i)  $W$  statistic provides a generally superior omnibus measure of non-normality; (ii) the distance tests ( $KS$ ,  $CM$ ,  $WCM$ ,  $D$ ) are typically very insensitive; (iii) the  $u$  statistic is excellent against symmetric, especially short-tailed, distributions but has virtually no sensitivity to asymmetry; (iv) a combination of both  $-Ab$ , and  $b2$  usually provides a sensitive judgment but even their combined performance is usually dominated by  $W$ ; (v) with sensitive procedures, good indication of extreme non-normality (e.g., the exponential distribution) can be achieved with samples of size less than 20.

Shapiro and Wilk (1965) introduced the statistical procedure for testing a complete sample for normality. The  $W$  test statistic for normality can be obtained by dividing the square of an appropriate linear combination of the sample order statistics by the usual symmetric estimate of variance. They stated this ratio is both scale and origin invariant and hence the statistic is appropriate for a test of the composite hypothesis of normality. The Shapiro-Wilks test is based upon comparing the quantiles of the fitted normal distribution to the quantiles of the data. The  $W$  test statistic for normality is defined by

$$W = \frac{R^4 \hat{\sigma}^2}{C^2 S^2} = \frac{b^2}{S^2} = \frac{(\hat{a}y)^2}{S^2} = \frac{(\sum_{i=1}^n a_i y_i)^2}{\sum_{i=1}^n (y_i - \bar{y})^2}, \quad (2)$$

where

$$R^2 = m'V^{-1}m,$$

$$C^2 = m'V^{-1}V^{-1}m,$$

$$a' = (a_1, \dots, a_n) = \frac{m'V^{-1}}{(m'V^{-1}V^{-1}m)^{\frac{1}{2}}}$$

and  $b = R^2 \hat{\sigma} / C$ .

Shapiro and Wilk (1965) suggest that the mean values of  $W$  for non-null distributions tends to shift to the left of that for the null case and further, it appears that the variance of the null distribution of  $W$  tends to be smaller than that of the non-null distribution. They point out this

fact is due to the positive correlation between the numerator and denominator for a normal population being greater than that for non-normal populations. The  $W$  statistic therefore provides a generally superior omnibus indicator of non-normality judged over the various symmetric, asymmetric, short- and long-tailed alternatives. Therefore,  $W$  statistic will be used for basic testing distributional assumptions and for normality in our stock-market research indeed (Shapiro, Wilk and Chen, 1968). A glance at the empirical cumulative distribution of  $W$  (Fig. 1) confirms that  $W$  is becoming less skew as  $n$  goes from 5 to 50.

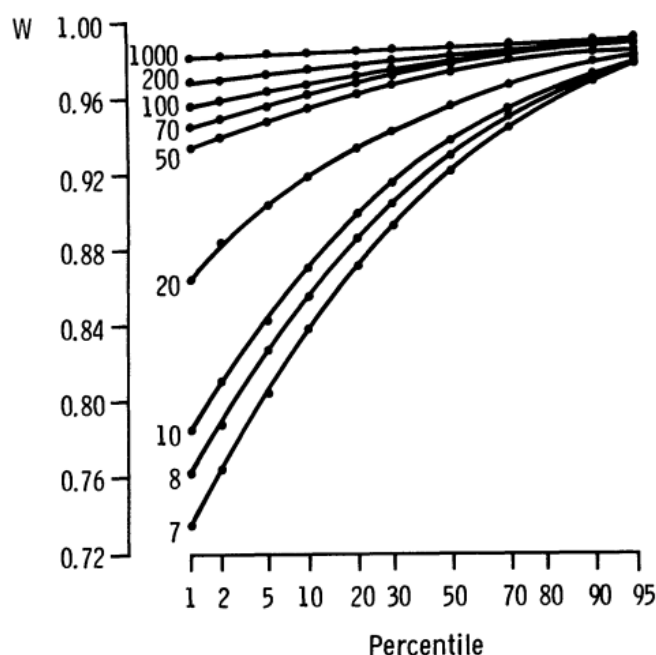


Fig. 1 – Normal probability plot of the empirical cumulative distribution unction of  $W$ , with sample sizes 7,8,10,20,50,70,100,200,1000. Source: Royston (1982)

In our research we also test whether the data come from a normal distribution and we use Royston's extension of Shapiro and Wilk- $W$  test for normality to large samples, available when  $2 \leq n \leq 2000$  (see Royston, 1982) to compute the Shapiro-Wilks statistic and P-Value. The small P-value for the Shaipro-Wilks test then indicates that the data do not come from a normal distribution. When the smallest P-value amongst the tests performed is less than 0.05, we can reject the idea that resistivity comes from a normal distribution with 95% confidence.

### ***Parametric and Nonparametric Methods***

Depending on the results of the normality test we use the appropriate correlation coefficient to calculate yearly correlations amongst pairs of variables to find out whether the variables are significantly correlated. Moreover, we calculate correlations among them also for the whole last fifteen year period (from February 01, 1999 to January 01, 2015). Correlation coefficients, referred to as  $r$ , measure the strength of the correlation between two variables on a scale of -1 to +1. Perfect positive correlation yields a +1. Perfect negative correlation yields a -1. If there is no relationship,  $r$  will be close to 0. If the P-Value is less than 0,05, then there is a statistically significant correlation between the pair of variables at the 5% significance level. We use *nonparametric* statistical techniques (multiple variable analysis) to provide alternatives to classical analyses for data that do not come from a normal distribution. Therefore, we estimate Pearson product-moment correlations or Spearman rank correlations

coefficients depending on the assumption of linearity. We use nonparametric Spearman's rank correlation coefficient to measure correlations between variables that are not normally distributed and Pearson's correlation coefficient to calculate correlations between variables that are normally distributed. Pearson's correlation coefficient is given by

$$r = \frac{\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{[\sum_{i=1}^n (x_i - \bar{x})^2][\sum_{i=1}^n (y_i - \bar{y})^2]}} \quad (3)$$

where  $x_i$  and  $y_i$  are the value of  $x$  and  $y$  for the  $i^{th}$  individual.

Spearman's rank correlation coefficient is defined by

$$r_s = 1 - \frac{6 \sum_{i=1}^n d_i^2}{n(n^2 - 1)} \quad (4)$$

where  $d_i$  is the difference in ranks for  $x$  and  $y$ .

The interpretation of correlation coefficients is different for medical research, social, economic or financial time series data. In the case of financial time series the interpretation can again be different depending on whether we compare raw price data or percent changes (yields), as the direct calculation of the correlation based on absolute prices tends to over estimate the correlation coefficient as relations between financial price series are seldom linear. Correlations based on price percent changes, on the other hand, produce more realistic values for the correlation coefficient as they deviate less from linearity (Katsanos, 2008).

## 4 RESULTS

### 4.1 Visual inspection of multiple comparison performance plot

We plot five stock international indices in one multiple comparison performance plot from January 04, 1999 till May 24, 2007 and from the crisis period till nowadays- from June 05, 2006 till February 02, 2015 (Fig. 2). From the visual inspection of these relative comparison plots (Fig.2) we expect to estimate non-zero correlations. We point out the indices have responded more closely in crisis periods.



Fig. 2 –Multiple comparison plot of leading international indices- the S&P 500, the Nikkei, the FTSE, the DAX and the Euro Stoxx 50 performances over the period 04 January 1999-24 May 2007 and over the period 26 May 2006 – 10 February 2015. Source: Own processing

To find out whether or not the leading international stock indices probably move at the same time for the same reason and in the same direction we estimate appropriate correlation coefficients depending on whether the time series data come from a normal distribution. We use Roysten's extension of Shapiro and Wilk-W (see Royston, 1982).

#### 4.2 Test for normality

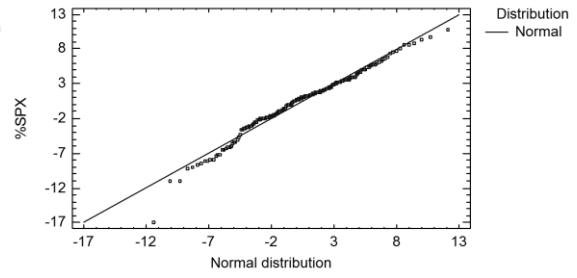
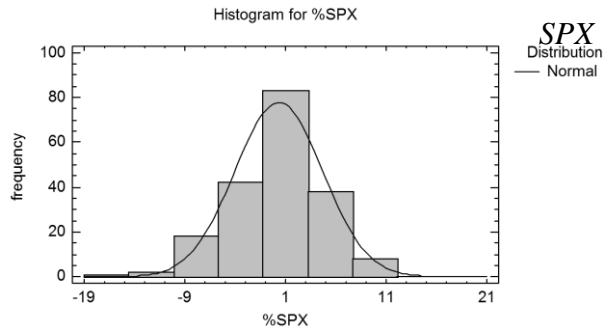
At first, we use horizontal analysis (1) to estimate monthly relative performances from collected monthly adjusted closing prices (dividends and splits are not considered in calculation) of the indices. Then we use our calculated time series data and test them for normality by creating histograms, Q-Q plots and by applying Shapiro-Wilk test based upon comparing the quantiles of the fitted normal distribution to the quantiles of the data (Tab. 1, Fig. 2).

Tab. 1 – The Shapiro-Wilk test. Source: Own processing

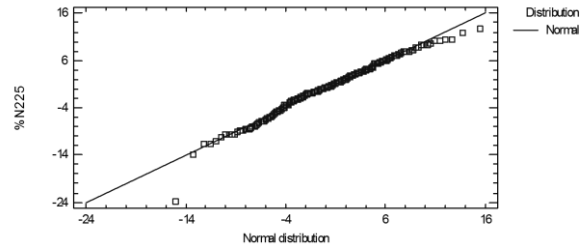
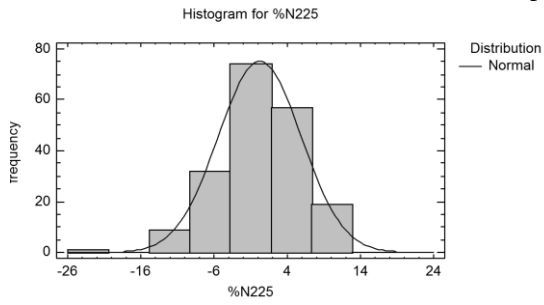
Fitted Distribution	Mean	Standard deviation	Shapiro-Wilk W Statistic	P-Value
<i>Normal</i>				
SPX	0.333073	4.37568	0.976206	0.14481
N225	0.242396	5.67063	0.980187	0.34625
FTSE	0.13875	4.06576	0.965398	0.00404
SX50	0.0975	5.44986	0.973126	0.06185
DAX	0.557448	6.31818	0.972029	0.04412

Tab. 1 shows the results of fitting a normal distribution to the data on leading international stock indices estimated parameters of the fitted normal distribution. To test whether the normal distribution fits the data adequately we apply Shapiro-Wilk test. In addition, we assess visually how well the normal distribution fits by frequency histograms (Fig. 3). Since the smallest P-value amongst the tests performed is greater than or equal to 0,05, we cannot reject the idea that S&P 500 (SPX), Nikkei 225 (N225), and EURO STOXX 50 (SX50) come from a normal distribution with 95 % confidence (Tab. 1, Fig.3). Therefore, we use nonparametric Spearman's rank correlation coefficient to measure correlations between these variables that are not normally distributed.

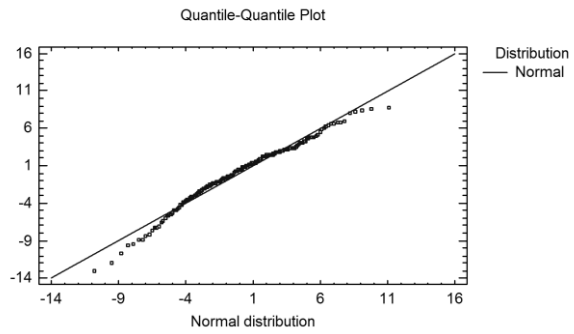
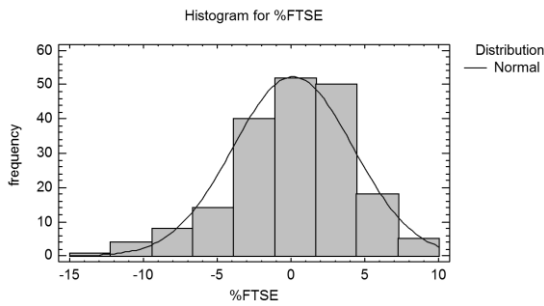
Since the smallest P-value amongst the test performed is less than 0.05, we can reject the idea that FTSE 100 (FTSE") and DAX 30 (DAX) come from a normal distribution with 95% confidence interval and can use Pearson's correlation coefficient to calculate correlations between these variables that are normally distributed.



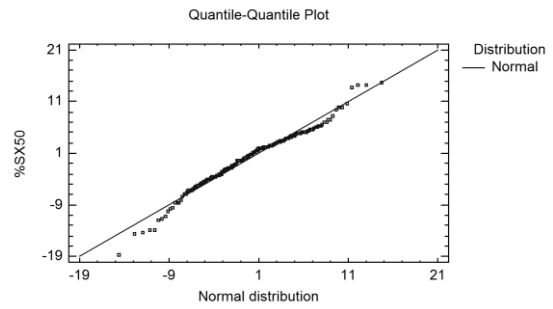
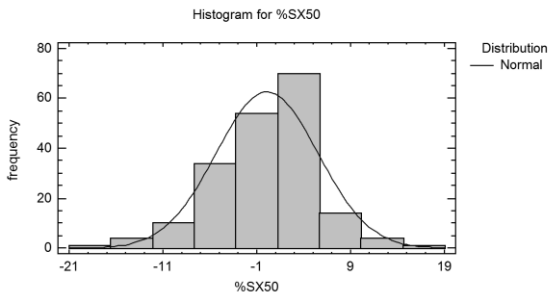
*N225*



*FTSE*



*SX50*



*DAX*

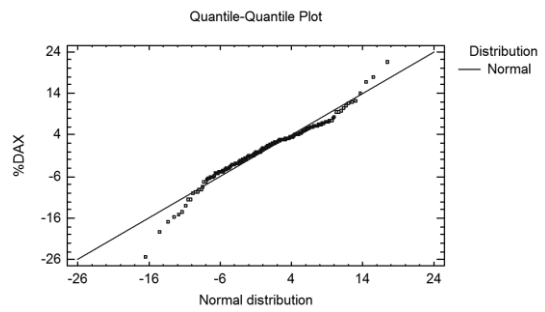
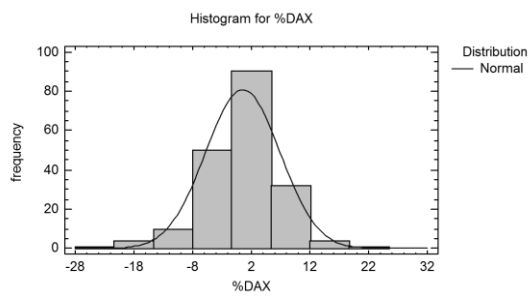




Fig. 3 –Frequency histograms and Quantile-Quantile plots of leading international indices the S&P 500, the Nikkei, the FTSE, the DAX and the Euro Stoxx 50 performances over the period 1999-2014. Source: Own processing

Tab. 2 shows the final results summary, when we use parametric or non-parametric methods to calculate correlations between the international indices.

Tab. 2 – The Shapiro-Wilk test. Source: Own processing

	<i>P-Vaule from Tab. 1</i>	<i>Can we reject the variable comes from a normal distribution?</i>
SPX	P-Value $\geq 0.05$	NO; parametric methods (2)
N225	P-Value $\geq 0.05$	NO; parametric methods (2)
FTSE	P-Value $< 0.05$	YES; non-parametric methods (3)
SX50	P-Value $\geq 0.05$	NO; parametric methods (2)
DAX	P-Value $< 0.05$	YES; non-parametric methods (3)

Tab. 1, Tab. 2 and Fig 3 indicate we should use non-parametric correlation coefficients to calculate correlations between the pair of the indices that includes variable *N225* or *SX50*. In other cases when we cannot reject the idea that the variable comes from a normal distribution with 95% confidence level we can use parametric Pearson's correlation coefficient to calculate correlations.

### 4.3 Correlation analysis

We measure the strength of the relationship between the variables and test the statistical significance of the estimated relations. Tab. 3 and Tab. 4 show estimated Pearson product moment correlations between the indices *S&P 500* and *Nikkei 225*. We highlight P-Vaues that indicate statistically significant correlations. In contrast to the more common Pearson correlations, we calculate the Spearman coefficients in Tab. 4 and Tab. 5 from the ranks of the data values. Consequently, they are less sensitive to outliers than the Pearson coefficients.

