University of Economics in Bratislava
Faculty of National Economy
Department of Finance

Proceedings of the 16th International Scientific Conference

FINANCE AND RISK 2014

vol. 1

Bratislava, Slovak Republic
Publishing House EKONÓM

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FINANCE AND RISK 2014
vol. 1

24 – 25 November 2014
Bratislava, Slovak Republic
Publishing House EKONÓM

Suggested citation:
AUTHOR, A. Title of the Paper. In *Proceedings of the 16th International Scientific Conference FINANCE AND RISK 2014 vol. 1*. Bratislava: Publishing House EKONÓM, 2014, pp. xx-xx. ISBN 978-80-225-3991-3.

Printer: Publishing House EKONÓM
Cover design: Region Poprad, s.r.o.

Conference website: http://www.far.nhf.euba.sk

All papers passed double-blind review process.

ISBN 978-80-225-3991-3

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PAPERS

SIZE AND DIRECTION OF DELEVERAGING EFFECTS IN GERMANY

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ABSTRACT

Using unique data on firm-bank relationships in Germany between 2005 and 2007, we show that the debt ratio of banks is related to the bank loan risk. Drawing the assumption that banks will respond to tighter capital requirements by deleveraging instead of raising equity, this finding requires an industry specific analysis. Indeed, this relationship differs across industries and our findings imply that manufacturing, financial and insurance activities and real estate activities are potentially facing a more restricted access to bank loans after tightening of capital requirements. Calculated size effects of a non- risk weighted leverage ratio of 3% illustrate importance.

Keywords: Bank lending, Deleveraging, Financial regulation, Basel III

JEL Codes: G21, G28, C33

1 Introduction

Our discussion of bank deleveraging is motivated by the question of whether banks facing tighter capital requirements will respond by raising equity or deleveraging. Indeed, banks may find it necessary to reduce their loan exposure because new equity is not available. However, banks will not reduce loans uniformly across the economy. To address the potential impact of bank deleveraging on corporate loans, we use unique data on firm-bank relationships in Germany between 2005 and 2007. Debt ratio and short-term funding ratio are calculated from balance sheet data, whereas the loan risk is proxied by implicit lending rates at the company level. In addition, we utilize information on the bank relationships of analyzed firms, which allows us to merge individual firm level data with the corresponding bank indicators. Furthermore, our multilevel modeling approach utilizes the information given by the structure of the data set.

Fidrmuc et al. find that the debt ratio of banks is related to the bank loan risk [4]. In addition, they identify industry specific effects of deleveraging in Germany. In this contribution, we calculate the size effect of a non-risk weighted leverage ratio of 3%. A non-risk weighted leverage ratio of 3% causes a reduction of bank debt for the periods under consideration of non-negligible size – approximately close to 300 billion euros.

2 Bank Financing and Lending

We expect that the marginal costs of banks' debt increase in debt. The more risky a firm's

project, the higher the lending rate banks require. Hence, an increase in banks' debt facilitates the access to capital for relatively riskier projects as banks have to cover increasing lending costs [2]. Moreover, banks have more capital which can be used for lending to projects which otherwise would not be financed. Alternatively, we could argue that the marginal revenues of loans have to equal their marginal costs. This approach is in line with lending "down the quality curve" [1].

Alternatively, the deleveraging scenario is also supported by the pecking order theory [11, 6] as well as the buffer theory [9, 10]. Nonetheless, the possibility that banks may respond to tighter capital requirements not solely by deleveraging represents a natural limitation of our approach. However, if banks address higher capital ratios by raising equity which in turn increases their lending spread [7], the same industries could lose access to bank loans due to higher costs and due to the disappearance of banks' willingness to lend. Thus, a different approach would not necessarily cause different results.

3 Data

The Dafne databank, provided by the Bureau van Dijk, includes information on balance sheets, profit and loss accounts and the legal form for German firms. We use data prior to the financial crisis which is from 2005 to 2007 since these three years are characterized by a sound economic environment and no significant regulatory changes. In total, the amount of firms varies between 23, 000 and 31, 000. To obtain a measure for corporate lending costs, we define an implicit lending rate associated with interest payments on bank loans using the reported balance sheet data such that

$$ILR_{it} = \frac{I_{it}}{L_{it}}, \tag{1}$$

where I_{it} denotes the total interest payments of firm $i = 1, \dots, N$ in period t and L_{it} are total bank loans reported by firm i in period t. Since the implicit lending rate, ILR_{it}, may be subject to errors, due to e.g. new loans, loan repayment, and received interest payments, large outliers, defined by an implicit lending rate above 30%, are excluded. Finally, the sectorial classification (Nace, Rev. 2) is available for each firm.

For each firm we draw data of all respective bank relations from Bankscope. In total, relevant bank relations comprise up to 2,216 different bank units or branches which are identified according to the bank routing code. They account for 6,197 observations from 2005 to 2007. Thereby, banks' debt ratios and short-term funding ratios are of interest. The debt ratio of bank b in period t (DR_{bt}) is defined as 1 minus equity ratio (ER_{bt}),

$$DR_{bt} = 1 - ER_{bt} = 1 - \frac{E_{bt}}{T\,A_{bt}}, \tag{2}$$

where equity ratio equals equity (E_{bt}) divided by total assets ($T\,A_{bt}$). Similarly, to obtain the short-term funding ratio of bank b in period t (ST_{bt}) the balance sheet item "other deposits and short-term borrowings" ($ODSTB_{bt}$) is divided by total assets,

$$ST_{bt} = \frac{ODSTB_{bt}}{TA_{bt}}. \tag{3}$$

Thus, all bank variables are standardized by total assets.

3 Estimation and Results

We estimate the impact of banks' debt ratio and short-term funding ratio on implicit lending rates,[1]

$$ILR_{ibt} = ß_0 + ß_1 DR_{ibt} + ß_2 ST_{ibt} + ß_3 C_{ibt} + \Psi_i + \theta_t + u_{ibt} \,. \quad (4)$$

Variables are specific to firm i and bank b. DR_{ibt} represents banks' debt ratio and ST_{ibt} represents banks' short-term funding ratio. To account for the important role of collateral regarding loan decisions [3, 5], C_{ibt} represents a proxy for collateral. Ψ_i reflects firm size dummies including quartile 1 to 3, θ_t stands for time fixed effects, and u_{ibt} denotes the residual.

A specific feature of our data set is that observations are nested. Two dimensions are specified in order to apply a multilevel model [8]: sectors (Nace, Rev. 2), s, and regions (federal states), r. The residual, u_{ibt}, is decomposed into random effects and an error term,

$$u_{ibt} = u_{ibtsr} = \nwarrow_{sr} + \nwarrow_r + \varepsilon_{ibtsr} \quad (5)$$

Table 1 Bank Funding, Basic Specification, 2005 – 2007

	(I)	(II)	(III)
Random effects	region, sector (class)	region, sector (class)	region, sector (class)
Fixed effects	time	time	time
Collateral[a]	profit margin	cashflow/turnover	EBIT margin
Size Dummies[a]	yes	yes	yes
Debt Ratio[b]	2.762**	2.858**	2.919**
	(1.359)	(1.364)	(1.361)
ST Funding Ratio[b]	2.198*	2.576**	2.317*
	(1.232)	(1.237)	(1.231)
Collateral[a]	-0.008***	-0.039***	-0.017***
	(0.002)	(0.002)	(0.002)
Constant	7.099***	7.253***	7.036***
	(1.290)	(1.294)	(1.292)
No of sectors	450	451	449
No of regions	16	16	16
No of groups	3642	3642	3645
No of observations	62424	61939	62637
LRL	-193300	-191761	-194128

Notes: * (**) [***] denotes significance at the 10% (5%) [1%] level. a – variable defined for firms. b – variable defined for banks. Standard errors are reported in parentheses. LRL - Log restricted-likelihood.

[1] Fidrmuc et al. (2014) present more details on the estimation of determinants of bank funding.

Table 2 Bank Funding, Basic Specification, 2005 – 2007, Industry Specific Regressions

	Sample only consisting of		
	Section C	**Section K**	**Section L**
Random effects	region, sector (class)	region, sector (class)	region, sector (class)
Fixed effects	time	time	time
Collateral[a]	EBIT margin	EBIT margin	EBIT margin
Size Dummies[a]	yes	yes	yes
Debt Ratio[b]	6.802**	21.496***	8.288**
	(2.703)	(8.279)	(3.979)
ST Funding Ratio[b]	-1.264	-4.025	5.730*
	(2.393)	(6.478)	(3.399)
Collateral[a]	-0.031***	-0.021***	-0.012***
	(0.006)	(0.006)	(0.004)
Constant	3.950	-12.477	-0.840
	3.950	(7.906)	(3.772)
No of sectors	203	9	4
No of regions	16	16	16
No of groups	1417	70	63
No of observations	17173	2194	4459
LRL	-53334	-6915	-12774

Notes: * (**) [***] denotes significance at the 10% (5%) [1%] level. a – variable defined for firms. b – variable defined for banks. Standard errors are reported in parentheses. LRL - Log restricted-likelihood.

where λ_{sr} is the random intercept for sector s and region r and λ_r is the random intercept for region r. The random effect for a sector is nested within regions, in the sense that it does not take on the same value for a given sector across all regions but takes on different values for each combination of both dimensions. The between-region heterogeneity is modeled by the region-level random intercept.

We start our empirical analysis with estimation of equation (4) for the whole economy. Table 1 presents estimation results. The coefficient of the debt ratio enters the regressions positively and statistically significantly at a 5%-level. Also, its size is similar for all three different proxies for collateral (column I to III). Hence, the estimated coefficient of the debt ratio confirms our hypothesis that more indebted banks allocate more capital to riskier projects. However, a more detailed picture is required to understand which industries would suffer most from bank deleveraging.

In order to analyze the effect of deleveraging on an industry level, we run industry- specific regressions specified again by equation (4). Thereby, industries are defined at section level according to the Nace Classification (Rev. 2) and are taken into account if they consist of about one thousand observations.

For a given industry, a strong impact of the banks' debt ratio on the implicit lending rate implies that the industry is highly sensitive to bank deleveraging. Such industry would experience deteriorating access to loans if regulatory changes cause banks to reduce their debt since firms facing a high implicit lending rate run riskier projects. Furthermore, we look at sectors with the highest impact of collateral variables because tighter financing conditions are likely to especially influence sectors where collateralization is important.

Table 2 reports the results of the industry specific regressions for those industries showing a

comparably large coefficient which is statistically significant.[2]

The result that the financing of financial and insurance activities (Section C) as well as real estate activities (Section K) depends on the overall leverage is not surprising and supports our general approach. However, the interaction of the financial intermediaries with other industries like manufacturing (Section L) is of core interest.

4 Size Effect

As a specific non risk-weighted leverage ratio we define the currently discussed threshold of 3%. We calculate the required amount of bank debt which has to be reduced in order to satisfy this criterion. Hence, we assume once again that banks will respond to the non-risk weighted leverage ratio by reducing debt and not raising equity. The debt level required to satisfy the leverage ratio is defined as:

$$\frac{E_{jt}}{T\,A_{jt}} = 0.0\overline{3} \Leftrightarrow \frac{E_{jt}}{E_{jt}+D_{jt}^{opt}} = 0.0\overline{3} \Leftrightarrow D_{jt}^{opt} = \frac{E_{jt}(1-0.0\overline{3})}{0.0\overline{3}} \tag{6}$$

where subscript *t* shows that the calculated reduction in bank debt is calculated for all three years under consideration. D_{jt}^{opt} denotes the maximum amount of debt possible. We substrate this amount of debt from the actual amount of debt for those banks in our sample which do not comply with a non-risk weighted leverage ratio of 3%. The sum of differences equals the amount of debt banks have to reduce in order to satisfy the non-risk weighted leverage ratio. Identifying those banks which do not comply with a non-risk weighted leverage ratio of 3% reduces our data set to 1,561 banks out of 6,197 which equals 25%. In sum across periods, these 1,561 banks carry close to 300 billion euro too much debt applying a non-risk weighted leverage ratio of 3%. A regulatory required reduction in bank debt of close to 300 billion euro equals a reduction in total bank debt in our sample of 24%.

6 Conclusion

Using a unique dataset for banks and their corporate borrowers in Germany between 2005 and 2007, we analyze the transmission of bank funding to corporate lending in Germany. Similarly to Fidrmuc et al. [4], we show that bank leverage determines the corporate sector's access to financing. We find that a reduction in bank debt might translate differently into the allocation of capital to specific industries. Finally, we extend our previous research results by a discussion of possible delivering effects in Germany.

Firms involved in financial and insurance activities, real estate activities, and manufacturing are found to be particularly vulnerable to changes in banks' debt. Moreover, the fact that the access to loans for the former two sections depends on the overall leverage is not an unexpected result. The extent of the transmission of bank funding to corporate loans for manufacturing firms is the main finding of this study. A non-risk weighted leverage ratio of 3% causes a reduction of bank debt for the periods under consideration of non-negligible size – approximately close to 300 billion euros.

[2] Since results are not sensitive to the use of different proxies for collateral, only outcomes employing the EBIT margin as a proxy for collateral are reported. Results for the remaining regressions are available upon request.

Acknowledgments

We appreciate excellent research assistance by Thilo von Gilsa and Rasmus Pichler. The usual disclaimer applies.

References

[1] Acharya, V. – Richardson, M. – Schnabel, P. (2012). *Restoring Financial Stability: How to Repair a Failed System*, New York: University Stern School of Business, pp. 83–100.

[2] Craig, B. – Dinger, V. (2013). Deposit market competition, wholesale funding, and bank risk. *Journal of Banking & Finance 37*, pp. 3605–3622.

[3] Diamond, D. – Rajan, R. (2000). A theory of bank capital. *The Journal of Finance LV (6),* pp. 2431–2465.

[4] Fidrmuc, J. – Schreiber, P. – Siddiqui, M. (2014). The Transmission of Bank Funding to Corporate Loans: Deleveraging and Industry Specific Access to Loans in Germany. In *3rd IES Economic Meeting, INFER Workshop on Banking in Europe: Current Challenges.* Prague: http://ies.fsv.cuni.cz/en/node/493.

[5] Holmstrom, B. – Tirole, J. (1997). Financial intermediation, loanable funds, and the real sector. *The Quarterly Journal of Economics 112*, pp. 663–691.

[6] Jackson, P. – Furfine, C. – Groeneveld, C. – Hancock, D. – Jones, D. – Perraudin, W. – Radecki, L. – Yoneyama, M. (1999). Capital Requirement and Bank Behavior: The Impact of the Basle Accord. *Basel Committee on Banking Supervision Working Paper No. 1.*

[7] Kashyap, A. – Stein, J. – Hanson, S. (2010). An Analysis of the Impact of "Substantially Heightened" in Capital Requirements on Large Financial Institutions. *University of Chicago - Working Paper.*

[8] Kayo, E. – Kimura, H. (2011). Hierarchical determinants of capital structure. *Journal of Banking & Finance 35,* pp. 358–371.

[9] Marcus, A. (1984). Deregulation and Bank Financial Policy. *Journal of Banking & Finance 8*, pp. 557–565.

[10] Milne, A. – Whalley, E. (2001). Bank capital regulation and incentives for risk-taking. *Cass Business School Research Paper.*

[11] Myers, S. – Majluf, N. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics 13*, pp. 187–221.

CORRUPTION AND INDIVIDUAL ETHICS. INSIGHTS FROM A PUBLIC PROCUREMENT AUCTION

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ABSTRACT

This article proposes an auction model where two firms compete for obtaining the license for a public project and an auctioneer acting as a public official representing the political power, decides the winner of the contest. Players as firms face a social dilemma in the sense that the higher is the bribe offered, the higher would be the willingness of a pure monetary maximizer public official to give her the license. However, it implies inducing a cost of reducing all players' payoffs as far as our model includes an endogenous externality, which depends on bribe. All players' payoffs decrease with the bribe (and increase with higher quality). We find that the presence of bribe aversion in either the officials' or the firms' utility function shifts equilibrium towards more pro-social behavior. When the quality and bribe-bid strategy space is discrete, multiple equilibria emerge including more pro-social bids than would be predicted under a continuous strategy space.

1 Introduction

Public procurements auctions are source of potential corrupt exchanges. All over the world many public projects have been uncovered as being executed resulting from the intervention of bribe transfers. Bribery is bilateral, either is offered by the side of the one who expects to receive a preferential treatment in exchange or is requested by the side of the one who has the discretionary power to decide on something. If we focus on the scenario of public procurement auctions, firms are the ones potentially offering bribes and auctioneers are the ones potentially requiring it. Despite the countless scandals discovered, we are still far from knowing the actual volume of bribery in public procurement because corruption is illegal and secret per se, thus difficult to measure with real data. According to Transparency International this particular kind of corruption is harmful as project's cost can increase more than 50% due to bribe expenses but it also has a direct implication on the execution of the projects by reducing their quality. Moreover, according to the World Bank, worldwide bribes are calculated to be around US$1 trillion ([7]).

Despite the huge effort exerted and the big contributions to the literature on this field, any empirical research about corruption and bribery remains a mere approximation from extrapolating some data from, for example, perception surveys[1]. This is not surprising due to the difficulty in getting the real amount of bribe as it is uncovered by definition, therefore, the

[1] [11] Transparency International publishes annually the Corruption Perceptions Index (CPI) which ranks countries "by their perceived levels of corruption, as determined by expert assessments and opinion surveys." Surveys/assessments are either business people opinion surveys or performance assessments from a group of analysts.

implicated parts are not interested in revealing it. However, we cannot omit the big progress that has been made by researchers in recent years and the reliability of the results obtained. Indeed, all the available indexes have been very useful to make progress in the investigation of corruption, concretely in an empirical way. The researches are mainly oriented to understand how corruption affects development, growth, poverty, and gender equality among others. From a total of 70 countries, [9] demonstrates the negative effect that corruption may have on growth. [10] find evidence that corruption gets lower levels when the public employees wages are high compared to those of the manufacturing sector. [6] show that corruption is positively correlated to poverty in terms of income distribution. [5] using a sample of more than 100 countries, give a gender oriented approach and prove that the higher is the representation of women in the parliament the lower the level of corruption. This article is addressed to present a theoretical model combining two elements, bribery and auctions. In particular, our model is oriented to the study of corruption in public procurement auctions in which firms compete between them and interact with a public official. In addition to empirical works, a large literature concerning theoretical models exists. Works as [1], [8], [3], [4] and [2] have inspired our model. Although those models reflect mainly the situation where the bidders take simultaneously decisions on bribes and prices, our model presents rather the tradeoff between bribe and quality. In particular, our work is based on [2] who propose an auction model where two providers of procurement compete bidding prices and bribe. Their game displays the kind of corruption that we personally consider is creating all over the world the highest damages, the one that involves public procurement auctions. Such a bribery can have fatal effects on the quality of public projects or services. In fact, this bribery is hard to denounce and to demonstrate as far as the political class has the power to control their transparency and the separation of powers is not always as true as desirable.

Hence, we propose a design in which we focus on an auction where two firms compete for obtaining the license for a public project and an auctioneer acting as a public official representing the political power, decides the winner of the contest. This model has the peculiarity of inducing players to engage in bribe as a monetary maximization behavior. Players as firms face a social dilemma in the sense that the higher is the bribe offered, the higher would be the willingness of a pure monetary maximizer public official to give her the license. However, it implies inducing a cost of reducing all players' payoffs as far as our model includes an endogenous externality, which depends on bribe. All players' payoffs decrease with the bribe (and increase with higher quality).

As we will see in the next section, our model presents multiple equilibria for firms. The interesting point is that, according to the monetary maximization theory, public officials should always prefer the firm that offers the highest transfer of bribe. Therefore firms and officials have divergent preferences.

The paper is organized as follows: in section 2 we present the model. Third section concludes.

2 The model

Our model is inspired on the theoretical framework of [2] in which pairs of sellers bid to obtain a public contract and the bid of each seller could include a bribe to be paid by the public official as buyer. Consider the variation of the previous model. A game is played between two firms (i, j) bidding for a procurement contract which will be granted to one of the two firms by a public auctioneer (official). Like in the original framework, bidding takes place in two dimensions. However, in our version, the social externality of the winning project, net of social or private costs affects uniformly to all agents. Thus, rather than the price paid by the state to the winning firm, the first bidding dimension is a bidder quality net of costs ($Q_i \leq A$, where A

represents an exogenously given upper bound to quality). This allows us to model the first dimension of bidding as a simple linear, monotonically increasing function of the winning project social quality benefiting unambiguously all agents, the auctioneer, the two firms and, potentially (as we do in a follow-up of this paper), the society surrounding them. The second dimension is a bribe (B_i) promised and finally paid by the winner of the auction to the auctioneer. Furthermore, in order to guarantee that a social dilemma emerges in this bribery game, we impose a restriction on bribes and qualities[2]: $Q_i + B_i \leq A$. We use a linear specification of the three agents monetary (induced) utilities, adding a psychological cost parameter, γ, capturing an agent′s aversion to bribe due to ethical reasons, expressed in monetary loss per monetary unit of bribe received by the official. Thus, the three agents' utility levels are given by:

$$\pi_{official} = F + a.Q_{winner} + \left(1 - \gamma_{official}\right).B_{winner} \quad (1)$$

$$\pi_{winner} = F + a.Q_{winner} - (c + \gamma_{winner}).B_{winner} + R \quad (2)$$

$$\pi_{loser} = F + a.Q_{winner} \quad (3)$$

Where F is a fixed amount earned by each subject in each period, R is a fixed private profit obtained by the firm winning the procurement and c a per monetary unit of bribe cost, borne by a bribing winner, denoting that the bribe may yield further monetary costs on its way from the firm to the official. Assuming perfect information on the agents preferences, the resolution of the game depends on the hypothesis of continuous versus discrete strategies.

2.1 Continuous strategies

In this section we study the theoretical prediction of the game assuming a continuous space of strategies. We first solve the case in which agents have non-monetary (psychological) concerning, then the case in which agents purely maximize their payoffs.

2.1.1 Non-monetary (psychological) payoffs

1. If $a_{of} > 1 - \gamma_{of}$, the highest quality project will be chosen and firms will bid only in qualities, leading to the equilibrium: $(Q_i, B_i) = \left(Q_j, B_j\right) = (A, 0)$ independently of the firms' preferences. □
2. If $a_{of} < 1 - \gamma_{of}$, the highest bribe will be preferred by the auc- tioneer. In that case, firms will bid with the maximum bribe they can, as long as the bribing (monetary and psychological) cost does not exceed the fixed amount *R*earned by the winner. Thus, in □equilibrium, firm i will bid $(Q_i, B_i) = (A - \frac{R}{c+\gamma_i}, \frac{R}{c+\gamma_i})$

Thus, we would expect officials to choose the highest quality proposals if they are sufficiently bribery-averse, while they will choose the bidder with the highest bribe otherwise. Firms (believing that they are) faced with a quality-maximizing auctioneer will not bid with bribes, independently of their own preferences, whereas firms anticipating a bribery-maximizing behavior by the auctioneer will promise higher bribes, the more bribery averse they are.

2.1.2 Monetary payoffs

Finally, in absence of psychological, bribe-regarding considerations, a monetary-reward maximizing behavior would predict maximal quality bids $(Q_i, B_i) = \left(Q_j, B_j\right) = (A, 0)$, if

[2] Corresponding, for example, to a resource-driven budget constraint in a more general version of the model

$a_{of} > 1$ and $(Q_i, B_i) = (A - \frac{R}{c+\gamma_i}, \frac{R}{c+\gamma_i})$ if $a_{of} > 1$, in which case, the social dilemma leads to a socially suboptimal equilibrium. In the linear version, the following parameters are adopted, $(F, a, A, R, c) = (10, \frac{1}{2}, 10, 10, 2)$, which guarantee the emergence of the social dilemma equilibrium bids: $(Q_i, B_i) = (Q_j, B_j) = (5{,}5)$ in the case of bribery-neutral agents with universal preference for the bribe- maximizing bids by the official, or top quality $(Q_i, B_i) = (Q_j, B_j) = (A, 0)$, and quality maximizing auctioneer behavior if $\gamma_{of} > \frac{1}{2}$.

2.2 Discrete strategies

Our game's theoretical prediction differs when considering discrete strategies. The matrix in table 1 shows the payoffs of both firms for different combinations of bribe (and quality). In the discrete game there are two strong Nash equilibria $(Q_i, B_i, Q_j, B_j) = (7{,}3{,}7{,}3)$ and $(Q_i, B_i, Q_j, B_j) = (6{,}4{,}6{,}4)$ where the former is Pareto superior to the latter.

The $(Q_i, B_i, Q_j, B_j) = (5{,}5{,}5{,}5)$ is still a weak equilibrium and also Pareto dominated by both the other two. It is weak, because each firm is indifferent between this and biding lower bribes just to become a loser (it earns 12.5 in both cases).

Table 1 Matrix for discrete strategies

		Player 2																			
	Bribes	10		9		8		7		6		5		4		3		2		1		0	
player 1	10	5	5	0	10	0	10	0	10	0	10	0	10	0	10	0	10	0	10	0	10	0	10
	9	10	0	6,5	6,5	2,5	10,5	2,5	10,5	2,5	10,5	2,5	10,5	2,5	10,5	2,5	10,5	2,5	10,5	2,5	10,5	2,5	10,5
	8	10	0	10,5	2,5	8	8	5	11	5	11	5	11	5	11	5	11	5	11	5	11	5	11
	7	10	0	10,5	2,5	11	5	9,5	9,5	7,5	11,5	7,5	11,5	7,5	11,5	7,5	11,5	7,5	11,5	7,5	11,5	7,5	11,5
	6	10	0	10,5	2,5	11	5	11,5	7,5	11	11	10	12	10	12	10	12	10	12	10	12	10	12
	5	10	0	10,5	2,5	11	5	11,5	7,5	12	10	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5	12,5
	4	10	0	10,5	2,5	11	5	11,5	7,5	12	10	12,5	12,5	14	14	15	13	15	13	15	13	15	13
	3	10	0	10,5	2,5	11	5	11,5	7,5	12	10	12,5	12,5	13	15	15,5	15,5	17,5	13,5	17,5	13,5	17,5	13,5
	2	10	0	10,5	2,5	11	5	11,5	7,5	12	10	12,5	12,5	13	15	13,5	17,5	17	17	20	14	20	14
	1	10	0	10,5	2,5	11	5	11,5	7,5	12	10	12,5	12,5	13	15	13,5	17,5	14	20	18,5	18,5	22,5	14,5
	0	10	0	10,5	2,5	11	5	11,5	7,5	12	10	12,5	12,5	13	15	13,5	17,5	14	20	14,5	22,5	20	20

3 Summary

A model of public procurement auction is developed where two firms compete and have the possibility to bribe for winning the contest. We imposed a social dilemma to the firms and we added a psychological cost parameter coming from bribing as it consists of an "unethical" behavior. We also consider the situation where no psychological parameters are included. Specific parameters are included in the model and we obtain the theoretical prediction either with continuous strategies or with discrete strategies. We believe that this model is interesting to be implemented in the laboratory to investigate people's preferences in this specific social dilemma.

4 References

[1] Beck, P. J., Maher, M.W. (1986). A comparison of bribery and bidding in thin markets. *Economics Letters*, 20, 1-5.

[2] Büchner, S., Freytag, A., González, L. G., Güth, W. (2008). Bribery and public procurement: an experimental study. *Public Choice*, 137(1- 2), 103-117

[3] Burguet, R., Che, Y. K. (2004). Competitive procurement with corruption. *Rand Journal of Economics*, 35, 50-68.

[4] Che, Y. K. (1993). Design competition through multidimensional auctions. *Rand Journal of Economics*, 24, 668-680.

[5] Dollar, D., Fisman, R., Gatti, R. (2001). Are women really the 'fairer' sex? Corruption and women in government. *Journal of Economic Behavior and Organization*, 46(4), 423-429.

[6] Gupta, S., Davoodi, H., Alonso-Terme, R. (2002). Does corruption affect income inequality and poverty? *Economics of Governance*, 3(1), 23-45.

[7] Kaufmann, Daniel, Myths and Realities of Governance and Corruption (November 2005). Available at SSRN: htof://ssrn.com/abstract=829244 or htof://dx.doi.org/10.2139/ssrn.829244

[8] Lien, D. D. (1986). A note on competitive bribery games. *Economics Letters*, 22, 337-341.

[9] Mauro, P. (1995). Corruption and growth. *The Quarterly Journal of Economics*, 110(3), 681-712.

[10] Van Rijckeghem, C., Weder, B. (2001). Bureaucratic corruption and the rate of temptation: do wages in the civil service affect corruption, and by how much? *Journal of Development Economics*, 65(2), 307-331.

[11] http://www.transparency.org/topic/detail/publicprocurement

CALENDAR EFFECTS ON STOCK RETURNS ACROSS MULTIPLE STATES

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ABSTRACT

*We test calendar effects on stock returns considering business and presidential cycles and volatility regimes and show evidence for eight states of the financial market. We jointly consider four types of seasonality: the day-of-the-week effect (*DWE*), the macroeconomic announcement effect (*MAE*), the January effect (*JE*) and the macroeconomic announcement-January effect (*MAJE*). Our approach enables us to determine in which states the efficient-market hypothesis (*EMH*) does not hold. Most of the evidence found is for the* DWE*, which arises mainly under low volatility regimes and in contraction periods in both Democratic and Republican administrations.*

Keywords: Seasonalities, Markov Switching Model, Conditional Heteroskedasticity

JEL Classification: C22, G14

1 Introduction

Calendar or seasonal effects on stock returns have been widely documented in the empirical literature on finance. At daily frequency, the most analyzed effects are day-of-the-week and macroeconomic-announcement effects. At monthly level, the January effect has become the most widely studied.