Tab. 3 – Are S&P 500 and Nikkei 225 indices positively correlated? Source: Own processing

Pearson's correlations								
SPX-N225 (P1a)	1999	2000	2001	2002	2003	2004	2005	2006
1. Correlation coefficient	0.63	0.38	0.74	0.28	0.33	0.31	0.55	0.72
2. P-Value	<b>(0.04)</b>	(0.23)	<b>(0.01)</b>	(0.38)	(0.30)	(0.32)	(0.06)	<b>(0.01)</b>
	2007	2008	2009	2010	2011	2012	2013	2014
1.Corr. coefficient	0.61	0.86	0.59	0.77	0.59	0.74	0.35	0.35
2. P-Value	<b>(0.04)</b>	<b>(0.00)</b>	<b>(0.04)</b>	<b>(0.00)</b>	<b>(0.04)</b>	<b>(0.01)</b>	(0.27)	(0.24)

Tab. 4 – Are S&P 500 and FTSE 100 indices positively correlated? Source: Own processing

Spearman's rank correlations								
SPX-FTSE (P1b)	1999	2000	2001	2002	2003	2004	2005	2006
1. Correlation coefficient	0.37	0.85	0.97	0.97	0.80	0.12	0.17	0.24
2. P-Value	(0.24)	<b>(0.01)</b>	<b>(0.00)</b>	<b>(0.00)</b>	<b>(0.01)</b>	(0.69)	<b>(0.04)</b>	(0.42)
	2007	2008	2009	2010	2011	2012	2013	2014
1. Corr. coefficient	0.80	0.87	0.71	0.93	0.93	0.53	0.75	0.74
2. P-Value	<b>(0.01)</b>	<b>(0.00)</b>	<b>(0.02)</b>	<b>(0.00)</b>	<b>(0.00)</b>	(0.08)	<b>(0.01)</b>	<b>(0.01)</b>

Tab. 5 – Are S&P 500 and DAX 30 indices positively correlated? Source: Own processing

Spearman's rank correlations								
SPX-DAX (P1c)	1999	2000	2001	2002	2003	2004	2005	2006
1. Correlation coefficient	0.79	0.51	0.93	0.95	0.79	0.65	0.84	0.77
2. P-Value	<b>(0.01)</b>	(0.09)	<b>(0.00)</b>	<b>(0.00)</b>	<b>(0.01)</b>	<b>(0.03)</b>	<b>(0.01)</b>	<b>(0.01)</b>
	2007	2008	2009	2010	2011	2012	2013	2014
1. Correlation coefficient	0.84	0.85	0.90	0.74	0.80	0.62	0.62	0.54
2. P-Value	<b>(0.01)</b>	<b>(0.01)</b>	<b>(0.01)</b>	<b>(0.01)</b>	<b>(0.01)</b>	<b>(0.04)</b>	<b>(0.04)</b>	(0.06)

Tab. 6 – Are S&P 500 and SX 50 indices positively correlated? Source: Own processing

Pearson's correlations								
SPX-SX50 (P1d)	1999	2000	2001	2002	2003	2004	2005	2006
1. Correlation coefficient	0.81	0.37	0.91	0.97	0.86	0.78	0.75	0.81
2. P-Value	<b>(0.00)</b>	(0.24)	<b>(0.00)</b>	<b>(0.00)</b>	<b>(0.00)</b>	<b>(0.00)</b>	<b>(0.01)</b>	<b>(0.00)</b>
	2007	2008	2009	2010	2011	2012	2013	2014
1. Correlation coefficient	0.90	0.91	0.92	0.84	0.87	0.68	0.73	0.52
2. P-Value	<b>(0.00)</b>	<b>(0.00)</b>	<b>(0.00)</b>	<b>(0.00)</b>	<b>(0.00)</b>	<b>(0.01)</b>	<b>(0.01)</b>	(0.07)

Tab. 7 shows Pearson product moment correlations and Spearman rank correlations between each pair of indices for the 15 year period from 1999 to 2014. The second number in parantheses in each location of the table is a P-value which test the statistical significance of the estimated correlations. P-values below 0.05 indicate statistically significant non-zero correlations at the 95.0% confidence level. All indices have P-values below 0.05 in the analysed 15 year period and we have investigated positive correlations in all cases (Tab.7).

Tab. 7 – Correlation of monthly percentage yields for the 15-year period from 1999 to 2014:  
Own processing

Correlation of monthly returns					
1999-2014	SPX	N225	FTSE	SX50	DAX
SPX		0.6108 <b>(0.0000)</b>	0.8206 <b>(0.0000)</b>	0.8317 <b>(0.0000)</b>	0.7941 <b>(0.0000)</b>
N225	0.6108 <b>(0.0000)</b>		0.5192 <b>(0.0000)</b>	0.5637 <b>(0.0000)</b>	0.5473 <b>(0.0000)</b>
FTSE	0.8206 <b>(0.0000)</b>	0.5192 <b>(0.0000)</b>		0.8297 <b>(0.0000)</b>	0.7829 <b>(0.0000)</b>
SX50	0.8317 <b>(0.0000)</b>	0.5637 <b>(0.0000)</b>	0.8297 <b>(0.0000)</b>		0.9193 <b>(0.0000)</b>
DAX	0.7941 <b>(0.0000)</b>	0.5473 <b>(0.0000)</b>	0.7829 <b>(0.0000)</b>	0.9193 <b>(0.0000)</b>	

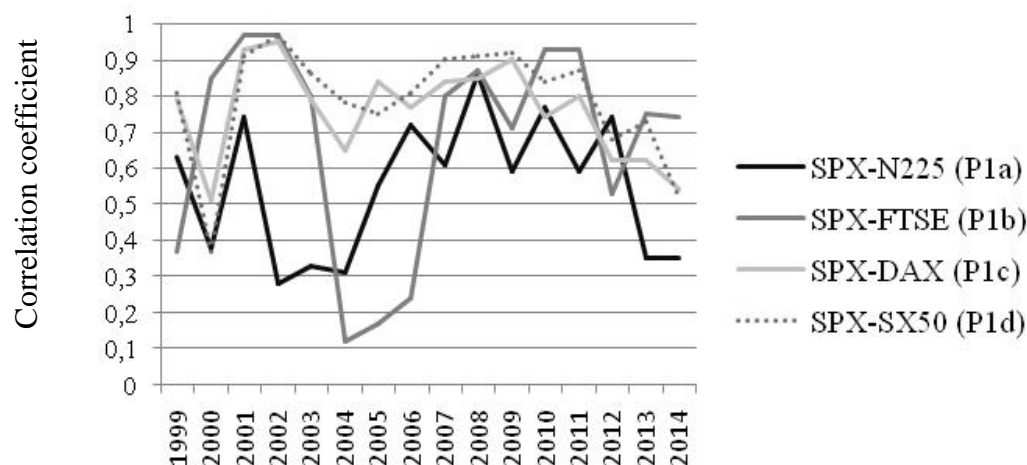


Fig. 4 – Yearly correlation variation between the S&P 500 and leading international indices from 1999-2014. Source: Own processing

## 5 DISCUSSION

The research about stock market linkages has been conducted on the basis of foreign studies results dedicated to cross market linkages investigation (Ayuso and Bianco, 2001; Arshanapalli and Doukas, 1993; King and Wadhvani, 1990; Katsanos, 2008; Kim and Park, 2011; Hon, Strauss and Yong, 2004; Aloui et. al., 2011).

We report evidence on the cross-market linkages and statistical significance among five major global stock markets. However, the strength of the linkages varied in researched years (Fig. 4). The linkages among leading stock market indices are shown in Tabs. 3-7. In this research, the statistically significant positive dependence between the American stock (SPX) and the Japanese stock (N225) markets (see Tab. 3) has been found during the entire past fifteen period ( $r = 0.6108$ ,  $p\text{-value} = 0,0000$ ). However, the strength of investigated positive linkage

varied in the researched years. The positive SPX-N225 correlations were statistically significant in 1999 (p-value = 0.04); 2001 (p-value = 0.01); 2006 (p-value = 0.01); 2007 (p-value = 0.04); 2008 (p-value = 0.00); 2009 (p-value = 0.04); 2010 (p-value = 0.00); 2011 (p-value = 0.04) and 2012 (p-value = 0.01). The hypothesis P1a is therefore accepted in these periods. We identified statistically significant relations between American stock (SPX) and the British stock (FTSE) markets indices (see Tab. 4). The statistically significant positive SPX-FTSE correlations in accordance with the hypothesis P1b were proven in years 2000 (p-value = 0.01); 2001 (p-value = 0.00); 2002 (p-value = 0.00); (p-value = 0.03); 2005 (p-value = 0.04); 2007 (p-value = 0.01); 2008 (p-value = 0.00); 2009 (p-value = 0.02), 2010 (p-value = 0.00), 2011 (p-value = 0.00), 2013 (p-value = 0.01); 2014 (p-value = 0.01) and in the whole period 1999-2014 ( $r = 0.8206$ , p-value = 0.0000).

Our research shows statistically significant positive SPX-DAX correlations. The hypothesis P1c about positively correlated American stock (SPX) and the German stock (DAX) markets during the entire past fifteen period ( $r = 0.7941$ , p-value = 0.0000) has been proved (Tab. 7). Yearly correlations were statistically significant positive in accordance with hypothesis P1c in 1999 (p-value = 0.01); 2001 (p-value = 0.00); 2002 (p-value = 0.00); 2003 (p-value = 0.01); 2004 (p-value = 0.03); 2005 (p-value = 0.01); 2006 (p-value = 0.01); 2007 (p-value = 0.01); 2008 (p-value = 0.01); 2009 (p-value = 0.01); 2010 (p-value = 0.01); 2011 (p-value = 0.01); 2012 (p-value = 0.04) and 2013 (p-value = 0.04). The strength of the estimated correlations is shown in Tab 5.

Tab. 6 and Tab. 7 indicates that hypothesis P1d about statistically significant positive linkage between the S&P 500 the European *EURO STOXX 50 (SX50)* can be accepted in summarized past fifteen period ( $r = 0.8317$ , p-value = 0.0000). Using parametric correlation analysis, we found statistically significant positive correlations between these indices in 1999 (p-value = 0.00), 2001 (p-value = 0.00), 2002 (p-value = 0.00), 2003 (p-value = 0.00), 2004 (p-value = 0.00), 2005 (p-value = 0.01), 2006 (p-value = 0.00), 2007 (p-value = 0.00), 2008 (p-value = 0.00), 2009 (0.00), 2010 (p-value = 0.00), 2011 (p-value = 0.00), 2012 (p-value = 0.01) and 2013 (p-value = 0.01). Other correlations were non-zero but statistically insignificant.

According to results Ayuso and Bianco (2001) during the nineties there has been an increase o the degree of market integration between stock markets. Our correlation analysis indicates the the S&P 500 has been correlated with international indices during the past fifteen year period and that the estimated correlations between the leading international stock indices strengthen during the crisis periods (Fig. 4). Moreover, we have found the Nikkei had the most volatile correlation with the S&P 500. These conclusions are compatible with the conclusions of Katsanos (2008). According to results of Hon, Strauss and Yong research (2004) the international stock markets, particularly in Europe, responded more closely to U.S. stock market. We investigated strong positive correlations between the American and European stock markets during the past fifteen period too. Our conclusions are also compatible with the conclusion about high degree of comovements in stock prices of Westerhoff (2003).

Further research could be directed towards testing the causality between indices.

## **6 CONCLUSION**

The aim of this contribution was to examine the development of the relationship between leading international stock indices the S&P 500, Nikkei 225, FTSE 100, DAX 30 and EURO STOXX 50 and to identify statistically significant correlations during the different periods, including the crisis period. Our research has been conducted on previous knowledge from foreign empirical studies related to cross-market linkages. In this research, the monthly

closing prices with the sample period from February 01, 1999 to January 01, 2015 have been used to estimate monthly relative stock market returns. Internal data have not been included into the examination. The strength and the direction of the relation between pair of indices have been examined within Pearson's product momentum correlation coefficient/ Spearman's rank correlation coefficient, depending on results of normality tests. The statistical significance of the calculated correlations has been tested with P-value statistics. The substantially positive correlations between the the S&P 500 and leading international indices existed over the last fifteen-year period have been proved. However, the strength of the relations between the pairs of indices varied in researched years. The empirical results point out financial markets are globally interconnected and imply the leadership role for the U.S. in international asset markets. Moreover, we have found the Nikkei had the most volatile correlation with the S&P 500.

### **Acknowledgement**

*The authors are thankful to the Operational Programme Education for Competitiveness co-funded by the European Social Fund (ESF) and national budget of the Czech Republic for the grant No. CZ.1.07/2.3.00/20.0147 - "Human Resources Development in the field of Measurement and Management of Companies, Clusters and Regions Performance", which provided financial support for this research.*

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## **A STUDY OF THE INVESTMENT BEHAVIOR BASED ON BEHAVIORAL FINANCE**

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### **Abstract**

Behavior finance introduces psychology, sociology and other research methods into the study of investment behavior to explain how investors handle the information and take actions. This paper presents the literatures as theoretical solutions to the market anomalies of the traditional market theories. The behavioral psychology is examined through the study on the questionnaire of Chinese security investors. The results show that the investors are not always adopt rational behaviors as traditional finance theory assumed, but make a lot of irrational decisions based on individual cognitive and prejudices, even institutional investors often show the characteristic of irrational. In the guidance of the behavioral finance theory, the research will be closer to the reality and give more significant insight to the selection of investment strategy and psychology characteristic used to explain market anomalies.

*Keywords: behavioral finance, market efficiency, irrational behavior, investor psychology, market anomalies*

JEL Classification: G11, G14

### **1 INTRODUCTION**

The behavior of security investors is assumed to be rational based on traditional finance theory. And as per this concept, a series of theories are formed such as Efficient Market Hypothesis (EMH), Capital Asset Pricing Model (CAPM), Portfolio theory, Two-fund separation theorem (MM) etc. However, consistent support comes with various arguments in recent years. For example, the benefits of diversify investing are emphasized by traditional theories, while still a few stocks are hold in portfolios by individual investors. Traditional finance theory considers rational investors can seize the opportunities created by irrational ones to survive and occupy the whole security market, while some empirical researches and abnormal phenomenon such as momentum effect, winner-loser effect, Friedman-Savage Puzzle and riddle of bonus bring challenge to it. As psychologists and sociologists have found their way into finance in the last decade, economic agents are also no longer to be assumed as rational actors. Instead, they are normal human beings with faults and cognitive foibles including emotional responses, reference points, overconfidence, positive illusion, loss aversion, framing, confirmatory bias, outcome bias, hindsight bias and so on, causing the emergence of behavioral finance (Jones, 2012).

Being described as contradictory to much of traditional market theory, Shiller illustrated finance from a broader human and social perspective, including sociology and psychology. Since 1990s, the focus on traditional asset pricing model has shifted towards new models incorporating psychology (Patrick & Charles, 2011). The editor of Journal of Behavioral Finance, previously naming Journal of Psychology and Financial Markets, pointed out that the importance of social behaviors and human cognition is prompted by behavioral finance theory.

Sent (2004) pointed out that the success and prevalence of behavioral finance attribute to its efficient availability of data and testable predictions compared with traditional efficiency

market theory, thus revealing that learning, arbitrage and evolution do not eliminate complications and human limitation. More meaningful thing is to use behavioral finance theory as a mirror to find blemishes of ourselves rather than just a magnifying glass to research the biases of others (Jones, 2012).

Under the condition of Chinese security market's short development and China's special system, the investors' irrational performance is more noticeable, irrational psychology and behavior will have a long-term, substantial effect on the entire market. Therefore, behavioral finance theory is not applicable in terms of analyzing the behaviors of Chinese security investors.

## **2 THEORETICAL SOLUTIONS**

Several influential theories have been prompted by behavioral finance theory through the study on investor psychology, which can be used to explain market anomalies to some extent.

### **2.1 Heuristics bias**

Several influential theories had been prompted by behavioral finance theory through the study on the psychology of investors, which can be used to explain market anomalies to some extent.

Three common heuristics (representativeness, availability, and adjustment and anchoring) were identified by Kahneman and Tversky (1974) as systematic biases in investment-decision judgment. Patrick and Charles (2011) argued that people often rely on rules of thumb or heuristics rather than rational analysis to evaluate risks in face of uncertainty. Trivers (1985, 1991) also pointed out that the true internal states cannot perfectly controlled by irrational investors.

(I) Representativeness refers to that A represent B through assessed possibilities which A resembles B (Patrick & Charles, 2011). Tversky and Kahneman (1974) pointed out that representative heuristics would prompt two main biases; one of them is the ignorance of the prior probabilities the sample is drawn because of over-emphasis on one characteristic. The ignorance of the significance of the size of the sample is the other bias, resulting in obtaining conclusion on the basis of little data, which is called Gambler's Fallacy effect by Rabin (1999).

Andreassen and Kraus (1990) found that subjects tend to buy on dips while sell on rises when the price fluctuates, which is in consistence with gambler's fallacy. Andreassen and Kraus (1990) also provided evidence to show that this kind of trick is less used by the subjects who would prefer chasing trends when an obvious trend appears. De Bondt and Thaler (1985) argued that investors are prone to believe the continuousness of past situation, over-pessimistic on loser and over-optimistic on winner, causing the deviation from true value of stocks.

(II) Availability bias means that people tend to assess the probability of an event based on the recalled past event rather than actual data collection (Patrick & Charles, 2011). Tversky and Kahneman (1974) pointed out that investors would predicate higher probability of upward tendency of a stock on account of the media publicity. According to Fischhoff, Slovic, and Lichtenstein (1978), people often undervalue the possibility of an indirect or invisible event. Overreaction and overconfidence can be suggested when unforeseen events occur (Hirshleifer, 2001). Shiller (1984) also argued that the focus of attention of investors can be unsteady and easily changed by other people, especially alleged experts.



(III) Anchoring and Adjustment bias describes the investors who usually reduce ambiguous with some reference points and reach a conclusion through appropriate adjustment (Liu, 2006). Patrick and Charles (2011) stated that investors with this bias would like to assume the rough correct of stocks' current price, resulting in certain predictability biases. Lovric (2008) pointed out that the adjustment of this heuristic bias is always insufficient which will cause overreliance on the anchor price. Shefrin (2000) argued that security analysts often being conservative and slowly adjust to the new information. Tversky and Kahneman (1974) also found that people tend to be constrained by meaningless "initial anchor".

## **2.2 Cognitive bias**

Typical cognitive bias include over-confidence, over-reaction and herd effect.

(I) Over-confidence refers to people over-evaluate the probability of success and accurate of private information (Liu, 2006). Numerous literatures indicate that people often believe their knowledge is broader than it really is. For example, Alpert and Raiffa (1982) argued that the confidence interval of 98% contain the really quantity of only 60%. Griffin and Tversky (1992) stated that experts tend to be more overconfidence than ordinary investors when evidence is ambiguous and predictability is low. Kahneman and Reiepr (1998) confirmed that investors would like to narrow margin of error on future stock index under the influence of overconfidence. De Bondt and Thaler (1995) also pointed out that over-confidence may be one of the steadiest human psychologies, which causes biased assessment on uncertainty events.

(II) Over-reaction is a common phenomenon that investors over-weight information as a result of irrational bias (Wu, 2004). Russell (2000) found that at least 10% of investor over-reaction when making decision. De Bondt and Thaler (1985) conducted an in-depth study on over-reaction in the article "Does the stock market overreact?" and argued that investors are not as rational as assumed, instead, they often overestimate new information and ignore long-term information. In contrast, institutional investors are tend to be under-reaction, which means they are usually confident at their judgment and don't change their minds easily.

(III) Herd behavior is a special irrational behavior which illustrates the psychology of investors imitating others' investment decision and over-relying on public opinion without consideration of their own information. Lakonishok, Shleifer and Vishny (1992) defined herd effect as investors buy or sell stocks at the same time with other investors. Scharfstein and Stein (1990) pointed out that herd effect will impact the efficiency of security market, causing the fluctuation of stocks' price.

## **3 OBJECTIVES AND METHODOLOGY**

### **3.1 Objectives**

Behavioral finance theory has explained some anomalies of traditional finance theory through several psychology biases of investors. In order to further examine the existence and significance of these behavioral psychology biases, the paper selects four typical ones to analyze. This paper can also help ordinary and institutional investors recognize their psychology biases and improve investment accordingly.

### **3.2 Methodology**

The paper analyses quantitative data to conduct descriptive study. Sekaran (2003) pointed out that the descriptive study can explain the features of the variables. Moreover, a survey questionnaire with predetermined questions implemented by Dong is applied to study the

behavior of Chinese investors) with the survey sample clients being selected from 20 sales departments of Southwest Securities, Northwest Securities, Huatai Securities, Hantang Securities, United Securities and so on (Dong, 2003).

Stratified random sampling method is used (institutional and ordinary investors are divided according to the transaction amount), 1000 survey questionnaires are given out randomly and collected back on time. 95% of all questionnaires are issued to ordinary investors, and 5% to institutional investors with 623 and 37 pieces of effective questionnaires respectively. The method of data collection is self-administered questionnaires containing predetermined questions to enable researchers to get results easier and quicker. Sekaran (2003) argued that personally administer the questionnaires is a good choice when conducting the survey in a local area. Lower cost and faster speed are two main reasons to choose questionnaire as research method.

## **4 RESULTS AND DISCUSSION**

### **4.1 Conservative bias**

Obvious conservative bias among Chinese security investors is reflected through two aspects.

(I) When the stocks with ordinary performance suddenly receive excessive returns, 61.99% of Chinese investors choose to sell at opportune moment while only 39.57% prefer buy in additionally. In terms of institutional investors, 70.82% choose to sell and 29.16 to buy in. (II) In face of new information, 42% of ordinary investors would require further confirmation rather than make use of it immediately (21.33%). Institutional investors show more preference on further confirmation (58.33% compared with only 8.33%) (see Tab. 1).

Different proportion on these two questions indicates various expected return in the future and extent of conservation. Obviously, institutional investors have more conservative bias than ordinary investors in China. The phenomenon of conservatism is identified by Edwards in 1968 that individuals are not prone to change their beliefs as a rational Bayesian under new information. Edwards (1968) also argued that the more useful the new information, the larger the difference between rational updating and actual updating. Grether (1992) pointed out that different judgments can be made in different situations according to experimental evidence, showing various kind of conservatism.

The people who choose to sell the good-performance stock are more than twice the time as ones who keep holding it. This reveals the psychology that investors tend to hold certain profit rather than chase more dubious return. More investors in China are small-to-medium retail investors who are prone to engage in short-term investment, which means once the stock have excess return, they will sell it to get certain return.

Hirshleifer (2001) argued that one of the explanations for conservatism is that conducting new evidence and updating opinion is costly and people may be under-react to new evidence. The phenomenon of under-reaction is more evident among experts as half of them would not like to incorporate new information into their investment strategy and think it needs further consideration. Conservative bias can be one of the most typical opposed evidences for market efficiency theory as prices will not effectively reflect market information.

### **4.2 Over confidence**

According to the research figure, half of ordinary investors consider own judgment as correct and 20.86% obtain higher return from their own judgment. Ones who are not sure about their judgment account for 22.18% while only 6.95% admit the mistakes they have made.

Institutional investors are even more confident than ordinary investors, respectively 52%, 40% and 8% of them regard their judgment as correct, not sure and wrong. Furthermore, investors who think themselves as talented represent 79.07%, compared with 20.93% who consider the opposite. The figures among institutional investors are 96% and only 4% hold the opinion of untalented (see Tab. 1).

Obvious characteristic of over confidence of Chinese security investors can be seen from the above two questions and institutional investors are more confident than ordinary investors. According to numerous research and literatures, investors tend to overrate their judgment, which can cause biased evaluation. It is interesting to note that almost all of institutional investors consider themselves as talented people, resulting in half of them believe the accurate of their strategy. Scheinkman and Xiong (2003) argued that institutional investors would like to buy overvalued stocks when they have positive information as they are confident to sell them to people of more extreme beliefs. However, in face of uncertainty, over-confidence may cause the abnormal change of stock price, especially as institutional investors hold a large amount of fund, which can influence the trend of stocks in finance market.

In terms of another angle of view, Bernardo and Welch (2001) argued that overconfidence of investors can contribute to the emergence of new ideas, which is beneficial to economy and finance market.

### **4.3 Self-attribution bias**

When contradiction exists between the fact and own judgment, 58.27% ordinary investors believe that the situation is ambiguous and more time is necessary to examine the results, 22.18% of them even insist the original judgment and only 19.53% admit the mistake of original judgment. However, if the fact is consistent with judgment, 36.45% attribute it to their own judgment ability. This bias is more obvious among institutional investors with success self-attribution accounts for 72% and 64% unwilling to attribute inconsistent to fault judgment (see Tab. 1).

The characteristic of self-attribution can be seen from the statistic figure. People, especially institutional investors, are more prone to attribute good results to own abilities and bad results to external reasons (Hirshleifer, 2001). Self-attribution and overconfidence can attribute to similar psychology of investors as they over-believe in the correctness of their investment strategy. Hirshleifer (2001) also argued that self-attribution and overconfidence are dynamic and static counterparts; self-attribution lead to overconfidence instead of converging to the actual self-evaluation.

### **4.4 Loss aversion**

Regarding a gamble from which you can win \$200 and loss \$100 at equal possibilities. 42.86% ordinary investors and 37.83% institutional investors are unwilling to take part in. However, as the repeat number of gamble increase to 100 times, 88.92% and 91.89% investors would like to conduct the gamble (see Tab. 1).

Another interesting comparison is, when the bet of the gamble is to win and loss \$100 at equal possibilities, 35.63% ordinary and 32.43% institutional investors would like to accept it while if the bet increases to \$10000, only 18.94% and 18.91% investors would like to accept it.

The psychology of loss aversion can be seen from the above comparisons. Hirshleifer (2001) defined that loss aversion is the phenomenon that people are prone to avoid risks that relative to a reference point in the utility function. Samuelson (1963) pointed out that for the choice of a single gambling that near the reference point, quite a few people tend to reject the gamble

with the fear of the loss of \$100 although the gamble have obvious benefits. However, the selection is far from the reference point when the gamble can be repeated 100 times, so most people chose to accept the gamble (Samuelson, 1963). Barberis and Huang (2001) examined that loss aversion can result in excess fluctuation in stock prices. Barberis (2001) pointed out that loss aversion bias can help explain equity premium puzzle as investors require a high premium to long-term hold stocks. Moreover, Grinblatt and Han (2005) stated that momentum effect can also be explained by loss aversion psychology.

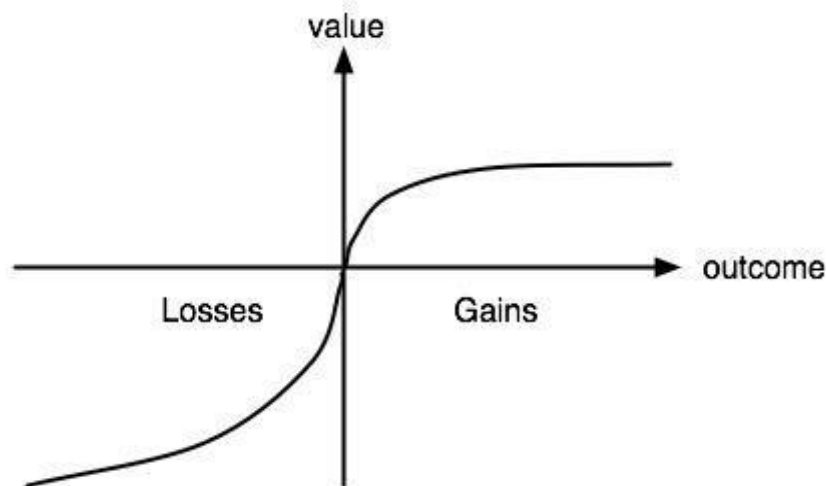


Fig. 1 – S-shaped curve of the value function.

The value function (see Fig. 1) indicates the different relative value for investors in face of different outcome. As seen from Fig. 1, the corresponding absolute amount of value in the result of loss is larger than that of the result of win. The sensitivity of win and loss are also not equal, investors are more sensitive to loss when the amount of loss is low and the value of win is lower when the profit is not very large, which shows the aversion to loss in investment. Moreover, the larger the amount of loss, the lower the sensitivity. The feeling of loss often much more intensity than win in investment (Li, 2012).

Tab. 1 – The results of questionnaire.

Behavioral psychology	Questions	Options	Proportion	
			Ordinary investors	Institutional investors
Conservative bias	When the stocks with ordinary performance suddenly receive excessive returns, which option would you prefer?	A. I will sell the stocks at opportune time.	61.99%	70.82%
		B. I will buy the stocks additionally.	39.57%	29.16%
	In face of new information, which option would you prefer?	A. Further confirmation is needed to make final decision.	42%	58.33%

		B. I will make use of the new information immediately.	21.33%	8.33%
over confidence	How do you consider about the correctness of your own judgment?	A. Generally correct and I can get higher return from my own judgment.	20.86%	52%
		B. Generally correct while I cannot grasp it appropriately.	50%	40%
		C. Not sure.	22.18%	8%
		D. Usually Wrong.	6.95%	0%
	Do you consider yourself as talented people in investment?	A. Yes, I think so.	26.91%	52%
		B. Yes, while I am just general talented one.	52.15%	44%
		C. No, I don't think so.	20.93%	4%
Self-attribution bias	When contradiction exists between the fact and your own judgment, which option would you prefer?	A. I think more time is needed to further examine it.	58.27%	64%
		B. I will insist the original judgment.	22.18%	25%
		C. I will admit the mistake of original judgment.	19.53%	11%
	If your judgment is consistent with the fact, which option would you prefer?	A. It can be attributed to accidental factors or there is no clear attribution.	63.53%	28%
		B. It should be attributed to my ability of judgment.	36.45%	72%
Loss aversion	Would you want to take part in the gamble that you can win \$200 and loss \$100 at equal possibilities?	A. Yes, I want to.	42.86%	37.83%
		B. No, I don't want to.	57.14%	62.17%
	If the repeat number of the gamble increase to 100 times	A. Yes, I want to.	88.92%	91.89%
		B. No, I don't want to.	11.08%	8.11%

	If the bet of the gamble is to win and loss \$100.	A. Accept the gamble	35.63%	32.43%
		B. Not accept the game	64.37%	67.57%
	If the bet increase to \$10000	A. Accept the gamble	18.94%	18.91%
		B. Not accept the game	81.06%	81.09%

## 5 CONCLUSION

The paper has reviewed the literatures associated with behavioral psychology such as heuristics biases, including representativeness, availability and anchoring, and cognitive bias, which consists of over-confidence, over-reaction and herd effect. These psychology characteristics can provide explanations and solutions to the market anomalies to some extent.

The paper also studies the investment psychology of Chinese investors based on questionnaire. As seen from the above analysis, investors, especially institutional investors, in China show the irrational characteristic in making investment decision. Conservative bias, over-confidence, self-attribution bias and loss aversion are four main psychology biases according to the research. These biases are more obvious among institutional investors, which means that the psychology biases cannot be improved or eliminated by studying and accumulating experiences.

Behavioral Finance is an exciting and interesting new field in terms of stock market research. The evidence of behavioral finance theory helps us understand behavioral psychology deeply and give more insight into stock market anomalies and investment strategy selection.

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## **HUMAN RESOURCES CONTROLLING AS A TOOL FOR MEASURING HUMAN RESOURCES KEY PERFORMANCE INDICATORS**

*Roman Zámečník*

### **Abstract**

The paper focuses on one of the functional fields of the Enterprise Controlling field – i.e. Human Resources Controlling (hereinafter “HR Controlling”). It presents HR Controlling as an integral part of the management controlling system and an important tool for measuring Human Resources Key Performance Indicators (hereinafter “HR KPIs”) in an enterprise. The focal point of this paper is the analysis of the possibilities for the use of the qualitative instruments of HR Controlling in a selected industrial enterprise. In contrast to the quantitative instruments, the measurement of these qualitative values (indicators) is more difficult and their enumeration is one of the main problems of HR Controlling. For example - motivation, employee satisfaction, the quality of the competencies of individual employees, or performance assessments of employees can be ranked among such instruments. There is no universal guide for estimating these values in specialized literature. In spite of this fact, we tested a methodology for the measurement of these qualitative values by means of some selected statistical methods in some carefully-chosen Czech and Slovak industrial enterprises. The paper also deals with an outline of motivation factor analysis methods in a selected industrial enterprise.

*Keywords: human resources controlling, human resources key performance indicators, analysis of motivation factors, cluster analysis*

JEL Classification: M12, M40, M54, 015

### **1 INTRODUCTION**

What to measure? How to measure it? Where to measure? When to measure? These questions make measurement of human resources indicators difficult. The following statement: “*What cannot be measured cannot be managed*” may be therefore considered to be the starting proposition for HR Controlling a Human Resources Key Performance Indicators.

In order to manage the various and varied human resources processes, HR Controlling requires a variety of measurement indices and quantities. One of the most fundamental questions HR Controlling seeks to answer is the establishment of relevant measurement quanta and indices. Among the key problems faced by HR Controlling, are those of the question of measuring the so-called “soft” factors and that of the measurement of the results of the human resources management process. These problems and issues are covered in the following chapters.

The primal aim of this paper is the analysis of the possibilities of using qualitative instruments for HR Controlling purposes in a selected industrial enterprise. We have divided our paper into three parts.

In the first part, we characterise the basic HR Controlling principles. In the following part, we introduce the HR Controlling instrumentaria in their quantitative and qualitative forms. The

third section deals with an outline of motivation factor analysis methods in a selected industrial enterprise.

The analysis of motivation factors, and their order, takes into account the level of importance they have for the employees - which is assessed using the Questionnaire Method. The Cluster Analysis method is used due to the possibility of creating various types of motivational programs.

The result is a proposal for the creation of methodologically-unified motivation programs using multi-factor statistical analysis (i.e. Cluster Analysis).

## **2 LITERATURE REVIEW**

In the dictionary of personnel managers increasingly grows the concept of „HR Controlling“, which follows the effort of companies to manage the performance of human capital, to measure its value, and to compare the results with another organizations (Soósová, 2011).

In the paper, ”Human Resources Key Performance Indicators”, Gabčanová (2012, p.127) suggests that organizations try to measure performance according to the financial drivers but in the recent period top leaders attempted to find new performance indicators (indices) which would take the “wind from sail” to their rivals in the market.

According to Gabčanová one of these competitive advantages is human capital. As the Tootell et al. (2009) stated “since 1980s there has been an increasing emphasis on the importance of HR measurement.” Yeung and Berman (1997) declared that “HR measures should be impact rather than activity orientated, forward looking than backward looking, and should focus on the entire HR system not just on individual practices.”

Toulson and Dawe (2004) identified three obstacles in measuring HR: lack of HR experience and precision and difficulties in measurement. There were defined tools by various authors for measuring the HR capital. Srimannarayana (2010) cited in Gabčanová (2012), brought brief overview of invented methods to evaluate HR capital:

- Multiple constituency approach suggested by Tsui,
- Human resources accounting system proposed by Flamholtz,
- McConnel identified 16 categories to be measured in HR,
- Return of investment methodology investigated by Fitz-Enz,
- Ulrich has showed how HR practices relate to BSC through productivity, people and process indicators,
- Methodology of behavioral costing to measure the financial impact to HR activities proposed by Cascio and Boundrenau,
- BSC in which strategic goals, i.e. operational objectives are transfer into 4 perspectives.

Based upon the model of BSC introduced by Kaplan and Norton (2007) and consequently its application in the area of the human resources, a new tool HR Scorecard for the management and measurement of the human capital was established. Becker, Huselid and Ulrich (2001) who have outlined HR Scorecard, added that it does two important things:

- Manage HR as a strategic asset,
- Demonstrate HR´s contribution to firm´s financial success.

Also Ulrich and Brockbank (2005) appended that strategic contribution accounts for almost half of HR's total influence on business performance.

Huselid, Becker and Beatty (2005) also confirmed that the HR Scorecard is designed to guide management of the HR function and declared that the elements in the HR Scorecard are key leading indicators for workforce success. Key performance indicators are assigned to each perspective in strategy map and lately KPIs on HR level became significant benchmark in the entrepreneurial sector.

Bean and Gerathy (2003) presented that according to their experience; KPIs are valid and effective when applied in a consistent and comprehensive manner. Further, they declare that financial performance must be respected as the critical measure of the Access for every business but financial KPIs are closely related set of operational metrics i.e. on HR level, too.

Bauer (2005) stated that once KPIs have been indentified, defined and formalized, business leaders may feel that KPI battle is won. Where possible, KPI targets must be based on concrete data and non-manipulative formulas. Griffin (2004) pointed out that there should be a direct link from KPIs to goals, from goals to objectives and from objectives to strategies. Skibniewski and Ghosh (2009) defined that all KPIs should impact a business decision in some time scale, depending on the window of time available. That makes the decision process difficult from the decisions made under no time constraint. Organizations should identify areas of business processes that are the most critical to the financial success of the organization. Further, KPIs can be divided into lagging and leading. Kaplan and Norton (2007) explained the difference between them. Leading indicator is a metric that mainly refers to future developments and drivers/causes. Lagging indicator is a metric that mainly refers to past developments and effects/results, e.g. reflects history and outcomes of certain actions and processes.

Eckerson (2007) described what characterizes "good" KPIs. According to his study effective KPIs are:

- Sparse: The fewer KPIs the better.
- Drillable: Users can drill into detail.
- Simple: Users understand the KPI.
- Actionable: Users know how to affect outcomes.
- Owned: KPIs have an owner.
- Referenced: Users can view origins and context.
- Correlated: KPIs drive desired outcomes.
- Balanced: KPIs consist of both financial and non-financial metrics.
- Aligned: KPIs don't undermine each other.
- Validated: Workers can't circumvent the KPIs.

On the other hand, Hursman (2010) defined next five criteria for effective KPIs:

- Specific
- Measurable
- Attainable
- Relevant

- Time bound

“S-M-A-R-T” is a fine way to spell KPIs, as this is a solid framework for making decisions about KPI selection (Gabčanová, 2012).

Ever-more frequently, new instrumentaria for Human Resources Management (hereinafter “HRM”) are used more and more in the strategies – of not only industrial manufacturing enterprises, since these allow an enterprise to better optimise and manage their costs and any surpluses that arise and to invest these into new investment or development activities, which will contribute in turn to increasing the competitive ability of the given enterprise, or simply to use them as motivational tools for their employees – which is, today, considered to be the form of investment with the greatest return-on-investment.