We also know that theoretical economic models rely on the efficient-market hypothesis (*EMH*) i.e., stock prices should reflect all the information available. Therefore, the vast empirical evidence showing the existence of seasonal effects implies the non-fulfilment of the *EMH*. Nevertheless, empirical evidence is typically based on another assumption: the financial market is in one deterministic state. Exceptions to this are McQueen and Roley (1993) [8], who analyzed the effect of macroeconomic announcements across economic states; Kohers and Patel (1996) [6], who suggest that the distinction by business cycles has important implications on the existence of the day-of-the-week effect and Liano *et al.* (1999) [7], who found evidence of this effect in both Democratic and Republican administrations. Agnani and Aray (2011) [1] used a Markov switching approach to study the January effect across volatility regimes and they showed that the January effect exists both in low and high volatility regimes. Moreover, they pointed out that if the January effect is suffering a decline, it is not so noticeable.

This article does not differ from the previous evidence in terms of its goal, that is, it revises the statistical significance of seasonal effects on stock returns. However, it diverges from the previous evidence in two very important aspects. On the one hand, we jointly consider the day-of-the-week effect, the macroeconomic announcement-day effect and the January effect in contrast to most previous evidence which focuses on only one aspect. On the other hand, as we pointed out, most of the previous evidence typically considers two states at most. We go much further by combining the following states: business cycles, presidential cycles and volatility regimes. In fact, when all states are considered jointly, eight different states are produced.

To the best of our knowledge, this is the first attempt to explain seasonal effects on stock returns considering such a large number of states. Our approach proves to be very ambitious and enables us to determine in which states seasonal effects on stock returns arise or, in other words, when the *EMH* does not hold.

Our approach could be interesting for practitioners given that the empirical results from our specification should be useful for portfolio decision making. Investors could choose stocks carefully or reallocate portfolios in order to deal with the abnormal returns due to calendar effects considering the state of the financial market.

We report evidence for US stock markets. Most of the evidence found is for the day-of-the-week effect, which is more likely to arise under low volatility regimes and in contraction periods both in Democratic and Republican administrations.

The rest of the article is organized as follows. Next section presents the econometric specification, section 3 presents the empirical results and conclusions drawn in Section 4.

2 The Econometric Model

Let r_{it} be the daily excess return on a one-month treasury bill of stock i in the t period and consider the following regression model. Call high (low) volatility regimes H (L) and consider the simple two-state Markov switching model in the spirit of Hamilton (1989) [4]

$$r_{it} = \rho_{it}^{H}\mu_{it}^{H} + \left(1-\rho_{it}^{H}\right)\mu_{it}^{L} + \varepsilon_{it} \tag{1}$$

where ρ_{it}^{H} $\left(1-\rho_{it}^{H}\right)$ is the conditional probability of being in state H (L) calculated as Gray (1996) [3] and with transition probabilities following Hamilton and Susmel (1994) [5] and μ_{it}^{H} (μ_{it}^{L}) is the conditional mean in state H (L) specified as

$$\mu_{it}^{k} = \beta_{0i}^{k} r_{it-1} + W_t'\beta_{1i}^{k} + \left(M_t W_t\right)'\beta_{2i}^{k} + \left(J_t W_t\right)_t'\beta_{3i}^{k} + \left(E_t W_t\right)_t'\beta_{4i}^{k} + \left(D_t W_t\right)_t'\beta_{5i}^{k} \tag{2}$$

for $k = H, L$.

$W_t = \left(m_t, t_t, w_t, x_t, f_t\right)'$ is a $\left(5\times 1\right)$ vector collecting the dummy variables for Monday, Tuesday, Wednesday, Thursday and Friday, respectively. M_t is a dummy variable that takes the value of one whenever major economic indicators such as employment situation, producer price index, consumer price index, employment cost index and industrial production and capacity are announced. J_t is a dummy variable that takes the value of one in January months.

E_t is a dummy variable that allows to control for business cycles. Therefore, it takes the value of one in economic expansion periods as specified by the National Bureau of Economic Research (NBER).

D_t is a dummy variable that allows to control for presidential cycles. Therefore, it takes the value of one when the Democratic party is holding office. And ε_{it} is a random disturbance.

Unlike the business and presidential cycles, which are deterministic states, volatility regimes are endogenously determined. Therefore, the Markov switching model is suitable for that. Moreover, it is widely used in financial economics literature to tackle the nonlinearity exhibited by financial data. The basic idea underlying this model is that at each point in time there may be a probability of a regime switch that is governed by switching probabilities. Therefore, the conditional mean and variance of the stock return are allowed to take different values according

to the regime distributions and a latent regime indicator which is a stochastic unobservable state variable indicating the current regime. One of the main advantages of this model is that it allows variation not only in the parameters but also in the functional forms.

With the specifications in equations (1) and (2) we have eight states: High-Contraction-Republican (*HCR*), High-Expansion-Republican (*HER*), High-Contraction-Democratic (*HCD*), High-Expansion-Democratic (*HED*), Low-Contraction-Republican (*LCR*), Low-Expansion-Republican (*LER*), Low-Contraction-Democratic (*LCD*) and Low-Expansion-Democratic (*LED*).

Therefore, in contraction periods under Republican administrations and volatility regime k (*HCR, LCR*), β_{1i}^{k}, collects the day-of-the-week effect (*DWE*), $\beta_{1i}^{k}+\beta_{2i}^{k}$, collects the macroeconomic announcement effect (*MAE*), $\beta_{1i}^{k}+\beta_{3i}^{k}$, collects the January effect (*JE*) and $\beta_{1i}^{k}+\beta_{2i}^{k}+\beta_{3i}^{k}$, the macroeconomic announcements in January month (*MAJE*).

In expansion periods under Republican administrations and in volatility regime k (*HER, LER*), $\beta_{1i}^{k}+\beta_{4i}^{k}$, $\beta_{1i}^{k}+\beta_{2i}^{k}+\beta_{4i}^{k}$, $\beta_{1i}^{k}+\beta_{3i}^{k}+\beta_{4i}^{k}$, $\beta_{1i}^{k}+\beta_{2i}^{k}+\beta_{3i}^{k}+\beta_{4i}^{k}$ collects the *DWE*, *MAE*, *JE* and *MAJE*, respectively.

In contraction periods under Democratic administrations and in volatility regime k (*HCD, LCD*), $\beta_{1i}^{k}+\beta_{5i}^{k}$, $\beta_{1i}^{k}+\beta_{2i}^{k}+\beta_{5i}^{k}$, $\beta_{1i}^{k}+\beta_{3i}^{k}+\beta_{5i}^{k}$, $\beta_{1i}^{k}+\beta_{2i}^{k}+\beta_{3i}^{k}+\beta_{5i}^{k}$ collects the *DWE*, *MAE*, *JE* and *MAJE*, respectively.

In expansion periods under Democratic administrations and in volatility regime k (*HED, LED*), $\beta_{1i}^{k}+\beta_{4i}^{k}+\beta_{5i}^{k}$, $\beta_{1i}^{k}+\beta_{2i}^{k}+\beta_{4i}^{k}+\beta_{5i}^{k}$, $\beta_{1i}^{k}+\beta_{3i}^{k}+\beta_{4i}^{k}+\beta_{5i}^{k}$, $\beta_{1i}^{k}+\beta_{2i}^{k}+\beta_{3i}^{k}+\beta_{4i}^{k}+\beta_{5i}^{k}$ collects the *DWE*, *MAE*, *JE* and *MAJE*, respectively.

The log-likelihood function with normal disturbances to be maximized is

$$LogL(r_{iT},\Theta)=\sum_{t=1}^{T}Log\left[\rho_{it}^{H}f_{it}^{H}+\left(1-\rho_{it}^{H}\right)f_{it}^{L}\right] \tag{3}$$

where

$$f_{it}^{k}=\frac{1}{\sqrt{2\pi\sigma_{it}^{k}}}\exp\left(-\frac{\left(\varepsilon_{it}^{k}\right)^{2}}{2\sigma_{it}^{k}}\right) \quad \text{for } k=H,L$$

The vector Θ brings together the parameters to be estimated and σ_{it}^{k} is the conditional variance in state k which is assumed to follow an ARCH(1) process.

In order to show powerful statistical evidence and provide a clear picture for each of the seasonal effects on stock returns, let us define, without loss of generality, b_{im}, b_{it}, b_{iw}, b_{ix} and b_{if} the effects of each day of the week in any state and perform the following sequential Wald test for *DWE*, *MAE*, *JE* and *MAJE*,

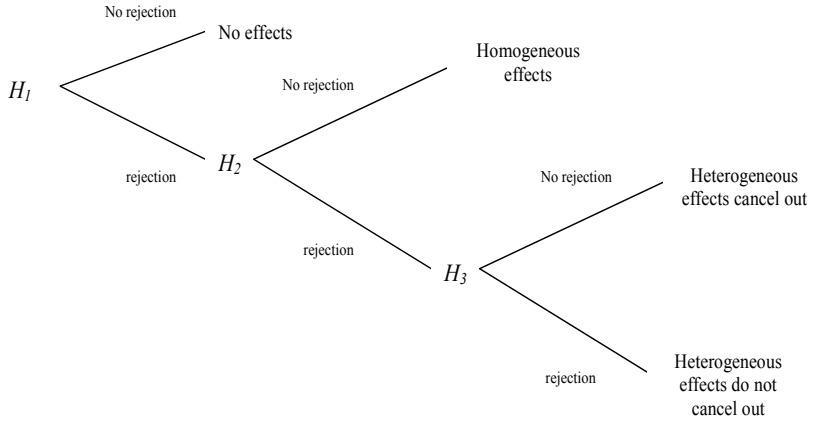
$$H_1: b_{im}=b_{it}=b_{iw}=b_{ix}=b_{if}=0$$
$$H_2: b_{im}=b_{it}=b_{iw}=b_{ix}=b_{if}$$
$$H_3: b_{im}+b_{it}+b_{iw}+b_{ix}+b_{if}=0$$

We begin by testing the hypothesis H_1 that all effects are jointly equal to zero. No rejection of H_1 implies no calendar effects and the sequential test is stopped. Since rejection could suggest

significant calendar effects, we test the hypothesis H_2 of the homogeneous response of stock returns to the calendar effects across the days of the week. No rejection of H_2 implies homogeneous effects or constant effects across the week and we do not proceed with the sequential test. Rejection of H_2 implies significant heterogeneous effects and we test the hypothesis of the sum of the daily calendar effects across the week equals to zero, H_3 . No rejection of H_3 means that although effects are heterogeneous and different from zero they tend to cancel out. Rejection of H_3 implies that holding the stock across the days of week has a non-zero return.

The sequential test is illustrated in Figure 1.

Figure 1 Sequential Test



3 Empirical Results

In the estimation we use the daily return on the S&P index in excess on the one month T-bill rate from the first trading date of 1976 to August 31th, 2008.

Table 1 shows the results in the high volatility regime. We reject H_1 and H_2 for all seasonal effects in all states except for the *DWE* during Republican administrations in both expansion and contraction periods. However, these daily effects cancel out since we cannot reject H_3 . Therefore, there is a significant and heterogeneous *DWE* in states *HCR* and *HER* that tend to cancel out across the week.

Table 2 shows the results in the low volatility regime. We reject H_1 and H_2 at a 10% level of significance for the *DWE* in states *LED*, *LER*, *LCD* and *LCR*. We can also reject H_1 and H_2 for the *JE* in state *LCR*. Notice that seasonal effects seem to arise more easily under low volatility regimes. This was already pointed out by Agnani and Aray (2011) [1], who found that the January effect is most frequent in low volatility regimes. This result could have the following simple and logical explanation: when stock market volatility is high, there may be so much information and such high uncertainty that the statistical significance of the calendar effects could be dampened as pointed out by Chien *et al.* (2002) [2] who warn about using the dummy variable approach commonly employed in the literature that assumes constant variance. By contrast, when the market is calm, statistical evidence in favor of calendar effects arises

more easily. Respect to the hypothesis H_3 , it is not rejected at a 10% level of significance for the *JE* in *LCR* and for the *DWE* in *LED* and is rejected for the *DWE* in *LER*, *LCR* and *LCD*. Considering a 5% level of significance, we cannot reject *DWE* in *LER*. Therefore, these significant and heterogeneous effects cancel out across the week. However, we reject H_3 at the 5% level of significance for the *DWE* in states *LCR* and *LCD*. Therefore, the *DWE* arises in contraction periods in both Democratic and Republican administrations and low market volatility, and these effects do not cancel out, i.e., they hold across the week. Therefore, our results suggest that the non-fulfilment of *EMH* could arise especially when the financial market is calm and in contraction periods, regardless of which party is holding office.

Our results have interesting implications for academia and practitioners alike. Even though many articles in the literature have documented the existence of abnormal returns blamed on calendar effects, thus implying financial market inefficiency, theoretical models typically do not take into account such an event. Our results, which are based on a new and very different specification from the previous one, therefore come to support that the non-fulfillment of the market efficiency hypothesis depends on the specific state in which the financial market is. Hence, theoretical models including the stock market should take this into account. Moreover, more theoretical and empirical research is needed to explain the calendar anomalies. For practitioners, our results could be useful in aiding investors to choose stocks carefully or reallocate portfolios in order to deal with the abnormal returns while taking into account the different states of the financial market.

4 Conclusions

By testing seasonal effects on stock returns considering business and presidential cycles and volatility regimes, we show evidence for eight different financial market states. Business and presidential cycles are deterministic states. However, volatility regimes are endogenously determined using a Markov switching model.

We jointly consider four types of seasonality: the day-of-the-week effect (*DWE*), the macroeconomic announcement effect (*MAE*), the January effect (*JE*) and the macroeconomic announcement-January effect (*MAJE*).

We have found no evidence of *MAE* and *MAJE* for all the states considered and only *JE* under low volatility regimes in contraction periods and under Republican administrations. Our evidence shows that the *DWE* is the most persistent seasonality effect and that this effect arises under low volatility regimes and in contraction periods in both Democratic and Republican administrations.

Acknowledgments

The author gratefully acknowledges financial support from the Junta de Andalucia through Project SEJ-2547.

References

[1] Agnani, B. - Aray, H. (2011). The January Effect across Volatility Regimes. *Quantitative Finance*, vol. 11, pp. 947-953.

[2] Chien, C. - Lee, C. - Wang, A.M.L. (2002). A Note on Stock Market Seasonality: The Impact of Stock Price Volatility on the Application of Dummy Variable Regression

Model. *The Quarterly Review of Economics and Finance*, vol. 42, pp. 155-162.

[3] Gray, S. (1996). Modelling the Conditional Distribution of Interest Rate as a Regime-switching Process. *Journal of Financial Economics* vol. 42, 27-62.

[4] Hamilton, J. (1989). A new Approach of the Economic Analysis of Nonstationary Time Series and the Business Cycle. *Econometrica*, vol. 57, pp. 357-384.

[5] Hamilton, J. - Susmel, R. (1994). Autorregresive Conditional Heteroskedasticity and Changes in Regime. *Journal of Econometrics*, vol. 64, pp. 307-333.

[6] Kohers, T. - Patel, J.B. (1996). An Examination of the Day-of-the-Week Effect in Junk Bond Returns over Business Cycles. *Review of Financial Economics*, vol. 5, pp. 31-46.

[7] Liano, K. - Liano, K. – Manakyan, H. (1999). Presidential Administrations and the Day-of-the-Week Effect in Stock Returns. *Review of Financial Economics*, vol. 8, pp. 93-99.

[8] McQueen,G. – Roley, V. (1993). Stock Prices, News, and Business Conditions. *The Review of Financial Studies*, vol. 6, pp. 683-707.

ANNEX

Table 1 Estimation results in High volatility regime

	Expansion				Contraction			
	Democratic		Republican		Democratic		Republican	
	Wald	P-value	Wald	P-value	Wald	P-value	Wald	P-value
DWE								
H_1	7.98	0.16	34.79	0.00	7.68	0.17	88.51	0.00
H_2			33.54	0.00			23.55	0.00
H_3			0.02	0.90			0.02	0.90
MAE								
H_1	3.01	0.70	5.87	0.32	1.80	0.88	2.24	0.81
H_2								
H_3								
JE								
H_1	4.89	0.43	8.81	0.12	1.27	0.94	1.79	0.88
H_2								
H_3								
MAJE								
H_1	3.71	0.59	4.99	0.42	1.78	0.88	2.04	0.84
H_2								
H_3								

Table 2 Estimation results in Low volatility regime

	Expansion				Contraction			
	Democratic		Republican		Democratic		Republican	
	Wald	P-value	Wald	P-value	Wald	P-value	Wald	P-value
DWE								
H_1	10.97	0.05	29.12	0.00	39.11	0.00	485.69	0.00
H_2	10.19	0.03	29.12	0.00	8.74	0.06	127.16	0.00
H_3	1.56	0.21	3.59	0.05	22.70	0.00	137.73	0.00
MAE								
H_1	0.78	0.97	1.27	0.93	4.19	0.93	5.57	0.34
H_2								
H_3								
JE								
H_1	3.41	0.67	6.31	0.27	0.13	0.10	12.08	0.03
H_2							9.77	0.04
H_3							1.32	0.25
MAJE								
H_1	1.96	0.85	3.06	0.68	4.99	0.41	6.31	0.27
H_2								
H_3								

REASONS AND CAUSES FOR THE DEVELOPMENT OF THE THIRD SECTOR

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ABSTRACT

The aim of this contribution is to summarize available theories and approaches to reasons of the third sector development and to make our personal conclusions about described topic. Actually there are expertly discussion about scope and boarders of this sector of economy. Evaluation of its importance is based not only quantitative indicators, but mainly on added value created by organizations of the third sector. Third, non-governmental, civil, non-profit sector is a part of mixture economy together with public and private sector. Organizations of the third sector operates in many different fields, most commonly in providing of social services, environmental protection, sport activities, health care, regional policy, education and many others. Significance of third sector is generally well known. Significant phenomenon connected with development of third sector and civil society is volunteering. Their work represents one of the options of providing quality services through unpaid work.

Keywords: third sector, non-profit sector, voluntarism, definitions and delimitations of third sector

JEL Classification: Z1, Z13, Z18

1 Introduction

There are a lot of definitions and delimitations of third sector reflecting different point of views and criteria. Bigger researchers' attention third sector gained only during 90s of 20th century. In the simplest way we can understand the third sector as a set of organisations operating in society, which have particular positive impact in the fields they act. Currently there are a lot of definitions of the third sector characterized by considerable heterogeneity. Different definitions differ to each other by different degree of generality or they define the third sector basing on some specific criterion. In the U.S., the term "non-profit organization" is commonly used and refers to a set of organizations that qualify for tax exemption and for tax-deductible donations [7]. The result of mentioned matters is fact, that content as well as overall understanding of concept of third sector is ambiguous.

Salamon, L. M. and **Anheier, H. K.** [4] has defined the non-profit sector as a collection of entities with five characteristics: institutionalisation, separation from government, self-governance, non-profit distribution and a certain degree of voluntarism. The third (non-profit) sector includes a diverse set of organisations which basically serve common purposes. This sector is very diverse sector that tends to produce certain "quasi-public" goods and services, determined by willingness of individuals, businesses, governments and other institutions to cooperate with non-profit organisations for the purpose of achieving their missions and goals.

Origins of volunteering go back up to medieval age. Activities of such type start its existence usually as a reaction on different extensive and serious problematic phenomena. In the medieval age it was the reaction on growing poverty and bad social situation of old, ill people and orphans. Volunteering had this time form of help to these groups of people in form of mutual aid. Except social objectives, volunteering starting to orient on fields like education, culture or art. Development of civil society in Slovakia and other currently post socialist countries stopped during the totalitarianism. Situation changed after 1989, when the civil society started to form and together with her also volunteering activities. It was emerged a lot of non-governmental organisations, foundations, associations, movements, non-profit organisations and civil associations. [5]

Our aim is to provide in this contribution the overview of the most important theoretical point of views on the origins and the reasons of existence of the third sector.

2 Size of the third sector and the financing dimension of the non-profit organizations

As we have mentioned in introduction, perception and scope of third sector is differ from country to country. Scope and support of third sector are influenced by a huge amount of factors and are conditional by historical development in each country. In measuring of size and scope of the third sector, the question how they can be expressed, respectively which indicators allow us to assess real scope of third sector and give us opportunity to compare arises.

There are several "alternative" measurements of the third sector scope, usually in form of different indexes, for example Civil Society Index, the Global Civil Society Index, Civil Society Sustainability Index or another global civil society index developed by **Glasius**, **Kaldor** and **Anheier**, which measures only cross boarder aspects of civil society development. In this part we want to look more detailed to **The Johns Hopkins Global Civil Society index**. Index was developed initially using empirical data that was gathered through the Johns Hopkins Comparative Non-profit Sector Project. It measures three critical dimensions of a country´s civil society sector. For each of these dimensions, the Index uses multiple indicators that capture the diversity of civil society patterns around the world while remaining manageable.

First dimension is **Capacity** in meaning of size of the sector and the effort or activity it mobilizes. Second one is named **Sustainability**, which means the ability of civil society sector to sustain itself over time – legally, financially and also socially. The last third dimension which is included into this index is named **Impact** understood like contribution of civil society sector which its organisations make to social, economic and political life. The main aim of Centre for Civil Society Studies is by implementation of this index to provide reliable and objective way to chart the health and vitality of the civil society sector in countries through the world; be able to compare the progress and strength of civil society among the countries and regions; spot the areas of civil society weakness and initiate corrective actions; improve public awareness of civil society´s role and potential and evaluate the effectiveness of efforts to strengthen civil society. Available data about the measures are available in the next table.

The financing dimension of this classification simply ask whether most of the organizational resources come from donations or other sources. [6]

Table 1 The John Hopkins Global Civil Society Index

Country	Capacity	Sustainability	Impact	Total
Netherlands	79	54	89	**74**
Norway	55	82	59	**65**
United States	76	54	54	**61**
Sweden	58	56	67	**60**
United Kingdom	66	60	50	**58**
Israel	70	42	50	**54**
Belgium	65	45	60	**57**
Ireland	64	45	52	**54**
Australia	51	46	49	**49**
France	56	46	44	**49**
Finland	48	42	50	**47**
Germany	47	45	47	**46**
Spain	54	37	30	**40**
Argentina	48	35	36	**40**
Tanzania	45	32	38	**39**
Uganda	44	37	30	**37**
Japan	38	34	35	**36**
South Africa	44	35	33	**37**
South Korea	32	38	36	**35**
Austria	35	42	34	**37**
Kenya	41	28	29	**33**
Italy	38	37	25	**33**
Hungary	38	32	20	**30**
Czech Republic	34	35	25	**31**
Colombia	37	26	22	**28**
Brazil	30	31	26	**29**
Peru	32	30	22	**28**
Philippines	30	35	17	**27**
Poland	30	38	7	**25**
Slovakia	32	28	13	**24**
India	27	30	20	**26**
Mexico	23	29	19	**24**
Romania	27	26	14	**22**
Pakistan	26	19	12	**19**

Source: CNP (2004)

Reasons for growth and strengthening of the third sector

Current literature refers to existence of multiple theories, which pointing out some concepts and hypotheses, usually with interdisciplinary characteristics, aimed on expansion of the third sector especially in the last few decades. Except of these theories there are also some statistical data, which indicates the significant differences between countries. The most common explanations for the third sector growth are usually related to markets and governments failures in providing of goods and services to all citizens or to increasing pluralism and individual freedom in societies.

Pevcin, **P**. [1] states that the assumptions, concepts and ideas constructed to date on the growth and importance of the Third Sector can be divided between approaches regarding to supply and

demand side. The demand side is mainly related to goods and services, which are not adequately provided by state (government) or market. On the other hand, supply side theories stress that scope of the third sector is related to extend of available resources.

Salamon, L. M. and **ANHEIER, H. K.** [3] tried to aggregate the causes of growth and impact of the third sector into six theories, from which four were defined specially for third sector and remaining two are borrowed from other sciences but are consistent with the main characteristics of this sector. They identify these six main approaches to growth of the third sector, which we are going to characterize in this subhead:

- Heterogeneity theory,
- Supply-side theory,
- Trust theory,
- Welfare state theory,
- Independence theory,
- Social origins theory,

Heterogeneity theory developed by economist Burton Weisbrod stressed the fact, that importance of the third sector is directly dependent on heterogeneity of society. Salamon and Anheier marked this theory also as **theory of government and market failure**. Market has some constraint in production of public goods and services, which should be available to whole population, depending on capacity of firms to afford them or not. Market failure is one of the most common arguments of state existence. Government failure has bigger impact in societies, where the diversification of society is bigger and where is bigger diversification of opinions about which public goods should be provided. Because of these reasons people have tendency to looking for public goods in the third sector especially in situation of market and state failure. Heterogeneity theory is aimed on dissatisfaction connected to demand for public goods as a result of market and state failure and abstract from supply side.

Supply-side theory is talking especially about the structures created as a reaction to society needs. In connection to this theory we are talking mainly about social enterprises, which take over initiative with aim to satisfy these needs. Establishment of such enterprises was at the beginning the domain of religion based associations, between which existing also some kind of competence with aim to become more attractive for believer. According to this theory we can assume that third sector will be bigger in countries with bigger variability of religions.

Ben-Ner and **Van Hoomissen** are representatives of ***thrust theory***, which does not argue by government or market failure and development of the third sector connecting with asymmetric information between sellers and consumers. Because of consumers don´t have sufficient information about products and services quality. Since in non-profit organisations there doesn´t exist redistribution of profit between the owners, they looks more trustful and they are also able to be more sensible to client needs. Clients (customers) have feeling, that in comparison to lucrative organisations, non-profit organisations do not use advantages coming from available information to cheat the consumers. Whereas consumers are not able to evaluate quality and quantity of particular services, which they want to take, organisations of third sector acting more trustful, mainly with taking to account their non-profit character. According to given theory third sector should be bigger in countries with lower trust to services provided by market.

Theory of social state consider third sector as so-called "resting category." It means, that traditional social state ignore importance and role of non-profit sector, which it plays in historical and also current political debates. This theory looks on third sector like on current modern mechanism, which manages or tries to manage social problems. According to **Quadagno**, **J**. [2] together with development of industrialization, there became also to growth of government expenditure in selected social fields like schools, kindergartens, issues of

disabled and retired people and therefore came to decrease in importance of traditional families. Increase or decrease in number of government interventions is result of economic and social development in country. Salamon and Anheier refer, that the higher is economic development of country, the higher will be providing of social services and as a result of growing issue of state, the decrease in amount of organisations of third sector and by that also to decrease in scope of this sector.

So theory of social state as well as theory of state and market failure stress, that relation between state and third sector is confrontational, in better case third sector is considered to be subsidiary product coming from internal restriction of state. According to negativistic authors, state has tendency to disperse bases of pluralism and diversity by using its social policy. We can analyse the relation between state and third sector also from point of view of mutual cooperation. Organisations of third sector are often connected to segments, to which state or government does not have impact or don´t have adequate reaction. On the other hand organisations of third sector have some natural constraints, so except for state failure and market failure we can point also to volunteering failure. These weaknesses come from philanthropic deficiency, which means problems of this sector in creation of sufficient incomes for maintenance its activity and also in obtaining of trust of society, if we are talking about self-sufficiency. Starting from ***interdependence theory*** we can make conclusions, that the bigger will be social policy costs, the bigger will be scope of third sector. According to this theory state and third sector are partners in production quasi-public goods and they complement each other.

Theory of social origins defines relationship between state and third sector by another way, like it is defined in interdependence theory. This relationship is according to this theory not linear and uniform. Salamon and Anheier argue that there exist more than one way how to evaluate the importance and scope of third sector. Based on social welfare models, which were developed by **Esping-Andersen**, it is possible to identify four regimes of development in the third sector. Two crucial criterions are scope of third sector and level of social expenditures of government. Overview of these regimes we can see in following table.

Table 2 Four regimes of non-profit sector

Level of government social expenditures	**Scope of third sector**	
	Small	Big
Low	Statist	Liberal
High	Social-democratic	Corporatist

Source: [3].

Model **Statist** is model of controlled social welfare; also government social expenditure and scope of third sector are limited. On the other hand in **liberal model** dominating low level of government social expenditure and from this reason the scope of third sector is relatively high. In **social-democratic model** organisation of the third sector are not so important in production of public goods. Finally in **corporatist model** are both government social expenditures and scope of third sector big. In this model there exists the effort for cooperation between state and third sector, where growth of one is connected with growth of second side. One of the limitations of this theory is, that even if it includes historical factors, but does not stress the evolution processes in the third sector.