Similarly to other fields of management today, not even HRM can do without the setting of aims and objectives and the tracking and evaluation of deviations from plans in reality – that is to say, without those activities today known as Controlling. The significance of HRM for the effective performance of an enterprise and its long-term character make HR Controlling one of the strategic company management tools.

In many enterprises, costs relating to human labour absorb the largest part of the total costs. As seen against such a background, the depiction of “value-added” through human labour is an important – but equally, extremely demanding task of the Controlling function. These problems associated with the valuation of “value-added” through human labour provided the basis for developments in HR Controlling as a variant of the controlling function. Further causes which could lead to developments in the Controlling for Human Resources field are:

- Growth in employee qualification requirements as a consequence of technological changes.
- A concentration on employee qualifications, e.g. their readiness to further educate themselves, teamwork, flexibility, etc. (Horváth & Partners, 2004).

HR Controlling – or simply stated, the tracking and analysis of selected human resources indicators, may thus be of use in the identification of an enterprise’s strengths and weaknesses regarding their HRM and to discover reserves for increases in effective performance and competitive abilities.

The aim of HRM is to assure that an enterprise has the right staff, with the right qualifications, at the right cost structure levels, and that they are in the right place at the right time. The task of HR Controlling is this process: to manage and track (i.e. measure). At the same time, HR Controlling functions as an early-warning system drawing attention to deviations between the set aims and reality. HR Controlling at the same time, may contribute towards the evaluation of the intangible activities of an enterprise (through the intermediary of human capital values), and which create an ever-larger part of an enterprise’s value.

Lubelec (2003), defines HR Controlling as a method and mechanism for us to exploit in order to document and prove that financial resources invested into individual types of personnel issues and activities, and overall into the human resources field, bring a return for both the enterprise and its staff through the effects we require, (i.e. achieving performance-related goals, behaviour, the quality of the functioning of processes, etc.), or respectively – which we have set for them, and thus – that they have been used effectively.

According to Urban (2004), we can understand HR Controlling as a tool which proves that Personnel Management is not only a cost item.

Horváth (2004), states that HR Controlling is a function, which stretches across the full breadth of an enterprise. It contributes to the planning, control, management and provision of information functions for all personnel measures.

Konetzny (2000), relates HR Controlling to all the fields and levels of Personnel Management.

Problems and issues relating to the question of the centralisation or decentralisation of an enterprise's Controlling function – which also have a direct bearing on HR Controlling, are dealt with in their work by, for instance, Rajnoha and Dobrovič (2011) or Tuček and Dlabáč (2013).

Urban (2004), states that developments in HR Controlling are transforming from the operative to the strategic. Traditional fields of HR Controlling, with regard to an enterprise's management's point-of-view of, include the tracking of employment levels and the reduction of personnel costs. Modern HR Controlling differentiates between strategic investments and operative costs. The correct evaluation of the costs relating to a certain measure can only be achieved in combination with their potential for increasing the value of an enterprise.

HR Controlling - in a narrower sense, has a quantitative and operative character, and evaluates the efficacy and outputs of the human resources process. HR Controlling – in a wider sense, tracks the quality of the management of human resources, its approaches and procedures, and the tools and instrumentaria. For both conceptions of HR Controlling, they have three characteristics with methodological features in common:

- The verification of the benefit/contribution of HRM for achieving the enterprise's aims and goals.
- The necessity to include qualitative – or “soft” – characteristics in the tracking activities as well. In the management of human resources, these often play a decisive role.
- The use of indicators, based upon special ways of acquiring data (i.e. market and field research studies, i.e., interview, employee questionnaires, enquiries, etc.) (Urban, 2004).

Despite the fact that a whole range of managers consider this to be a very “soft” and difficult to measure discipline, the quality of the human potential creates value for an enterprise as well as determines its standing on the market. Formánková (2006) states that HR Controlling endeavours to resolve two fundamental issues: On the one hand, to identify just which HR KPIs are key ones, and then to suggest the appropriate tools or instruments, i.e. how to track/measure them; or, on the other hand, to provide “benchmarking” standards for the possible identification of weak points. Measurement should be by means of those indicators which could best discover the influence of the correct management of human resources on the successful implementation of an organisation's strategies and thereby increasing its performance.

The fact that the quality of the analysis of selected HR KPIs contributes to higher profitability for an enterprise was shown in the PricewaterhouseCoopers study “*HR controlling 2013 – Measuring Performance of Human Capital*”. This also summarises the most useful HR KPIs and their numerical values in the most successful enterprises – according to profitability. It was shown that the most successful enterprises were those which, in comparison to the others, use HR Controlling a great deal more, and have much better and more elaborate strategies for the management of human resources and also – conduct more frequent investigations into their employees' satisfaction.

As has already been mentioned hereinabove, HR Controlling tools and instruments can be primarily subdivided into the quantitative and the qualitative. We rank economic indicators (e.g. wage/salary costs, cost for the individual personnel processes, etc.), and socio-economic indicators (i.e. absenteeism, fluctuations, etc.), among the quantitative tools. Among the tracked qualitative indices are things like employee motivation and satisfaction, the quality of the various competencies of the individual employees, or evaluations of their performance. Quantitative Personnel Controlling indices can be relatively easily compared and measured. However, the measuring of qualitative indices (the so-called “soft” tools) ranks as one of the core problems facing Personnel Controlling and not even in the available literature is it devoted sufficient attention. This is confirmed by Zámečník (2009), who states that - in the course of the evaluation of the results of human endeavours, it is necessary to take into consideration the unique character of working with human resources. And, since in comparison with controlling oriented on other enterprise activities, there continues to be a lack of adequate models, and it is necessary to learn to exploit existing quantitative quanta and to suggest appropriate ways and means of measuring qualitative quanta. In the following section of this paper for this reason, we orient ourselves on the possibilities of tracking and measuring selected qualitative quanta (employee motivation) under the concrete conditions pertaining to industrial manufacturing enterprises.

As Devadass (2011) states scholars and practitioners care about cultivating, increasing, and maintaining work (employee) motivation. Motivation research has a long history of considering employee motives and needs (Alderfer, 1969; Maslow, 1954; McClelland, 1961). Interest in these areas peaked in the 1970s and early 1980s, and the last fifteen years has seen little empirical or theoretical research. According to Moorhead and Griffin (1998) is employee performance frequently described as a joint function of ability and motivation, and one of the primary tasks facing a manager is motivating employees to perform to the best of their ability. Pinder (1998) cited in Devadass (2011), describes work motivation as the set of internal and external forces that initiate work related behaviour, and determine its form, direction, intensity, and duration. Work motivation is a middle range concept that deals only with events and phenomena related to people in a work context. The definition recognizes the influence of both environmental forces (e.g., organizational reward systems, the nature of the work being performed) and forces inherent in the person (e.g., individual needs and motives) on work-related behaviour. An essential feature of the definition is that it views work motivation as an invisible, internal, hypothetical construct (Devadass, 2011).

Motivation, delegation of powers gets its importance at the present time as well. Authors Foot and Hook (2005), Armstrong (2002) cited in Gabčanová (2011), unanimously agree upon the fact that the management of the performance is the process by which the performance of the organization, team and individual improve and is used by the leaders for managing. Hall (2008) clearly declares that the very best way for managers to improve employee performance is to set clear expectations and hold regular business reviews to those expectations. The scientists try to discover the dependence between working performance and motivation. However, the answer is not unequivocal in all cases (Gabčanová, 2011).

### **3 RESEARCH OBJECTIVES AND METHODOLOGY**

The need of an employee motivation program was solved for a number of Czech and Slovakian industrial manufacturing enterprises. The paper shows the results of their application on a selection of furniture-making enterprises in the category of shop-floor workers. This company uses the following motivation factors: payments and allowances, education of employees and other advantages. According to motivation criteria used in the

company it is necessary to detect the following research questions for the current system of workers motivation improvement:

- to analyze the current condition in motivation of workers,
- to find other motivation factors that highly influences worker performance and also verifying if there are exceptions to the primary motivation factors (measured or estimated) also so called latent motivation factors (hidden, immeasurable) acting in the background of primary motivation factors,
- to check the possibility of creating an unification motivation program for workers with the intention of its effective application in the practice.

Analysis of motivation structure accepts general knowledge from the theory of motivation. Together with analysis of employees' motivation profile it allows us to obtain information about strong and weak aspects of managerial systems within organizations and its motivation impacts. Without those basic knowledge suggestions are only stochastic processes which will miss the goal when they do not correspond to employees' priorities. The most important criteria for employee performance are those which cause that employees feel that they do a work which has a sense, which is important for an employer, interesting for employees and which give to employees ability of their personal development. But there are also other factors which impact employees' performance-career growth, adequate financial reward, suitable working environment and interpersonal relationships and last but not least respect of personal honour.

Before analysis of motivation structure it would be understood and evaluated all events which have a big impact on company function, on workers willingness to work and on workers performance. Therefore it is necessary to get information about:

- technical and organizational conditions of work,
- socially-demographic and qualification features of employees,
- information about features of job environment, about job conditions and about social equipment of job places,
- applied systems of evaluation and rewarding,
- application of personal management system and own personal work in a company,
- application of social welfare system and employees advantages in a company,
- collecting and analysis of so called soft data (information about satisfaction or dissatisfaction of a worker, about their value orientation, aspirations, relation to work, relation to superiors, to fellows and to whole company).

After analysis of presented social-economic information it can be created outstanding motivation program for employees. These issues are the subject of the works by authors, for instance, Hitka and Rajnoha (2003) and Zámečník (2007 and 2014).

These authors have elaborated and applied a methodology for the analysis of employee satisfaction and for motivational factors for the employees of industrial manufacturing enterprises through the assistance of multi-criteria statistical analysis methods – i.e. cluster analyses. A partial task of this methodology is the creation of a universal, easily modifiable questionnaire that is usable for all employee categories and which determines the valuation spread used to evaluate responses to the questionnaire. On the basis of practical verification with the assistance of cluster analysis, groups are formed of similarly motivationally oriented employees. Analysis of these groups is further determined by the priority allocated a

motivational factor for an individual group. The motivational factor can subsequently be used in the creation of a motivational programme for a group of similarly motivated employees.

Cluster analyses are one of the possibilities available to exploit the information contained in multi-dimensional comparisons using the differentiation of sets into several relatively unified sets of clusters. The application of the cluster analysis method leads to favourable results – especially there where the set under investigation in reality falls into classes, and where objects have a tendency to gather together into natural clusters. Through use of appropriate algorithms, the structure of the set under investigation can be peeled away to reveal its consistent components and thus to classify the individual objects. This can be achieved through the radical reduction of the dimensions of roles – and this in such a way that a number of variables will be represented by one variable expressing its association or belonging to such a defined class or type. The aim being to achieve in essence such a state where, the objects to be found within a cluster will as similar to one another as possible and the objects in various clusters will bear as little similarity to one another as is possible. In view of the fact that employee motivational systems are based on differing criteria according to variable characteristics, it is appropriate to use cluster analysis – further only CLUA, for the final evaluation of motivational factors, where through the use of a suitable algorithm, we can work our way to an evaluation of the realistic order of motivational criteria. Application of the CLUA system is performed in three stages: differentiation – the selection of groups, their interpretation – naming of these groups and their “profiling” – and the description of the characteristics of each of these groups. Cluster analyses can therefore be used for research investigations into the possibility of creating certain types of motivational programmes, that is to say, the possibility of establishing a unified motivational programme for a group of workers with similar motivational profiles. The aim of analysis, is to discover on the basis of the measurement of the similarity of respondents` answers to questionnaires, whether or not it is possible to identify a group of employees with a similar make up of motivators among the employees – for whom it would be possible to elaborate (tailor-made) unified motivational programmes with the intention of simplifying and rendering more effective the validation in practice of motivational programmes in everyday practice. Apart from the aforementioned, cluster analysis can also be used for more detailed verification of the structures and ranking of the importance of motivational criteria. From among the wide range of cluster analysis methods available, we chose the Hierarchical Clustering Method – i.e. the so-called Ward Method with its measurement of the scale or degree of similarity in the responses of individual respondents in the simplest possible way, i.e. through the use of the so-called Euclidian Distances Method.

The actual phases in the preparation, creation, and realisation/implementation of the motivational programme can be broken down into the following basic steps. (Fig. 1):

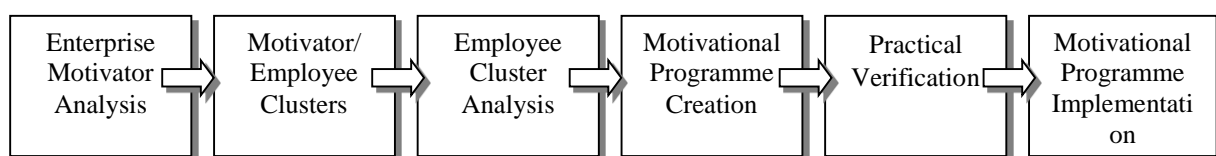


Fig. 1 – Schema of the creation of motivational programmes using the cluster analysis Source: own study



## 4 RESULTS

As already mentioned above, this methodology was applied in a number of Czech and Slovakian industrial manufacturing enterprises. In order to foster a better understanding, the contribution shows the results of their application on a selection of furniture-making enterprises in the category of shop-floor workers. Information regarding motivation in these enterprises was acquired by means of questionnaires containing 27 motivational factors. Out of the 100 respondents, 66 shop-floor workers filled-in the questionnaires. From the statistical significance point-of-view, this is a sufficient number for the determination of motivator cluster structures and cluster analysis of the motivational criteria of the shop-floor workers of this enterprise. The respondents had the task of indicating the motivational factors and assigning them an evaluation ranging from 5 to 1 (5 – Most significant; 4 – Very significant; 3 – Significant; 2 – Quite insignificant; 1 – Insignificant).

Table 1 shows the rankings of the individual motivational factors.

Tab. 1 – Motivator Ranking in Selected Enterprise Source: own study

<b>Ranking:</b>	<b>Motivator:</b>	<b>Sum of responses</b>
1	Self-sufficiency (Independence) when working	264
2	Free time	251
3	Interpersonal relationships within the workplace	241
4	High degree of personal responsibility	239
5	The atmosphere in the workplace	234
6	Job security	230
7	Interesting work	229
8	Wages/salary levels	226
9	Way work instructions are delivered	224
10	The quality of the inputs needed to work well	222
11	Working hours, overtime	221
12	The company's "name"	219
13	Independence	205
14	The enterprise's ecology	204
15	Sufficient space to work in, in the workplace	201
16	The relationship between the management and employees	200
17	The organisation of work	198
18	The working environment	197
19	Financial bonuses and benefits	196
20	Noise, dust, heating and lighting conditions at work	193
21	Recognition, rewards, praise by superiors	192
22	Validation through use of one's qualifications	185
23	Ways decisions are made	185
24	Social services	180
25	Career growth possibilities/opportunities	166
26	Information flows	163
27	Education and personal growth	157

From the results of the analysis, it is clear that – surprisingly, among the most important motivators in the enterprises investigated were - self-sufficiency (i.e. independence) when working, free time, interpersonal relationships within the workplace, degree of personal responsibility and atmosphere in the workplace. It is only in eighth place of importance that wage/salary levels are to be found, and which – in parallel research into comparable

enterprises (as well as in earlier research studies conducted within these same enterprises) this was to be found in the priority position at the peak of the motivator rankings. This is proof of the need of employees for improvements in the interpersonal and working relationships in employment, and which suppress the primary desire for a higher income.

Fig. 2 shows the motivational structure criteria for labourers in selected enterprises hierarchical cluster – the tree-diagram depicts the cluster analyses of 27 mutually dependent motivational factors. These clusters of mutually-interdependent motivators was created through use of the principles of the hierarchical agglomeration procedure, which is founded on the progressive clustering of groups of elements – starting with the most similar, and, in the following steps – mutually less similar clusters.

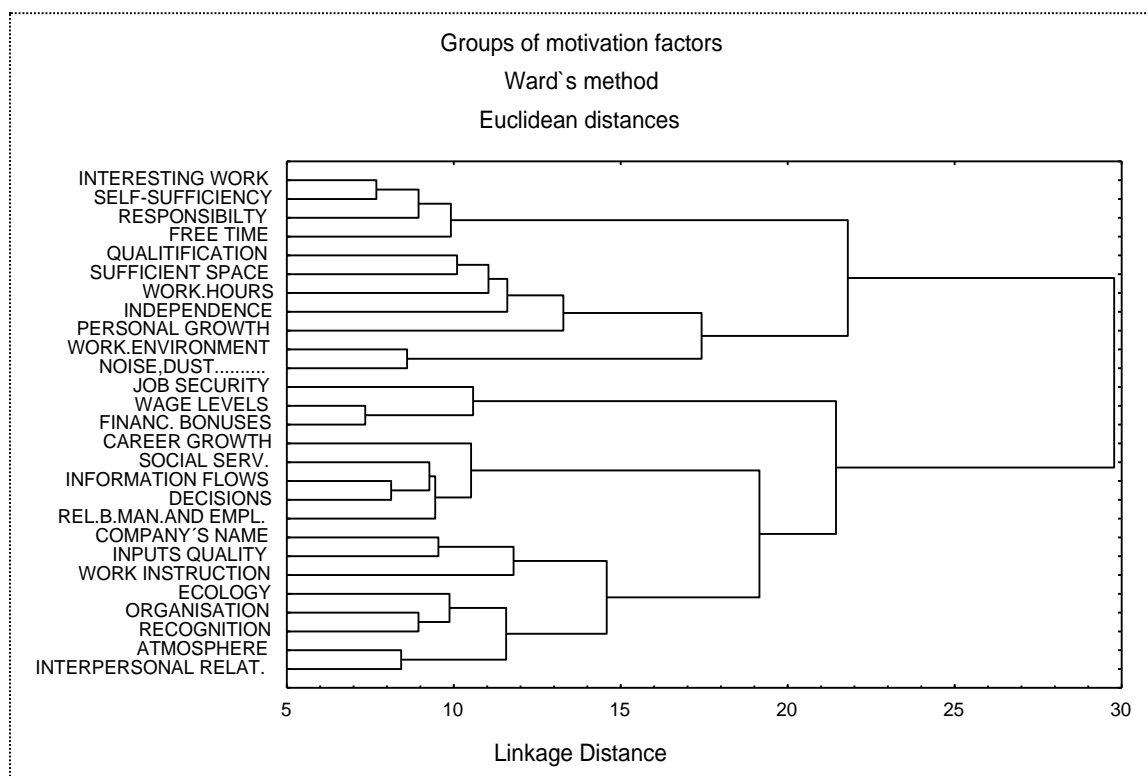


Fig. 2 – Hierarchical cluster analysis of the structure of motivational criteria for labourers in selected enterprise. Source: own study

The first motivator cluster is how interesting the work is, self-sufficiency/independence when working, a high degree of personal responsibility, and free time. This group of criteria can be complexly called the work result recognition group.

The second motivator cluster is made up of motivators like validation through the use of one's qualifications, the sufficiency of room to work freely in the workplace, the working hours, independence, and the possibility of education and personal growth. It is possible to see the effort by co-workers to find self-realisation and to develop their own personalities

The third cluster is composed of the working environment and noise, dust, and heating and lighting conditions. Behind the above-mentioned motivators, can be seen the interest by the workers in suitable ergonomic conditions in the workplace. To a wider extent, the third cluster is linked to cluster No. 2.

The fourth cluster is made up of the motivators – job security, wage/salary levels and financial benefits and bonuses. This cluster can be called the materialistic cluster. In its background can be felt the material needs of the workers and their efforts to secure the same.

The fifth cluster is composed of the motivators – the possibility of career growth, social services, information flows, decision-making methods, and the relationship between the enterprise’s management and its employees. This cluster can be called the organisational–career cluster.

The sixth cluster is that of motivators like the “name” of the enterprise, the quality of inputs needed for good work, and the ways in which decisions are made. This goes together with the seventh cluster - made up of motivators like the ecology of the enterprise, the organisation of work, recognition, rewards and remuneration and praise by superiors, atmosphere in the workplace and interpersonal relationships. This cluster can be called the collaboration and cooperation cluster.

Similarly, it is also possible to depict the structure of the similarities between the individual profiles of the workers in the selected furniture-making enterprises, and subsequently – to identify groups of workers with similar motivational structures. Interpretation of the identified groups by means of more detailed breakdowns of the individual motivational factors is a further task in the course of analysing the make-up and creation of motivational programmes for workers of industrial manufacturing enterprises.

Fig. 3 shows below the structure of similarities between individual worker profiles in the selected industrial manufacturing enterprises. From an overall point-of-view, it is possible here to identify 5 groups of workers with similar motivational structures. These are the group of workers designated C\_1 – C\_66, C\_4 – C\_55, C\_8 – C\_36, C\_2 – C\_64 and C\_5 – C\_27.

The problems and issues associated with employee motivation in the analysed furniture-making enterprises were also conducted to meet the needs of the middle management.

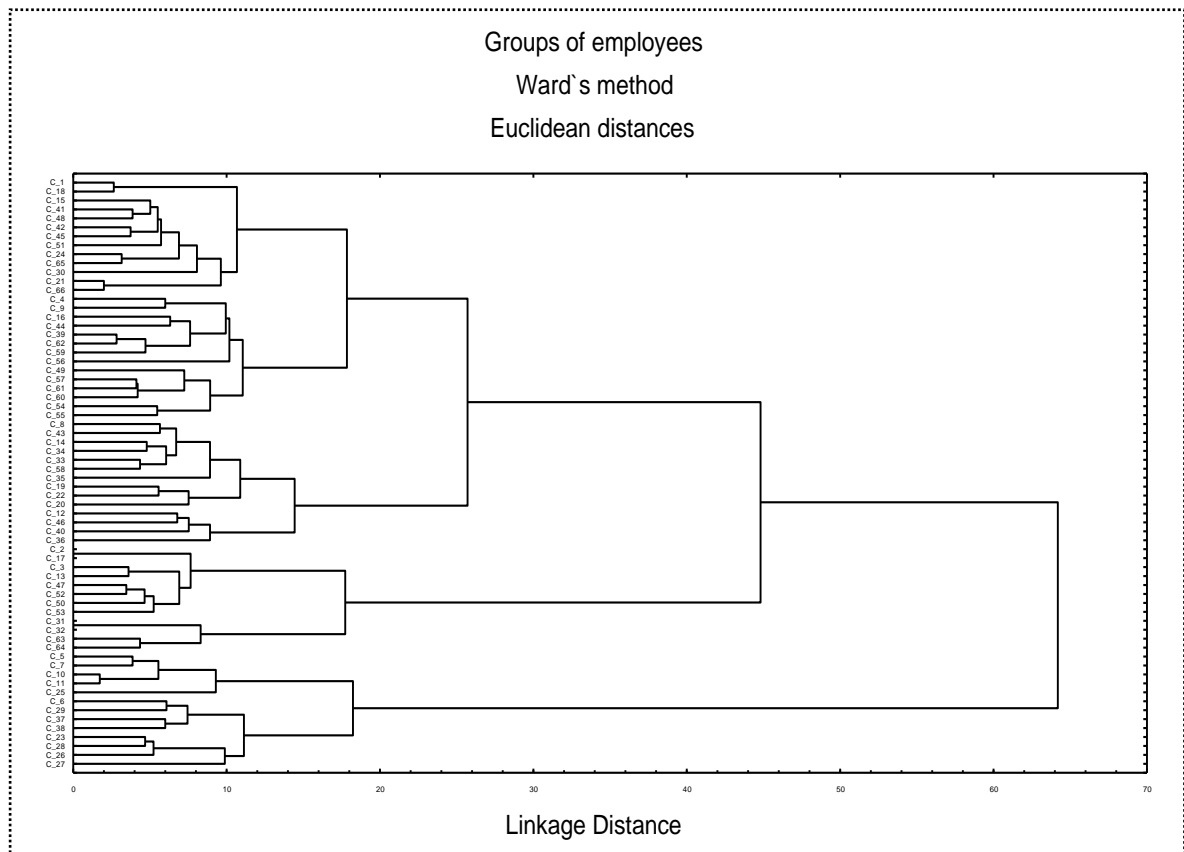


Fig. 3 – Hierarchical cluster analysis of the structure of motivational profiles of individual workers in selected enterprise. Source: own study

## **5 DISCUSSION**

Marking the motivators in the questionnaire provides information as to the character of ordinal qualitative features. From the methodological perspective, this has to do with a classical multi-dimensional matrix of the *Objects × Tracked Features* type useable in the course of upholding certain basic principles for the validation and application of multi-dimensional statistical methods. Of these methods, in this analysis, we used the Cluster Analysis Method due to the need to investigate the possibilities of creating certain types of motivational programmes – that is to say, the possibility of establishing a unified motivational programme for a group of employees with similar motivational profiles (not only for blue-collar workers, but also for middle management too).

The aim of the analysis was to discover whether or not – and on the basis of the measurement of similarities between the responses by workers to the main questionnaire, there existed the possibility of identifying groups with similar compositions of motivators for whom it would be possible to elaborate a unified motivational programme with an orientation on its simplification and on making it effective to validate such a motivational programme through implementation in everyday working practice. Apart from this, the Cluster Analysis Method was also used for a more detailed verification of the structures and rankings by importance of motivational criteria. Out of the great quantity of potential cluster analysis techniques, we selected the “Hierarchical (Tree) Clustering Method” – the so-called “Ward Method” and for more detailed analysis purposes, we chose the method with an orientation on the measurement of degrees of similarity in the responses of individual respondents in the simplest way possible, through the so-called “Euclidian Distances” Method. The whole overall approach was chosen in such a way as to be suitable for qualitative, non-metric quanta (i.e. motivational factors) set out in a unified scale (Degree of importance: 1 – 9; eventually: 1 – 5).

## **6 CONCLUSION**

The results demonstrate that HR Controlling is a term, which is more and more often to be found in the vocabularies of HR managers. It is associated with the growing effort by Czech and Slovak enterprises to measure the value of human capital, to direct and manage performance in line with the overall commercial strategy, and to compare its data regarding personnel practices with that of other enterprises. With the assistance of HR Controlling, it is possible to analyse not only the economic (financial), but also the social consequences of measures which in the first instance influence performance and employee motivation within an enterprise.

The design and implementation of an effective and economically-effective motivational programme should be one of the key roles of each and every enterprise. An incorrectly and poorly-applicable motivational programme has a negative influence on the employees and simply does not motivate them to strive for maximum performance. At the current time, the motivation of the majority of employees in the majority of industrial manufacturing enterprises fails to meet all of the needs and requirements of those employees.

On the basis of analysis and of the acquired results, it can be stated that - in the enterprises we analysed, there exists the possibility of creating motivational programmes for groups of similarly motivationally-oriented employees unified according to their motivational and

value-orientations. At the same time, it is necessary to point out that the suggested possibility for the unification of motivational programmes for groups of employees of necessity must undergo even more detailed practical elaboration and subsequent verification. At the same time, there is a need to emphasise the interim and ongoing need for the updating of motivational programmes in the context of developments in employees' values orientations, which may change through time. Further, there exists the possibility for the eventual individualisation of generalised motivational programmes through the use of motivators associated with self-realisation and individual employees' personal ambitions.

### **Acknowledgements**

*The authors are thankful to the Operational Programme Education for Competitiveness co-funded by the European Social Fund (ESF) and national budget of the Czech Republic for the grant No. CZ.1.07/2.3.00/20.0147 - "Human Resources Development in the field of Measurement and Management of Companies, Clusters and Regions Performance", which provided financial support for this research.*

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## **REGIONAL TAX REVENUES AS THE INDICATORS OF ECONOMIC ACTIVITY OF REGIONS IN THE CZECH REPUBLIC**

*Jarmila Zimmermannová, Jolana Skaličková, Jan Široký*

### **Abstract**

The paper is focused on an analysis of relationships between selected indicators of economic activity of regions in the Czech Republic (GDP, unemployment) and regional tax revenues obtained from taxes imposed on economic activity (VAT, income taxation). Firstly, the introduction and literature overview is provided; then the economic activity taxation in the Czech Republic is described. The methodology is based on correlation analysis (both the Pearson's and the Spearman's correlation coefficients), using data from official statistics of the Czech Republic. The main idea of the paper is that VAT and income taxes revenues in particular regions should give us the picture of economic activity of residents and entrepreneurs in these regions. Based on the results, we can say that there is statistically significant positive relationship between regional VAT revenues and regional GDP, and statistically significant negative relationship between regional income taxes revenues and regional unemployment. In spite of the weaknesses of this analysis, the results show us that these regional tax revenues can serve as an additional source of information about economic activity of particular regions.

*Keywords: VAT, Income Taxation, Macroeconomic indicators, Correlation Analysis, Regions, Czech Republic*

JEL Classification: E62, H25, H71, R11

## **1 INTRODUCTION**

### **1.1 Literature overview**

Focusing on economic activity of particular countries or regions, we can use different macroeconomic indicators as GDP, unemployment, inflation and balance of trade, or their components (consumption, investments etc.). These macroeconomic indicators show us the economic health of particular regions and we can use them to compare the development of particular regions in selected period.

On the other hand, there is problem of data delay – especially in case of regional macroeconomic indicators. For the purposes of regional policy planning and regional management, the policy makers need actual economic data. Since there are tax offices on the regional level (represented by regional and organizational units), we can assume, that regional policy makers can obtain some economic data from these tax offices, for example regional tax revenues. However, there is a question of suitability of tax based information for regional management and decision making, since it cannot give the whole picture of the regional economy.

Generally, economic theory assumes that the relationship between indirect taxation and economic growth is negative, for example Mendoza et al. (1997); moreover specific excise taxes generate less distorting effects on economic growth than the general consumption tax, as stated in Widmalm (2001), focusing on Czech literature Kubátová (2010) and Vitek (2008).



Existing scientific studies, focusing simultaneously on issues of regional economic health and regional tax data, deal mainly with income taxation and tax burden and try to analyse the impact of regional taxation on GDP development in particular regions.

For example Arhipova and Rudusa (2005) focused on development of territories within countries in transition period, mainly in Latvia. They analysed GDP, unemployment level, the number of economically active enterprises and businesses, nonfinancial investments and the amount of income tax. The results of their research should contribute to strategic cooperation for the improvement of entrepreneurial processes.

Cebula and Clark (2014) provided preliminary analysis for OECD countries and non-G8 OECD nations; they focused their research on study of the impact of economic freedom, regulatory quality and relative burden of taxation on the level of GDP in period 2003 – 2007. They analysed the relationships between the degree of economic freedom and GDP, the level of regulatory quality and GDP and the overall tax burden and GDP.

Reshina and Vocish (2011) deal with budgetary policy and inter-budgetary relations at the regional level in Latvia, particularly the taxation capacity (financial potential) across the regions.

Szarowska (2011) analysed the effect of tax burden on economic growth in the countries within the European Union. The analysis is performed on a panel data of 24 EU countries in a period 1995 – 2008, methodology is based on panel regression with fixed effects. Author presents statistically significant negative effect of both tax burden and direct tax on GDP growth, moreover negative correlation between corporate income taxes and GDP growth.

Folster (2002) focused on relationship between taxation and self-employment, using a panel data from OECD countries and Sweden. He presents a strong negative correlation between the tax burden and the share of self-employed within total employment.

Currently, there is a lack of studies focused on the relationships between revenues obtained from the regional economic activity taxation and the regional economic development. Moreover, the authors did not find any study focused on analysis of regional tax data as economic indicators for policy decision making.

The main goal of this paper is to analyse relationships between selected indicators of economic activity of regions in the Czech Republic (GDP, unemployment) and regional tax revenues obtained from taxes imposed on economic activity (VAT, income taxation). For the purposes of this main goal, the authors define the following 4 hypotheses:

*H1: There is a statistically significant relationship between regional VAT revenue and the value of regional GDP.*

*H2: There is a statistically significant relationship between regional income tax (PIT and CIT) revenue and the value of regional GDP.*

*H3: There is a statistically significant relationship between regional VAT revenue and the regional unemployment.*

*H4: There is a statistically significant relationship between regional income tax revenue and the regional unemployment.*

## **1.2 Taxation of economic activities in the Czech Republic**

The tax system of the Czech Republic had the same features as standard European tax systems in the analysed period (2005 – 2012). Economic activity taxation is based on the

following legislation: Act No. 586/1992 Coll., on income taxes (Czech Republic, 1992) and Act No. 235/2004 Coll., on value added tax (Czech Republic, 2004).

The trends in particular tax rates development and fiscal indicators development are shown in Table 1. Regarding VAT, tax rates were changed 3-times in the analysed period (Široký et al., 2014). Focusing on income taxation, the most significant change is visible in case of personal income tax (PIT), whereas since 1<sup>st</sup> January 2008 there has been introduced flat tax rate for all individuals within the Czech Republic (calculated from the so-called super gross wage). Regarding legal entities, the tax rate of corporation income tax (CIT) decreased from 26% in 2005 to 19% tax rate in 2012 (Schelleckens, ed., 2014). Primarily due to a reduction in the statutory CIT, the effective tax rate of corporate tax calculated according to the methodology Deveroux (in more detail Denis et al., eds., 2014) decreased in the analysed period by 6 percentage points (from 22.7% to 16, 7%).

Tab. 1 – Overview of macroeconomic indicators in period 2005 - 2012. Source: Czech Republic (1992), Czech Republic (2004), Denis et al., eds. (2014)

		2005	2006	2007	2008	2009	2010	2011	2012
1	VAT rates	5; 19	5; 19	5; 19	9; 19	9; 19	10; 20	10; 20	14; 20
2	PIT rates	15; 20; 25; 32	12; 19; 25; 32	12; 19; 25; 32	15	15	15	15	15
3	CIT rates	26	24	24	21	20	19	19	19
4	ETR CIT	22.7	21.0	21.0	18.4	17.5	16.7	16.7	16.7
5	Tax quota in total	35.7	35.3	35.9	34.4	33.4	33.6	34.6	35.0
5a	Tax quota - State Budget	24.8	24.5	25.0	23.8	22.8	23.0	23.8	24.1
5b	Tax quota - budgets of municipalities	5.2	5.0	5.1	4.9	4.7	4.7	4.8	4.8
6a	PTQ - VAT	6.9	6.4	6.3	6.8	6.9	6.9	7.1	7.2
6b	PTQ - PIT	4.4	4.2	4.3	3.7	3.6	3.5	3.7	3.8
6c	PTQ - CIT	4.3	4.6	4.7	4.2	3.5	3.4	3.4	3.3
6d	PTQ - SSC	15.4	15.6	15.7	15.5	14.8	15.2	15.5	15.6

*Notes: VAT - Value added tax, PIT - Personal income tax, CIT - Corporate income tax, ETR - Effective tax rates, PTQ - partial tax quota. Row 2 in the table: in the period 2005 - 2007 - progressive tax rate, in year 2005 in the range 0 - 109 200 the tax is 15 %, 109 201 - 218 400 the tax is 20 %, 218 401 - 301 200 the tax is 25 %, more than 301 200 the tax is 32 %. In the period 2006 - 2007 in the range 0 - 121 200 the tax is 12 %, 121 201 - 218 400 the tax is 19 %, 218 401 - 331 200 the tax is 25 %, more than 331 200 the tax is 32 %. Since 2008 - flat tax rate 15 %. Rows 5a and 5b in the table: the distribution of the total tax quota to the state budget and budgets of municipalities. Supplement consists of funds of social insurance, health insurance funds and payments to the EU budget.*

The tax quota of the Czech Republic (as the most widely used indicator of the tax burden) was fluctuating around the average of EU28 in the analysed period. Focusing on the partial tax quota (PTQ), the Czech Republic is above the average of the EU-28, regarding PTQ value added tax; it was the 18<sup>th</sup> highest within the EU-28 in year 2012. In the same year, PTQ was low in case of personal income tax (on the 25<sup>th</sup>) and high in case of corporate income tax (4<sup>th</sup>) and social security contributes (3<sup>rd</sup>). It should be mentioned, that the ratio of distribution of total tax revenues between the state and municipal budgets was in the ratio of 6: 1 in the analysed period.

## 2 DATA AND METHODOLOGY

### 2.1 Data

The main data sources used to analyse relationships between selected indicators of economic activity of regions in the Czech Republic (GDP, unemployment) and regional tax revenues obtained from taxes imposed on economic activity (VAT, income taxation) are the following: Czech Statistical Office (CZSO, 2015), Ministry of Labour and Social Affairs (MLSA, 2015), and Financial Administration of the Czech Republic (FACZ, 2015).

For the purposes of the correlation analysis, the following data are used: GDP in the regional breakdown, share of employed in the regional breakdown - indicator compares the number of job applicants (aged 15-64 years) to all residents (in this age group), value added tax (VAT) revenues and income tax revenues (PIT and CIT) in the regional breakdown, fulfilled in tax forms. All of the data represent period 2005 - 2012.

Regarding regional tax revenues, we can present the differences between particular regions in the graphical expression. For example Figure 1 shows the differences between regional tax revenues in year 2012.