3 Conclusions

Most of studies, which tries to explain development of third sector and differences between countries acting as part of neoclassical paradigm, that means, their explanation are based on

microeconomic basis. Although these studies contributed to explanation of existence and development of third sector, their arguments are often distorted, unclear or contradictory, in case that they are confronted with results of empirical analyses. Mentioned theories were developed in accordance to US society conditions, by which they are not adequate for European area, because of big differences between these areas.

As we have mentioned these theories are aimed only on microeconomics aspects and ignore macroeconomic factors, which argues importance and task of organisations of third sector in economies of modern societies. These theories have significant loopholes in perception of evolution dynamic of third sector, in its scope and differences between countries, distribution of productive activities, and task of third sector in creation of new work places and in relation to state and other sectors of economy.

Another difficulty connected to verification and confrontation of these theories with empirical studies is to make those studies. Biggest problem is availability of data related to third sector and its organisations also in national and international range. Data are often collected as part of research grant projects and after their ending ends also this collection.

References

[1] PEVCIN, P. (2012): *Analysis of cross-country differences in the non-profit sector size*. In Prague Economic Review. ISSN 1210-0455, 2012, vol. 20. Nr. 2, 186 – 204 p.

[2] QUADAGNO, J. (1987): Theories of the Welfare State. In *Annual Review of Sociology*. ISSN 0360-057, 1987, 109-128 p.

[3] SALAMON, L. & ANHEIER, H. (1996): *Social origins of civil society: explaining the non-profit sector cross-nationality*. Baltimore: the John Hopkins University Institute for Policy Studies, 1996. 54 p. ISBN 1-886333-26-2.

[4] SALAMON, L. ANHEIER, H. (1997): *Defining the Nonprofit Sector: A Cross-National Analysis.* Manchester: Manchester University Press, 1997. 526 p. ISBN 0-7190-4901-0.

[5] SVOREŇOVÁ, K. (2012): *Dobrovoľnícka alternatívna mena DAM ako prostriedok aktívneho starnutia.* In *Zborník zo X. Medzinárodnej konferencie k problematike Sociálna ekonomika a sociálna inklúzia seniorov*. Banská Bystrica: Univerzita Mateja Bela, 2012. ISBN 978-80-0400-5.

[6] STEINBERG, R. (2006): *Economic Theories of Nonprofit Organizations.* In The NON PROFIT SECTOR: A Research Handbook, Powell and Richard Steinberg, 2nd. Ed. and Yale University, 2006. 117 p. ISBN 13: 978-0- 300 – 10903 – 0.

[7] SIEBEL, W., ANHEIER, HELMUT K., (1990): *The Third sector: Comparative Studies of Non-profit Organizations.* Walter de Gruyter & Co., Berlin 30. 21 p. ISBN 0 -89925 – 486 – 1.

THE EFFECTS OF FISCAL POLICY ON ECONOMIC GROWTH NEXUS IN OECD COUNTRIES: A BOOTSTRAP PANEL GRANGER CAUSALITY ANALYSIS

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ABSTRACT

The paper analyses the potential causalities between tax revenue and economic growth on one hand and government expenditure and economic growth on the other hand. This issue could be crucial for the decision about fiscal policy measures in different countries. Our analysis tries to identify potential relationships, taking into account the differences among countries used in the sample. We applied the bootstrap panel Granger causality approach proposed by Kónya [12]. The dataset used in the paper consists of data for 23 OECD countries during the period 1971-2012. Based on our results, there is evidence for government expenditure Granger causing economic growth only in six countries out of 23. The causality in the opposite direction has been found only in France. Furthermore, we have found evidence for tax revenues Granger causing economic growth in six countries, while the opposite causality seems to be present only in four countries.

Keywords: taxes, government expenditure, economic growth, bootstrap panel causality test

JEL codes: H20, H50, H62

1 Introduction

The main question regarding to the topic of our paper is, whether the fiscal policy has some impact on economic growth. There have been several views on this problem in the literature so far. According to assumptions of neoclassical growth models [25] there should be no significant effect of the fiscal policy on a long-run economic growth. On the other hand, the endogenous growth models assume that fiscal policy could affect the economic growth in the short-run as well as in the long-run in several ways [11]. A significant part of the economic literature so far has supported this view (see for example [7], [26]).

The main aim of the paper is to empirically test a significance of causality between the fiscal policy instruments and GDP growth, taking to the account potential two-way effect between both. We have analysed the causalities between selected variables using the bootstrap panel analysis, allowing for cross-country correlation, without the need of pre-testing for unit roots. We are focused on testing the potential Granger causality between government expenditure and economic growth on one hand as well as the Granger causality between tax revenue and economic growth on the other hand. Hence, we are also taking into account possible two-way

causalities between these variables. A similar methodology has been used for example in [1] or [5] to test the causality between government revenue and spending. The results are presented separately for each country included into the sample, which allows detailed look on differences and similarities among them.

2 Literature Review

Regarding to a fiscal policy we can distinguish the impact of public expenditure and the impact of taxes on economic growth. Public expenditure could have a positive growth effect taking into account the endogenous growth models. Several studies found empirical evidence for this relationship [22], [15]. Some studies reported a non-linear relationship between public expenditure and economic growth mostly presented as an inverted U-shape curve [8], [29]. The structure of public expenditure may be also important, as the impact of individual components of public expenditure on economic growth is different. The positive effect of these public expenditure could be eliminated with the so called crowding out effect, when government spending crowds out private investment. Similarly, the positive effect on long-run economic growth is as well mostly reported in the case of the expenditure on education [14], [16] and R&D expenditure [24].

On the other hand, the effect of the taxes on economic growth is mostly perceived as negative [3], [11]. Romer and Romer also found a negative effect of taxes on economic performance in the short-term in the United States after World War II [23]. This effect is primarily assigned to the decrease of investment due to the higher tax burden. Mutascu, Crasneac and Danuletiu analyzed the relation between taxes and economic growth on panel data for 25 EU countries [17]. On one hand they found a positive impact of direct taxes on economic growth and on other hand a negative impact of indirect taxes. They argue that a 1% rise in direct tax burden generates an increase of 1.61% in GDP per capita.

However, the effect of public expenditure and taxes on growth depends also considerably on specific conditions and the current state of the economy. Barro stated the government has the potential to positively or negatively influence the economic growth of the country in the long-term [3]. He also states that the while the increase in public expenditure positively affects the marginal productivity of capital and economic growth, the increases in the tax burden affects economic growth negatively. Barro has further showed that the positive effect of expenditures dominates when the public sector is rather small [4]. The study done by Izák also confirms a negative impact of distorting taxes and a positive impact of productive public expenditure on growth [10]. On the other hand, Perotti analyse the effect of fiscal policy on GDP growth in 5 OECD countries using a structural VAR approach concludes that this effect is in general rather small [18].

However, it is rational to assume that there is a two-way relationship between tax revenues and economic growth. The higher economic growth should lead to the higher tax bases and the higher tax revenue. This has been empirically supported for example in [28]. Based on the Pairwise Granger causality she found strong evidence for two-way causality between economic growth and tax burden by economic function in the short term. Furthermore, this effect could be then transferred to higher government expenditure. Moreover, the higher GDP per capita could lead also directly to higher public spending according so called Wagner's law. The empirical evidence for this kind of relationship was found in the long-run by [13] using panel cointegration analysis.

3 Data and Methodology

This paper is to investigate the relationship between fiscal policy and economic growth using panel causality tests during the period 1971-2012 for 23 OECD countries. The sample includes the data for 23 OECD countries during the period 1971-2012. These countries are selected according to the eligible dataset from the *OECD Database.* Our dataset includes *Total tax revenue as (% of GDP), General government final consumption expenditure (% of GDP)* and *GDP growth (annual %).* All data used in the paper are obtained from the *OECD Database* and all data span from 1971-2012. There are 23 OECD countries namely, Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, UK, and USA included in this analysis.

In the literature, there are the causality tests that are fairly common in use and they refer more to the ability of one variable to predict or cause the other [2]. The first method to analyze the causal relationships between variables employed in this study is the Engle-Granger approach in VECM framework. The causality analysis developed by Granger used in the methodology indicated that the question of whether X causes Y is whether the current Y can be decided with past values of Y and X. So, there is no need panel unit root methods to analyze the bootstrap panel causality test.

Firstly, we analyze the panel causality method, we must find out the cross-section dependence analysis in the panel data models. Testing for the cross-sectional dependence test, we can apply LM test statistics [6] and [19]. The Breusch and Pagan Lagrange Multiplier (*LM*) test is based on the sum of squared coefficients of correlation among cross-section residuals acquired by ordinary least squares (OLS) [6]. So, the test statistics show the null hypothesis of no cross-section correlations that is a fixed N and $T \to \infty$. The *LM* test we used in this paper is distributed as chi-square asymptotic $N(N-1)/2$ in degrees of freedom. The LM test statistics can be calculated as follows:

$$LM = T\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}\hat{\rho}_{ij}^{2} \tag{1}$$

where $\hat{\rho}_{ij}^{2}$ is the sample estimation of pair-wise correlation coefficients obtained from OLS estimation for each *i.* In addition to these, we can say that LM test is presented for panels with large *T* and small *N*. Pesaran used the CD_{lm} test that has the scaled version of *LM* test [19]. This test is not suitable for large N, it can use the Lagrange multiplier statistic developed by Pesaran [19]. The test statistics can be defined as follow:

$$CD_{LM} = \sqrt{\frac{1}{N(N-1)}}\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}(T\hat{\rho}_{ij}^{2}-1) \tag{2}$$

When *T* is small, *N* is large and, it can be used, the CD test allows the cross-section dependence developed by Pesaran [19]. It is built on the sum of the coefficients of correlation among cross-section residuals. CD_{LM} test in this model includes the asymptotic standard normal distribution by first $T \to \infty$ and then $N \to \infty$ under the null hypothesis. On the other hand, this test is also systematized as follows:

$$CD = \sqrt{\frac{2T}{N(N-1)}}\left(\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}\hat{\rho}_{ij}\right) \tag{3}$$

We must determine whether or not the slope coefficients are homogeneous or heterogeneous for our panel causality analysis in this paper. In the panel data models, it is accepted that slope coefficients are homogeneous across the individual units [21]. So, it is supposed that the null hypothesis of slope homogeneity is $H_0 : \beta_i = \beta$ for all i and the alternative hypothesis is $H_1 : \beta_i \neq \beta_j$ for a non-zero fraction of pairwise slopes for $i \neq j$. The first test in this field that was developed Swamy [27], and was applied to some panel data models. Swamy is focused to estimate using the pooled Fixed Effect rather than the ordinary least squares estimator [27]. Swamy's test is valid for a fixed N and as $T \to \infty$.

The slope homogeneity of Swamy (1970) test is follow:

$$\tilde{S} = \sum_{i=1}^{N} \left(\hat{\beta}_i - \tilde{\beta}_{WFE}\right)' \frac{X_i' M_\tau x_i}{\hat{\sigma}_i^2} \left(\hat{\beta}_i - \tilde{\beta}_{WFE}\right) \tag{4}$$

where $\hat{\beta}_i$ is the pooled OLS estimator, $\hat{\beta}_{WFE}$ is the weighted fixed effect pooled estimator (WFE) of slope coefficients, M_τ is an identity matrix of order T. $M_\tau = I_T - Z_i (Z_i' Z_i)^{-1} Z_i'$ and $Z_i = (\tau_T, X_i)$, where τ_T is a T x 1 vector, $\tilde{\sigma}_i^2$ is the estimator of σ_i^2. The version of the dispersion test statistic in this case is as follows:

$$\tilde{\Delta} = \sqrt{N}\left(\frac{N^{-1}\tilde{S} - k}{\sqrt{2k}}\right) \tag{5}$$

Under the condition $(N, T) \to \infty$,we can say that error terms are normally distributed during the $\sqrt{N}/T \to \infty$. When T is very small relative to N and it also seems to have reasonable power properties, $\tilde{\Delta}_{adj}$ has the suitable size for all grouping of sample sizes. Under the normally distributed errors that is the following mean and variance bias adjusted version, the small sample properties of the $\tilde{\Delta}$ test can be evolved as follow:

$$\tilde{\Delta}_{adj} = \sqrt{N}\left(\frac{N^{-1}\tilde{S} - E(\tilde{z}_{it})}{\sqrt{var(\tilde{z}_{it})}}\right) \tag{6}$$

where mean $E(\tilde{z}_{it}) = k$ and the variance $var(\tilde{z}_{it}) = 2k(T-k-1)/T+1$. We can analyze the bootstrap causality approach proposed in [12] in our context to economic growth, government expenditure and tax revenue. Kónya panel bootstrap causality test is based on seemingly unrelated regressions (SUR) and Wald tests with country specific bootstrap critical values for determining the relationships in the panel model [12]. Kónya's method has some advantages in the panel data analysis. *Firstly*, this method does not need pre-testing the unit roots and cointegration properties of the variables used in their levels. Therefore, the variables in this system do not require being stationary in analysis. But there is also no need for pre-testing except for the specification of the lag structure. *Secondly,* due to the contemporaneous correlation is allowed in across countries, it is likely to apply the extra information provided by the panel data setting. These set of equations are not VAR, but SUR systems. Besides, this approach identifies how many and which countries exists one way or Granger causal relation [12]. The procedure is based on estimating first following equations:

$$G_{1,t} = a_{1,1} + \sum_{l=1}^{ly1} \beta_{1,1,l} G_{1,t-l} + \sum_{l=1}^{lx1} \partial_{1,1,l} E_{1,t-l} + \sum_{l=1}^{lz1} \partial_{1,1,l} R_{1,t-l} + \varepsilon_{1,1,t}$$
$$\vdots \qquad (7)$$
$$G_{N,t} = a_{1,N} + \sum_{l=1}^{ly1} \beta_{1,N,l} G_{N,t-l} + \sum_{l=1}^{lx1} \partial_{1,N,l} E_{N,t-l} + \sum_{l=1}^{lz1} \partial_{1,N,l} R_{N,t-l} + \varepsilon_{1,N,t}$$

and

$$E_{1,t} = a_{1,1} + \sum_{l=1}^{ly2} \beta_{1,1,l} G_{1,t-l} + \sum_{l=1}^{lx2} \partial_{1,1,l} E_{1,t-l} + \sum_{l=1}^{lz2} \partial_{1,1,l} R_{1,t-l} + \varepsilon_{1,1,t}$$
$$\vdots \qquad (8)$$
$$E_{N,t} = a_{1,N} + \sum_{l=1}^{ly2} \beta_{1,N,l} G_{N,t-l} + \sum_{l=1}^{lx2} \partial_{1,N,l} E_{N,t-l} + \sum_{l=1}^{lz2} \partial_{1,N,l} R_{N,t-l} + \varepsilon_{1,N,t}$$

and

$$R_{1,t} = a_{1,1} + \sum_{l=1}^{ly3} \beta_{1,1,l} G_{1,t-l} + \sum_{l=1}^{lx3} \partial_{1,1,l} E_{1,t-l} + \sum_{l=1}^{lz3} \partial_{1,1,l} R_{1,t-l} + \varepsilon_{1,1,t}$$
$$\vdots \qquad (9)$$
$$R_{N,t} = a_{1,N} + \sum_{l=1}^{ly3} \beta_{1,N,l} G_{N,t-l} + \sum_{l=1}^{lx3} \partial_{1,N,l} E_{N,t-l} + \sum_{l=1}^{lz3} \partial_{1,N,l} R_{N,t-l} + \varepsilon_{1,N,t}$$

where G is the economic growth, E is the government expenditure and R refers the government revenue or tax revenues. N is the number of panel countries, index i refers to the country (i = 1,...,N), index t is the period (t = 1,...,N), l is the lag length, the error terms, $\varepsilon_{1,1,t}$, $\varepsilon_{2,1,t}$, $\varepsilon_{3,1,t}$ are assumed to be white-noises [12]. While we determine the relationship between government expenditure and economic growth, we use the tax revenues as an instrument variable, and finally while we test the causal linkages between the economic growth and tax revenue, we use the government expenditure as an instrument variable.

Testing for Granger causality, we can find alternative causal relations for a country For example, there is one-way Granger causality: (i) there is one-way Granger-causality from E to R if not all $\partial_{1,i}$ are zero, but all $\beta_{2,i}$ are zero, (ii) there is one-way Granger causality running from R to E if all $\partial_{1,i}$ are zero, but not all $\beta_{2,i}$ are zero, (iii) there is two-way Granger causality between R and E if neither $\delta_{1,i}$ nor $\beta_{2,i}$ are zero, and (iv) there is no Granger causality between R and E if all $\partial_{1,i}$ and $\beta_{2,i}$ are zero [12].

The estimation and testing process for direction of Granger-causality, we need to determine the optimum number of lags. In the analysis, there are some problems, the choice of both too few and too many lags, in causality analysis. If we chose too few lags, it may cause to omission of some important variables from the model. When too many lags are chosen for the observations in the model, this position will lead the standard errors for the estimated coefficients. The results of this selection may lead bias in the retained regression and less precise decisions. If the lag structure is chosen which is allowed to vary across countries for a relatively large panel, this situation would enhance the computational burden substantially. To solve this problem, Kónya [12] allowed for different maximal lags for *G, E* and *R* in each system, but to be the same across equations. We estimate the system for each possible pair of $ly1$, $lx1$, and $ly2$, $lx2$, and $ly3$, $lx3$, respectively, by assuming from 1 to 4. First we determine the each possible pair of them, then

we choose the combinations minimized the Akaike Information Criterion (AIC) and Schwartz Bayesian Criterion (SBC) [12].

4 Results and Discussion

In a panel analysis, testing the cross-section dependence and slope homogeneity, we can perform four different cross-sectional dependence tests, named LM, CD_{LM}, CD, LM_{adj} developed by [6] and [19] and [20]. We got the results from the cross sectional dependences and slope homogeneity in Table 1. The results in Table demonstrate that the null hypothesis of no cross-sectional dependence is rejected at 1% level of significance. The empirical evidences suggest that a shock in an OECD country can be transferred easily to any country in OECD. Thus, these results indicate a strong evidence of cross-section dependence for our dataset. There have a growing experienced economic and financial integration of countries and financial entities that indicates strong interdependencies between cross-units [9].

Table 1 Results of Cross-Sectional Dependence and Homogeneity Test

Tests	Test Statistics	P-values
LM	2155.142***	0.000
CD_{LM}	84.565***	0.000
CD	40.968***	0.000
LM_{adj}	80.780***	0.000
$\tilde{\Delta}$	12.673***	0.000
$\tilde{\Delta}_{adj}$	13.481***	0.000

Source: Authors calculation.

Note: The null hypothesis has no cross-section dependence and the alternative hypothesis supposes the cross section dependence. *** indicates rejection of the null hypothesis at 1 % level of significance. The data for these tests involve during the period 1971-2012.

It is important to take account of cross-sectional dependency and country-specific heterogeneity in empirical analysis, because countries have a high degree of globalization in terms of economic relations. Zellner's seemingly unrelated regression equation (SURE) method in the cross-sectional dependence tests is used, and is more effective than the country specific OLS estimation method [30]. Table 1 also shows the results of slope homogeneity tests. We reject the null hypothesis of the slope homogeneity test and we support the country specific heterogeneity.

Table 2 shows the test results of causal linkages between economic growth and government expenditure for 23 OECD countries. According to the results, the results demonstrate the null hypothesis of "Expenditure does not cause Growth" or "Growth does not cause Expenditure" cannot be rejected even at the 10% significance level for Australia, Austria, Canada, Denmark, Finland, Germany, Greece, Ireland, Luxembourg, New Zealand, Norway, Portugal, Spain, Sweden, Turkey, UK, and USA. For other results, there is strong evidence to reject the null hypothesis "Expenditure does not cause Growth" for Belgium, Italy, Japan, Netherlands, and Switzerland. Finally, we found strong results for bidirectional Granger causality between government expenditure and economic growth for only France.

Table 2 Causality Test Results between Economic Growth and Expenditure

Countries	H_0 : Expenditure does not cause Growth				H_0 : Growth does not cause Expenditure			
	Wald Stat.	Bootstrap critical values			Wald Stat.	Bootstrap critical values		
		1%	5%	10%		1%	5%	10%
Australia	5.337	21.066	11.895	8.028	0.638	38.567	16.148	10.936
Austria	8.733	26.382	15.567	9.621	0.007	27.900	14.652	10.304
Belgium	47.172***	37.093	21.611	13.675	0.329	32.942	16.708	11.663
Canada	0.559	42.046	23.391	16.638	2.267	34.694	20.339	13.826
Denmark	2.464	30.246	17.407	11.427	5.357	27.975	18.156	13.141
Finland	2.240	37.855	20.724	13.511	0.032	31.405	16.496	12.176
France	25.603**	35.583	21.601	14.136	24.557**	27.826	15.984	11.049
Germany	0.000	34.868	22.175	15.854	2.703	25.988	17.015	11.233
Greece	0.074	28.342	17.559	11.784	0.249	24.749	15.575	10.193
Ireland	0.554	33.033	17.178	11.919	5.606	38.340	21.509	14.107
Italy	31.598**	46.782	28.849	19.769	0.060	24.910	13.049	8.842
Japan	25.300**	31.111	16.726	11.270	6.779	42.979	18.524	12.339
Luxembourg	3.119	30.673	14.639	9.315	0.334	27.059	16.242	11.178
Netherlands	14.343*	35.355	18.069	12.392	3.038	24.305	15.428	10.773
New Zealand	0.415	23.204	12.918	9.049	3.468	31.552	17.581	12.010
Norway	0.669	24.495	15.726	11.031	2.876	35.503	20.265	13.073
Portugal	7.305	30.603	18.749	13.542	9.231	30.458	16.253	11.649
Spain	1.368	31.532	17.128	11.764	0.869	26.793	15.203	10.812
Sweden	3.456	30.590	17.166	12.157	0.395	29.461	18.368	11.680
Switzerland	12.739*	27.939	15.838	10.909	0.040	31.184	17.482	11.569
Turkey	0.372	22.924	13.438	9.397	0.085	28.505	17.399	11.251
UK	0.209	37.129	20.349	15.031	11.407	35.730	18.875	13.708
USA	0.936	37.332	22.944	16.038	9.727	36.745	16.891	12.234

Source: Authors calculation.

Note: The data span used the results shown in this table above covers the full sample period from 1971 to 2012. Bootstrap critical values were obtained from 10.000 replications. ***, **, and * imply rejection of the null hypothesis at the 1%, 5% and 10% levels of significance, respectively.

Table 3 demonstrates the test results of causality relationship between economic growth and net saving for OECD 23 countries. According to the results, the results indicate the null hypothesis of "tax revenues does not cause economic growth" or "economic growth does not cause tax revenue" cannot be rejected even at the 10% significance level for Australia, Canada, Finland, Greece, Ireland, Luxembourg, Netherlands, New Zealand, Portugal, Spain, Sweden, Turkey, and UK.

Table 3 Causality Test Results between Economic Growth and Tax Revenue

Countries	H_0 : Tax revenue does not cause Growth				H_0 : Growth does not cause tax revenue			
	Wald Stat.	Bootstrap critical values			Wald Stat.	Bootstrap critical values		
		1%	5%	10%		1%	5%	10%
Australia	4.522	20.320	11.512	7.904	1.206	35.671	18.130	12.550
Austria	3.175	22.426	13.147	9.997	8.946*	22.399	12.503	8.504
Belgium	15.761*	33.007	19.218	12.717	0.165	25.573	12.330	8.816
Canada	4.777	39.974	23.561	14.717	0.619	29.799	15.171	9.368
Denmark	11.094*	30.417	17.422	11.087	4.802	25.220	14.131	10.234
Finland	1.989	34.861	20.352	12.585	0.041	27.167	12.128	7.976
France	24.853**	33.377	18.526	13.337	1.323	20.858	11.145	8.557
Germany	10.804	46.029	22.072	16.668	12.704**	21.976	11.715	8.252
Greece	0.048	23.465	14.425	9.501	0.772	23.749	12.513	8.274
Ireland	6.927	33.007	16.761	11.748	0.067	34.513	20.257	13.197
Italy	57.653***	33.453	20.972	13.992	0.153	28.734	13.725	9.199
Japan	7.534	30.103	14.343	10.862	16.650**	27.051	13.291	9.697
Luxembourg	3.908	27.565	15.782	10.477	0.161	31.447	15.678	11.267
Netherlands	4.817	36.257	24.170	16.546	2.994	25.872	14.138	9.067
New Zealand	0.404	26.582	14.345	9.970	2.069	28.211	16.698	11.918
Norway	31.727**	34.925	19.320	12.446	8.182	28.889	15.273	9.890
Portugal	7.079	25.809	15.709	10.872	0.014	26.451	13.986	10.747
Spain	1.369	33.154	18.942	11.843	0.047	23.135	13.677	9.685
Sweden	0.000	28.751	15.911	11.393	2.851	23.844	13.225	8.757
Switzerland	12.074*	24.906	14.702	9.658	1.063	32.228	16.166	11.041
Turkey	0.470	16.261	9.170	6.699	0.292	26.611	16.510	11.375
UK	1.468	42.707	26.269	18.363	0.174	31.330	15.957	10.089
USA	5.591	42.494	25.257	18.172	34.367***	29.837	17.434	10.746

Source: Authors calculation.

Note: The data span used the results shown in this table above covers the full sample period from 1971 to 2012. Bootstrap critical values were obtained from 10.000 replications. ***, **, and * imply rejection of the null hypothesis at the 1%, 5% and 10% levels of significance, respectively.

We also derived evidence to reject the null hypothesis "Tax revenue does not cause economic growth" for Belgium, Denmark, France, Italy, Norway, and Switzerland. And finally, we found evidence to reject the null hypothesis "economic growth does not cause tax revenue" for Austria, Germany, Japan, and USA.

5 Conclusions

Based on the results of our analysis we can reach several conclusions and policy implications. Firstly, we found a strong evidence for cross-section dependence for our dataset. Thus, the results suggest that a shock in any OECD country could rather easily spread to the other OECD countries included in the sample.

There are rather significant differences in the results of the Granger causality test between government expenditure and economic growth. We found strong evidence for government expenditure impact on economic growth for Belgium, France, Italy and Japan. Furthermore, this effect is significant at 10% level of significance in the case of Netherlands and Switzerland. Thus, in these countries it can be expected that the changes in government expenditure should influenced the economic growth in short run. The short-run causality is not likely in other OECD countries included in the sample, but this does not preclude the existence of similar relationship in the long run. The two-way short-run relationship between government expenditure and economic growth has been found only in France.

Regarding to the Granger causality between the tax revenue and economic growth the results is similar in certain way. The tax revenues should cause the changes in economic growth in Granger sense in Belgium, Denmark, France, Italy, Norway and Switzerland. The effect in opposite direction is evident in the case of Austria, Germany, Japan and USA. In these countries higher economic growth should generate higher tax revenue in short-run. There is no significant Granger causality between selected variables in most of the OECD countries. Despite this fact, the differences among the countries need to be taken into account as stated. Due to this fact above mentioned methodology has been used in the paper. However, there are of course certain limitations of our study arising from this approach. The relationships explained in our paper are valid only in the short-run. In order to incorporate long-run causalities the panel cointegration regression has to be used in the future studies.

References

[1] Alfonso, A. – Rault, C. (2009). Bootstrap panel Granger-causality between government spending and revenue in the EU. *William Davidson Institute Working Paper*, No. 94. pp. 1-12.

[2] Asteriou D, – Hall S. G. (2007). *Applied Econometrics: A Modern Approach Using E-views and Microfit.* New York: Palgrave Macmillan.

[3] Barro, R. J. (1990). Government Spending in a Simple Model of Endogenous Growth. *The Quarterly Journal of Economics*, vol. 98(5), pp. 103-125.

[4] Barro, R. J. (1991). Economic Growth in a Cross-Section of Countries. *The Quarterly Journal of Economics,* vol. 106(2), pp. 407-443.

[5] Bolat, S. (2014). The Relationship between Government Revenues and Expenditures: Bootstrap Panel Granger Causality Analysis On European Countries. *Economic Research Guardian*, vol. 4(2), pp. 2-17.

[6] Breusch T. – Pagan, A. (1980). The LM Test and Its Application to Model Specification in Econometrics. *Review of Economic Studies*, vol. 47(1). pp. 239–254.

[7] Easterley, W. – Rebelo, S. (1993). Fiscal Policy and Economic Growth: An Empirical Investigation. *Journal of Monetary Economics*, vol. 32(2). pp. 417-458.

[8] Grossman, P. J. (1988). Government and economic growth: A non-linear relationship. *Public Choice*, vol. 56(2), pp. 193-200.

[9] Hoyos R. E. D. – Sarafidis, V. (2006). Testing for Cross-Sectional Dependence in Panel-Data Models. *The Stata Journal.* vol. 6(4), pp. 482–496.

[10] Izák, V. (2011). Vliv vládních výdajů a daní na ekonomický růst. [The effect of public expenditure and taxes on the economic growth]. *Politická ekonomie,* vol. 59(2), pp. 147–163.

[11] King. R. – Rebelo, S. (1990). Resuscitating Real Business Cycles. In Taylor, J. B., Woodford, M. (Eds.*) Handbook of Macroeconomics*, Amsterdam: Elsevier. pp. 927-1007.

[12] Kónya L (2006). Exports and growth: Granger causality analysis on OECD countries with a panel data approach. *Economic Modelling*. vol. 23(6), pp. 978–992.

[13] Lamartina, S. – Zaghini, A. (2011). Increasing Public Expenditure: Wagner's Law in OECD Countries. *German Economic Review*, vol. 12(2), pp. 149-164.
[14] Landau, D. L. (1985). Government Expenditure and Economic Growth in Developed Countries. *Public Choice*, vol. 3, pp. 1952-1976.
[15] Liu, Ch. L. – Hsu, Ch. E. (2008). The association between government expenditure and economic growth: The granger causality test of the US Data, 1974-2002. *Journal of Public Budgeting, Accounting and Financial Management,* vol. 20(4), pp. 439-452.
[16] Miller, S. M. – Russek, F. S. (1997). Fiscal Structures and Economic Growth. *Economic Inquiry,* vol. 35. pp. 603-613.
[17] Mutascu, M. I. – Crasneac, A. O. – Danuletiu, D. C. (2007). The Taxes Impact on the Economic Growth: The Case of European Union. *MPRA Paper*, No. 6143. pp. 1-7.
[18] Perotti, R. (2005). Estimating the effects of fiscal policy in OECD countries. *Centre for Economic Policy Research Working Paper*, no. 276. pp. 1-59.
[19] Pesaran M. H. (2004). General Diagnostic Tests for Cross Section Dependence in Panels. *Cambridge Working Papers in Economics,* no. 0435,
[20] Pesaran, M. H. – Ullah A. – Yamagata T. (2008). A Bias-Adjusted LM Test of Error Cross-Section Independence. *Econometrics Journal*. vol. 11(1), pp. 105–127.
[21] Pesaran M. H. – Yamagata T. (2008). Testing Slope Homogeneity in Large Panels. *Journal of Econometrics*. vol. 142(1), pp. 50-93.
[22] Ram, R. (1986). Government Size and Economic Growth: A New Framework and Some Evidence form Cross-Section and Time-Series Data. American Economic Review, vol. 76, pp. 191-203.
[23] Romer, Ch. D. – Romer, D. H. (2010). The Macroeconomic Effects of Tax Changes: Estimates Based on a New Measure of Fiscal Shocks. *American Economic Review,* vol. 100 (6), pp. 763-801.
[24] Romer, P. M. (1990). Endogenous Technological Change. *Journal of Political Economy*, vol. 98 (5), pp. 71-102.
[25] Solow, R. (1957). Technical Change and the Aggregate Production Function. *Review of Economics and Statistics,* vol. 39, pp. 312-320.
[26] Stokey, N. L. – Rebelo, S. (1995). Growth Effects of Flat-Rate Taxes. *Journal of Political Economy*, vol. 103 (3), pp. 519-550.
[27] Swamy, P. A. V. (1970). Efficient inference in a random coefficient regression model. *Econometrica,* vol. 38, pp. 311 - 323.
[28] Szarowská, I. (2013). Shift in Tax Burden and Its Impact on Economic Growth in The European Union. *Acta Universitatis Agriculturae Et Silviculturae Mendeliana Brunensis*, vol. 61, pp. 1153-1160.
[29] Yavas, A. (1998). Does too Much Government Investment Retard Economic Development of a Country? *Journal of Economic Studies*, vol. 25(4), pp. 296-308.
[30] Zellner A. (1962). An Efficient Method of Estimating Seemingly Unrelated Regressions and Tests for Aggregation Bias. *Journal of the American Statistical Association*. vol. 57(298), pp. 348–368.

INSURANCE OF DEVELOPER ACTIVITIES RISKS

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ABSTRACT

The fundamental aim of this paper is to recognize, that is to acknowledge the method (instrument) of insuring as the most appropriate regarding the safety of the provided protection, completeness and feasibility of the compensation of the risks transfer method. In the case examined in this paper those are the risks connected with widely understood field of real estate, especially in the aspect of their feasibility, that is to say, the actions of the entities conducting developer activities. The used research methods are based on the method of conceptual analysis of literature oriented to point out the research directions recognizing insurance as an adequate method of risk transfer, on the basis of developer activities.

Keywords: risk, risk transfer, insurance, real estate developer activities

JEL codes: D81, G22, R30

1 Introduction

The activity of entities conducting developer activities undoubtedly involves clear recognition of a number of technical, as well as organizational and legal determinants. Due to the fact that the final effect of developer's activities is - somewhat simplified - a real estate as a property designed to fulfil specified, including commercial, purposes, it is essential to be aware of the way the real estate is defined in the legal regulations. As regards the understanding of real estate, for which insurance is applied as the method of transfer of risk to a specialized entity (the insurer), the Civil Code in art. 46; art. 805-828 (concerning the character of the insurance relationship) is of significant meaning. And thus, what is considered as real estate is a part of land area constituting a separate object of ownership (land), as well as buildings permanently connected with the land or parts of such buildings, if they constitute, pursuant to special provisions, object of ownership separated from the land [1]. As far as the abovementioned provisions of Civil Code, i.e. regarding the establishing of insurance relationship, are concerned, art. 823 is of special significance within the context of real estate insurance. Therefore, if after concluding the insurance agreement the ownership of the insured real estate is transferred to other party, the rights and obligations arising from such an agreement are transferred to the new owner, provided that the insurance company as well as the new owner are entitled to terminate the agreement subject to terms specified in the general insurance conditions [2]. Such actions generally apply in case of change of the owner of the real estate insurance agreement, therefore, in principle, they do not have to apply to this specific ownership change that taking the real estate over from the developer constitutes. The activities within the field of real estate, like other forms of economic activity, are conducted under the conditions of risk and uncertainty.

This paper is of strictly theoretical character, it examines the range of risk factors connected with widely understood activities within the real estate field, and especially the field of

developer activities, suggesting insurance as a method of risk transfer – and that is the objective of the paper.

2 Risk factors in developer activities

Generally speaking, from the perspective of the possibility of applying insurance protection, real estate is understood as: buildings (e.g. a building build on the land granted the right of perpetual usufruct), premises (e.g. flats in a tenement building, offices) and land. Therefore, a household insurance, as well as garage, farm building and house under construction insurances are recognized as non-life insurances – property insurances that can be called real estate insurance. The real estate insurance in this sense covers not only the already existing buildings (houses, flats etc.) but also the ones under execution.

From the point of view of the general insurance conditions TUiR Warta S.A. applies the following terminology [13]:

- single-family home – a building permanently connected with the land, sectioned off from the area by means of wall barriers and having a foundation and a roof. It is a detached or a semi-detached building or a building in row or group development, structurally constituting an independent entity, designed to satisfy housing needs
- dwelling unit – an independent, sectioned off part of a multi-family building designed to satisfy housing needs.
- investment means:
  - construction (execution of a building)
  - expansion,
  - reconstruction (conducting construction works resulting in the change of performance or technical parameters of the building, except for characteristic parameters such as: cubic capacity, gross covered area, height, length, width or number of storeys) of a single-family home, holiday home, dwelling unit, garage, other building, street furniture objects or fences, to be found in the insured location under the condition of conducting the construction works according to the construction law.

When taking into consideration the terminology applied in the general insurance conditions (GIC), the single-family home, as well as the dwelling unit can constitute the target of the real estate developer's activities. In case of the objects coming into being in the process of the implementation of a project by a specialised body, e.g. a real estate developer, specific demands occur to secure the activities by way of risk transfer through insurance. It happens like that since the real estate at each stage of a life cycle, starting from the land development, through the execution of investment project (by a specialized body, e.g. real estate developer), ending with the usufruct, is exposed to the realization of risk factors. It can be assumed that "the development of a land real estate is a complex project, consisting of numerous stages, engaging a lot of participants and, undoubtedly, it requires the highest expenditures" [22]. In this place it is worth mentioning, that "real estate cycles are highly considered in portfolio management, real estate marketing, appraisal and analysis but should be more concerned in real estate finance, project development, corporate real estate management, public real estate management and facility management" [20].

The developer activities are undertaken by "a natural or legal person that initializes, promotes, begins and conducts the process of area development which aims at increasing the value of the

real estate." [23]. Economic activity undertaken by entities within the specified markets is accompanied by risk. The risk factors determine the level of activity on the market of real estate development services. Attention has been drawn to the fact that developer activity can take place under the conditions of full risk, reduced risk and in risk-free conditions [14]. However, this last situation should rather be attributed a strictly theoretical context. Regardless of the typology of the risk factors accompanying developer activities it is recognized that they have to undergo a complete identification, analysis at the assessment stage in the risk management process, in order to enable the choice of the most suitable method of risk handling, constituting the reaction to the risk response. The fundamental condition of the effectiveness of each risk management system is its compatibility with the organization [6]. One of the acknowledged and popular methods of handling the risk, besides other ones forming the *risk management matrix* [7], [8], [9], is the risk transfer through the insurance protection, that is a feasible "risk allocation is performed to an insurance institution by means of civil liability insurance of a real estate developer or to a bank by means of opening a trust account or transaction insurance in the form of a bank guarantee" [24].

The identification of risk factors for the real estate is a complicated task. The portfolio of the identified risk factors for the real estate quoted after M. Bac [5]. The author has adopted the risk sources categorization from C.A. Williams, M.L. Smith, P. C. Young [25]. However, it should be stressed that, as the authors C.A. Williams and others emphasize, the risk sources categories are of general character, and thus without specific reference to so-called subject or activity which such categories were to correspond (accompany). One may wonder, whether some of the kinds of risk factors listed by M. Bac under some of the specific categories are fully adequate, as well as referred to the real estate in a way that does not cast any doubts of cognitive nature. It also has to be emphasized that M. Bac uses the term "risk source", here the term "risk factors" has been adopted as more adequate. The following can be classified within the category of real estate risk factors [5]:

- natural environment: generating natural catastrophic risks such as flood, lightning discharges, fire, earthquakes, hurricanes, etc.,
- social environment: human behaviours, changing habits and values, social structures and institutions that also generate catastrophic civilization risks such as fire, terrorism, industrial, nuclear and construction disasters,
- political environment: policy on the real estate,
- legal environment: legislation on the real estate,
- environment of operating activities: process and procedures in the construction organizations, in developer activities (the issue of manufacturing, production process of building real estate or objects of public infrastructure),
- economic environment: associated especially with the construction activities, determining through financial factors, including interest rate and credit conditions, inflation and recession, the time of establishment of construction investment and the length of its operation stage as well as the quality of used materials and technology, repairs and maintenance conducted during the use,
- cognitive environment: the ability of the owners and administrators of a real estate to perceive risk and their attitude towards this issue.

Risks in the real estate development business are described by different factors such as social, technological, economic, environmental and political ones. Generally speaking, examples of risks in the area of real estate are as follows: separation of design from construction, lack of

integration, poor communication, changing environment and increasing project complexity and economic changes e.g. inflation, regional economic crises including greater competition in real estate business [10]. The authors S. Khumpaisal, Z. Chen determined in their studies 5 risk major criteria and 33 sub-criteria, evaluating method of each sub-criteria including the assumed alternative plan [10]. In 2012 the European Group of Valuers' Associations provided a systematic classification of risks also into property related risks: location risk, construction related property risk, tenants and leases risk [21]. According to C. D'Alpaos, R. Canesi real estate operating risks can be grouped into 6 categories: operating risk, development risk, leasing risk, leasehold risk, leverage risk, tax risk [11].

Table 1 The examples of risks in real estate depending on the affecting factors

Risk / Factor	Risk of an error	Catastrophic risk	Financial risk	Legal risk	Political risk
Human	- project - structure - material - execution: Real estate developer activities	- mining damage - industrial and civilization disasters - terrorism	-ineffective investments[1] - bankruptcy	- violation of law[2]	- disturbance - riots - strikes - revolutions
Nature		- floods -earthquakes - hurricanes - landslides - hail, avalanches etc...	- loss of profit (*business interruption*)		- recession of economy of the regions affected by a disaster [3]
State			- interest rate - credits - inflation	- faulty legislation[4] - lack of administrative acts (orders) - conditions resulting from local plans [5]	- wars - martial law
			Example of risk		

[1] - uneconomical calculation of the investment's cost-effectiveness; [2] – concerning the real estate and its security (e.g. non-compliance with the rules of the technical inspection of the buildings); [3] - damage to the technical infrastructure, public utility facilities, dwellings and workplaces; [4] – that does not provide protection against threats (e.g. regulation on obligatory removal of snow from the roof); [5] e.g. prohibition of development on the endangered areas.

Source: [5]

Table 1 presents a sample division of real estate risks according to various criteria. Attention should be drawn to the fact that, from the perspective of the threats in the developer activities, the risk of developer activities should be placed within the category of the risk of error[1] in the factor regarding the execution (author's note)

Generally speaking, the risk factors for real estate that are subject to identification can be divided, as it seems, according to the following criteria and the proposition of so-called catastrophic risk in real estate has been used, modified and adjusted to the needs of the identification of real estate risk factors [4]: threat to real estate by the natural disaster, that is location on the area exposed to the effect of an element, increase of the value of a (construction) investment on the particular land, demographic factor, environment degradation and pollution

[1] If this criterion is to be accepted as reliable enough.

influencing the condition of the real estate (possibility of applying reclamation). The next criterion can be the features of the real estate, that is to say the physical characteristics e.g. the type of materials used during the manufacture, stability of the structure, compliance with the legal and formal requirements, including the technical design etc. as well as the economic (financial) features e.g. the source of real estate funding, own contribution in the funding, the role of insurance and bank guarantees. Yet another criterion can be the extra-objective (subjective) characteristics, while the risk factors include: the entities of developer activities, contractors, subcontractors, as well as owners or (temporary) users of the real estate. "Risks that can be incurred outside the development sphere include the financial risks incurred in leasing, purchasing and the potential reversion of the asset and various physical risks such as design weaknesses and site and location risks"[19].

Therefore, within the context of real estate developer activities it can be assumed that the basic division of the identified risk factors are the following ones:

- subjective (personal), which partially include also moral hazard,
- objective (extra-subjective), which partially include physical hazard.

Moral and physical hazard are indeed used in the insurance theory of risk. The example of the physical hazard regarding the risk of the real estate (e.g. civil structure) fire are the following characteristics of the real estate: structure, location etc [18].

3 Insurance by means of a risk transfer method in real estate developer activities

As it seems and, most of all, as it is recognized, insurance is a proven way / method of transfer of the entity's (organization) risk to other specialized entity (insurer). Very often the situation on the mortgage loan market is of great significance for the residential property market. It is like that "since through the insurance products the banks transfer to the insurance company the credit risk, risk of real estate value loss, risk of real estate legal defects, as well as personal risks concerning particular borrower (…). Therefore, the role of the insurance products (mainly the ones securing the lender against the lack of repayment form the borrower) is of great importance in the financing of the purchase of a residential property" [16]. As it has already been established, the situation on the mortgage loan market influences the real estate market (especially, the so-called contracting) and in some (financial) sense – determines it. Moreover, it is assumed that the conditions of the mortgage loan market affect the attitude and behaviours not only of natural persons purchasing a real estate, but also "the financing of the real estate from the bank credits (which) is also important for the developer and other entities making investments in the real estate market" [17].

From the point of view of applying the insurance protection, the widely understood insurances connected with or directed to the broadly defined real estate can be divided according to the criterion of product offer for the consumers, that is to say households, and in this case the flat and house insurance can be distinguished. The other criterion is the insurance offer in the public-private partnership in socio-economic policy and in this approach we can generally distinguish the real estate insurance. What has to be emphasized at this point is the abovementioned fact that frequently the insurance policies, which are a kind of materialization of the insurance protection, derive from securing the subject of the mortgage loan. Moreover, the statement that "real estate constitutes a significant factor of the society's wealth and real estate management requires knowledge about the value and range of insurance protection" [15] is already to be deemed as fundamental information.

The act of 16th September, 2011 on the protection of the rights of the purchaser of a dwelling or single-family house – the so-called developer act – came into force on 29th April, 2012 [3], and this document is also significant for the insurance sector [12]. Due to the fact that the act defines, among others, a standard developer agreement, it introduces the obligation of preparing an information prospectus and so "the prospectus' inconsistency with the facts can cause termination of the developer agreement and criminal sanctions against the people responsible for the preparation of such a prospectus" [12]. Payments from the people purchasing a flat or a house from a developer become protected, can be accumulated on a housing trust account run by a bank, whereas the buyer will be able to use four kinds of insurance. What can be presented as an example here is the open housing trust account, which "is reinforced by an insurance guarantee (payments of buyers are insured by the developer) or a bank guarantee (a developer has paid a security equal to the payments made by the buyers)" [12]. The bank guarantee or the insurance guarantee expires on the date of signing a notarial deed for an agreement transferring to the buyer the property right free from any encumbrances and third-party claims, except for the encumbrances that the buyer has consented to.

A developer agreement is a civil-law agreement and it consists of two parts, namely the one with the content required by the legislator and the other containing the provisions agreed on by the parties. Besides the basic information included in the agreement, such as e.g. the parties involved, place and date of concluding the contract, the price, information about the property where the development is to take place, including the information about the plot size, legal status of the property together with determining the owner or holder of perpetual usufruct, possible mortgage encumbrances and easements, determining the location, important characteristics of a single-family home or a building where the dwelling unit, constituting the subject of the agreement, is to be located, etc. The agreement should also contain the information mentioned earlier, namely the information about:

- the housing trust account, giving the account number, the rules of disposing of funds accumulated on the account and the costs of running such an account,
- the bank guarantee or the insurance guarantee – if the developer offers this protective measure – giving the name of the bank or the insurer, the guaranteed amount, term of guarantee.

In the appendix to the paper is presented an example of an insurance guarantee agreement on the proper performance of the contract and rectification of faults and defects, on the Polish market offered by InterRisk TU S.A. Vienna Insurance Group, with its registered office in Warsaw, offered by an insurance broker to an entity whose data is secret. The rights resulting from this guarantee cannot constitute the subject of a bank transfer without prior written consent from InterRisk S.A. Vienna Insurance Group, or shall otherwise be null and void. This guarantee shall be returned to InterRisk S.A. Vienna Insurance Group immediately after its expiry.

The following model amounts can be applied in an insurance guarantee on the proper performance of the contract and rectification of faults and defects of an Obligor X[2]:
a) PLN 45 060.41
b) PLN 13 518.12

Example of the periods:
a) 11.09.2014 - 30.12.2014
b) 31.12.2014 - 14.01.2018

[2] The information comes from an insurance broker operating in the Silesian region

Besides the insurance guarantee, being a very useful product, what is also connected with developer activities (and also within the field of general contracting) are the following risks, for which appropriate insurance products should be used:

- construction and assembly risk: the insurance contract covers the value of the performed works, material used, temporary plant and facilities and building machines. The insurance protection covers the investor or substitute investor, general contractor, subcontractors and special purpose vehicles. From time to time, in case of these risks, a clause extending the insurance contract through a loss of profit insurance as well as construction machines and equipment insurance, is applied,
- risk of loss of profit: the insurance contract protects the investor should the necessity arise to cover the losses resulting from the delays in the commissioning of the investment due to the reasons covered by the insurance policy for all the risks of construction and assembly. The insurance covers also the contracting breaks, improper transport, improper storage, disruptions during staging
- civil liability: insurance of damage inflicted to third parties as a consequence of events caused by the construction or assembly works, besides the basic risks it includes also the insurance protection:
- product liability,
- damage inflicted by the subcontractors,
  - damage inflicted by machines that are not subject to the obligatory third-party liability insurance,
  - damage inflicted in underground devices and systems,
  - counterclaims between the entities covered by the same insurance contract.
- personal accidents risk: insurance protection provides the basic financial protection to the construction workers in case of an accident on or off the construction site.
- third party liability insurance for members of the corporate bodies: insurance covers the personal liability of the members of the corporate bodies for the damage inflicted as a consequence of an error or omission committed when performing their function (the insurance protection covers the company's assets, as well as, indirectly, the personal property of the member of the company's body)
- the so-called automobile risk: insurance of the vehicle fleet as the most complete and adequate protection.

4 Conclusions

Summing up, the developer activities, similarly to many other specialized economic activities, generate numerous risk factors. Some of them have more and the other - less significant influence on the developer services and entities participating in them. Some of the identified and assessed risks do not require applying an advanced response method (risk handling methods), namely the risk transfer. However, in most cases the specificity of risks accompanying the real estate, construction, contracting, developer activities requires the use of most structurally, legally and methodologically diligently constructed and, at the same time, the safest method of risk transfer through insurance.

References

[1] Act of April 23rd, 1963 – Civil Code, Journal of Laws No. 16, item 93 as amended art. 46, § 1,

[2] Act of April 23rd, 1963 – Civil Code, Journal of Laws No. 16, item 93 as amended art. art. 283, § 1,

[3] Act of 16th September, 2011 on the protection of the rights of the purchaser of a dwelling or single-family house, Journal of Laws 2011 No. 232 item 1377,

[4] Bac M. (2008), *Istota ryzyka katastroficznego w nieruchomościach* in: *Ubezpieczenia ryzyka katastroficznego*, Collection of articles edited by. I. Jędrzejczyk, S. Bożek-Węglarz, Prace Naukowe Akademii Ekonomicznej w Katowicach, Katowice 2008, p. 31,

[5] Bac M., (2002) *Zarządzanie ryzykiem katastroficznym w nieruchomościach. Rozwiązania ubezpieczeniowe w Polsce i na świecie*, "Dom Organizatora" Publishing house, Toruń 2009, Williams C.A., Smith M.L., Young P. C., *Zarządzanie ryzykiem a ubezpieczenia*, Wydawnictwo Naukowe PWN, Warszawa 2002, pp. 38-39,

[6] Bożek S., (2014), *The meaning of insurance In the enterprise risk management In public finance sector on the example of application of insurance for tax office employees*, in: *Trends of development In the insurance 2014*, University of Economics in Bratislava, Bratislava, p. 47

[7] Bożek S., (2010), *Funkcjonowanie przedsiębiorstw ubezpieczeniowych w warunkach ryzyka. Standaryzacja zarządzania ryzykiem,* Prace Naukowe Uniwersytetu Ekonomicznego w Katowicach, Katowice 2010, pp. 22-25

[8] Bożek-Węglarz S., (2007) *Risk Management Process – Allocate an Appropriate Method by Means of Using a Risk Management Matrix*, in: *The Insurance of Catastrophic Risk in the European Union and the Global Changes*. I. Jędrzejczyk, S. Bożek-Węglarz (ed.), Wydawnictwo Akademii Ekonomicznej w Katowicach, Katowice, p. 111 ff.

[9] Bożek-Węglarz S., (2008), *Functioning of Insurers in Conditions of Catastrophic Risk*, in: *Integration Process and Its Impact on Public and Corporate Finance*, Ninth International Scientific Conference, University of Economics in Bratislava, Bratislava 2008, p. 87.

[10] Chen Z., Khumpaisal S., (2008) *Risks assessment in real estate development: an application of analytic network process,* School Of Built Environment, John Moores University Liverpool, UK, p. 1 ff.

[11] D'Alpaos C., Canesi R., (2014), *Risks Assessment in Real Estate Investments in Times of Global Crisis*, WSEAS Transactions on Business and Economics, Vol. 11, p. 371

[12] "Gazeta Ubezpieczeniowa",www.gu.com.pl, 30.04.2012

[13] General Insurance Conditions of Warta Dom Komfort Plus (2013), TUiR Warta S.A., p. 5, 6.

[14] General Insurance Conditions of Warta Dom Komfort Plus (2013), TUiR Warta S.A., p. 84,

[15] Kawiński M., (2013), *Ubezpieczenia w rozwoju społeczno gospodarczym Polski*, „Wiadomości Ubezpieczeniowe" No. 2, p. 75

[16] Kowalczyk-Rólczyńska P., (2013), *Analiza wybranych czynników wpływających na rynek ubezpieczeń kredytów hipotecznych w latach 2001-2012,* "Wiadomości Ubezpieczeniowe" No. 1, p. 50,

[17] Kowalczyk-Rólczyńska P., (2013), *Analiza wybranych czynników wpływających na rynek ubezpieczeń kredytów hipotecznych w latach 2001-2012,* "Wiadomości Ubezpieczeniowe" No. 1, p. 52,

[18] Michalski T. (2000), *Ryzyko w działalności człowieka* in: *Podstawy ubezpieczeń,* J. Monkiewicz (ed.), vol. 1: *Mechanizmy i funkcje,* Poltext, Warszawa 2000, p. 22,

[19] Shah W., Khan M., Adnan H.,Shazrin A., Azmi M., Nawawi A. H., Rosman M. R., (2014), *Risk Management and Corporate Real Estate Performance* "PARIPEX – Indian Journal of Research" Vol. 3, p 2.

[20] Sitthiyot N., (2011), *Risk Management of Small Real Estate Management Firms.The Study of Residential Real Estate Market in Zurich, Switzerland,* KTH Architecture and the Built Environment, Department of Real Estate and Construction Management Real Estate Management, Stockholm, p. 7

[21] TEGoVA. (2012), *European Valuation Standards 2012*, 7th Edition

[22] Uhruska M., (2009), *Model łańcucha wartości w kontekście zarządzania wartością nieruchomości*, in: *Ryzyko w działalności inwestycyjnej - aspekty teoretyczne i praktyczne*, Collection of articles edited by H. Henzel, Prace Naukowe Akademii Ekonomicznej w Katowicach, Katowice, p. 94,

[23] Węgrzyn J., (2009), *Klauzule waloryzacyjne – możliwość sterowania ryzykiem w mieszkaniowych inwestycjach deweloperskich*, in: Collection of articles edited by H. Henzel, Prace Naukowe Akademii Ekonomicznej w Katowicach, Katowice, pp. 84-85,

[24] Węgrzyn J., (2009), *Klauzule waloryzacyjne – możliwość sterowania ryzykiem w mieszkaniowych inwestycjach deweloperskich*, in: Collection of articles edited by H. Henzel, Prace Naukowe Akademii Ekonomicznej w Katowicach, Katowice, p. 85,

[25] Williams C.A., Smith M.L., Young P. C., (2002), *Zarządzanie ryzykiem a ubezpieczenia*, Wydawnictwo Naukowe PWN, Warszawa, p. 70-71.

APPENDIX

InterRisk TU S.A., acting by order of X (hereinafter referred to as the Obligor) unconditionally and irrevocably guarantees the payment of receivables, subject to the rules specified in this guarantee:

a) within the period from **X** to **Y** up to the amount of PLN....., which the Obligor is obliged to pay to the guarantee Beneficiary on account of the payment of due and payable liquidated damages regarding non-performance or improper performance of the agreement ..... No ..... dated ..... concerning ....., hereinafter referred to as "the agreement covered by guarantee",
b) within the period from **Z** to **W** up to the amount of PLN ..... (say: PLN .....), which the Obligor is obliged to pay to the guarantee Beneficiary in case of lack of rectification or improper rectification of faults and defects revealed within the abovementioned period after acceptance report has been signed,

- if such receivables have not been paid by the Obligor.

The guaranteed amount constitutes an upper liability limit of InterRisk S.A. Vienna Insurance Group, and each payment on account of guarantee reduces the amount paid. This guarantee is valid within the period from X to Y, concerning the proper performance of an agreement and rectification of faults and defects.

The payment of the amount referred to in point 1 is to be made by InterRisk S.A. Vienna Insurance Group within 30 days from the delivery of the guarantee Beneficiary's written claim of payment to InterRisk S.A. Vienna Insurance Group, together with:

1) a written statement that the Obligor has not performed or improperly performed the agreement covered by guarantee and has not made the payment of due and payable receivables referred to in point 1,
2) a written statement that the Obligor has not rectified or improperly rectified faults and defects revealed after the acceptance report has been signed and has not made the payment of due and payable receivables referred to in point 1,
3) a certified true copy of a request for payment of receivables, under point 1a or 1b, sent to the Obligor, together with a proof of posting.

A claim of payment should:

1) be delivered, or shall otherwise be null and void, to InterRisk S.A. Vienna Insurance Group through the bank running the account of the guarantee Beneficiary and such bank shall confirm that the signatures put on the request for payment belong to the persons authorized to incur material liabilities on behalf of the guarantee Beneficiary,
2) be signed by the guarantee Beneficiary or persons authorized by him, including the basis for authorization,
3) be delivered to InterRisk S.A. Vienna Insurance Group at the latest within 3 days after the expiry of the guarantee period, in a written form or shall otherwise be null and void,
4) regard only the due and payable receivables that occurred within the guarantee validity period,
5) contain the designation of the bank account to which the drawing of guarantee is to be made.

Liability of InterRisk S.A. Vienna Insurance Group on account of this guarantee is excluded:

1) if the guarantee Beneficiary delivers a request for drawing of guarantee that is non-compliant with the conditions determined in point 4 and 5,
2) in case of non-existence or revocation of the obligation constituting the subject of the guarantee,
3) regarding any change to the agreement covered by the guarantee, if such a change has not been accepted by InterRisk S.A. Vienna Insurance Group.

The guarantee expires after the lapse of its term and also in the following cases:

1) as of date of the return of guarantee before the lapse of its validity period,
2) as of date of the Obligor's fulfilment of the obligation constituting the subject of guarantee,
3) by means of releasing the Obligor by the guarantee Beneficiary from the obligation constituting the subject of guarantee,
4) by means of releasing InterRisk S.A. Vienna Insurance by the guarantee Beneficiary from the obligation constituting the subject of guarantee,
5) after the payment of a total guarantee amount made by InterRisk S.A. Vienna Insurance Group.