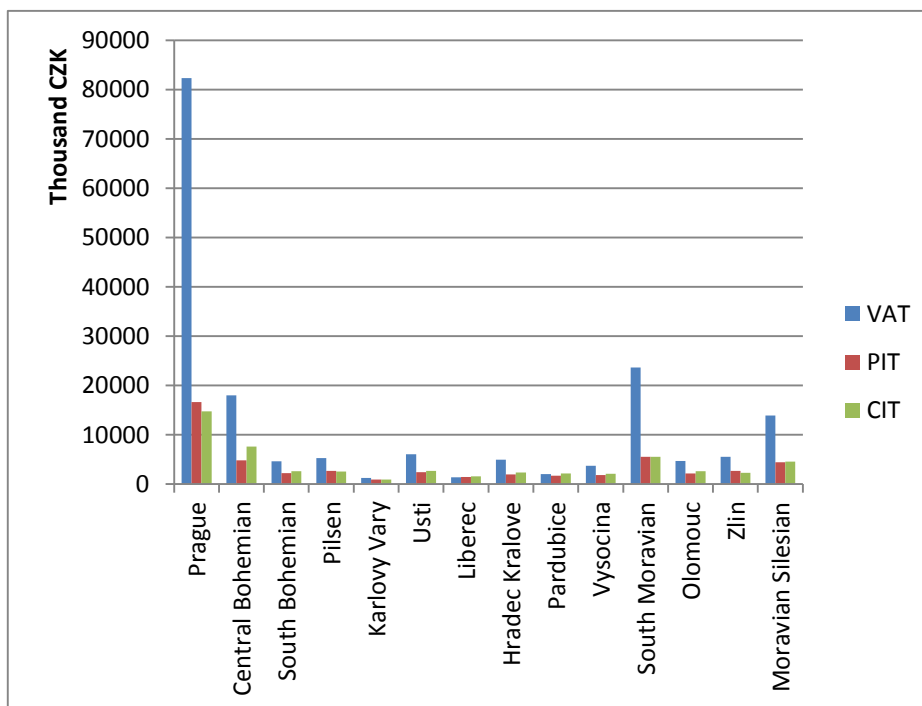


Fig. 1 Tax revenues in regional breakdowns in Y2012. Source: FACZ, 2015; authors.

You can see that VAT revenues represented the most important part of tax revenues in almost all of the regions in year 2012. However, Prague achieved the highest VAT revenue, mainly due to the allocation of seats of many large corporations. Regarding both CIT and PIT revenues, they had similar importance within particular regional tax revenues. The importance of the analysed tax revenues was almost the same in the whole analysed period.

The following Figure 2 and Figure 3 illustrate the development of unemployment and GDP in all regions in analysed period 2005 - 2012.

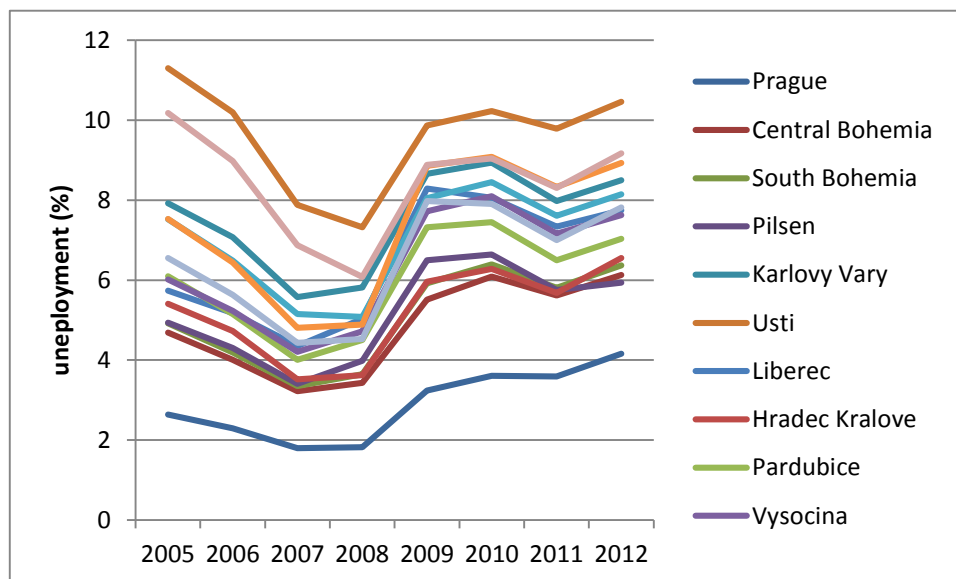


Fig. 2 The development of unemployment between 2005 and 2012. Source: MLSA, 2015; authors.

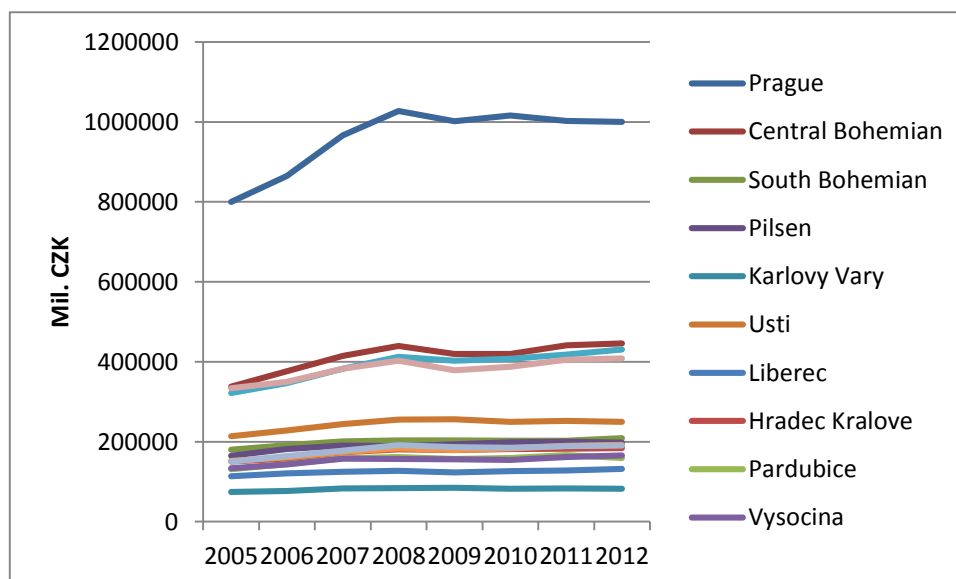


Fig. 3 The development of GDP between 2005 and 2012. Source: CZSO, 2015; authors.

You can see that all of the regions show similar trends in the analysed period. Moreover, there is also visible the impact of the economic crises in year 2008, since the unemployment

increased significantly in the following year 2009 in all regions of the Czech Republic and GDP decreased in the same year in almost all of the regions within the Czech Republic.

## **2.2 Methodology**

Generally, the following classical methods are used: input data and indicators examination, comparison of particular characteristics at regional level, deduction and synthesis for the purposes of conclusions formulation. The research presented in this article is also based on the study of current legislation of the Czech Republic.

For the purposes of achieving the main objective of the paper, the authors use the correlation analysis.

Thanks to the calculation of the correlation coefficients, the correlations between selected economic indicators and the tax revenues are studied. Correlation coefficients can take the value in the interval  $<-1; 1>$ , whereas the positive or negative values signal the dependence direction. The absolute value expresses the strength of the dependence. The dependence can be studied as linear (the Pearson's correlation coefficient) or nonparametric (the Spearman's correlation coefficient).

The Pearson's correlation coefficient is defined as

$$r = \frac{\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^n (x_i - \bar{x})^2 \sum_{i=1}^n (y_i - \bar{y})^2}}$$

and the Spearman's correlation coefficient as

$$\rho = \frac{6 \sum_{i=1}^n (p_i - q_i)^2}{n(n^2 - 1)}.$$

These correlation coefficients were successfully applied by the authors in their previous research connected with the impacts of particular economic instruments of public economy in the Czech Republic (Zimmermannova, 2012; Zimmermannova and Mensik, 2013) or in research focused on the dependence among various variables - income structure, health and social insurance and personal income tax; GDP per capita, net disposable household income per capita, and the mean gross monthly wage in the Czech regions (Kvicalova et al., 2014). In the case of net disposable income, for instance, strong dependence on the quantities of mean gross monthly wage, employment incomes, health and social insurance, personal income tax and the GDP per capita can be seen. Social incomes, on the other hand, show low levels of correlation coefficient towards all of the other quantities (Kvicalova et al., 2014).

For the purposes of this paper, the correlation analysis is performed for the period 2005 – 2012 as a whole.

## **3 RESULTS**

Firstly, we should focus on the relationships between selected indicators of economic activity of regions within the Czech Republic (GDP, unemployment) and regional tax revenues obtained from taxes imposed on economic activity (VAT, income taxation), based on linear

dependence. The following Table 2 shows us the results of correlation analysis based on the Pearson's correlation coefficient. The amount of observations was 8 for each indicator and region.

Tab. 2 – The Pearson's correlation coefficients. Source: authors.

Regions	VAT and GDP	VAT and share of unemployed	CIT and GDP	PIT and GDP	CIT and share of unemployed	PIT and share of unemployed
Prague	0.650	0.716*	-0.333	-0.624	-0.889**	-0.627
Central Bohemian	0.893**	0.106	-0.411	-0.316	-0.938**	-0.622
South Bohemian	0.797*	0.341	-0.344	-0.545	-0.919**	-0.767*
Pilsen	0.761*	0.305	-0.677	-0.196	-0.905**	-0.929**
Karlovy Vary	0.271	0.040	-0.020	-0.458	-0.735*	-0.666
Usti	-0.857**	0.166	-0.260	-0.544	-0.512	-0.222
Liberec	-0.530	-0.454	-0.652	-0.452	-0.884**	-0.861**
Hradec Kralove	0.964**	0.192	-0.754*	-0.558	-0.749*	-0.692
Pardubice	-0.642	-0.516	-0.223	-0.339	-0.841**	-0.797*
Vysocina	0.617	0.545	-0.073	-0.221	-0.951**	-0.807*
South Moravian	0.943**	-0.071	-0.504	-0.458	-0.856**	-0.611
Olomouc	0.752*	0.176	-0.433	-0.449	-0.910**	-0.700
Zlin	0.843*	0.275	-0.347	-0.575	-0.839**	-0.726*
Moravian Silesian	0.817*	-0.681	-0.401	-0.474	-0.508	-0.173

*\*Correlation is significant at the 0.05 level. \*\*Correlation is significant at the 0.01 level.*

Regarding the relationship between value added tax (VAT) revenues and GDP, we can see positive statistically significant relationship in the most of the regions. The values of Pearson's correlation coefficient are higher than 0.8 in five of fourteen cases and higher than 0.7 in eight of fourteen cases. However, there is also negative statistical significant relationship in the Usti region – the development of GDP was similar as in the other regions (see Fig. 3), but values of VAT revenues were decreasing from year 2006. Also income taxes revenues showed decreasing trend. It could be caused by movement of the seats of regional companies to other regions for the purposes of lower frequency of financial controls.

Analysing the relationship between VAT revenues and unemployment, we can say that the Pearson's correlation coefficient is significant only in case of the Prague region, other values of correlation coefficient are weak; moreover it is not clear, whether their mutual relationship is positive or negative. It follows that the development of the examined variables are mutually independent and different in particular regions.

Focusing on income tax revenues and GDP, there is low level of correlation coefficients, both in cases of PIT and CIT. However, we can see the direction of their mutual relationship, which is negative.

Regarding the relationship between income taxation revenues and unemployment, we can see strong negative statistically significant relationship between corporate income tax (CIT) revenues and share of unemployed in almost all of the regions. The values of the Pearson's correlation coefficient are higher than 0.8 in ten of fourteen cases (for regions Prague, Central Bohemian, South Bohemian, Pilsen, Liberec, Pardubice, Vysocina, South Moravian, Olomouc and Zlin). The values for Karlovy Vary and Hradec Kralove are higher than 0.7.

Lower negative statistically significant relationship can be visible also among personal income tax (PIT) revenues and share of unemployed. The values of the Pearson's correlation coefficient are higher than 0.7 in six of fourteen cases.

Analysing the nonparametric relationship of particular variables, the following Table 3 shows us the results of correlation analysis based on the Spearman's correlation coefficient. The amount of observations was 8 for each indicator and region.

Tab. 3 – The Spearman's correlation coefficients. Source: authors.

Regions	VAT and GDP	VAT and share of unemployed	CIT and GDP	PIT and GDP	CIT and share of unemployed	PIT and share of unemployed
Prague	0.643	0.714*	-0.095	-0.738	-0.952**	-0.619
Central Bohemian	0.786*	0.173	-0.690	-0.429	-0.952**	-0.524
South Bohemian	0.667	0.241	-0.595	-0.548	-0.857**	-0.857**
Pilsen	0.476	0.381	-0.762*	-0.595	-0.786*	-1**
Karlovy Vary	0.643	0.119	0.333	-0.333	-0.714*	-0.905**
Usti	-0.595	-0.143	-0.214	-0.595	-0.524	-0.214
Liberec	-0.548	-0.190	-0.714	-0.405	-0.738*	-0.905**
Hradec Kralove	0.881**	0.286	-0.857**	-0.619	-0.810*	-0.786*
Pardubice	-0.714*	-0.595	-0.381	-0.452	-0.714*	-0.905**
Vysocina	0.262	0.405	-0.143	-0.167	-0.929**	-0.905**
South Moravian	0.881**	0.024	-0.619	-0.452	-0.857**	-0.548
Olomouc	0.595	0.262	-0.571	-0.452	-0.952**	-0.690
Zlin	0.714*	0.500	-0.190	-0.452	-0.833*	-0.786*
Moravian Silesian	0.619	-0.667	-0.452	-0.333	-0.333	-0.024

\*Correlation is significant at the 0.05 level. \*\*Correlation is significant at the 0.01 level.

Focusing on the Spearman's correlation coefficient and the relationship between VAT revenues and GDP, the values of correlation coefficient are lower than in case of the Pearson's correlation coefficient, moreover there are statistically significant only in five cases. Also as in case of Pearson's correlation coefficient, we can see here negative correlation in three regions; however, the value of correlation coefficient is statistically significant only in one of them - the Pardubice region. There has been significant slump of VAT revenues during the analysed period. As is mentioned above, it can be caused by movement of the seats of regional companies to other regions for the purposes of lower frequency of financial controls.

Analysing the relationship between VAT revenues and unemployment, we can say that the results are almost similar as in case of the Pearson's correlation coefficient - the Spearman's correlation coefficient is significant only in case of Prague region, other values of the

correlation coefficient are weak; similarly it is not clear, whether their mutual relationship is positive or negative.

Dealing with income tax revenues (both PIT and CIT) and GDP, we can see that the correlation is significant only in two cases – Pilsen and Hradec Kralove regions.

Regarding corporate income tax (CIT) revenues and share of unemployed, it is obvious, that there is strong negative statistically significant relationship between them in almost all of the regions; it is similar as in case of the Pearson's correlation coefficient. The values of the Spearman's correlation coefficient are higher than 0.8 in eight of fourteen cases and higher than 0.7 in twelve of fourteen cases.

We can also see strong negative statistically significant relationship between personal income tax (PIT) revenue and share of unemployed values, in more cases than in previously used the Pearson's correlation coefficient. The values of the Spearman's correlation coefficient are higher than 0.7 in eight of fourteen cases.

## **4 DISCUSSION**

The main goal of the paper is to analyse possible relationships between regional tax revenues and their economic activity. Generally, the relationships between regional tax revenues and economic growth are the subject of research provided mainly by the neoclassical economists dealing with the growth models (in more details for example in Barro and Sala-i-Martin (2004) or Widmalm (2001)). This research is focused on an application of economic growth issue to the regional level and also includes the other aspects, for example unemployment. The originality of this paper is also determined by analysis of not only the tax rates, but tax revenues at the regional level.

The authors are aware of the barriers of the presented research, particularly the “regional” tax revenues and the indicators of the “regional” performance using the GDP. It can be for example the situation, where the corporations have their seats in another region than in which they operate, respectively run their activities. The typical example can be Prague region, since many of companies have their seats in Prague due to many economic subjects in this region and consequent low frequency of financial controls.

**H1: There is a statistically significant relationship between regional VAT revenue and the value of regional GDP.**

We can partially confirm this hypothesis H1. Focusing on the results in the previous chapter, we can see statistically significant positive correlation in eight regions (Central Bohemian, South Bohemian, Pilsen, Hradec Kralove, South Moravian, Olomouc, Zlin and Moravian Silesian). However, not all regions show similar results, for example the Usti and the Pardubice regions show unusually negative statistically significant correlation coefficients. This can be caused for example due to fluctuations and irregular development of tax revenues during the analysed period (especially significant reduction in tax revenues).

We can say that VAT revenues represent the added value within the regional economic activities in most of the regions of the Czech Republic.

**H2: There is a statistically significant relationship between regional income tax (PIT and CIT) revenue and the value of regional GDP.**

We can reject this hypothesis H2. We anticipated that the relationships between income tax revenues and the value of regional GDP would be similar as in case of VAT and GDP; that means that regional tax revenues represent the regional economic activity. Nevertheless,



regional income tax (PIT and CIT) revenues are not correlated significantly with the value of regional GDP. Within our analysis, there were noted low and insignificant values of correlation coefficients. It can be caused by regular tax optimization carried out by companies and self-employed.

We can say that income tax revenues do not represent the value of regional economic activities in the regions of the Czech Republic.

**H3: There is a statistically significant relationship between regional VAT revenue and the regional unemployment.**

We can reject this hypothesis H3. There is no clear relationship between regional VAT revenues and regional unemployment. The results of the correlation analysis are ambiguous and the correlations are weak.

We can say that regional VAT revenues have no relationship with the value of regional unemployment.

**H4: There is a statistically significant relationship between regional income tax (PIT and CIT) revenue and the regional unemployment.**

We can partially confirm this hypothesis H4. Regarding relationships between regional CIT revenues and the regional unemployment, there can be observed statistically significant negative correlation in twelve regions, both in cases of linear and nonparametric relationship (except of only two regions - Usti and Moravian Silesian). We can say that the value of regional unemployment is in opposite relation to the production and profits of companies within particular regions. Regarding correlations between regional PIT and regional unemployment, there is visible only negative nonparametric relationship. Statistically significant negative correlations can be observed in 8 regions.

We can say that it is obvious, that higher regional income tax revenues are connected with lower regional unemployment, in other words we can anticipate that their values go to the diverse direction. Therefore the low share of unemployed persons in regions together with higher number of companies would create additional PIT and CIT revenues.