THE EUROPEAN UNION FUNDS AND THE ACHIEVEMENT OF THE OBJECTIVES OF POLAND'S NATIONAL DEVELOPMENT STRATEGY 2020 – ACTIVE SOCIETY, COMPETITIVE ECONOMY, EFFICIENT STATE

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ABSTRACT

A development strategy constitutes a plan which comprehensively defines the goals and priorities for the development of an entity to which it refers. It should comprise the strengths and opportunities that the entity has, while minimizing its internal weaknesses and threats that it faces. Poland's "National Development Strategy 2020. Active society, competitive economy, efficient state" is a document which will play a major role in the process of designing, creating and implementing public intervention supporting Poland's long-term development. The EU Funds provide financial backing necessary for the achievement of most development objectives presented in Poland's Strategy. The effective use of EU funds for the National Strategy 2020 is facilitated by the set of Operational Programmes adopted for the coming years. Furthermore, the fact that the objectives of the National Strategy are in alignment with the flagship initiatives of the UE Strategy Europe 2020 will also contribute to economic growth and the improvement in the quality of life.

Keywords: strategy of development, Poland, European funds

JEL codes: O20, H7

1 Introduction

The development strategy constitutes a plan which comprehensively defines the goals and priorities for the development of an entity to which it refers. It should comprise the strengths and opportunities that the entity has, while minimizing its internal weaknesses and threats that it faces[18]. It is created on micro and mezzo levels, which makes it relevant both for enterprises and regions. Moreover, every national economy should also have a development strategy. The National Development Strategy 2020. Active society, competitive economy, efficient state is a document which should play a major role in the process of designing, creating and implementing public intervention contributing to Poland's long-term development[13].

The European Union Funds, which we have been using as a fully fledged UE member state since 2004, have become an important source of funding for a variety of projects. Their implementation allows for the gradual elimination of disproportions between the Polish economy and more advanced and innovative economies of the so-called old EU member states, which offer their citizens higher standards of living. From this perspective, it is clear that the funds that Poland receives for the co-financing of investment projects offer necessary financial support for the achievement of the majority of development goals defined in the National Development Strategy 2010 (NDS 2020). In the near future, the effective use of EU funds may be decisive in terms of how successfully the development model, which aims at the economic growth and increased quality of life, presented in the Strategy is implemented in practice.

The study attempts to evaluate the contribution of EU funds allocated to Poland for the years 2014-2020 to the achievement of development goals introduced in the "National Development Strategy 2020. Active society, competitive society, efficient state" and the consequential civilization change.

The primary assumption is that the scale and use of the EU funds in the years 2014-2020 will, to a significant extent, be decisive in terms of the achievement of objectives in the Medium-Term National Development Strategy 2020 (the study uses the abbreviations NDS 2020 and MTNDS interchangeably) and contribute to faster and deeper structural changes in Poland.

The study uses descriptive and comparative analysis, supported with the systematization of statistical data.

2 Medium-Term National Development Strategy as a determinant of the national development policy

In the EU, the strategic planning of the socio-economic development is related to the reform known as the Delors Package, implemented in 1989. As a result, both the EU budget and its policies started to be planned in the long-term perspective [19].

Following Poland's EU accession, the National Development Plans were created and they converged with the EU programming periods, while their construction stemmed from the 2004 National Development Plan Act [1].

The National Development Plan 2004-2006 was a document defining Poland's socio-economic strategy in its first years of the EU membership. It offered a reference point for initiatives undertaken drawing solely on domestic funds and acted as a foundation for the creation of the Community Support Framework for Poland, a document defining the directions and contributions from the structural funds towards the achievement of development objectives.[15] Arguably, the prime goal of the document was to acquaint the European Union with the activities which were planned to be financed from the structural funds.

The National Development Plan for the next EU budgetary period of 2007-2013, on the other hand, combined all development projects and activities undertaken in the country. It was a comprehensive programme of the socio-economic growth, co-financed with the EU and national funds [12].

The new development management system in Poland was defined in the amended Development Policy Act of 2006. Pursuant to the Act, a development strategy is a starting point for the creation and implementation of the development policy on national and regional levels. The Act defines the development policy as "a set of mutually related initiatives undertaken and implemented with the aim of achieving sustainable growth in the country, socio-economic, regional and spatial cohesion, increasing the competitiveness of the economy and creating new jobs on national, regional and local levels" [2].

The primary document which shapes the development strategy of the country is, according to Article 9, paragraph 1, of the said Act, a long-term national development strategy, defining the main goals, challenges and directions for the country's socio-economic growth, and embracing the concept of sustainable development. Currently, Poland has the Long-Term Development Strategy Poland 2030. The Third Wave of Modernity (LTNDS) [11]. The document was created in the years 2011-2012 and it accounts for the international context of Poland's situation, which, undoubtedly, is greatly affected by the global economic crisis and its ongoing consequences. A long time perspective, which is the nature of long-term strategies, causes that modifications are unavoidable. This results mainly from changing circumstances in the international

environment, but also evolving domestic conditions. In the case of Poland, the current long-term strategy may be modified in compliance with the current development policy and based on the performance evaluation of the medium-term strategy, namely the National Development Strategy 2020. Active society, competitive economy, efficient state, which will be discussed later in the paper [13].

The new system comprises a number of strategic documents providing the basis for the development policy and linked by the coherent hierarchy of development goals and intervention directions. LTNDS (the Long-Term National Development Strategy), one of the main documents in the system, defines major trends, challenges and the overall concept of the country's development in the long run. Another document is MTNDS (the Medium-Term National Development Strategy), which determines the strategic goals of the country's development until the year 2020 and is of key importance for development initiatives co-financed by the EU funds in the programming period of 2014-2020, which will be the subject of the analysis in this paper. Its prime objective is to reinforce and unleash economic, social and institutional potentials contributing to the faster and more sustainable growth of the country and the improved quality of life for its citizens.

Other important elements are 9 integrated strategies which aim to pursue development goals. They comprise the Strategy for Innovation and Efficiency of the Economy, the Human Capital Development Strategy, the Transport Development Strategy, the Strategy for Energy Security and the Environment, the Efficient State Strategy, the Social Capital Development Strategy, the National Strategy of Regional Development 2010-2020: Regions, cities, rural areas, the Strategy for Development of the National Security System, the Strategy for Sustainable Development of Rural Areas, Agriculture and Fisheries.

It should be noted that the development goals and priorities established in the national strategic documents are a coherent part of the overall EU goals. This applies in particular to their harmonization with the strategy Europe 2020, especially that the documents of Poland's development policy were created at the time of formulating the Strategy's goals of intelligent and sustainable growth facilitating social cohesion – Europe 2020 [6]. What significantly contributed to the coherence of Poland's and EU's goals was the creation of the first draft of the National Reform Plan, adopting the Strategy Europe 2020 to the capabilities of the Polish economy [10].

3 Poland as a beneficiary of the EU Cohesion Policy 2014-2020

Poland is one of these EU member states that are the biggest net beneficiaries of the EU aid allocated within the EU Cohesion Policy. Both in the previous and in the current programming period, the value of the EU support for Poland has also been one of the highest among all EU member states.

The effective use of EU funds from the operational programmes 2007-2013 implemented in Poland is confirmed by the data of the National IT System SIMIK, which show that in Poland until 26.10.2013 as many as 300.1 thousand applications which were formally correct were submitted. The large scale of the use of funds allocated to Poland in the years 2007-2013 is also demonstrated by 103,829 agreements signed with beneficiaries on the co-financing of eligible expenditure, amounting to EUR 68.2 bn, (at an average exchange rate for the period of 2008-2013, EUR 1 = PLN 4.18) which is 101.1 per cent of allocation for the years 2007-2013. The value of expenditure on the side of beneficiaries recognized as eligible reached EUR 50.8 bn.

The experiences of our participation in the first entire programming period of the cohesion Policy were used by the Polish government in the negotiations on the EU forum during the

process of developing the 2014-2020 cohesion policy. As a consequence, Poland was allocated a total of EUR 82.5 bn, more than in the previous period, which is particularly important in the situation when the total EU budget has been reduced. Out of the entire allocation, EUR 76.9 bn will be spent on national programmes, which are the basis of the EU cohesion policy.

In order to improve coordination in using the funds from the Cohesion Policy, the Common Agricultural Policy and the Common Fisheries Policy, the intervention strategy of the EU funds in the current financial framework was comprised in a joint document – a Partnership Agreement (PA). The PA includes: the most important principles of investing EU funds, the kinks between the funds and strategic documents, the breakdown of funds into particular areas and the system of operational programmes, finally, the division of responsibility for managing EU money between the regional and central levels.

Similarly to the previous programming period, the PA implementation instruments are national operational programmes (NOP) and regional operational programmes (ROP). Operational programmes and the Partnership Agreement create a coherent system of strategic and programming documents for the financial framework 2014-2020. Pursuant to the provisions of the Partnership Agreement, in the coming years the UE funds will be invested in projects which have the greatest potential to contribute to the country's development, for example, increasing the competitiveness of Poland's economy, improving the social and territorial cohesion of the country and, finally, enhancing the efficiency and effectiveness of the state [16]. This is reflected in operational programmes 2014-2020, which are presented against the background of the previous financial framework in Table 1.

Compared to the previous programming period, the major change involves using as much as 40 per cent of funds within the Regional Operational Programmes and their co-financing not only from the EU Regional Development Fund, but also from the Cohesion Fund, which is connected with the return to the multifunding of Operational Programmes.[20]

One change is the establishment of a new national programme – Digital Poland – which will be allocated 2.7 per cent of the EU cohesion funds and its primary objective is the reinforcement of the so called digital foundations for the socio-economic growth of the country. The Partnership Agreement identifies the following: wide access to high speed internet, efficient and user-friendly public e-services, and constantly improving digital competences in society. Another change, compared to the previous programming period, involves modifications in the names and scope of intervention in the case of two national programmes. The Operational Programme Knowledge Education Development (OP KED) was launched in response to the need for reforms in the areas of employment, social inclusion, education, higher education, health care and good governance. It replaced the Operational Programme Human Capital and will support social innovation and trans-national cooperation in the above areas. Additionally, it will promote the Youth Employment Initiative in Poland. OP KED will support the following areas: employment and employee mobility, social inclusion and combating poverty, investment in education, skills and life-long learning, improving the efficiency and effectiveness of the state. Moreover, the OP Innovative Economy was replaced with the OP Smart Growth, which will support scientific research, innovative technologies and initiatives increasing the competitiveness of small and medium-sized enterprises. Its primary objective will be to stimulate innovation in Poland's economy through increased private investment in R&D and stronger demand for innovation and research in the business environment.

The Programme will focus on the following areas: establishing new and maintaining the existing connections between the science sector and firms, stimulating innovation in business, improving quality in research and strengthening the position of scientific centres in the European Research Area. Notably, due to a high risk involved in innovative projects, the

financing of scientific research and innovation within OP SG will rely, to a significant extent, on subsidies [5].

It is also worth mentioning that the shares of particular national programmes have changed compared to the previous financial framework. There is a significant increase in the share of the OP Infrastructure and Environment, while the shares of the other national programmes have been reduced, which is confirmed by the data in Table 1.

Table 1 Operational programmes implemented in Poland in the years 2007-2013 and 2014-2020

2007-2013	Sources of funding	share %	Value in billion EUR	2014-2020	Sources of funding	share %	Value in billion EUR
Infrastructure and Environment	ERDF, CF	41.9	27.9	**Infrastructure and Environment**	ERDF, CF	35.34	27.41
Innovative Economy	ERDF	24.9	16.6	**Smart Growth**	ERDF	11.1	8.61
Human Capital	ESF	14.6	9.7	**Knowledge Education Development**	ESF	6.04	4.69
				Digital Poland	ERDF	2.8	2.17
16 regional programmes	ERDF	12.4	8.3	**16 regional programmes**	ERDF, ESF	40.33	31.28
Development of Eastern Poland	ERDF	3.4	2.3	**Eastern Poland**	ERDF	2.58	2.0
Technical Assistance	ERDF	0.8	0.5	**Technical Assistance**	ERDF	0.9	0.7
European Territorial Cooperation	ERDF	-	0.7	**European Territorial Cooperation**	ERDF	0.9	0.7
Total	ERDF, CF, ESF	98% (+2% national performance reserve)	66 (+EUR 1.3 bn)	**Total**	ERDF, CF, ESF	100%	77.56

Source: Based on [5]

4 The importance of EU funds for meeting the challenges of the Strategy Poland 2020. Active society, competitive economy, efficient state

The Report Poland 2030. Development Challenges, published in 2009, initiated a discussion on the principles of development policies in Poland [14]. The challenges and dilemmas that were presented there became a starting point for the debate on the strategic vision of the future based on the experiences of the 20 years of political and economic transformation. The Report offered the genuine opportunity to think strategically and innovatively, formulate the vision and goals and create the tools necessary to achieve the goals.

As a consequence of the Report and the amendments in the development policy act, a new strategic order was established based on the framework of the Long-Term National Development Strategy and the National Spatial Development Strategy. The development goals

of the Long-Term National Development Strategy will be reached through integrated strategies, primarily through the Medium-Term National Development Strategy 2020.

Poland's EU membership determines our participation in EU policies and the resulting consequences. This also affects the way that EU funds are used. An important reference point for the creation of the National Strategy is the European perspective together with the goals stemming from the Strategy Europe 2020. Hence the change of the time horizon of the medium-term strategy. The previous strategy was created for the years 2007-2015 and, in compliance with the Act on the principles of development policy, the change in the time horizon was treated as a modification resulting from changing internal or external conditions.

The MTNDS defines three strategic areas and the corresponding goals.

The first area – Effective and efficient state – involves three goals:

1. Transition from development administration to development management
2. Providing funds for development activities
3. Improvement of the conditions for satisfying the individual needs and activity of citizens

The second strategic area – Competitive economy – comprises as many as seven goals:

1. Strengthening macroeconomic stability
2. Growth of the efficiency of the economy
3. Increasing the innovativeness of the economy
4. Human capital development
5. Increasing the use of digital technologies
6. Energy security and the environment
7. Increasing the efficiency of transport

Finally, the third area – Social and territorial cohesion – embraces three goals:

1. Social integration
2. Providing access and specific standards of public services
3. Strengthening the mechanisms for territorial development balancing and spatial integration in order to develop and make a full use of the regional potentials

Even the cursory analysis of these goals and their comparison with the operational programmes, which will be co-financed with EU funds in 2014-2020, indicates a significant share of EU funds in their implementation. Operational Programmes Infrastructure and Environment, Knowledge, education, development, Digital Poland and Smart Growth all contribute to the achievement of the objectives within the area of the competitive economy. Regional operational programmes, on the other hand, will determine the progress in the achievement of goals in the area of Social and territorial cohesion. Support in this area will also come from the programme Knowledge, education, development, particularly in relation to the goal Social integration.

It no coincidence that the majority of goals within the Strategy Poland 2020 is convergent with the central initiatives of the Strategy Europe 2020. The Strategy towards smart and sustainable development facilitating social cohesion, adopted in 2010, constitutes a crucial strategic document for all EU member states [6]. The goals which are defined in agreement with the EU guidelines and taking into account Polish priorities in the national strategy should increase the effectiveness of initiatives, which would allow for the implementation of the Strategy Europe

2020 together with the National Development Strategy. Although the strategy Poland 2020 was adopted prior to the decisions on the value of EU funds for the member states in the years 2014-2020, it should be stressed that once again Poland received the highest share of the EU aid. This, undoubtedly, means that the EU understands Poland's needs to eliminate the developmental gap, but it also means that Poland's use of the funds allocation so far has been recognised ad our strategic development plan has been approved.

The links between the flagship initiative of the Strategy Europe 2020 and the goals of the National Development Strategy 2020 are presented in Table 2. It is notable that the majority of the areas II and III form an integral part with the central projects of Europe 2020.

Table 2 National Development Strategy 2020 goals and Europe 2020 flagship initiatives

Strategy Poland 2020 goals		**Europe 2020 flagship initiatives**	
Area II Goal 2	Growth of the efficiency of the economy	An industrial policy for the globalisation era	initiative supporting the improvement in the business environment, especially for SMEs, and the development of the strong and sustainable industrial base, prepared to compete globally;
Area II Goal 3	Increasing the innovativeness of the economy	Innovation Union	project improving the framework conditions and access to finance for research and development
Area II Goal 4	Human capital development	1. Youth on the move	1. project aiming to modernise labour markets and strengthen the position of citizens through life-long learning
		2. An agenda for new skills and jobs	2. project aiming to modernise labour markets and strengthen the position of citizens through life-long learning
Area II Goal 5	Increasing the use of digital technologies	Digital agenda for Europe	project aiming to offer universal access to the high-speed internet and enable households and businesses to benefit from a single digital market
Area II Goal 6 and Goal 7	Energy security and the environment Increasing the efficiency of transport	Resource efficient Europe	initiative aiming to decouple economic growth from resource use, move towards low-emissions economy and higher use of renewable energy, modernise transport and promote energetic efficiency
Area III Goal 1 and Goal 2	Social integration Providing access and specific standards of public services	1. An agenda for new skills and jobs	1. project aiming to modernise labour markets and strengthen the position of citizens through life-long learning
		2. European platform against poverty	2. project aiming to build social and territorial cohesion, so that benefits from economic growth and employment can become universally available and people who suffer from poverty and social exclusion can live with dignity and actively participate in society

Source: Based on [3], [4], [7], [8], [9], [11], [17],[21]

5 Conclusions

The spatial framework for the development policy in Poland, including the implementation of particular development strategies, is provided by the National Spatial Development Strategy. The Medium-Term National Development Strategy, on the other hand, is the fundamental document which determines the development objectives for the coming decade. Its significance has increased since it coincides with the financial perspective defines by the EU for the years

2014-2020. Poland's experiences from the programming period coming to an end now and substantial funds allocated for the coming years may imply that the achievement of the MDS 2020 objectives should proceed according to the adopted plans and timetables. This should also be helped by the Operational Programmes, corresponding with particular areas of the Strategy, to be implemented in the coming years and co-financed by the UE funds. Moreover, the National Development Strategy is in alignment with the flagship initiatives of the EU Strategy Europe 2020.

Finally, the factor which will contribute to the achievement of the objectives of both the national and the UE strategy will definitely be an economic upturn expected after a few years of the financial crisis, which affected all UE member states.

References

[1] *Act on the National Development Plan* as of 20 April (Journal of Laws 2004 No 116, item 1206 and Journal of Laws 2005 No 90, item 759)

[2] *Act on the principles of development policy* as of 6 December 2006 codified version (Journal of Laws 2006 No 227 item 1658 Art. 2, later amended)

[3] *An agenda for new skills and jobs: a European contribution towards full employment*, COM(2010) 682 final version, Strasburg, 23.11.2010

[4] *An integrated industrial policy for the globalisation era: Competitiveness and sustainable development in the foreground*, KOM(2010) 614 final version, Brussels, 28.10.2010

[5] EU Funds Portal, http://www.funduszeeuropejskie.gov.pl/2014_2020

[6] *Europe 2020. A European strategy for smart, sustainable and inclusive growth*. KOM(2010)2020 final version, Brussels 2010

[7] *European digital agenda,* KOM(2010) 245 final version, Brussels, 26.8.2010*Long-Term Development Strategy Poland 2030. Third wale of modernity.* Ministra of Administration and Digitization, Warszawa 11 January 2013

[8] *European platform against poverty: to ensure social and territorial cohesion*, KOM(2010) 758 final version, Brussels, 16.12.2010;

[9] *Flagship initiative of the Strategy Europe 2020 Innovation Union*, COM(2010) 546 final version, Brussels, 6.10.2010*Krajowy Program Reform, Europa 2020*, Warszawa April 2011

[10] *Krajowy Program Reform, Europa 2020*, Warszawa April 2011

[11] *Long-Term Development Strategy Poland 2030. Third wale of modernity.* Ministra of Administration and Digitization, Warszawa 11 January 2013

[12] *Narodowy Plan Rozwoju 2007-2013*, Document adopted by the Council of Ministers, Warszawa 6 September 2005

[13] *National Development Strategy 2020 – Active society, competitive economy, efficient state*, Ministry of Regional Development, Warszawa, September 2012

[14] *Polska 2030. Wyzwania rozwojowe,* M. Boni (ed.), Chancellery of the Prime Minister – Strategic Think Tank of the Prime Minister, Warszawa 2009

[15] *Polska - Narodowy Plan Rozwoju 2004-2006*, Document adopted by the Council of Ministers, Warszawa 13 January 2003

[16] *Programowanie perspektywy finansowej, 2014-2020, Umowa Partnerstwa*, Ministry of Infrastructure and Development, Warszawa 21 May 2014,

[17] *Resource efficient Europe – flagship initiative of the Strategy "Europe 2020*", KOM(2011) 21 final version, Brussels, 26.1.2011;

[18] Sulmicka M., (2007) *Strategia Rozwoju Kraju - nadrzędny dokument w nowym systemie programowania rozwoju*, *E-mentor*, vol. 1(18).

[19] Szlachta J., (2005) *Programowanie rozwoju społeczno-gospodarczego w Polsce na tle doświadczeń Unii Europejskiej*, [in:] Problemy ekonomii i polityki rozwoju, J. Stecewicz et al., SGH, Warszawa

[20] Szlachta J (2013), *Wyzwania przed europejską polityką spójn*ości, [in:] *Polityka gospodarcza. W poszukiwaniu nowego paradygmatu*, J. Stecewicz et al., SGH, Warszawa

[21] "Youth on the move*"*, *An initiative to unleash the potential of young people to achieve smart, sustainable and inclusive growth in the European Union*, KOM(2010) 477 final version, Brussels, 15.9.2010;

DEVELOPMENT POTENTIAL OF COMMODITY EXCHANGES IN CEE REGION: CASE STUDY OF THE POLISH WINE MARKET

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ABSTRACT

Instability appearing periodically in the traditional financial markets contribute to an increased interest in alternative investments from private and institutional investors. The dynamic development of alternative markets also includes the wine market. This phenomenon can also be observed in CEE countries. Taking into account the dynamics of wine sector development in Poland, the article verifies the possibility and reasonability of establishing a new commodity exchange for wine producers, merchants, brokers, retailers, importers, exporters and investors from CEE. Based on empirical data of Polish wine prices we show that the quality of the Polish wine is not fully reflected in its prices. The prices of the same wines are also differentiated. However, analysis of commodity exchanges reveals that the size and maturity of the Polish market does not justify establishing such a wine exchange in the short term, but by its continued rapid growth it may turn out to be legitimate in the future.

Keywords: commodity exchanges, Polish wine market, econometric modeling of wine quality

JEL codes: G12, L11

1 Introduction

Instability appearing periodically in the traditional financial markets contributes to an increased interest in alternative investments from private and institutional investors. This is reflected i.a. in the growing development of commodity exchanges, where a wide range of standardized contracts are traded. The dynamic development of the alternative markets also includes the wine market. This phenomenon can also be observed in CEE countries. However due to the historical conditions the level of development of local stock exchanges and commodity exchanges in these countries substantially differs from that in developed countries. Among alternative assets there is an increasing potential for wine commoditization. As for now, the only professional marketplace exclusively dedicated to listing and trading fine wines is Liv-ex located in London. Taking into account the dynamics of wine sector development in Poland, the article attempts to verify the possibility and reasonability of establishing a new commodity exchange, operating as a transparent, efficient and safe marketplace for wine producers and investors from CEE.

2 Wine markets literature review

The global wine production has been dominated by the "Old World" winemakers from France, Italy and Spain for decades. Recently producers from the USA, China and countries from the

southern Hemisphere (Argentina, Chile, Australia, New Zealand, RPA etc.) began to play an increasingly important role in the wine industry, see Table 1. There are also representatives of CEE region: Romania, Hungary, Bulgaria and Croatia which are among the world's 20 largest wine producers. This fact should not be surprising taking into account the venerable tradition of viticulture in this area. From the enological point of view Poland can be also classified into the group of countries with rich historical experience in the field of vine cultivation and winemaking. According to archaeological excavations, the earliest vineyard residues discovered on the slopes of the Wawel Castle in Cracow date back to the turn of the IX and X century AD, [13]. Over the centuries, Polish viticulture has repeatedly suffered from numerous political and economic perturbations. The transformation of the economic system and integration with EU have created a stable environment for restoration of domestic wine industry and provided positive outlook for its dynamic development in the future.

Table 1 Wine production (excluding juice and musts) in 1000 hl (1)

	2010	2011	2012	2013	2014	2014/2013	Ranking
France	44,381	50,757	41,548	42,004	46,151	10%	1
Italy	48,525	42,772	45,616	52,429	44,424	-15%	2
Spain	35,353	33,397	31,123	45,65	37	-19%	3
United States (2)	20,89	19,14	21,74	23,5	22,5	-4%	4
Argentina	16,25	15,473	11,78	14,984	15,2	1%	5
Australia	11,42	11,18	12,26	12,31	12,56	2%	6
China (3)	13,000	13,200	13,810	11,780	11,780	0%	7
South Africa	9,327	9,725	10,568	10,98	11,42	4%	8
Chile	8,844	10,464	12,554	12,846	10,029	-22%	9
Germany	6,906	9,132	9,012	8,409	9,725	16%	10
Portugal	7,148	5,622	6,327	6,238	5,886	-6%	11
Romania	3,287	4,058	3,311	5,113	4,093	-20%	12
New Zealand	1,9	2,35	1,94	2,48	3,2	29%	13
Greece	2,95	2,75	3,115	3,343	2,9	-13%	14
Brazil	2,459	3,46	2,967	2,71	2810	4%	15
Hungary	1,762	2,75	1,776	2,667	2,734	3%	16
Austria	1,737	2,814	2,125	2,392	2,25	-6%	17
Bulgaria	1,224	1,237	1,442	1,755	1,229	-30%	18
Switzerland	1,03	1,12	1	840	900	7%	19
Croatia	1,433	1,409	1,293	1,249	874	-30%	20
OIV World Total (4)	264,372	267,243	256,222	287,6	270,864	-6%	

(1): Countries for which information has been provided with a wine production of more than 1 mhl
(2): The International Organisation of Vine and Wine (OIV) estimate (USDA basis)
(3): Report for the year 2013, 2014 figures not yet available
(4): Range used for 2014 world production: 266,2 mhl to 275,5 mhl

Source: [11]

According to the data recorded by the Polish Agricultural Market Agency (ARR) – a public institution responsible i.a. for carrying out activities aimed at supporting and maintaining economic balance in the Polish agri-food sector, exercising supervision over manufacturing of agricultural products under the EU-Common Agricultural Policy and keeping registers of wine

producers – the local wine production has grown at a strong rate over the last 6 years, see Table 2. The upward trend in the wine market is expected to continue during forthcoming years.

Table 2 Polish wine market

Production year	2009	2010	2011	2012	2013	2014	Change (2009=100)
Number of producers	21	20	26	35	49	76	262%
Total cultivated area under vines (ha)	36.05	37.013	58.6	97.879	99.49	134.348	273%
Wine production (hl)	412.490	437.130	428.470	898.254	1,978.950	3,392.000	722%

Source: unpublished data from Polish Agricultural Market Agency

Although the volume of wine production in Poland differs substantially from quotas reached in other countries, even within CEE region, there are many indications to anticipate further expansion of domestic wine-making in Poland. The most important reasons seem to be the size of the country's wine market, its development potential measured by the wine consumption per capita (WCPC) indicator, changes in consumer preferences for alcoholic beverages (in favor of wine), consumers' growing awareness of product origin, sustainable fashion for organic products of Polish farms and increasing popularity of enoturistic activities. According to the data disseminated by Nielsen Corporation, a global marketing research firm which monitors the polish alcoholic beverage market, 114 million hl of wine was sold in Poland in 2013, [14]. The development potential is still high, looking at the difference between WCPC in the world's biggest wine consumers where it exceeds the level of 40 l, and in Poland where it fluctuates around 3 l a year. The distribution landscape is one of the key determinants of the wine market's efficiency and capability to expand. In this area the Polish wine market is highly fragmented, with as many as 800 companies active in 2013, [12]. Due to its distribution structure the Polish wine market resembles the global market. The main channels are formed by super- or hypermarkets and on-trade businesses like restaurants, bars, hotels etc. The only difference in the wine distribution channel structure reveals in an inverse proportion of retail market representatives such as independent retailers and specialist retailers, see Table 4. For smaller wine producer the valuable sales channels include enotourism, internet sales, regional wine trade fairs and promotional events.