As is mentioned above, there are weaknesses of the presented research, based mainly on the differences between official seats of particular companies and the place, where the company really operate. However, the results show that in spite of this situation, there can be significant relationship between some of the analysed indicators. Comparing the results with for example Mendoza et al. (1997), we can say that our results are “the other side of the same coin” – the relationship between indirect taxation and economic growth is negative; however higher regional VAT revenues represent higher economic activity of particular regions, expressed officially by regional GDP indicator.

Further research in this area can be focused on an analysis of regional aspects of public finance by applying of complex methods, for example regression analysis, cluster analysis or I-O analysis.

## **5 CONCLUSION**

The paper presents the first analysis of the relationships between selected indicators of economic activity of regions in the Czech Republic (GDP, unemployment) and regional tax revenues obtained from taxes imposed on economic activity (VAT, income taxation).

Based on the results, we can say that there is statistically significant positive relationship between regional VAT revenues and regional GDP, and statistically significant negative

relationship between regional income taxes (PIT and CIT) revenues and regional unemployment. Therefore we can use regional VAT revenues and its development as the additional indicator of economic activity of particular regions.

In spite of the weaknesses of this analysis, the results show us that the analysed regional tax revenues can serve as an additional source of information about regional economic activity for the purposes of decision making of policy makers on governmental or regional level.

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## **MANAGEMENT CONTROL OF INNOVATIVE ACTIVITIES: RESEARCH RESULTS FROM CZECH MANUFACTURING INDUSTRY**

*Ondřej Žižlavský*

### **Abstract**

The paper investigates how owners and/or managers are currently performing innovation activities and simultaneously managing performance and measures they are currently using to facilitate these dimensions. To achieve the goal the author evaluates and interprets the results of survey conducted in 2014 within research project 13-20123P sponsored by Czech Science Foundation. To gain data the quantitative methodology was applied in the form of on-line questionnaire survey. This data and the information collected through their further process were completed with primary qualitative data from personal interviews and secondary data from previous studies. The main conclusion of the paper rests in empirical findings that the continece still prevails in Czech business practice. Managers use modern management control tools, but usually in combination with tradition methods. Results of this study are limited to analysis of a single case study, representing starting point for further research in other industries and countries. Moreover, the results of this study are exploratory and are not to be interpreted as the only possible answer to the research questions.

*Keywords: Innovation, management control, performance measurement, metrics, Czech manufacturing industry*

JEL Classification: M21, O32, P47

## **1 INTRODUCTION**

The old adage says: “You cannot manage what you do not measure.” This is especially true for innovations where it is necessary to bring focus, intelligibility and discipline, particularly to the initial, inventive phase of the innovative process. Innovation is a continuous process. Companies are continually creating changes in their products and processes and gathering new knowledge. Measuring such a dynamic process is much more complex than in a static activity.

According to the abundance of books and publications that have been written over the past few years on the topic of measuring enterprise performance (see Neely, 2005 for an overview of the state of the art of performance measurement and further research perspectives), it might seem that we know everything we need. Despite this, many companies do not have this issue supported and it is often taken for granted and considered resolved within the scope of the existing information systems.

Management control systems are essential and crucial to the success of innovations. It is not enough just to pick a few areas, use random indicators and expect to obtain the information needed for managing innovations. It ends up mostly in a situation where the competent managers are overwhelmed with analysis results that they do not use in their work or that they use in a completely inefficient manner. This approach is time-consuming and draining on productivity. It can also lead to inconsistent analyses and incorrect measures (Davila et al., 2013; Skarzynski & Gibson, 2008).

How do Czech companies actually manage and control innovation performance? This was the aim of the own research. The objective of this paper is to present the contemporary situation of innovation management control as it is implemented in current Czech business environment. The research framework is based on primary research carried out in Czech innovative manufacturing companies under the auspices of the Faculty of Business and Management Brno University of Technology with financial support from Czech Science Foundation research project No. 13-20123P.

After a short introduction, the crucial terms, such as innovation, innovative capability and innovative performance, are defined. Then the methods, hypothesis and process of research survey are presented along with the results in the field of management control of implemented innovations, followed by a discussion on the contemporary situation.

## **2 LITERATURE REVIEW**

The most commonly used substantive typology of innovation terms is the classification under the Oslo Manual prepared by experts in the field of measurement and evaluation of innovation activities from OECD member states. The Oslo Manual defines innovation as the implementation of a new or significantly improved product (goods or services), or a process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations (OECD, 2005). Although, there exist more publication about innovation classification, the Oslo Manual is the foremost international source of guidelines for the collection and use of data on innovation activities in industry (Gault, 2013). Therefore, definition of innovation proceeds from the Oslo Manual in this paper.

Besides, the Oslo Manual defines four types of innovation that encompass a wide range of changes in companies' activities:

- Product innovations involve significant changes in the capabilities of goods or services. Both entirely new goods and services and significant improvements to existing products are included.
- Process innovations represent significant changes in production and delivery methods.
- Organizational innovations refer to the implementation of new organizational methods. These can be changes in business practices, in workplace organization or in the firm's external relations.
- Marketing innovations involve the implementation of new marketing methods. These can include changes in product design and packaging, in product promotion and placement, and in methods for pricing goods and services (OECD, 2005).

Nowadays, successful companies reach or maintain their success by continuous changes in the industry where they compete with the help of systemic innovation. Their competitive success comes from "running differently", by reinventing themselves through innovation capability (Fiorentino, 2010). Innovative capability is currently considered the key condition of companies' competitiveness (Andergassen et al., 2009) and performance. This relates particularly to small and medium-sized enterprises (SMEs), which, thanks to their less structured organizational and administrative systems, are able to react more quickly to customers' requirements and trends in development (Audretsch, 2003; Zeng et al., 2010). An increasing number of studies underlines the existing correlation between the innovative capability and innovation market success (Baden Fuller & Pitt, 1995; Barker & Duhaime, 1997; Christensen & Raynor, 2003; Drucker, 1999; Epstein et al., 2004; Markides, 1997; Tushman & Anderson, 2004).

Hence, innovation performance can be understood as the ability to transform innovation inputs into outputs, and thus the ability to transform innovation capability and effort into market implementation. The result of innovative performance is innovation market success.

The innovative performance overarches the measurement of all stages from R&D to patenting and new product introduction. In other words, this definition of innovative performance in the broad sense focuses on both the technical aspects of innovation and the introduction of new products onto the market, but it excludes the possible economic success of innovations (Ernst, 2001; Stuart, 2000).

If we want to assess the success of innovations, we need to choose a type of criteria to be used for the assessment. Hauschildt recommends the following three types of criteria to measure innovation success, i.e. technical, economic and others (Hauschildt, 2004). This paper is intended to assess the economic performance of the innovation process (for better understanding of innovation process see Zizlavsky, 2013a). Options for expressing innovation process effectiveness by economic indicators have also been investigated by the prominent Czech expert Valenta. In his last publication, he concludes that better economic performance of a company is not only the result of innovative measures in the manufacturing area, but also of non-manufacturing innovations expressed in managing and servicing activities, and is also intensively influenced by the external environment (Valenta, 2001).

In innovations, we want to find out what economic benefits have been generated by new products, or what savings have been made by the implemented process innovations, and what is the ratio between those benefits and their costs. In each stage of the innovation process, questions should be raised about whether it makes sense to continue working on the project, whether the parameters set will be achieved, and even whether the innovation stands a chance of asserting itself on the market (Tidd et al., 2009). There are several ways to approach innovation process performance assessment, from identifying barriers that might threaten the process, pre-setting criteria for individual stages of the innovation process to economic evaluation. Determining innovation performance has a lot in common with determining the success of investments (Erner & Volker, 2010). Just as in investments, it involves significant expenditure that may bring concrete results only after a certain period of time (Patterson, 2009). At the same time, the assessment of innovation process performance has a number of very specific features. There are other authors (e.g. Gailly, 2011; Huang et al., 2004), who also propose assessing investment performance using indicators analogous to those applied to the assessment of the effectiveness of investment (NPV, EVA, profitability, payback period, etc.). We can also use a project management approach: we estimate future cash flows, create a cash-flow, calculate the rate of return on capital invested, compute financial indicators, and compare the values calculated with pre-determined criteria. The use of the above indicators, however, is hampered by problems with determining the costs incurred, and especially with the quantification of future earnings on investment (Kislingerova, 2008).

### **3 METHODOLOGY**

With regard to the identified objective of research project – learn and study the current state of issues of the management of innovative activities and their performance measurement as these areas are currently being solved in Czech, as well as foreign expert literature and practice in Czech innovative manufacturing companies – the following research hypotheses were defined:

**Hypothesis 1:** Large companies tend to evaluate their innovative activities more than SMEs.

**Hypothesis 2:** Large companies implement “innovative” techniques of innovation management control.

When deciding which method to adopt for a study, there are many factors that should be considered. First, all methods have their strengths and weaknesses, so it is important to evaluate each method’s appropriateness regarding the research project. Second, because a research project is usually made up of different types of data, namely primary and secondary data, a number of methods might be used in order to be able to address the research problem. As a consequence of the difference between these types of data, a collection of various methods has to be adopted. Based on the purpose of our study we decided to start with a survey.

This section provides an overview of the data used for this paper and the main characteristics of the research sample. After extensively examining previous relevant, related literature and research in innovation, management control, performance measurement, and related topics (Žižlavský, 2013a; Žižlavský, 2013b; Žižlavský & Sággy Estélyi, 2013; Žižlavský & Senichev, 2013; Žižlavský, 2014a; Žižlavský, 2014b; Žižlavský & Karas, 2014), the field research was started in 2014. Three types of data were collected for this study: questionnaire and interviews, company data and public information. We consider data from a survey conducted every two years by the Czech Statistical Office.

As concerns the methodological approach, following recent examples (Baird et al., 2004; Careno & Turolla, 2010; CZSO, 2012; CZSO, 2014; OECD, 2009; Sulaiman & Mitchell, 2005; ZEW, 2013; Žižlavský, 2013b), a questionnaire-based survey was implemented to gather information and determine the real state of solved issues of management control of innovation activities. The survey method is often used to collect systematic data since it is time and cost-efficient and allows carrying out a statistical analysis (Groves et al., 2009). In addition, the replication of questions is possible and thus consents a comparison of results and pattern analysis.

The first step was to define the research sample. Before the research commenced, the circle of respondents was duly considered. Research could have been limited based on a company's size, the field, and distribution of companies in the Czech Republic. After careful consideration, it was decided to carry out the research via a random selection of various-sized innovative companies from manufacturing industry in the Czech Republic.

As far as the first feature is concerned, this choice is related to the fact that managerial tools primary originated, and were subsequently developed, in manufacturing companies. The second feature was the fact that manufacturing industry is considered as the most significant industry for development of the Czech economics. According to Czech Statistical Office and its survey in 2014, 51% from 5,449 innovative companies belong to manufacturing industry. Moreover, these companies participated in total revenues by 45,4% in 2012 in mentioned part of Czech economics (CZSO, 2014, p.15).

The key was to approach as many respondents as possible and so to acquire a sufficiently large data scale factor for evaluation of primary research. The inquiry itself provided quantitative, as well as semi-qualitative data on the current state of the issue in question. Simplicity and the relative brevity of the questionnaire, affecting a respondent's willingness to fill it out, was an important factor when creating the questionnaire. There were the following types of questions:

- With selectable answers and the option to select just one.
- With selectable answers and the option to select several answers.



- With pre-defined answers with an evaluation scale.
- Some questions had the option to fill in answers freely.

The questionnaire is structured in two parts. The first part consists general information about company, whereas the second part focuses on innovation measurement and management and used management control tools and methods.

The questionnaire, part of the research project titled “Innovation Process Performance Assessment: a Management Control System Approach in the Czech Small and Medium-sized Enterprises” and sponsored by the Czech Science Foundation (GACR), was web-based.

Once drawn up, the questionnaire should be tested on a sample population. Therefore, the questionnaire was pre-tested by a number of academics and then send to several practitioners for further review. Minor adjustments in wording and layout were made in order to further understanding of the questionnaire. None of these respondents considered the questionnaire difficult to complete.

#### **4 RESEARCH RESULTS**

The survey was composed of 15 questions and was conducted by sending a fully standardized questionnaire by e-mail to the company (a link to the electronic questionnaire was included in the e-mail). The e-mail implied a brief introduction clarifying the purpose and objectives of the research project and invitation to contact us if they wish to participate in an in-depth interview to be conducted later. It was send exclusively to CEOs, top managers, executive officers, or in small companies, directly to owners. The survey was anonymous, took approximately 10 to 15 minutes to complete, and was conducted from April to November 2014.

Addressed companies were those that, by their principal activities, belong to manufacturing industry (according to CZ-NACE rev. 2, division C, section 10-33). Data on the total number of companies in the target population of the survey are taken from the Czech Statistical Office. We estimate that the target population consists over 11,000 manufacturing companies (CZSO, 2014). Selective sample of these companies was obtain from the database Technological Profile of the Czech Republic ([www.techprofil.cz](http://www.techprofil.cz)). A random sample of 2,467 innovative companies was drawn from basic sample.

Tab. 1 – Overall statistics and distribution of companies engaged in research survey. Source: Own research

Basic sample		Manufacturing enterprises in the Czech Republic				
Selective sample		Innovative manufacturing enterprises in the Czech Republic				
Category (Number of employees)		Micro (1-9)	Small (10-49)	Medium (50-249)	Large (>250)	Total
Response	Number	26	101	158	69	354
	%	8.93%	14.41%	20.18%	9.97%	
Non-response	Number	265	600	625	623	2,113
	%	91.07%	85.59%	79.82%	90.03%	
Total	Number	291	701	783	692	2,467

	%	100.00%	100.00%	100.00%	100.00%	
<b>Response rate</b>	%	<b>8.93%</b>	<b>14.41%</b>	<b>20.18%</b>	<b>9.97%</b>	<b>14.35%</b>

After the first posting at the beginning of April 2014, non-responding companies received a reminder at the end of May or beginning of June, a follow-up was a few months later. At the end of November 2014, 354 completely filled questionnaires were collected. The real response rate more than 14% can be considered as good because response rates of mail-back questionnaires are usually less than 10%. The detailed statistics of the questionnaire inquiries are shown in Table 1.

Moreover, using Pearson chi-square test, we found no statistically significant difference between the two groups: the size of respondents and non-respondents. Null fragmental hypothesis FH0 is going to be tested that random values are not depended in comparison with alternative fragmental hypothesis FH1.

*FH0: Size of the company and response are not related to each other.*

*FH1: Size of the company and response are related to each other.*

Calculated test criterion for micro companies:

$$\text{Chi-Sq} = 3.662; \text{DF} = 1; \text{P-Value} = 0.056$$

(63 complete questionnaires and 562 potential respondents)

Calculated test criterion for small companies:

$$\text{Chi-Sq} = 0.004; \text{DF} = 1; \text{P-Value} = 0.949$$

(94 complete questionnaires and 674 potential respondents)

Calculated test criterion for medium companies:

$$\text{Chi-Sq} = 0.122; \text{DF} = 1; \text{P-Value} = 0.727$$

(123 complete questionnaires and 853 potential respondents)

Calculated test criterion for large companies:

$$\text{Chi-Sq} = 2.927; \text{DF} = 1; \text{P-Value} = 0.087$$

(74 complete questionnaires and 434 potential respondents)

For selected significance level  $\alpha = 0.05$  is determined a quantile chi-sq (1) = 3.841. Because the value of test criterion was not realized in critical field ( $3.662 < 3.841$  and  $\text{P-Value} = 0,056$  for micro companies;  $0.004 < 3.841$  and  $\text{P-Value} = 0.949$  for small companies;  $0.122 < 3.841$  and  $\text{P-Value} = 0.727$  for medium companies;  $2.927 < 3.841$  and  $\text{P-Value} = 0.087$ ), fragmental null hypothesis FH1 is refused on five percentage level signification and alternative fragmental hypothesis FH0 is accepted.

#### **4.1 General characteristics**

Questions from the first part of the questionnaire were related to the basic characteristic data of the company, such as the company's size, origin, market, etc. Company size is traditional contingency factor in economic research. Specifically, this paper studies the impact of one factor linked to company size: number of employees (although, the revenue data were collected with help of questionnaire as well. However, due to limit of the paper, only number of employees in concerned). In fact, this factor is usually the basis of company classification. Distribution of companies by size is based on EU law and the Recommendation of the

European Commission 2003/361/EC of 6 May 2003 (EC, 2003, p.36). This standard divides four groups: micro, small, medium and large company. Figure 1 show the percentages obtained from using the number of employees indicator.

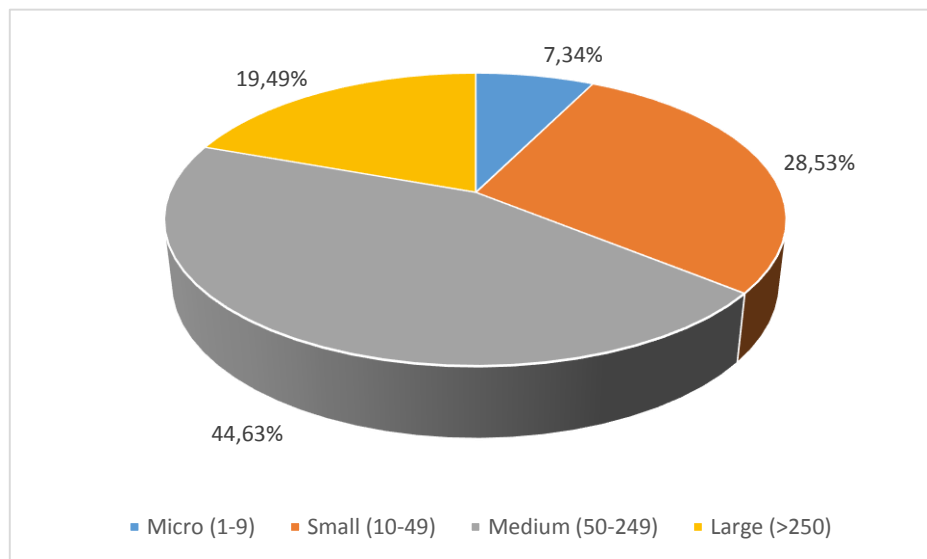


Fig. 1 – Distribution of companies engaged in research survey (n=354, number of employees).  
Source: Own research

The first empirical evidence of the survey emerged by way of descriptive statistics. We noted through the analysis of questionnaires that innovations are mostly performed by SMEs (80.51% in total), resp. by medium enterprises (44.63% of respondents) followed by small enterprises (28.53% of respondents) with large (19.49% of respondents) and micro companies (7.34% of respondents) at the tail.