Table 4 Distribution landscape of the wine market

Wine market distribution channel	% share, by volume, 2012	
	Poland	Global
Supermarkets, hypermarkets	37.9%	40.6%
Independent Retailers (PL)/ Convenience Stores (global)	29.4%	4.4%
On-trade	20.4%	27.8%
Specialist Retailers	8.1%	20.3%
Other	4.1%	6.8%
Total	100%	100%

Source: [5], [6]

2.1 Commodity markets

Similar to other commodities, the wine market is an arena of constant interaction between supply and demand from market participants interested in price setting and physical delivery of goods. With ongoing liberalization and globalization of international trade, resulting in growing numbers of market participants and transaction volume, the market mechanism improves information transmission and stimulates price discovery contributing to reducing transaction costs, [3]. In some other agricultural commodity markets (e.g. wheat, soybeans, coffee, cocoa), parallel to the spot and forward transactions requiring the actual delivery of the product, many cash-settled futures and options contracts are traded. Such trade takes place on specialized international or regional commodity exchanges on the basis of standardized contracts with respect to quantity, quality, settlement dates and delivery requirements. Such contracts can serve a variety of functions related to financing, risk management and marketing including managing price risk, reducing counterparty risk, enhancing price transparency, reducing risks related to collateral value, certifying quality of commodities or providing effective access to national capital markets through the use of repo schemes guaranteed by their clearing systems, [2]. It is also important to mention, that a stable commodity derivatives exchange requires permanent balancing of all traders' activities. When speculators become the dominant force the market equilibrium may be disrupted leading to irrationally exuberant price levels, [7]. Beside the global commodity exchange groups (like CME Group with CME, CBOT, NYMEX and COMEX) operating worldwide and enabling access to agricultural derivatives for international hedgers, speculators and arbitrageurs, numerous local commodity exchanges offer services tailored to domestic investors. This is the case of some commodity exchanges in CEE. Due to their weak organizational and financial strength they do not play a meaningful role as the transaction platform. For investors from non-euro countries, such as Poland, Hungary or Romania, their main advantage lies in offering instruments denominated in national currency which results in avoidance of foreign exchange risk exposure. Due to characteristics such as price varying over time and exposure to exogenous risks (lying outside of the firm or sector of economic activity) wine is predestined to commoditization, [9]. Depending on its quality, determined mainly by wine origin and vintage, it can be treated strictly as the consumption good or investment asset that stores value. Taking into account the numbers of wine market actors interested in streamlining the price discovery process, its inclusion into the listings on commodity exchanges seems to be justified. At present, there are many marketplaces named "wine exchange" (e.g. The New York Wine Exchange, The San Francisco Wine Exchange, The Hong Kong Wine Exchange, The Wine Exchange Asia) serving mostly as internet platforms offering wines at fixed values or in auction mode than developed commodity exchanges with inherent price dynamic. As for now, the most recognizable and meaningful exchange exclusively dedicated to listing and trading fine wines is Liv-ex established in 1999 in London. It operates by providing access to the pool of 440 global buyers and sellers specializing in wines originated mainly from the Bordeaux region having potential to appreciate in value and strongly demanded in the secondary market. The company also computes indices reflecting the current trends on the fine wine market (Liv-ex Fine Wine 50, Liv-ex Fine Wine 100, Liv-ex Fine Wine 1000, Liv-ex Bordeaux 500, Liv-ex Fine Wine Investable) which can serve as underlying for derivatives products or benchmarks for portfolio managers. Some detailed characteristics of Liv-ex exchange are presented in Table 5.

Table 5 Liv-ex characteristics

	Characteristics	Exchange
Opportunities	Number of live wines listed	4,500
	Value of live offers	£18m
	Value of live bids	£5m+
	Daily price changes	20,000
	Lines of current and historic price data	25 million
Assurance	Standard In-Bond contract	yes
	Number of active Counter Parties	440
Efficiency	Cost of trades	1% to 2.5%
	Trading process	Live and on-line
	Settlement – on-time and in-full	94%+
Other	Private clients	Not applicable
	Stock held	Not applicable

Source: www.liv-ex.com (downloaded at 12-11-2014)

3 Data and Methodology

We empirically verified two hypotheses on the Polish wine market in this paper:

- There are unique prices in the Polish wine market (*Hypothesis H1*),
- Prices of Polish wines depend on wine quality (*Hypothesis H2*).

In the hypothesis H1 we postulate that a price of the same bottle of wine should not differ substantially due to the sales channel. To verify this hypothesis we investigated the prices (in Polish Zloty) of the Polish wines offered by internet wine shops. Based on the publicly available information we gathered prices of 212 different wines produced in 22 vineyards from different regions of Poland. We queried 10 internet shops that offer Polish wine for the following information: vineyard, vintage, price and vine stock composition. Additionally we gathered the prices of wines from previous years using the internet archive. We first analyzed the price differences of the same wine bottles offered by different internet shops. Bottles of wine were identified by the name, vintage, vineyard and type (whereas the type is defined as white, rose or red wine). This additional criterion was necessary due to the fact that some wine producers use the same name for red and white wines. We identified 20 cases where wine was offered by 2 or more internet shops. In each such case price variation (defined as standard deviation of prices divided by the mean price) is calculated. In the second step mean variation was calculated: mean price deviation = 6,8% and standard deviation of price deviation = 5,9%. We can observe that prices of the same bottle of wine differ on average by 6,8% from the mean price. As mentioned in [1] “it might seem a daunting task to determine the quality of each”. However, we follow the same approach, namely we analyze and compare weather conditions and relevant wine prices of the same vintage. The main assumption is that the better the weather conditions the higher is the wine quality and thus the higher wine prices of the vintage. Such assumption is verified [1] based on Bordeaux wines. An extension of this method can be found in [4]. We follow the same approach, however, we made two modifications. First, we adopt the weather factors used in the model based on the potential for climatic differences such as insolation and temperature, which are the most important factors for grape quality in Poland.

Rainfall, however, is not considered as important as insolation and temperature, [8]. Secondly, as the data available for analysis is sparse (meaning not all vintages of the same wine are represented) and heterogeneous (different vineyards, wine stocks and wine internet shops) we follow a different analytical approach. Specifically, for all 21 cases of the same wine (however produced in different years) sold by the same internet shop we make binary comparisons (based on its price). Historical weather data is downloaded from the web page www.wunderground.com. The data contains the daily information on such weather parameters as average, maximal and minimal temperatures, cloud cover and events: rain, snow, and thunderstorm activity for 4 locations: Kraków, Rzeszów, Lublin and Zielona Góra. The locations are chosen based on data availability and proximity to wine regions in Poland. We define vintage as a period from 1st October until 30th September of the consecutive year. Following weather factors are constructed for each vintage:

- Factor.1: Average daily temperature in the vegetation period from 1st April until 30th September
- Factor.2: Sum of the active temperatures (SAT) in the vegetation period whereas daily active temperature are defined as average daily temperature only if this is equal or greater than 10°C. Otherwise it is assumed to be 0°C.
- Factor.3: Average cloud cover in the vegetation period (Cloud cover is expressed in 1/8th of the cloud covered. For example cloud cover of 4 means that 4/8 of the sky was covered by clouds)
- Factor.4: Average daily temperature in September
- Factor.5: Average cloud cover in September

As we can observe in Table 6 the vintages 2009, 2011 and 2012 are better, with respect to weather conditions, than the other vintages presented in the table.

Table 6 Values of weather factors for vintages 2008-2014

Vintage	Factor.1	Factor.2	Factor.3	Factor.4	Factor.5
2008	15	2492	4.2	12.6	4.3
2009	15.6	2750	3.1	15.2	3.2
2010	15	2488	3.9	12.2	4.3
2011	15.6	2714	3.3	15.3	3.5
2012	15.8	2755	3.2	14.4	4.3
2013	15	2650	3.6	12.1	4.6
2014	15.5	2693	3.2	15.2	3.5

Source: own calculations conducted in R

Additionally these 4 locations are also compared among each other, see Table 7 (we have not used 2008 vintage as for Zielona Góra only historical data starting from 2009 was available). We can observe that the weather conditions in Wrocław (Dolnośląskie) are the most favorable for wine growing.

Table 7 Values of weather factors for vintages 2008-2014

Region	City	Factor.1	Factor.2	Factor.3	Factor.4	Factor.5
Małopolskie	Kraków	15.4	2675	3.4	14.1	3.9
Podkarpackie	Rzeszów	15.7	2722.5	3.7	14.1	3.9
Dolnośląskie	Wrocław	15.9	2779.7	3	14.8	3.3
Lubuskie	Zielona Góra	15.6	2728.3	3.7	14.3	3.8

Source: own calculations conducted in R

First, we identified 17 cases where the same wine (having however at least two different vintages) is sold in the same wine shops. In each case, variation (standards deviation of price divided by the mean price) was calculated. In the second step the mean variation was calculated: mean = 7,1% and standard deviation = 9,6%. We can observe the differences between wines due to its vintages although they are of moderate magnitude.

In the following Tables 9 and 10 we present the results of the binary comparisons (21 comparisons) among wines from different vintages. All the cases of different price are shown in the Table 8. For example the value of 1 in the second row and first column means that the same wine from 2009 vintage was higher than this of 2008 vintage in exactly 1 case.

Table 8 Binary (higher price relation) comparison matrix

	2008	2009	2010	2011	2012	2013
2008	0	0	0	0	0	0
2009	**1**	0	0	0	0	0
2010	0	1	0	0	0	0
2011	0	0	3	0	2	1
2012	0	0	0	3	0	0
2013	0	0	2	0	1	0

Source: own calculations conducted in R

All the cases of equal price are shown in the Table 9. The value of 2 in the fourth row and sixth column means that the same wine from 2011 vintage was equal to this of 2013 vintage in 2 cases.

Table 9 Binary (equal price relation) comparison matrix

	2008	2009	2010	2011	2012	2013
2008	0	0	0	0	0	0
2009	0	0	1	0	0	0
2010	0	1	0	0	1	0
2011	0	0	0	0	0	**2**
2012	0	0	1	0	0	3
2013	0	0	0	2	3	0

Source: own calculations conducted in R

We analyze the results further using a similar approach as in [10], namely the analytic hierarchy process (AHP). Based on binary comparisons, we get the average relative price level between the same wines from different vintages. These results are shown in Table 10. For example 0.93

in the first row and second column means that the prices of wines from 2010 vintage are on average 93% of the prices from 2011 vintage. The value of 1.08 in the second row and first column is simple inverse of 0.93.

Table 10 Relative wine price levels of different vintages

	2010	**2011**	**2012**	**2013**
2010	1	0.93	1	0.98
2011	1.08	1	1	1.03
2012	1	1	1	0.97
2013	1.02	0.97	1.03	1

Source: own calculations conducted in R

Based on this information we calculate the values of the highest eigenvalue 4.047 and the appropriate eigenvector: [0.253, 0.25, 0.249, 0.248]. The consistency coefficient calculated according to formula (1), amounts to 0.0157.

$$CC = \frac{\lambda_n - n}{n - 1} \tag{1}$$

n – matrix dimension (number of observations), see Table 10
λ_n – highest eigenvalue

The results now suggest wine price differentiation due to the vintage. However such differentiation should be observed due to different weather conditions and the resultant difference in wine quality. Using the binary comparisons, we have also compared the prices of the same wines over time. In 13 of 14 cases the price remains the same. The last analysis we do is to compare the relative wine prices in different regions of Poland (we use voivodships as the primary grouping criterion. Additionally Dolnośląskie and Śląskie as well as Lubelskie i Świętokrzyskie are grouped together)

We construct, based on grape stocks, similarity and characteristics 6 wine categories, grouped as follows:

Table 11 Wine groups

Group	**Wine 1**	**Wine 2**	**Wine 3**	**Wine 4**
1	Sibera	Riesling	Hibernal	Johanniter
2	Seyval Blanc	Muscat Odeski		
3	Solaris			
4	Rondo	Regent		
5	Marechal Foch	Leon Millet		
6	Pinot Noir			

Source: own grouping

We can observe that there are regional differences in wine process, see Table 12. The ordering of the mean prices in each region is somehow correlated with weather conditions. However based on earlier results we suspect that this may actually be caused by the average area of the vineyard (the higher the area the higher is the wine price offered by the vineyard).

Table 12 Average wine prices for vintages 2008-2013

Category	Area	Number	Mean price	Category	Area	Number	Mean price
1	Lubuskie	2	65	**4**	Lubuskie	6	72.67
1	Śląskie	7	55	**4**	Śląskie	1	65
1	Świętokrzyskie	23	53.7	**4**	Świętokrzyskie	8	62.5
1	Podkarpackie	1	53	**4**	Podkarpackie	2	61
1	Małopolskie	8	48.36	**4**	Małopolskie	9	43.32

Source: own calculations conducted in R

4 Conclusions

We verified the rationale and potential of establishing a wine exchange for CEE wines. Based on empirical research of wine prices we assume that such an exchange would both increase the market transparency (prices closer related to the wine quality) and would cause the wine prices to be more uniform as well. It would also contribute to market education. On the other hand the examples from more mature countries (e.g. UK and France) with regard to wine production, consumption and trading, suggest that the CEE does not possess the scale and maturity to make establishing such a wine exchange possible in the near future.

Regardless of the negative conclusions on the possibility of establishing a wine exchange in CEE countries, some issues can be raised. First, the CEE wine market has both a limited scale due to relatively small number of producers and field of viticulture and relatively high heterogenity of wine stocks planted as well. Therefore higher degree of cooperation and unification of the vinification process is required in CEE countries. Secondly, to limit the information asymmetry between wine producers and consumers by independent wine rating system, such as Parker Points, adapted to local conditions could be established. Such rating system can be supported by objective statistical models taking into account local weather conditions (micorclimat) and soil conditions.

In the article we also propose to use an alternative to the classical regression model taken by Ashenfelter and apply another approach similar to Analytic Hierarchy Process. Specifically, based on the binary comparisons we build the relevant matrix and calculate the highest eigenvalue and relevant eingenvector. We believe that such approach is better suited to the sparse and heterogeneous data.

Our further research will concentrate on extension of our study to other CEE wine markets. Furthermore we will, based on market microstructure, investigate the potential for the simplification of the order execution process. Currently necessary wine case quality appraisals, as at Liv-ex, as well as transactional costs limit the trade potential only to investment wine.

Acknowledgments

We would like to thank Piotr Burkot and Polish Agricultural Market Agency (Agencja Rynku Rolnego) for data provision. We also greatly benefited from cooperation with Polish Women and Wine association (Kobiety i Wino) as well as from discussions with Michał Kurtyka on Burgundy wine region as well as with Paweł Woźniczka and Stefan Dunin-Wąsowicz on the Polish wine market. As always in such cases all imperfections and remaining errors are ours. The research was supported by statutory means of Cracow University of Economics.

References

[1] Ashenfelter O. (2008), Predicting the quality and prices of Bordeaux wine, *The Economic Journal*, Jun2008, Vol. 118, Issue 529

[2] Belozertsev A. – Rutten L. – Hollinger F. (2011), Commodity exchanges in Europe and Central Asia. A means for management of price risk, *Working Paper*, FAO Investment Centre, www.fao.org (downloaded at 13-11-2014)

[3] Han L. – Liang R. – Tang K. (2013), Cross-market soybean futures price discovery: does the Dalian Commodity Exchange affect the Chicago Board of Trade?, *Quantitative Finance*, 2013, Vol. 13, No. 4

[4] Jones G. – Storchmann K-H.. (2011), Wine market prices and investment under uncertainty: an econometric model for Bordeaux Crus Classes, *Agricultural Economics,* Nov 2001, v. 26 (2)

[5] MarketLine (2013a). Wine Industry Profile: Poland, August 2013

[6] MarketLine (2013b). Wine Industry Profile: Global, August 2013

[7] Masters M. – White A. (2011), How Institutional Investors Are Driving Up Food And Energy Prices. in: Excessive Speculation in Agriculture Commodities: Selected Writings from 2008–2011, Institute for Agriculture and Trade Policy, April 2011

[8] Myśliwiec R. (2013), *Uprawa winorośli*, Powszechne Wydawnictwo Rolnicze i Leśne Warszawa

[9] Pichet E., Who killed the WINEFEX? Autopsy of the Bordeaux wine futures contract, article available at SSRN: http://ssrn.com/abstract=1588753 (downloaded at 12-11-2014)

[10] Saaty T. L. (1980), *The Analytic Hierarchy Process*, McGraw Hill International

[11] Smith E., OIV confirms France as world's top wine producing country, www.harpers.co.uk, 27-10-2014, (downloaded at 10-11-2014)

[12] Meininger Verlag (2014), The Polish market fast track, www.meiningers-weinsuche.com. (downloaded at 14-11-2014)

[13] Wawro E. (2011), *Winnice w Polsce*, Warszawa: MULTICO Oficyna Wydawnicza

[14] Woźniak B. (2014), Rynek wina w Polsce ma duży potencjał do dalszego wzrostu, www.portalspozywczy.pl, 13-06-2014 (downloaded at 12-11-2014)

COST-BENEFIT ANALYSIS – BASIS FOR EVALUATION OF EXTERNAL COSTS IN TRANSPORT SECTOR

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ABSTRACT

Outcomes of the Cost-Benefit Analysis can be used as a basis for pricing strategies in the transport policy. Cost-Benefit Analysis enables to increase effectiveness of Public projects implemented in the transport sector.

Keywords: externality, internalisation, financial analysis, economic analysis, public investment

JEL codes: H4, H5, R48

1 Introduction

External costs have a significant influence on the economy. External costs of transport are connected with the following four different modes of transport (each of them are differentiated for passenger and freight transport):

1. Rail: passenger, freight (diesel and electric traction),
2. Road: passenger, freight (light duty vehicles – LDV and heavy duty vehicles – HDV),
3. Air transport: passenger aviation, freight aviation,
4. Waterborne (Maritime and Inland waterways): passenger, freight.

It is necessary to identify the main types of external costs. There are six core external costs of transport categories:

1. Accidents,
2. Air pollution,
3. Climate change,
4. Noise,
5. Congestion and delay costs,
6. Biodiversity.

Internalisation these impacts enables increasing effectiveness in the transport sector. Furthermore, one of the main focus points of the EC Greening Transport Package from 2008 includes a strategy in order to internalise the external costs of transport. [1]. Also in the latest White Paper of Transport presented by the European Commission in March 2011, internalisation of external costs is mentioned as one of the key policy lines. Therefore EU-countries have to take into account this fact. One of the most used tool for the purpose of

internalisation of external costs is cost-benefit analysis. It is applied mainly in the financing of the transport infrastructure projects.

2 Result and discussion

Fundamental to understanding of basic principles of Cost-Benefit analysis is the description of its general concept. This procedure enables explanation of individual components used in Cost-Benefit analysis as well.

2.1 General concept of Cost-Benefit analysis in the European Union

Cost-benefit analysis (CBA) is one of the complex models for assessment of the investment projects. [2]. This instrument has a significant role in the transport policy therefore. CBA as part of assessment of the investment project´s effectiveness should provide evidence that the project is [3]:

- desirable from a socio-economic point of view. This is demonstrated by the result of the economic analysis and particularly by a positive Economic Net Present Value,
- consistent with the economic (transport) policy goals,
- in need for co-financing from public funds, which means existence of a funding gap (negative financial net present value). This requirement is demonstrated by the financial analysis.

The reference period for all transport projects is usually 30 years, but minimum 25 years (including the construction period). The reference period consists of two periods:

- investment (construction) period in which the investments are expended and projected infrastructure constructed. This period is connected with funding of investment cost,
- operation period, i. e. the period connected with spending of operating costs and generation of operating revenues.

Generally, there are two types of prices, which may be used for the valuation of particular project components:

- constant prices

Constant prices represent value of investment costs at the price level of particular year (usually the first year of the reference period). This means that inflation is eliminated from the analysis.

- current prices

Current prices determine the value of investment costs in prices actual for the respective year of the reference period. These prices include the inflation.

CBA is performed using an incremental method. It presents comparison between the amount of costs and benefits between the project scenario and the scenario without the project. There are three essential of cost-benefit analysis - financial analysis, economic analysis and sensitivity and risk analysis (each of them as a one separate part).

2.2 Financial analysis

Financial analysis is the key part of the CBA. Its purpose is to assess the project´s eligibility for co-financing from public funds and determine the degree of co-financing. This final purpose is met through system of financial indicators based on the cash flow forecast of the project. The

two main financial indicators resulting from the financial analysis are Financial Net Present Value (FNPV) and Financial Internal Rate of Return (FRR). The financial analysis as well as the whole CBA is a theoretical concept which is based on certain assumptions and rules:

- only cash inflows and cash outflows are included in the analysis. This means that financial costs or revenues not linked with flows of financial resources (e. g. depreciation, provisions) may not be included in the analysis,
- only incremental cash flows (i.e. cash inflows and outflows raised through the realization of the project) should be included. These may be calculated as the gap in the cash flows of the project scenario and scenario without project,
- appropriate discount rate should be used to calculate the present value of cash outflows and inflows incurred in different time intervals.

Generally we can say that negative value of indicator NPV indicates that investment project needs co-financing.

2.3 Economic analysis

Economic analysis enables to assess the extent to which the project meets its social and macro-economic objectives and quantify the contribution of the project to the public welfare. The major indicators used to assess this contribution are Economic Net Present Value (ENPV) and Economic Internal Rate of Return (ERR).

The major difference to financial analysis (in terms of scope) is fact, that while the financial analysis is made on behalf of the owner of the infrastructure, economic analysis is made on behalf of the whole society. [4]. This basic difference results in some significant adjustments regarding the components included in each of the analysis, their valuation and the discount rates used. In this case is used so called social discount rate and it is normally higher than financial discount rate. [5]. The positive value of ENPV indicates that public investment project is effective relative to society. This conclusion of the economic analysis has its rational background - the costs and benefits raised by the project to the whole society are wider than those raised only to the owner of infrastructure.

Value of the costs and benefits for whole society may differ due to the fact, that part of the value represents only transfer within the society and has to be eliminated in the economic analysis. Social value of employed resources may vary from the market prices used in the financial analysis due to ineffectiveness of markets and their deformation (e. g. due to insufficient competition resulting from monopoly). This distortion may be eliminated through the usage of conversion factors which convert the market prices to accounting prices.

In addition, some inputs of the economic analysis simply do not have their active market, hence has no available market price. Social value of these factors may be quantified through their monetization. In the last years some studies has been carried out and published in order to execute appropriate quantification of external (non-market) effects for the purpose of CBA. There are some examples of these studies used in the European Union - the EU Handbook on external costs of transport – HEATCO Study, CAFE CBA, NEEDS, IMPACT, ASSET [6]. The most used document used for the preparation of Cost-Benefit Analysis in the Slovak Republic is HEATCO Study (Developing Harmonised European Approaches for Transport Costing and Project Assessment, 6th Framework Programme).

2.4 Sensitivity and risk analysis

Both the financial and economic analysis represents calculation of complex indicators based on the forecasted cash flows or benefits and costs. As the input for this calculation is only forecast, it is linked with significant uncertainty which results in risk that the actual value of the key financial and economical indicators will vary from the projected values.

As a result, the sensitivity and risk analysis are to be included in the CBA. Risk analysis represents the extension of sensitivity analysis. Its purpose is to understand the probability distribution for critical variables, analysis of risk resulting from the distribution, assessment, if the risk is within the acceptable range and management of this risk.

2.4.1 Sensitivity analysis

Purpose of the sensitivity analysis is to quantify the sensitivity of the indicators to the variations in particular variables and identify the critical variables. Critical variables are those which may cause major variations in projected financial and economic indicators. Special form of the sensitivity analysis is the scenario analysis. While in sensitivity analysis the impact of each parameter is tested separately from the other parameter, scenario analysis provides complex overview of combined impact of changes in more variations.

2.4.2 Risk analysis

Preparation of the probability distribution for each of the critical variables is the next step in the assessment (and management) of the project´s risk. Data for probability distribution may be derived from various sources: risk workshops, experiments, already realized similar projects, consultations with experts, statistical analysis and transfer of information from other countries or projects. Once the probability distributions for critical variables were established, next step is to calculate probability distribution of the financial and economic indicators (Net Present Value and Internal Rate of Return). This may require usage of simulation models, like Monte Carlo method.

3 Conclusions

Several Eastern European countries joined the EU and their fast developing economies have significant impacts on the transport systems. They have been forced to consider these impacts. Outcomes of the Cost-Benefit Analysis can be used as a basis for pricing strategies in the transport policy. This instrument is applied especially in the processes concerning transport investment projects implemented from the EU-funds in the Slovak Republic.

References

[1] http://ec.europa.eu/transport/strategies/2008_greening_transport_en.htm.

[2] GAYER, T. - HARVEY, S. ROSEN. 2010. *Public Finance*. New York: Published by McGRAW-HILL COMPANIES, 2010. pp. 152 - 178. ISBN 978-007-126788-5.

[3] OECD.1995. *The economic appraisal of environmental projects and policies - a Practical Guide*. Paris: Published by Institut pro ekonomickou a ekologickou politiku VŠE v Praze with approval of Head of Publication Service, OECD, 2000. pp. 27-33. ISBN 80-245-0009-4.

[4] JÍLKOVÁ, J. - PAVEL, J. - SLAVÍK, J. - VÍTEK, L. 2006. *Poplatky k ochraně životního prostředí a jejich efektivnost*. Praha: Published by Eurolex Bohemia, 2006. pp. 14 - 15. ISBN 80-7379-002-5.

[5] GAYER, T. - HARVEY, S. ROSEN. 2010. *Public Finance*. New York: Published by McGRAW-HILL COMPANIES, 2010. pp. 160 - 161. ISBN 978-007-126788-5.

[6] CE DELFT - INFRAS - FRAUNHOFER ISI. 2011. *External Costs of Transport in Europe - updated Study*. Oude Delft - the Netherlands: Published by CE Delft, 2011. pp. 24 - 27. Code 11-4215-50.

THE ROLE OF PUBLIC EXPENDITURES IN ECONOMIC GROWTH. ALBANIA CASE

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ABSTRACT

Public expenditure effects are important for the economy. This paper aims to present the theoretical views about the relationship of public expenditure and growth and also to analyze management of public investment in Albania. Many economists have argued that a big public sector is not necessarily efficient. Expenditures policy in Albania has tended to function for the development of the country. However there are problems associated with the management of expenditures. The paper will focus on historical view about the size of the public sector and also a brief summary of literature relationship between public expenditure and economic growth.

Keywords: public expenditures, management of public investment, public sector, economic growth

JEL codes: H50

1 Literature Review

1.1 The importance and size of the public sector

In view of the public economy, three public sector activities that are of particular interest are: government spending, government taxes and government regulation on private market activities. A fourth activity, equally important in the public sector activity, which should not be forgotten is debt financing, in other words the power of state for borrowing. To clearify this indicator is given total expenditure in % of GDP. In this indicator, Albania has shown small fluctuations. In 2002 this indicator was 30.9% whereas in 2012 this figure was 27.2%.

The presence of the state in the economy has changed over time and from state to state. This has come as a result of social changes, market conditions and technological development. In 1870 in France and Italy the level of public expenditure is calculated as 13% of GDP. In the US this level was even lower. At that time the role of the state in the economy was focused only on functions such as defense, justice and public works. In the coming years the attitude towards the role of the state in the economy began to change. In 1926, Keynes proposed the expanding of the role of state. There is much debate about whether the large increase in public spending, especially during the past 50 years, has really contributed to the growth of the welfare of the majority of citizens, or if people would have been better with less public spending , which would have left them with more after-tax income, but less government services [4].

Authors have collected data about government spending and the Human Development Index for the 20 countries of the world [13]. From this analizing, these countries that have high values of the Index, as Austria, Belgium, Denmark, France, Germany and Sweden are characterized by large public spending. While others such as USA, Canada, Australia and Japan are

characterized by low levels of public spending. In some other countries which are not included in the study, like Singapore, Taiwan, Hong Kong, the public sector is small but efficient, while the value of the HDI index and some other socialeconomic indicators are almost as good as the countries with large public sector. Many of the countries that are characterized by large public sector have high values of HDI too. Albania for 2013, is ranked at 95 post in the group of the countries with the high human development index from the 187 countries ranked. In 2012, Albania was ranked in 97 posts. Compared with the other countries of the region, this position is not so good, for ex: Montenegro 51, Bosnia and Hercegovina 86, Serbia 77, Macedonia 84. The other neighbour countries are classified as follow: Croatia 47, Greece 29, Italy 26.

1.2 Theoretical views about the relationship between public expenditure and growth

The link between public spending and the increase of economic growth is an issue discussed by economists. Public expenditures are important for effects that bring to the economy. The recent financial crisis has increased the focus on public investments that are part of public spending, considering the latter as a potential tool to respond to the crisis by creating jobs and providing a sustainable economic growth. In the coming years public investment can play an important role in achieving government objectives. This usually involves the economic growth, reducing poverty and creating conditions to anticipate demographic changes. The main challenge of the public sector is to realize the investments necessary to keep in mind the budgetary constraints (public spending may affect the political process, which determines the Fiscal Policy). Cycles of electiones in most cases in all countries of the world the discipline reduce the use of budget funds. Usually in these governments in different countries make additional costs which in many cases are financed through public debt beyond the limits of the budget. The main concern about this fact is related to the efficiency and proper channeling of these funds that goes for three expenditures [3]. According to the theory of economic growth associated with public expenditures can be founded three main variables: public investment spending, consumption public spending and social spending and redistribution policies. Also there is theoretical view that public expenditure which contribute to the growth of human capital and technological development or innovation classified as essential expenses.

1.3 The dimensions of the influence of the state in economic growth

The institutional framework and the environment, in which fiscal policies operate, are very important for economic growth. Firstly, the existence of a well-defined institutional framework is the key to growth. Public finances, indirectly, play an important role in its proper functioning. Legal restrictions and regulations play a key role here, such as better regulated rights of ownership or existence of efficient markets while minimizing institutional uncertainty, affecting the growth of the control and security of investment returns [11].

The rules should promote competition, provide relevant information and allow efficient risk management. They should also guarantee that government actions do not undermined but supported the functioning of markets. In this way a better functioning institutional framework minimizes transaction costs for the private economy and helps to internalize externalities and spread. This view of the role of government has been supported by classical economists like Adam Smith and those who defend the modern constitutional and institutional view of the economy when we manage public finances in a qualitative way; they indirectly support the economy by supporting the growth of the best institutional wide. With inadequate funding for internal security and foreign country, civil servants trained and corrupt, can not move forward. On the other hand, a bloated and supported administration without sufficient fund, leads in less-functioning of institutions.

Second, the institutional framework governing fiscal policy plays an important role for the quality of public finances and economic growth through fiscal rules and institutional conductance [6].

1.4 Government spending

In the theoretical literature linking public finance with economic growth depends on three main variables: public investment, consumer public spending and social welfare and redistribution costs. Part of this category is also considered public spending that increase and improves human capital and expenses that contribute to scientific innovation / technology. Total government expenditures go averaging about 45% of GDP in industrialized countries. More specifically range from slightly more than 30% of GDP to nearly 60% of GDP, which indicates that there are major differences from country to country. There are several activities related to government and public spending that are necessary for performance of the economy. These expenditures "essential" or "productive", may be as important for growth as the private equity or work. These types of expenses may directly increase the stock of capital or technological progress and the economy. Also can affect indirectly by creating synergies for private activities. Without them the economy will not function well and will not grow. The level of these costs depends on how the government is efficient in the use of available resources. More effectively is the government; the lower will be spending needs. But government spending also depends on a number of factors "exogenous": geographical location, the country's level of development and sophistication of markets [14]. Basic expenses include administrative costs for basic services and the justice system, basic education and research, health, public infrastructure, internal security and external, etc. Costs of these categories in industrialized countries are difficult to be estimated precisely. However, accounting the public consumption they go from about 20% of GDP to 45% of total public spending (European Commission, AMECO). Public spending on education (human capital) and research and development boost economic growth.

Public activity is necessary and can compensate the market failure due to external factors and monopolistic competition. Public expenditure can raise education and research in a more efficient level than could be in a completely free market situation.

Expenses in redistribution could undermine growth by reducing incentives to work, invest in human capital or inhibit entrepreneurial talent. Early retirement incentives of retirement or social generous aid will reduce the supply of labor market and incentives to develop human capital in organizations. On the other hand, spending on basic social safety networks reduce the need for precautionary savings and increases the potential for risk taking and can serve as a factor of economic growth. However, an increase in the base expenditures can efficiently perform economic growth. However redistribution remains the second largest important category in many industrialized countries on average about 40% of public expenditure.

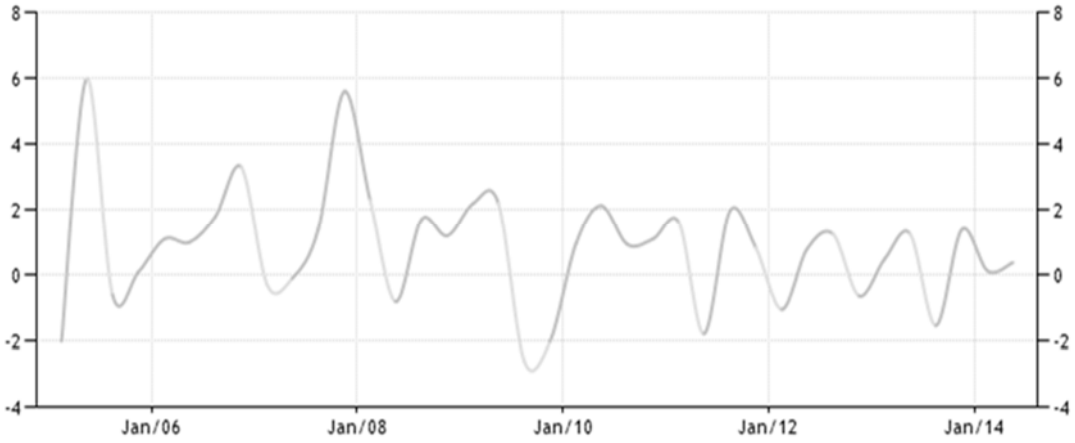
1.4.1 The contribution of public finance in macroeconomic stability

Macroeconomic stability is a condition fundamentally in the economic development of a country and very important for passing successfully the transition phase. Macroeconomic variables that are in the center of attention of the policy makers and main indicators of an economic development of attention of policy makers are: inflation, unemployment, economic growth. Keeping these variables in desiderable levels is a difficult task, because these variables are correlated. [1]

Fiscal policy is a factor which contributes to macroeconomic stability. Low levels of deficit and public debt create the premises for sustainable fiscal policies. This affects economic growth, as influenced savings and investing decisions in the long run. In contrast, if for a period earnings

are much lower than public spending could decrease economic growth, as reduced incentives to invest by private as a counterweight to higher taxes that may be imposed in the future. [2]

Figure 1 Albanian GDP growth rate



Source: www.tradingeconomics.com/Albania

1.4.2 The contribution of education in growth

There is correlation evidence between education and economic growth. Sapir and Camdessus [10] argue that the slower growth may have been caused by the European Union's relatively meager investment of 1.1 percent of its gross domestic product in higher education, compared to 3 percent in the U.S. Also [12], using data on 221 enterprises from 1970 to 1985--show that enterprises whose executives have a high level of technical education spend more money on research and development that lead to innovations. Similarly, the "Asian miracle" (high productivity growth in Asian countries like South Korea) is associated more with investments in primary and secondary education than with investments in higher education. Examining cross-country correlations, [5] conclude that "[overall,] education [is] statistically significantly and positively associated with subsequent growth only for the countries with the lowest education." Clearly, the education-growth relationship is not so simple that one can compute average years of education in a state and confidently predict growth.

Albania shows a low rate of public spending on education (in % of GDP). This measure differ from 3 to 3.3 % in different years. This figure is 5.7-5.9 % for Euro area.

2 Analysis of budgetary spending

Firstly it is important to give some definitions of some important terms related to the budget. Later I will present the progress of public spending over the last decade by focusing more on the 2012 and 2013 draft.

The economic crisis that affected many countries and broadcast in our country too also affected the public spending. According to the Bank of Albania, in the international scenario, the country's economic growth slowed as a result of the slowdown in domestic demand and external, in the presence of tightening liquidity and reduction of foreign currency inflows. Aggregate demand as a source of growth has declined as a result of reducing consumption, private investment and demand for exports. Also there has been a decrease in imports, especially of capital goods, which together with the decrease in remittances and limiting lending directly affected private investment.

Also the increase in government spending in the first half of the year, depreciation of the local currency, rising deficits, led to stop the private investment. Due to the effects of the global crisis created a climate of insecurity which led to reduced consumption and increased savings instead.

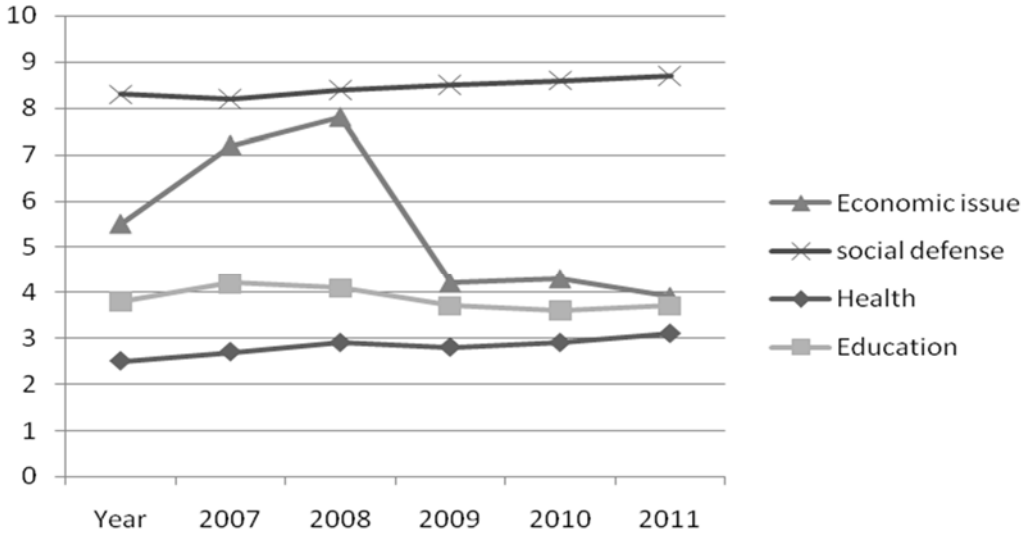
2.1 The performance of budget expenditures

According to theoretical concepts a way to see the performance of the spending of public is through performance. Their trend has been downward, but not in all periods.

Since the high levels of spending in 1992, their trend has been downward. Some of the policies of the government that have contributed in reducing government spending, have been cuts in public administration, in order for improving public services, liberalization of exchange rates and prices that resulted in the reduction of subsidies in the economy, reducing the costs of protection, reduction of interest rates for debt payments and a reduction of the treasury bonds rate. This downward trend was interrupted after the crisis of 1997, for the following two years, considering reforms to emerge from the crisis and the support that was given to the Kosovo war in 1999.Since then expenditures have decreased which amounted stable lower in 2003, about 28.4 percent of GDP. Even in the following years the level of expenditure has remained at a constant value from 28 to 29 percent of GDP [7]. In 2008 there was an increase of this figures compared to a year before reaching the value of 32.3 percent, the highest value of expenditure since 1999 (35%). Unlike other early growth came as a result of increased capital expenditure for the construction of road infrastructure Durres -Kukes. This was one of the biggest investments and more costly for the state budget, which carries with it among others and political garb. Even today continue controversy about the costs and benefits of this investment. After the 2009, level of expenditure has decreased continuously until it has reached a value of 28% of GDP in 2012. In 2013 this figures is 29.1% of GDP being increased by about 1%. A fact worth noting that there is a right connection between the growth of government spending and electoral periods. This explains the high levels of spending for 2009 by adding the effects of the crisis. Nearly half of current expenditure goes to personnel expenses, which include salaries and social security contributions and health. There is a downward trend of operational and personnel expenses and capital expenditures Purpose of expenditure policy, which is emphasized even more these past 5 years has been: to reduce current expenditure by reducing the number of employees of the administration, reorganization of ministries, lowering operating costs, subsidies, and local government grants are affected by this policy to allow more space to the capital investment. Is the government able to increase investment capacity through expenditures, without adversely affecting the economy? This is one of the questions which is at the center of public finance theories nowadays. The answer of this question is even more difficult in the case of our country taking into account elements such as prolonged transition, problems in the functioning of market institutions, the fragility of macroeconomic variables, gaps in coordination of strategies, etc.

The chart above presents data about 4 classes of functional classification. By indicator of the size of the public sector expenditures in this category also distinguish between a small government and a big. The level of spending of our country into this category and in relation to the size of the economy classifies us as a country with an average level of the public sector in the limits of 30 percent of GDP. During the period 2003 - 2006 there was a decrease in spending in this category, which is related to the proper functioning of the social insurance scheme. While in coming years we face an increase of spending on social policies. One major reason is the reduction of remittances, as well as the effects of the economic crisis on the poorest ons. Also note that spending on economic issues reach values higher than spending on education and health.

Figure 2 Performance of budget expenditures by functional classification (in % of GDP)



Source: Ministry of Finance of Albania

2.2 Budget in 2012 and 2013

In 2012 are gathered around 332.7 billion of revenue, versus total expenditure of 382.2 billion, including billion in recurrent expenditure and 64.6 billion in capital expenditures, of which 43.1% internal financing, and 56.9% foreign funding. Of the total income, the share of revenue collected by the General Directorate of Taxation and Customs is about 235.922 billion or 70.8% of the planned revenues for the period. Of the total recurrent expenditure of 313.2 billion, 69.2 billion (22% of total current expenditure) is spent on personnel, about 42.2 billion (13.4%) interest, 31.1 billion (9.9%) for operating and maintenance expenses, 1.62 billion (0.5%) for subsidies, 120.9 billion (38.6%) for the costs of social and health insurance and 27 billion (8.6%) for local government spending, 20.9 billion (6.6%) for other expenses. The deficit of 49.5 billion for the period January-December 2012, was based on the value of 27.1 billion from domestic sources and 22.3 billion foreign assistance. Issuance of treasury bills was the main tool of domestic financing, foreign financing and were long-term loans.

Table 1 Budget in 2012 &2013

Year	2012	2013
Income (million lek)	332 758	360 661
Expenditures (million lek)	382 296	409 590
GDP (million lek)	1 346 169	1 407 000
Real GDP growth in %	1.5	1.3

Source: Ministry of Finance [8], [9]. (Exchange rate 1 euro=1390 Al)

Data for the 2013 are given in the Table 1 in comparison of 2012. Risks already identified as lack of liquidity of businesses, debts of the business chain between them, restriction of credit to businesses by banks, decline in demand for new loans, increased bad loan portfolio, the level of public debt, are evident factors that significantly influenced economic growth in 2013.

3 Recommendations and conclusions

The link between public spending and economic growth is an issue discussed by economists. Public expenditure are important for effects that bring to an economy. As a conclusion about the spending policy in Albania, we conclude that it has tended to be in the functioning of economic development. At the beginning of transition period, reducing the spending was the main objective in order to reduce the deficit, and in the next 10-year this problem was overcomed and is placed on expenditure allocation towards better and efficiently in the direction of priority sectors. Despite improvements there are problems related to the management of spendings.

The paper gives data on Human Development Index and the public spending in education in % of GDP. Even it is shown an increase or an improvement on these figures, we are still suffering from low level in comparison with the other countries of the region. From the countries of Eastern Europe, Albania shows the lower value of this figures. As the theory announce, it is very important to increase the public expenditures in education and infrastructure, because they bring economic growth.

Another recommendation which would help economic growth and reduce the negative effect on the public debt on it, is the distribution of funds that provides government borrowing, on education, health, agriculture, and infrastructure.

The main recommendation that can be made at the conclusion of this paper is to improve the management of public investment. The first step to achieve this is tracking the objectives and development of plan. That means rigorous enforcement spending plan and not sudden changes of plan. In terms of public investment may say that should be carefully analyzed proposals investment and selected investments with lower costs, according to previously priorities.

Investing in sectors such as education and agriculture will help to increase human capital, which will increase productivity and wages. Their growth would increase consumption, which would bring a higher GDP. On the other hand increase investment in agriculture, will bring increase of competitiveness of our agricultural products. Efficient investment in infrastructure will create more opportunities for businesses and citizens movement that will bring more profit for businesses, and more revenue for the state budget.

So, a proper channelization of funds, would have a significant effect on the economy of Albania and the welfare of the citizens.

References

[1] Anderson, E., De Renzio, P. dhe Levy, S. (Mars 2006) *The Role of Public Investment in Poverty Reduction: Theories, Evidence and Methods*, World Bank Working Paper Series, 263/4.

[2] Afonso, A., Werner, E., Schuknecht, L. dhe Thöne, M. (2005) "Quality of Public Finances and Growth", *ECB Working Paper Series,* No. 438/1.

[3] Fondi Monetar Nderkombetar. (2013) *DataMapper database*, marre nga:http://www.imf.org/external/datamapper/

[4] Kule, Dh. dhe Wenzel, D. (Shtator 2003) *Përmasat e Sektorit Publik*, studim i paraqitur në Konferencën e 4 të Bankës së Shqipërisë me temë "Ekonomia Shqiptare: Arritjet dhe sfidat e politikës ekonomike", Sarandë.

[5] Krueger, Alan and Mikael Lindahl (2001). "Education for Growth: Why and for Whom?" Journal of Economic Literature, 39, 1101-1136

[6] Rajaram, A.,Tuan, M., Biletska, N., dhe Brumby, J. (Gusht 2010) *A DiagnosticFramework for Assessing Public Investment Management*, World Bank Africa Region, Working Paper Series 5397.

[7] Republika e Shqiperise, Ministria e Financave. (2009) *Buletini fiskal,* publikimi nr. 12/2012, Drejtoria e pwrgjithshme e politikave makroekonomike dhe fiskale.

[8] Republika e Shqipërisë, Ministria e Financave. (2009) *Programi makroekonomik dhe fiskal,* publikimi nr. 4/2012, Drejtoria e pergjithshme e politikave makroekonomike dhe fiskale.

[9] Republika e Shqipërisë, Ministria e Financave. (2009) *Ekonomia dhe buxheti,*publikimi nr. 5/2012, Drejtoria e pergjithshme e politikave makroekonomike dhe fiskale.

[10] Sapir, A. (ed.), Philippe Aghion (author), Giuseppe Bertola (author), Martin Hellwig (author), Jean Pisani-Ferry (author), Dariusz Rosati (author), and Jose Vinals (author) (2004). An Agenda for a Growing Europe. Oxford: Oxford University Press.

[11] Shah, A. (January 2005) *Budgeting for results: An idea whose time may be here?,* World Bank CEPAL Regional Seminar on Fiscal Policy, Santiago, Chile.

[12] Scherer, F and K. Hue (1992). "Top Managers' Education and R&D Investment", Research Policy, 21, 507-511.

[13] Tanzi, V. (2005). "The economic role of state in the 21 century", *Cato Journal*, 23(*5*),fq. 617 – 638.

[14] Tanzi V. dhe Schuknecht, L. (1997), "Reforming government: An overview of recent experiences", *European Journal of Political Economy*, 13(*1*), fq. 395 – 417.

ESTIMATING THE IMPACT OF PUBLIC FINANCE FOR THE COUNTRIES OF EUROZONE: INVESTMENT MODEL

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ABSTRACT

The paper focus on the theory and international evidence on the links between public finances and growth. Moreover, paper investigates the effects of inflation rate, government expenditure, general government gross debt, employment rate, growth rate, population, interest rate on public investments of 18 Eurozone Countries. In addition, paper came to the conclusion that these variables determined model at 37.48 percent at 95 percent of probability. In short, results confirmed strong positive correlation between these variables by using method of least squares, fixed effects model, random effects model through Hausman test and examined heteroskedasticity through White test.

Keywords: Public Finance, Public Investment, Eurozone Countries, Growth, Heteroskedasticity

JEL codes: E60, H11, H50

1 Introduction

However, while it was apparent that public finances could affect output growth in both the short and longer term, the theoretical link was not clearly established in the standard neoclassical growth theory according to the Solow [4] and Swan [3]. Moreover, the only source of long-run growth was exogenous technical change with the production function featuring decreasing marginal returns to both capital and labor. In other words, policy changes could affect the level of output but not its steady-state growth rate. It is important to mention following studies on this subject. Growth models such as Romer [9], Lucas [10]and Barro [1] determined increases in the productivity of human and physical capital thus implying that the marginal product of physical capital would not tend to zero when the amount of capital per worker increases and allowing for long-run per capita growth. Expenditures with a substantial (physical or human) capital component are treated as productive, but it may apply to only a narrow range of expenditures, such as subsidies to R&D, education and transport presented by Romero De Avila and Strauch [8]

Among studies examined fiscal policy on economic growth. Moreover, they used an aggregate approach, looking at the impact of total government revenue or expenditure (percent of GDP) on growth. First, they found no significant relationship between the level of spending and the rate of growth exempli gratia Mendoza, Milesi-Ferretti and Asea [7] Tanzi and Zee [6]. Second, others found either a significant positive as Sala-i-Martin [5] or negative accrding to the Barro [2] relation between the variables.

Toigo and Woods [13] pointed out that the macro-economic framework is a key factor to correct a bias against public investment in UK, it needs to be underpinned by a robust micro-economic framework. Kasek, Laursen, Skrok [11] examined link between taxation, employment, and investment in the EU8 countries. Their econometric analysis revealed a strong negative impact of distortive taxation on employment and growth. Creel, Monperrus-Veroni, Saraceno [12] presented SVAR methodology to investigate the effects of public investment on growth, and more specifically, the effects of the introduction of a golden rule. They found that in such a long run framework investment has significant and permanent positive effects on GDP growth.

Kholjigitov [14] described public financial management that plays key for developing, transitional and poor countries for several reasons. In sum, public finance system holds together the whole system of government agencies with their programs and objectives which are usually tied to the economic development strategy of the country. Cavalcanti, Marrero, Le [16] pointed out that a framework to assess whether countries meet the conditions for realizing the net benefits over the costs of public investment debt financing. They presented that is important to ensure the operational viability of public investment projects by having in place adequate project management: (i) project screening and appraisal, (ii) a clear connection between capital and recurrent expenditures once the projects are launched, and (iii) safeguards for appropriate project implementation and facilities operations. Eden, Kraay [16] estimated the effect of government investment on private investment in a sample of 39 low-income countries. They found evidence of crowding in: an extra dollar of government investment raises private investment by roughly two dollars, and output by 1.5 dollars. In other words, for most countries in the sample, the returns to government investment exceed the world interest rate. Mattauch, Edenhofer, Klenert, Bénard [17] studied the impact of heterogeneous saving behavior on the distributional effects of public investment. They found that inequality is reduced the higher the capital tax rate and that low rates even constitute a Pareto improvement. Warner [18] focused on empirical record whether big infrastructure and public capital drives have succeeded in accelerating economic growth in low-income countries. On average the evidence showed only a weak positive association between investment spending and growth and only in the same year, as lagged impacts are not significant.

1.1 The Objectives

The research objectives of this paper are presented as follows: What are effects of investments on economic growth of countries in Eurozone? What is the microeconomic dimension vs. macroeconomic level of capital, debt? Are investments of countries in Eurozone closely related to inflation rate, expenditure, gross debt, employment rate, growth rate, population, interest rate?

1.2 Data and Methodology

This paper explores econometric model, in other words we use panel data regression analysis. First, model examine impact of HICP - inflation rate; Total general government expenditure (% of GDP); General government gross debt (% of GDP); Employment rate (total; by sex), Growth rate (%), Population (since 2005-2013), Interest rate (Maastricht criterion interest rates; 2004-2012) on government fixed investment (% of GDP) of countries of Eurozone at 95 percent of probability. Moreover, we examine this model through economic software Eviews, method of least squares, fixed effects model, random effects model through Hausman test, than testing for heteroscedaticity through white test and illustrated by scatter graphs. In this context, we use data from 2002 to 2013 from Eurostat.

The remainder of this paper proceeds as follows: Section 2 presents briefly economic growth, public expenditures and investments, macroeconomic sustainability, current situation in EU. Ergo, the main contribution of this paper is contained in section 3 that provides examined Investment model. On the other hand, after discussion section 5 concludes the paper.

2 Literature Review

The type of FDI is also a factor of integration into the global market. However, fixed investment contrasts with investments in labour, ongoing operating expenses, materials or financial assets. Moreover, government consumption expenditures and gross investment is the official government measure of government purchases undertaken by the government sector. Gross investment consists of spending by government for fixed assets that directly benefit the public, such as highway construction, or that assist government agencies in their production activities, such as purchases of military hardware. In short, governments contribute to economic output when they provide services to the public and when they invest in capital. On the other hand, governments also affect the economy through taxes and by providing incentives for various business activities.

Viewed in this light, the effects of FDI on economic growth are dependent on the existing or subsequently developed internal conditions of the host country (economic, political, social, cultural or other). Thus, the host countries authorities have a key role in creating the conditions that allow for the leverage of the positive effects or for the reduction of the negative effects of FDI on the host country's economic growth. Cavalcanti, Marrero, Le [15] presented public expenditures and investments need to follow an active rule that responds inversely to the stock of outstanding public debt, otherwise, debt would follow an explosive path, increasing at a rate higher than real GDP growth. However, the microeconomic dimension can also feed back to the macroeconomic level. Suppose there are decreasing returns to capital and consider the case of a country that has a high capital to GDP ratio but low levels of debt. A macroeconomic sustainability assessment might suggest a relatively high total level of capital that could be financed through borrowing. However, an effective system of budgetary controls would capture the low returns and value for money of the additional project, which would fail the efficiency test. In such a case, it would be the microeconomic considerations, the lack of worthwhile projects, rather than the debt ceiling that posed the binding constraint on the level of investment [13].

EU foreign direct investment (FDI) is recovering after the global financial turmoil, in 2013, EU-28 outward flows were 34 percent higher than EU-27 flows in 2012. Similarly, EU-28 inward flows were 12 percent above EU-27 flows in the previous year. Total EU-27 FDI outflows increased by 57 percent in 2011, mainly due to a substantial increase for equity capital and reinvested earnings. EU-27 inward flows increased in 2011 by 90 percent. In 2012, outward flows of FDI dropped again, down 46 percent, once more due to a sharp decline in equity capital invested outside the EU-27, though partially compensated by an increase in reinvested earnings and steady levels of other capital. FDI in EU (17) increased by 64 percent from EUR 6.7mln in 2007 to EUR 10.4 mln in 2012 according to Eurostat. If we look at data, GDP in the Euro Area was worth USD 12749.93 bn in 2013. The GDP value of Euro Area represents 20.56 percent of the world economy according to World Bank. GDP Growth Rate in the Euro Area averaged 0.35 percent from 1995 until 2014, reaching an all time high of 1.30 percent in the second quarter of 1997 and a record low of -2.80 percent in the first quarter of 2009.

Nonetheless, the level of investment in an economy tends to vary by a greater extent than other components of aggregate demand. The question is why? This is because the underlying determinants also have a tendency to change. Moreover, the main determinants of investment

are the expected return on the investment, Business confidence, Changes in national income, Interest rates, General expectations, Corporation tax, The level of savings, The accelerator effect. On the one hand, investment is a sacrifice, which involves taking risks. This means that businesses, entrepreneurs, and capital owners will require a return on their investment in order to cover this risk, and earn a reward. In other words, changes in national income create an accelerator effect. Investment is inversely related to interest rates, which are the cost of borrowing and the reward to lending. Investment is inversely related to interest rates for two main reasons. Firstly, if interest rates rise, the opportunity cost of investment rises. Secondly, if interest rates rise, firms may anticipate that consumers will reduce their spending, and the benefit of investing will be lost.

3 Investment Model

Significance of investment plays following macroeconomic roles: First, it contributes to current demand of capital goods, thus it increases domestic expenditure. Second, it enlarges the production base (installed capital), increasing production capacity. Third, it modernizes production processes, improving cost effectiveness. Fourth, it reduces the labour needs per unit of output, thus potentially producing higher productivity and lower employment. Fifth, it allows for the production of new and improved products, increasing value added in production. Sixth, it incorporates international world-class innovations and quality standards, briging the gap with more advanced countries and helping exports and an active participation to international trade.

At this point, we use for panel data following methods: pooled regression OLS, random effects model, fixed effects model through Hausman test, and heteroscedasticity test through white test by using economic software Eviews, especially for examination of impact of observed variables (216) since 2002 to 2013 at 95 percent of probability, that include following explanatory variables: HICP - inflation rate; Total general government expenditure (% of GDP); General government gross debt (% of GDP); Employment rate (total; by sex), Growth rate (%), Population (since 2005-13), Interest rate (Maastricht criterion interest rates) of observed countries of Eurozone. Countries include: Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Luxembourg, Malta, Netherlands, Portugal, Slovakia, Slovenia, Spain. We examine impact of variables that were mentioned above on General government fixed investment (% of GDP) - response variable; of countries.

Results coming out from Model of Investment, N=216, k=7, α=0.05 show that coefficient of determination R^2=0.3748 indicates that 37.48% of changes of investments in countries of Eurozone is being explained by changes in variables that were mentioned above, on the other hand 62.52% could be caused by variables that are not included in this model (e. g. consumption, export, import). Prob (F-statistic) is 0.000< 0.01; that means model is high statistically significant (++). For N = 216, k = 7, and significant level = 5%, the significant Durbin-Waston statistic dL is 1.723 and dU is 1.835; 4-1.835=2.165, moreover a value 0.522 coming out from table below indicates autocorrelation in this model. In other words, cumulated investments over time give rise to capital, opening the path to improvements in production conditions. Viewed in this light, production capacity, potential productivity, cost effectiveness, production and process quality will be all increased by properly-oriented investment. Export competitiveness should also rise, on the other hand investment has an immediate impact on GDP. An increase of consumption rises GDP by the same amount, other things equal. Moreover, since income (GDP) is an important determinant of consumption, the increase of income will be followed by a rise in consumption.