The factor that may be behind this result is the economic crisis of that period. It can be assumed that companies were aware of the threat of losing their competitiveness that could potentially lead to their end. While large enterprises focused on operational efficiency and cost saving, SMEs could react to changes in the environment through innovation. The bigger the company the more organizationally demanding are any innovative changes, which is why mainly smaller businesses with flexible organizational structure innovate in these times. Large companies naturally strive to support innovation as well but due to more complicated organization these activities may manifest themselves later. The importance of small and medium enterprises for the development of Czech economics is therefore increasing. This is highlighted also by the Concept for Support of Small and Medium Entrepreneurs for the period of 2014–2020 carried out by the Ministry of Industry and Trade of the Czech Republic (for more information see MIT, 2012).

However, these results contrast with study of the Czech Statistical Office (CZSO, 2014) that consider large companies as innovation leaders in the Czech Republic. Previous studies conducted within 2009-2011 under the sponsorship of the Internal Grant Agency of the Faculty of Business and Management Brno University of Technology (Žižlavský, 2013b) has reached the similar contradictory conclusions.

Majority of respondents (76.55%) is carrying out innovation irregularly and randomly, i.e. as a consequence of intuitive and immediate decisions, or reverse the negative development. Only 23.45% of respondents execute innovation regularly, i.e. as a standard part of their businesses and systematically managed (see Table 2).

Tab. 2 – Period of innovation (n=354). Source: Own research

Category (Number of employees)		Micro (1-9)	Small (10-49)	Medium (50-249)	Large (>250)	Total
Regularly	Number	2	17	29	35	83
	%	7.69%	16.83%	18.35%	50.72%	<b>23.45%</b>
Irregularly	Number	24	84	129	34	271
	%	92.31%	83.17%	81.65%	49.28%	<b>76.55%</b>
Total	Number	26	101	158	69	354
	%	100.00%	100.00%	100.00%	100.00%	100.00%

Respondents answered the question about what innovations had been implemented by the company during the last three years and what importance they carry for the company represented another part of the research. They could select from four predefined answers (see innovation classification according to Oslo Manual). The questionnaire includes a list of examples for each type of innovation. Some of the key research findings are summarized in Table 3.

Tab. 3 – Implemented innovations (n=354). Source: Own research

Category (Number of employees)		Micro (1-9)	Small (10-49)	Medium (50-249)	Large (>250)	Total
Product innovation	Number	11	48	54	23	136
	%	42.31%	47.52%	34.18%	33.33%	<b>38.42%</b>
Process innovation	Number	8	26	50	20	104
	%	30.77%	25.74%	31.65%	28.99%	<b>29.38%</b>
Organization innovation	Number	1	8	21	10	40
	%	3.85%	7.92%	13.29%	14.49%	<b>11.30%</b>
Marketing innovation	Number	6	19	33	16	74
	%	23.08%	18.81%	20.89%	23.19%	<b>20.90%</b>
Total	Number	26	101	158	69	354
	%	100.00%	100.00%	100.00%	100.00%	100.00%

The most performed innovation type is product innovation (38.42% of respondents), followed by process (29.38% of respondents) and marketing innovation (20.90% of respondent). The organization innovation is at the tail with 11.30% of respondents. These balanced results highlight the fact that product innovations often require process innovations, e.g. in the form of acquiring new production technology, and in order for these product innovations to be successful on the market and bring the company higher value, it is often necessary to seek new distribution channels via marketing innovations.

The importance of innovation was evaluated by the scale: 1 – very important, 2 – important, 3 – neutral, 4 – not important, 5 – completely unimportant. In the summary of the percentage

ratio of positive answers, i.e. values 1 (very important) and 2 (important), the order of individual possibilities was determined. Therefore, results show that respondents see the importance of innovations for their company in the following order: innovation of products, processes, organization, and marketing.

Tab. 4 – Importance of particular innovation types for companies (n=354). Source: Own research

	Mean	Standard deviation	Median	Evaluation 1–5 (%)					Σ 1+2 (%)
				1	2	3	4	5	
Product innovation	2.5426	1.4769	2	120	193	94	80	53	313
Process innovation	2.4442	0.9926	2	128	187	106	67	41	315
Organizational innovation	2.6220	0.9256	3	100	188	174	53	59	288
Marketing innovation	2.5077	0.9024	2	107	181	127	66	37	288

Since respondents were able to select more answers for this question, a recalculation had to be carried out where relative frequency was determined as a percentage of the number of selected answers out of the total number of respondents in the group. Evaluation of the importance of individual types of innovation for companies is shown in Table 4.

Innovation expenditures includes all expenses for both in-house and externally purchased activities that aim at the development and introduction of innovations, regardless whether these innovations have been introduced yet. They comprises current (e.g. labor costs, externally purchased goods or services etc.) and capital expenditures (e.g. on machinery, instruments, intangible assets etc.).

Innovation expenditures are an important metric to determine the amount of resources that company provided for carrying out innovation activities. To overcome unwillingness of the respondents to transmit confidential information four categories were predefined; innovation expenditures based on actual needs, up to 5% of an annual budget, 5-10% of an annual budget and more than 10% of annual budget.

We noted that the most frequent innovation expenditures are up to five percent of an annual budget, especially in small and medium companies. SMEs invest into innovative activities according the actual needs. The largest contribution to this fact is made by micro companies (65.38% of respondents) identically followed by small (38.61% of respondents) and medium companies (36.08% of respondents). To contrast, inverse pattern is observed for the expenditures from five to ten percent, from 11.54% for micro companies to 34.78% for large companies. Large companies (23.19% of respondents) devote more than ten percent of their annual budget for innovations, while micro companies invest into innovation according actual needs (65.38% of respondents). In other words, the greater company the higher expenditures, regularly planed and annually spend on innovations.

Tab. 5 – Innovation expenditures (n=354). Source: Own research

Category (Number of employees)		Micro (1-9)	Small (10-49)	Medium (50-249)	Large (>250)	Total
Actual needs	Number	17	39	57	9	122
	%	65.38%	38.61%	36.08%	13.04%	<b>34.46%</b>
up to 5% of annual budget	Number	6	37	75	20	138
	%	23.08%	36.63%	47.47%	28.99%	<b>38.98%</b>
5-10% of annual budget	Number	3	21	23	24	71
	%	11.54%	20.79%	14.56%	34.78%	<b>20.06%</b>
More than 10% of annual budget	Number	0	4	3	16	23
	%	0.00%	3.96%	1.90%	23.19%	<b>6.50%</b>
Total	Number	26	101	158	69	354
	%	100.00%	100.00%	100.00%	100.00%	100.00%

#### 4.2 Management control of innovation

Well-managed innovations successfully commercialized in the market are a tool that companies can use to win competitive advantages that will allow them to prosper even under the conditions of the current recession. It is a modern trend to innovate, but innovations must be implemented prudently and in a targeted manner. Moreover, innovative activities are very costly and they tie a substantial part of a company's available resources for a significant period of time. Effort and resources expended must be recouped if the company is to stand a chance of surviving in the strongly competitive environment. The need of management control system is crucial in innovations.

Tab. 6 – Evaluation of innovation projects (n=354). Source: Own research

Category (Number of employees)		Micro (1-9)	Small (10-49)	Medium (50-249)	Large (>250)	Total
Yes	Number	5	23	49	24	101
	%	19.23%	22.77%	31.01%	34.78%	<b>28.53%</b>
Rather yes	Number	11	62	72	35	180
	%	42.31%	61.39%	45.57%	50.72%	<b>50.85%</b>
Rather no	Number	8	9	21	8	46
	%	30.77%	8.91%	13.29%	11.59%	<b>12.99%</b>
No	Number	2	7	16	2	27
	%	7.69%	6.93%	10.13%	2.90%	<b>7.63%</b>
Total	Number	26	101	158	69	354
	%	100.00%	100.00%	100.00%	100.00%	100.00%

Therefore, a key area of the survey was the question of evaluation and responsibility for innovative activities – where the key decisions are made and where it is decided whether the innovation is viable. When asked whether the enterprises had evaluated the implemented innovative projects, the vast majority (79.38% of respondents) answered affirmatively. On the other hand, what is disquieting is the fact that this area is neglected by 20.62% of the respondents even though innovations are implemented by them (see Table 6).

Based on these data, hypothesis 1 “Large companies tend to evaluate their innovative activities more than SMEs” is tested. Independence statistical testing of two qualitative characters is carried out for statistic dependency verification. For this purpose following question “Does your company evaluate innovation? is used. Null fragmental hypothesis FH0 is going to be tested that random values are not depended in comparison with alternative fragmental hypothesis FH1.

*FH0: Size of the company and evaluation of innovation are not related to each other.*

*FH1: Size of the company and evaluation of innovation are related to each other.*

Tab. 7 – Relation research of evaluation of realized innovation and size of the company (n=354). Source: Own research

Size of company/ Innovation evaluation	SMEs	Large	n <sub>i</sub>
No/rather no	63	10	73
Yes/rather yes	222	59	281
n <sub>j</sub>	285	69	354

Calculated test criterion for large companies:

$$\text{Chi-Sq} = 1.967; \text{DF} = 1; \text{P-Value} = 0.161$$

For selected significance level  $\alpha = 0.05$  is determined a quantile  $\text{chi-sq}(1) = 3.841$ . Because the value of test criterion was not realized in critical field ( $1.967 < 3.841$  and  $\text{P-Value} = 0.161$ ) fragmental null hypothesis FH1 is refused on five percentage level signification and alternative fragmental hypothesis FH0 is accepted. In other words, SMEs are aware of importance of innovation evaluation and they perform it as well as large companies. On the other hand, SMEs use different techniques of management control than large companies (see Table 8).

For enterprises who responded affirmatively to the above question, the method of evaluating the innovative activities has been examined. Here again respondents were able to select more answers for this question, a recalculation had to be carried out where relative frequency was determined as a percentage of the number of selected answers out of the total number of respondents in the group. The management control tools were divided into two groups; financial and non-financial.

Tab. 8 – Management control methods (n=354). Source: Own research

Category (Number of employees)	Micro (1-9)	Small (10-49)	Medium (50-249)	Large (>250)
Balanced Scorecard	0.00%	2.38%	10.95%	33.91%
Budget	67.45%	72.46%	84.27%	100.00%
Cost accounting (with cost drivers)	11.33%	19.31%	35.13%	42.67%
Cost accounting (without cost drivers)	20.38%	24.59%	22.54%	14.17%
EBITDA, EBIT	28.16%	30.45%	36.19%	34.85%
Economic value added EVA	0.00%	2.14%	17.50%	20.15%
Payback period	3.15%	17.23%	24.49%	36.84%
Profitability (ROI, ROE, ROA, ROS)	23.70%	20.13%	13.52%	7.92%
Revenues from innovation	59.19%	74.28%	83.45%	100.00%
Cannibalization of existing products by innovation	4.12%	5.26%	6.43%	16.24%
Customer satisfaction indicators	23.45%	17.33%	22.50%	26.67%
Growth of market share	8.69%	13.17%	18.36%	36.13%
Innovativeness	2.70%	2.56%	7.12%	13.41%
Number of new customers	34.33%	32.73%	47.20%	52.48%
Patents	7.81%	10.47%	28.49%	36.96%
Productivity and quality indicators (lead time, etc.)	3.43%	6.81%	15.70%	32.76%

## 5 DISCUSSION

Focusing on companies adopting measurement and management control systems, the following analysis investigates the diffusion of management control techniques. Table 7 shows that budget, revenues from innovation and EBITDA are the most frequently applied managerial tools in Czech innovative manufacturing companies. Based on these results we can claim that the prevailing approach is the monitoring of financial indicator. On the other hand, EVA, Balanced Scorecard and innovativeness are implemented the least. In other words, the companies analyzed and adopt traditional management control tools, whereas, “innovative” techniques are implemented in small number of companies (It is very difficult to confirm or invalidate Hypothesis 2 based on these insufficient results). Here, the gap between global and Czech companies has been discovered (cf. Chiesa & Frattini, 2009).

A first reason that could explain the gap between Czech and foreign companies could stem from lack of knowledge. Especially small Czech companies are not usually familiar with these managerial instruments. A second reason is the fact that in management of the vast majority of these companies is the owner, who prefers his own experience instead of the management control tools. A third reason could lie in the characteristics of the management control tools. They are primarily design to solve homeland company issues (such as Balanced



Scorecard from USA, which represents robust management control system). Therefore, it is difficult to adopt them to different context without making adjustments. Besides, the high level of uncertainty avoidance does not allow Czech companies to try out new management control instruments.

In addition, Table 7 demonstrates that financial indicators are more frequently adopted than non-financial indicators. Financial assessment is an integral part of every project. Simply speaking, only those projects that pay off should be implemented. But how to assess objectively the rate of return of the invested efforts and time? Assessing the results of an innovation project only in terms of its economic benefits may not be the most advantageous way, since it may also result in rejection of projects in which the qualitative benefits significantly exceed the potential costs associated with project implementation.

Many large global companies, as well as most of the surveyed Czech companies, measure the results using financial indicators, although the majority of managers in these companies feel that also non-financial indicators should be used to monitor the undertaken innovative efforts and projects. The managers should rely more on non-financial indicators than on the financial ones, because these indicators provide a better assessment of progress in real time and of the probability of success.

Integration of non-financial metrics into systems for measuring performance allows managers to better understand relations between various strategic innovation targets, communicate the linking of these targets with workers' activity and, upon the defined targets to formulate priorities and allocate resources (Kaplan & Norton, 2000). The main contribution of non-financial indicators is the identification of key factors influencing the development of financial indicators. These indicators are also more sensitive to changes, which can be considered a crucial characteristic in the current turbulent environment. There is also space for the measurement of other important factors that support the innovation, such as creative climate, commitment to innovative activity, the number and quality of ideas, communication inside the company, etc. (Humphreys et al., 2005). Scientific research in measurement methods and indicator creation describing innovations and their effects on the social environment has only just started (Hipp & Grupp, 2005).

In fact, profitability metrics, cash flow etc., typically short-term indicators are the most significant measures adopted by companies to evaluate their innovation performance. These financial metrics are connected with short-term aims and based on historical accounting data. They are also known as delayed indicators, because they are used to measure past results. But innovations are more oriented into the future and are connected with long-term aims. The innovation has to be understood as the long-term creation of values and for companies the future financial performance has to be stronger moving power than short-term cycle. Hence, focusing only on financial metrics is not correct way. A well-designed management control system of innovation should therefore include an appropriate mix of financial and non-financial indicators, which should be subsequently, compared using benchmarking with competitors or with models of excellence.

However, empirical evidence highlights an increasing group of companies adopting non-financial measures. In particular, number of new customers and their satisfactory index are the most implemented when compared to the innovativeness and cannibalization of existing products by innovative ones, which was assessed by the respondents as an insignificant indicator. Thus, the most significant effect of innovations was shown on the satisfaction of customer needs, which should be subsequently reflected in the growth of sales or, more precisely, operating profit.

Finally, the empirical evidence demonstrates that low adoption rate of the Balanced Scorecard. Most Czech companies, especially medium and large, monitor performance of innovation activities by using specific financial and non-financial measures, but without any logical link between them. In other words, only a small number of companies, especially large ones and those having different perspectives, actually understand the importance of cause-effect relationship between metrics. In addition, after overcoming the barriers and reluctance of the managers to communicate more detailed information about their systems of innovation evaluation, these systems proved not to be very appropriate, while being biased in favor of financial indicators.

As concerns number of employees indicator, empirical data demonstrates that medium and large companies adopt instruments to a greater extent than smaller companies. In addition, Table 7 suggests a positive correlation between company size and the adoption of innovation management control tools. For instance, focusing on budget, we noted that the percentage of diffusion increases from 67.45% in micro companies to 100.00% in large companies. In other words, the greater company, the higher the adoption of a budget system. Similarly, we noted the same positive trend, even if with different percentages, for revenues and cost accounting with cost centers, number of new customers and their satisfactory index.

Simple cost accounting (a single-basis cost allocation without cost centers) and profitability indicators show a negative trend. This suggest the bigger and more complex company the greater need for more reliable and quicker information. Therefore, it requires analytical and advanced management control tools. In this context, simple cost accounting become less productive for managers, whereas cost accounting with cost centers meet the new need.

Focusing on advanced management control approach, Balanced Scorecard, we found a gap between micro and small companies and medium and large enterprises. In the first two groups (micro and small companies), Balanced Scorecard is implemented only in minority group. Less than 3% of respondents adopted this method. However, this percentage increases in medium and large companies. We noted the same positive link between company size and management control tools, both traditional and “innovative”. For instance, the percentage of adoption budget, revenues, number of new customers, Economic value added EVA, payback period, market share, patents etc. grow with the increasing number of employees.

## **6 CONCLUSION**

Well managed and successfully introduced innovations into the market represent a tool for the companies, by means of which they can achieve competitive advantages and enabling their prosperity. Therefore, the effectiveness must be assessed by management control tools and indicators in all stages of the innovation, from the birth of the idea to the final commercialization stage. From this point of view, management control systems represent a key element in all enterprises.

The aim of research was to study the current state of issues of the management of innovative activities and their performance measurement mainly in Czech innovative manufacturing companies.

Based on gained data we can state that Czech manufacturing companies consider innovation as an essential success factor for their business. Most companies performing innovation pay attention to evaluation of realized innovation (irrespective of size of the company), since they tie a substantial part of a company's available resources for a significant period of time.

This paper reveals the fact that management control methods, especially “innovative” methods such as Balanced Scorecard, are mainly implemented in medium and large

companies. In addition, the study shows a positive correlation between company size and management control systems. The larger the company is, the higher the adoption of managerial techniques.

## **7 ACKNOWLEDGEMENT**

The author would like to thank all participants in the research survey and Czech Science Foundation for its funding support within post-doc project No. 13-20123P “Innovation Process Performance Assessment: a Management Control System Approach in the Czech Small and Medium-sized Enterprises”.

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**Proceedings of the 7th International Scientific Conference**

**„FINANCE AND PERFORMANCE OF FIRMS IN SCIENCE,  
EDUCATION AND PRACTICE“**

Zlín, Czech Republic  
April 23 - 24, 2015

Published by: Tomas Bata University in Zlín, Faculty of Management  
and Economics

Address: nám. T. G. Masaryka 5555, 760 01 Zlín  
Czech Republic

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ISBN 978-80-7454-482-8

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