Table 1 OLS of Investment
Dependent Variable: INVESTMENT
Method: Least Squares
Sample: 1 216
Included observations: 216

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EMPLOYMENT_RATE	-0.015	0.013	-1.157	0.248
GOVERNMENT_EXPENDITURE	-0.026	0.014	-1.824	0.069
GROSS_DEBT	-0.018	0.002	-7.054	0.000
GROWTH_RATE	-0.057	0.018	-3.182	0.001
INFLATION_RATE	0.059	0.032	1.827	0.069
INTEREST_RATE	0.027	0.021	1.267	0.206
POPULATION	4.85E-09	2.79E-09	1.736	0.084
C	6.133	0.977	6.271	0.000

R-squared	0.374	Mean dependent var	2.969
Adjusted R-squared	0.353	S.D. dependent var	1.066
S.E. of regression	0.857	Akaike info criterion	2.566
Sum squared resid	152.863	Schwarz criterion	2.691
Log likelihood	-269.151	Hannan-Quinn criter.	2.616
F-statistic	17.820	Durbin-Watson stat	0.522
Prob(F-statistic)	0.000		

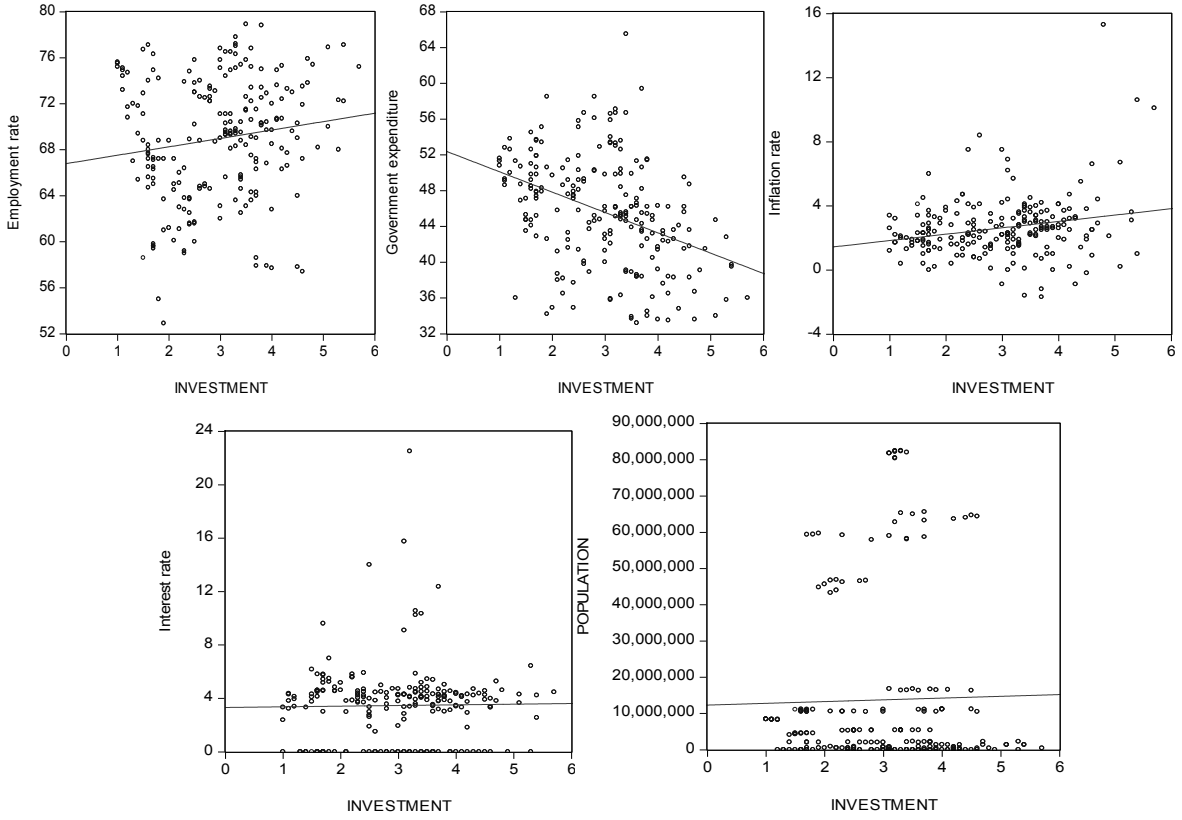
Source: Author´s estimation by using Eviews.

In short, we get following estimation equation of model: Investment = β_0 + β_1*population - β_2*interest rate + β_3*inflation rate - β_4*growth rate – β_5*gross debt- β_6*government expenditure – β_7* employment rate . And after substituted coefficients we get formula as follows: Investment=6.133 + 4.85030552555e-09*population – 0.027*interest rate + 0.059*inflation rate – 0.057*growth rate – 0.018*gross debt- 0.026*government expenditure – 0.015* employment rate. The expected sign of the coefficients are $\beta 1 > 0$ and $\beta 2 < 0$.

Investment is a clear source of the business cycle. On the one hand, investment grow at a much faster pace than consumption, on the other hand GDP, usually irrespective of interest rate movements, for more details see correlation between variables in scatter graphs in figure 1-4. On the contrary, the influence of interest rates on investment can be important at turning points. At peaks, consistent increase of the interest rate would drastically worsen the costs of existing loans for past investment. At trough, low interest rates may be one of the very few good news for firms. Thus, combined with positive expectations, investment may start growing from the very low level at which they were. Positive expectations toward the economy may also bring leading firms to invest earlier than the trough. In so doing they may even invert the business cycle.

However, in following scatter we present correlation between significant variables. As can be seen, there is a positive correlation between investments and employment rate, investments and inflation rate, investments and interest rate, investments and population.

Figure 1-4 Simple Scatter Graph* of observed variables in Model of Investment



Source: Author´s estimation by using Eviews.

* Note: The data is 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. If the pattern of dots slopes from upper left to lower right, it suggests a negative correlation.

Viewed in this light, at this point we present correlation matrix. Results coming out from this matrix show that exempli gratia correlation between following variables, gross debt and government expenditure at 0.677, inflation and growth rate, interest rate and government expenditure, interest and growth rate, etc. increase together. On the other hand, correlation between growth rate and expenditure at -0.511, that shows one variable increases and other decrease.

Table 2 Correlation Matrix: Investment Model

	GOVERNMENT_EXPENDITURE	GROSS_DEBT	GROWTH_RATE	INFLATION_RATE	INTEREST_RATE	INVESTMENT	POPULATION	EMPLOY-MENT_RATE
GOVERN-MENT_EXPENDITURE	1							
GROSS_DEBT	0.611	1						
GROWTH_RATE	-0.511	-0.424	1					
INFLATION_RATE	-0.347	-0.216	0.254	1				
INTEREST_RATE	0.202	0.123	-0.121	-0.032	1			
INVESTMENT	-0.394	-0.552	0.114	0.221	0.017	1		
POPULATION	0.268	0.148	-0.098	-0.067	0.291	0.022	1	
EMPLOYMENT_RATE	-0.035	-0.437	0.145	0.040	0.067	0.148	0.138	1

Source: Author´s estimation by using Eviews.

Note: A correlation coefficient' is a value that indicates whether there is a linear relationship between two variables.. In short, 1.0 means perfect correlation, 0 to 1 means that the two variables tend to increase or decrease together, -1 to 0 means that one variable increases as the other decreases.

Nevertheless, at this point we test panel data for fixed effects or random effects model. It is important to mention that Fixed Effect Model is a statistical model that represents the observed quantities in terms of explanatory variables that are treated as if the quantities were non-random, correlated with the independent variables. On the other hand, to random effects models and mixed models in which either all or some of the explanatory variables are treated as if they arise from random causes, uncorrelated with the independent variables. This models are presented in following tables.

Table 3 Fixed Effects Model

Dependent Variable: INVESTMENT
Method: Panel Least Squares
Sample: 2002 2013
Periods included: 12
Cross-sections included: 18
Total panel (balanced) observations: 216

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EMPLOYMENT_RATE	0.061	0.018	3.294	0.001
GOVERNMENT_EXPENDITURE	0.076	0.014	5.234	0.000
GROSS_DEBT	-0.025	0.003	-7.792	0.000
GROWTH_RATE	-0.014	0.011	-1.258	0.209
INFLATION_RATE	0.009	0.021	0.469	0.639
INTEREST_RATE	-0.001	0.013	-0.083	0.933
POPULATION	-7.84E-11	2.86E-09	-0.027	0.978
C	-3.157	1.535	-2.055	0.041
Cross-section fixed (dummy variables)				
R-squared	0.811	Mean dependent var		2.969
Adjusted R-squared	0.787	S.D. dependent var		1.066
S.E. of regression	0.491	Akaike info criterion		1.525
Sum squared resid	46.115	Schwarz criterion		1.915
Log likelihood	-139.725	Hannan-Quinn criter.		1.683
F-statistic	34.242	Durbin-Watson stat		0.824
Prob(F-statistic)	0.000			

Source: Author´s estimation by using Eviews.

Table 4 Random Effects Model

Dependent Variable: INVESTMENT
Method: Panel EGLS (Cross-section random effects)
Sample: 2002 2013
Periods included: 12
Cross-sections included: 18
Total panel (balanced) observations: 216
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EMPLOYMENT_RATE	0.033	0.016	2.071	0.039
GOVERNMENT_EXPENDITURE	0.056	0.013	4.140	0.000
GROSS_DEBT	-0.025	0.002	-8.551	0.000
GROWTH_RATE	-0.019	0.011	-1.760	0.079
INFLATION_RATE	0.019	0.020	0.930	0.353
INTEREST_RATE	0.005	0.013	0.406	0.684
POPULATION	8.38E-10	2.67E-09	0.313	0.753
C	-0.422	1.332	-0.317	0.751

			S.D.	Rho
Cross-section random			0.645	0.632
Idiosyncratic random			0.491	0.367
		Weighted Statistics		
R-squared	0.369			
Prob(F-statistic)	0.000			
		Unweighted Statistics		
R-squared	0.125	Mean dependent var		2.969
Sum squared resid	213.832	Durbin-Watson stat		0.185

Source: Author´s estimation by using Eviews.

At this point, we apply Hausman test to check wich model, moreover Fixed Effect Model or Random Effect Model is suitable to accept. We formulate following hypothesis:

H_0: Random Effects model is appropriate; cov (vi, X_{it}) = 0
H_1: Fixed Effects model is appropriate; cov (vi, X_{it})≠ 0

According to hypothesis, results coming out from Hausman test are presented in following table.

Table 5 Hausman Test

Correlated Random Effects - Hausman Test
Equation: EQ04
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	25.856	7	0.0005

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
EMPLOYMENT_RATE	0.061	0.033	0.000	0.002
GOVERNMENT_EXPENDITURE	0.076	0.056	0.000	0.000
GROSS_DEBT	-0.025	-0.025	0.000	0.778
GROWTH_RATE	-0.014	-0.019	0.000	0.006
INFLATION_RATE	0.009	0.019	0.000	0.018
INTEREST_RATE	-0.001	0.005	0.000	0.001
POPULATION	-0.000	0.000	0.000	0.375

Cross-section random effects test equation:
Dependent Variable: INVESTMENT
Method: Panel Least Squares
Sample: 2002 2013
Periods included: 12
Cross-sections included: 18
Total panel (balanced) observations: 216

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.157	1.535	-2.055	0.041
EMPLOYMENT_RATE	0.061	0.018	3.294	0.001
GOVERNMENT_EXPENDITURE	0.076	0.014	5.234	0.000
GROSS_DEBT	-0.025	0.003	-7.792	0.000

GROWTH_RATE	-0.014	0.011	-1.258	0.209
INFLATION_RATE	0.009	0.021	0.469	0.639
INTEREST_RATE	-0.001	0.013	-0.083	0.933
POPULATION	-7.84E-11	2.86E-09	-0.027	0.978

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.811	Mean dependent var	2.969
Adjusted R-squared	0.787	S.D. dependent var	1.066
S.E. of regression	0.491	Akaike info criterion	1.525
Sum squared resid	46.115	Schwarz criterion	1.915
Log likelihood	-139.725	Hannan-Quinn criter.	1.683
F-statistic	34.242	Durbin-Watson stat	0.824
Prob(F-statistic)	0.000		

Source: Author´s estimation by using Eviews.

Results show that according Beta values Random effect model is accepted, and significant variables at P value<0.05 are employment rate, government expenditure, growth debt, growth rate, on the other hand we may say that other variables are not significant. Determination coefficient 81.14% of this model are explained by observed variables. In other words, if we increase by 1% investments in the countries employment rate will rise by 0.06%, government expenditure will rise by 0.07%, etc. In short, if the random effects assumption holds, the random effects model is more efficient than the fixed effects model. However, if this assumption does not hold (i.e., if the Durbin–Watson test fails), the random effects model is not consistent. Random Effect Model is appropriate.

3.1 Detecting the heteroscedasticity

3.1.1 White test

To test for constant variance one undertakes an auxiliary regression analysis: this regresses the squared residuals from the original regression model onto a set of regressors that contain the original regressors along with their squares and cross-products. One then inspects the R^2. The Lagrange multiplier (LM) test statistic is the product of the R^2 value and sample size:

$$LM = n \,.\, R^2 \tag{5}$$

In our case LM= 216*0.245= 52.92

This follows a chi-squared distribution, with degrees of freedom equal to the number of estimated parameters (in the auxiliary regression). We formulate hypothesis as follows:

H_0: There is homoscedasticity; $var(\varepsilon_i)=(\sigma)^2$
H_1: There is heteroscedasticity; $var(\varepsilon_i)=(\sigma_i)^2$

First, the squared residuals from the original model serve as a proxy for the variance of the error term at each observation. Following table 6 illustrates White test.

Table 6 White Heteroscedasticity Test
Heteroskedasticity Test: White

F-statistic	1.670	Prob. F(35,180)	0.016
Obs*R-squared	52.960	Prob. Chi-Square(35)	0.026
Scaled explained SS	36.656	Prob. Chi-Square(35)	0.391

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares

Sample: 1 216
Included observations: 216

R-squared	0.245	Mean dependent var	0.707
Adjusted R-squared	0.098	S.D. dependent var	0.866
S.E. of regression	0.822	Akaike info criterion	2.599
Sum squared resid	121.899	Schwarz criterion	3.161
Log likelihood	-244.705	Hannan-Quinn criter.	2.826
F-statistic	1.670	Durbin-Watson stat	1.456
Prob(F-statistic)	0.016		

Source: Author´s estimation by using Eviews.

White's test statistic is asymptotically distributed as a $\chi 2$ with degrees of freedom equal to the number of slope coefficients, excluding the constant, in the test regression (k is the number of slope coefficients; k=35 in this model). The critical $\chi 2$ we calculated in EViews by typing the following formula in the EViews command window: =@qchisq(0.95,35). We get value of Scalar=49.801 that appears in the lower left of the EViews screen. Since the nR^2 value of 52.92 is greater than the 5% critical $\chi 2$ value of 49.801, we can reject the null hypothesis. The probability printed to the right of the nR^2 value in the EViews output for White's heteroskedasticity test (i.e., 0.026<0.05) represents the probability that we would be incorrect if we rejected the null hypothesis of no heteroskedasticity.

4 Discussion

The question is: Does high investments mean strength for country? Moreover, investment flows is that their share in total inflows is higher in riskier countries, with risk measured either by countries' credit ratings for sovereign (government) debt or by other indicators of country risk. There is also some evidence that its share is higher in countries where the quality of institutions is lower. What can explain these paradoxical findings? In short, investments are more likely than other forms of capital flows to take place in countries with missing or inefficient markets.

5 Conclusion

We identified that model shows that 37.48 percent of impact on investments in countries of Eurozone is affected by inflation rate, expenditure, growth rate, population, interest rate, debt and employment rate at 95 percent of probability. Results show that model is high statistically significant. According to the Durbin-Watson test, there is evidence of positive autocorrelation. The white test confirmed heteroscedasticity. In sum, random Effect Model is appropriate due to beta values, P values as well, in other words determination coefficient 81.14% of this model are explained by observed variables. In this regard, results indicate that public investment drives tend eventually to be financed by borrowing, the current public investment drives will be more likely to succeed if governments do not behave as in the past, and instead take analytical issues seriously and safeguard their decision process against interests that distort public investment decisions.

From our findings, government spending of Eurozone countries has a significant and positive impact on the growth of Eurozone's economy. Also, employment rate shown to be determinant of economic growth and development in Eurozone. The general conclusion is that public expenditure is paramount in promoting the growth of Eurozone's economy which can be achieved through investments in productive economic activities.
We therefore advocate for increased investment on economic services to be directed mainly to productive economic activities. More to the point, this will stimulate activities in the economic

sectors i.e. consumers would have more income since increased government spending increases the income of consumers, this in turn would increase investment by firms.

Acknowledgments

Foremost, I would like to express my sincere gratitude to Prof. Zlatica Ivanicova from University of Economics in Bratislava for immense knowledge.

References

[1] Barro, R.J. (1990). Government Spending in a Simple Model of Endogenous Growth. *Journal of Political Economy*, No. 98, pp. S103-S125.
[2] Barro, R.J.(1991). Economic Growth in a Cross-section of Countries. *Quarterly Journal of Economics,* Vol. 106, No. 2, pp. 407-43.
[3] Swan, T.W. (1956). Economic Growth and Capital Accumulation. *Economic Record*, Vol. 32. No. 3, pp. 334-61
[4] Solow, R.M. (1956). A Contribution to the Theory of Economic Growth. *Quarterly Journal of Economics*, Vol. 71, No. 1, pp. 65-94.
[5] Sala-i-Martin, X. (1992). Transfers. NBER, Working Paper, No. 4186, National Bureau of Economic Research.
[6] Tanzi, V. and H.H. Zee (1997). Fiscal Policy and Long-run Growth. IMF, Working Paper, No. 97/1, Washington (D.C.), International Monetary Fund.
[7] Mendoza, E., G. Milesi-Ferretti and P. Asea (1997). On the Effectiveness of Tax Policy in Altering Long-run Growth: Harberger's Superneutrality Conjecture. *Journal of Public Economics*, Vol. 66, No. 1, pp. 99-126.
[8] Romero de Avila Torrijos, D. and R. Strauch (2003). Public Finances and Longterm Growth in Europe: Evidence from a Panel Data Analysis. European Central Bank, Working Paper, No. 246.
[9] Romer, P.M. (1986). Increasing Returns and Long-run Growth. *Journal of Political Economy*, Vol. 94, No. 5.
[10] Lucas, R.E., Jr. (1988). On the Mechanics of Economic Development. *Journal of Monetary Economics*, No. 22, pp. 3-42.
[11] Kasek, L., Laursen, T., Skrok, E. (2006). Public Finance, Employment and Growth in the EU8.
[12] Creel, J., Monperrus-Veroni, P., Saraceno, F. (2006). Estimating the Impact of Public Investment for the United Kingdom: Has the Golden Rule of Public Finance Made a Difference?
[13] Toigo, P., Woods, R., (2005). Public Investment in the UK.
[14] Kholjigitov, G. A. (2013). The Role of the Fiscal Discipline in Public Finance Management in Developing Countries.
[15] Cavalcanti, C. B., Marrero, G. A., Le, T. M., (2014). Measuring the Impact of Debt-Financed Public Investment. The World Bank. Poverty Reduction and Economic Management Network, Economic Policy and Debt Unit, WPS6766 Public
[16] Eden, M., Kraay, A., (2014). Crowding In' and the Returns to Government Investment in Low-Income Countries. World Bank Policy Research Working Paper No. 6781
[17] Mattauch, L., Edenhofer, O., Klenert, D., Bénard, S., (2014). Public Investment When Capital is Back - Distributional Effects of Heterogeneous Saving Behavior. CESifo Working Paper Series No. 4714.
[18] Warner, A. (2014). Public investment as an engine of growth. IMF Working paper No. 14//148.

TRADING WARRANTS IN EMERGING MARKETS

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ABSTRACT

The aim of this paper is to investigate trading warrants in the 29 world stock exchanges. For this purpose author focused on emerging markets as they are defined by Financial Times Stock Exchange. In these markets investor's behavior must be observed in different context then in the well developed markets. The main problem solved is whether different features of such markets cause lower trading volumes of these financial derivatives or if there is no difference from not-emerging markets. Other aim is to compare emerging markets among each other and describe the links between trading volumes of warrants and particular economical factors that could possibly affect them. It is shown that emerging level of a market affects trading warrants.

Keywords: warrants, emerging markets, trading

JEL codes: G12, G15, C51

1 Introduction

Warrants are agreements where one side has a right (not an obligation) to sell or buy an underlying asset for a predefined price at a predefined time or a period of time. The other side has an obligation to settle the agreement if the first side chooses to use the warrant. Because warrants are very similar to options the Black-Scholes option pricing model may be used to price them. [3] In this context it is necessary to emphasize that recent studies proved that this model has many assumptions which cannot be fulfilled by real markets hence the pricing is not very accurate. It might be important to examine trading and pricing warrants in broader context. For this purpose author focuses on emerging markets as a markets with different features than developed markets have. When we link these two parts together we get an interesting problem from financial economics.

2 Literature Review

This paper is built on an original research of author. It contains trading warrants in emerging markets generally while other studies consider only one or few particular markets. There is almost none literature concerning this particular aim therefore author uses her own methodology to gain unique results.

Author has chosen emerging markets because they have been very often discussed recently. These markets are full of opportunities to invest and to gain high profits. Unfortunately, they are still developing and the risks are higher than in the regular well-developed financial markets. Sechel and Ciobanu (2014) found out that financial investments conducted in emerging markets bear risk mainly due to the price volatility. That is the consequence of bundle of several risks related to the investment. For example political risk (observed in politically unstable countries), inflation rate (affecting the value of investment) and change or exchange rate. Nonetheless, the investors can trade with higher risk for obtaining higher profits than those obtained in financial

markets of developed countries. The other advantage for investing in financial instruments of emerging markets is the diversification of investor's portfolio. That is due to the fact that there is not strong correlation between emerging markets and developed countries. [5]

Although there are some clear mathematical methods to price warrants (Black, Scholes, 1972). [1] Recent studies showed that this model cannot provide precise results, because it has many assumptions which cannot be fulfilled entirely by the real markets. There are some historical cases which appeared on different world stock exchanges that confirm breaking these assumptions with connection to abnormal prices of warrants. Therefore there are lots of questions about trading warrants from many points of view and they must be examined in wider context. This paper should help to understand trading warrants from the view of a part of its determinants.

3 Data and Methodology

Data was gathered from official web pages of chosen stock exchanges for the year 2014. Former data are not considered because this paper deals with examination of current situation in the world markets and the aim is to compare current development of such stock exchanges.

This paper considers emerging markets as how they are defined by Financial Times Stock Exchange ("FTSE"). For distinguishing they use national state income and development of market infrastructure. According to this definition, emerging markets are divided into two groups - Advanced and Secondary. Secondary emerging markets are those which have low, lower middle and upper middle gross national income, reasonable market infrastructures and significant size or those which have upper middle gross national income but less developed market infrastructures. Advanced emerging markets are those which have upper middle gross national income and advanced market infrastructures or those which have high gross national income but less developed market structures. See the list below. [2]

Secondary emerging markets: Chile, China, Colombia, Egypt, India, Indonesia, Morocco, Pakistan, Peru, Philippines, Russia, United Arabic Emirates ("UAE").

Advanced emerging markets: Brazil, Czech Republic, Hungary, Malaysia, Mexico, Poland, South Africa, Taiwan, Thailand, Turkey.

In this paper we will compare these countries with well-developed ones. We consider the developed markets to be non-emerging markets and these were selected by the criterion of the highest sum of listings of securitized derivatives in 2014. This criterion has been chosen as an indicator of popularity of the market. As a high sum we consider more than 4000 currently listed securitized derivatives. We will call them Leader markets in this paper. See the list below.

Leader markets: Australia, Austria, Germany, Hong Kong, Luxembourg, South Korea, Switzerland, Taiwan.

We observe two interesting facts. Firstly, one of the emerging markets appears also in Leader markets, namely Taiwan. That means that despite having poor market structure and low gross national income warrants are traded on this market frequently. Secondly, there are no American countries involved in Leader markets group. That confirms the fact that warrants are mostly traded in Europe, Asia and Oceania, on the contrary options are usually more popular in America.

We did research on the major stock exchanges of every country in each group. The first question was if there was possible to buy or sell warrants or not. See Table 1.

Table 1 Trading warrants in emerging markets

Secondary	Warrants	Advanced	Warrants
Chile	No	**Brazil**	No
China	No	**Czech Republic**	No
Colombia	No	**Hungary**	No
Egypt	No	**Malaysia**	Yes
India	No	**Mexico**	Yes
Indonesia	No	**Poland**	Yes
Morocco	No	**South Africa**	Yes
Pakistan	No	**Taiwan**	Yes
Peru	No	**Thailand**	Yes
Philippines	Yes	**Turkey**	Yes
Russia	No		
UAE	No		

Source: Author's own construction

Consequently we selected markets where warrants are traded and compared trading volumes with developed markets. See table 2.

Table 2 Listed derivatives

Emerging	Listed derivatives	Leader	Listed derivatives
Malaysia	436	**Australia**	4484
Mexico	105	**Austria**	6105
Philippines	3	**Germany**	1321270
Poland	90	**Hong Kong**	6508
South Africa	107	**Luxembourg**	6907
Thailand	535	**South Korea**	4131
Turkey	354	**Switzerland**	36156
Taiwan[1]			8709

Source: Author's own construction based on data valid to January 2014 available at http://www.world-exchanges.org/statistics/monthly-reports. [4]

Another way of investigation to trading warrants is the geographical approach. We can divide markets into several groups according to their continent of origin. See Picture 1.

[1] Taiwan belongs to Emerging market group as well as to Leader group.

Picture 1 World Stock Exchanges

Source: Author's own construction

A *triangle* stands for stock exchanges of emerging markets where warrants are traded, a *circle* stands for stock exchanges of leader market group and a *star* stands for stock exchanges of emerging markets where warrant are not traded.

We can divide these stock exchanges into regions according to the continent in which they lay. Having done that we get following groups:

America - Mexican Stock Exchange, Bovespa, Santiago Stock Exchange, Colombian Stock Exchange, Lima Stock Exchange.

Africa - Johannesburg Stock Exchange, Casablanca Stock Exchange, Egyptian Exchange.

Australia - Australian Stock Exchange.

Europe - Warsaw Stock Exchange, Borsa Istanbul, Moscow Exchange, Swiss Exchange, Luxembourg Stock Exchange, Vienna Stock Exchange, Frankfurt Stock Exchange, Prague Stock Exchange, Budapest Stock Exchange.

Asia - Islamabad Stock Exchange, Bombay Stock Exchange, Taiwan Stock Exchange, Stock exchange of Thailand, Shanghai Stock Exchange, Philippine Stock Exchange, Dubai Stock Exchange, Bursa Malaysia, Indonesia Stock Exchange, Korea Exchange, Hong Kong Stock Exchange.

Afterwards stock exchanges are divided into groups based on their distance from other stock exchanges.

Distant - Johannesburg Stock Exchange, Australian Stock Exchange

Medium - Mexican Stock Exchange, Bovespa, Santiago Stock Exchange, Colombian Stock Exchange, Lima Stock Exchange, Casablanca Stock Exchange, Egyptian Exchange, Islamabad Stock Exchange, Bombay Stock Exchange, Stock exchange of Thailand, Philippine Stock Exchange, Dubai Stock Exchange, Bursa Malaysia, Indonesia Stock Exchange, Korea Exchange, Moscow Exchange, Bursa Istanbul.

Close - Shanghai Stock Exchange, Hong Kong Stock Exchange, Taiwan Stock Exchange, Warsaw Stock Exchange, Swiss Exchange, Luxembourg Stock Exchange, Vienna Stock Exchange, Frankfurt Stock Exchange, Prague Stock Exchange, Budapest Stock Exchange.

Since we separated stock exchanges into groups, we are able to build a model to test the hypothesis that trading warrants depend on following factors: region, involving in emerging markets and closeness to other stock exchanges.

As the data are in binary form, logit method is used for modelling part. First two models are nonlinear regression models using logit method as followed [6]:

$$logit(Warr_i) = \beta_0 + \beta_1 \cdot Emerging_i + \beta_2 \cdot Distance_i + \varepsilon_i \quad (1)$$

$$logit(Warr_i) = \beta_0 + \beta_1 \cdot Emerging_i + \beta_2 \cdot Region_i + \varepsilon_i \quad (2)$$

where variable $Warr_i$ is equal to 0 if warrants are not traded on the i-th market and to 1 if they are, variable $Emerging_i$ is equal to 1 if the i-th market belongs to Secondary Emerging markets, to 2 if it belongs to Advanced Emerging markets and to 3 if it belongs to the Leader markets group, variable $Distance_i$ is equal to 1 if the i-th stock exchange is near another ones, to 2 if it is not near but not far from the other ones and to 3 if it is far from the other ones, variable $Region_i$ is equal to 1 if the i-th stock exchange lays in America (both North and South), to 2 if it lays in Africa, to 3 if it lays in Australia, to 4 if it lays in Europe and to 5 if it lays in Asia, ε_i is a white noise, β_i are coefficients.

This models should provide information whether any of factors affect trading warrants aside from its volumes.

Next model is also a nonlinear regression model using logit method [6]:

$$logit(Listed_i) = \beta_0 + \beta_1 \cdot Emerging_i + \beta_2 \cdot Distance_i + \beta_3 \cdot Region_i + \varepsilon_i \quad (3)$$

where $Listed_i$ stands for the amount of currently listed warrants on the i-th stock exchange, variable $Emerging_i$ is equal to 1 if the i-th market belongs to Secondary Emerging markets, to 2 if it belongs to Advanced Emerging markets and to 3 if it belongs to the Leader markets group, variable $Distance_i$ is equal to 1 if the i-th stock exchange is near another ones, to 2 if it is not near but not far from the other ones and to 3 if it is far from the other ones, variable $Region_i$ is equal to 1 if the i-th stock exchange lays in America (both North and South), to 2 if it lays in Africa, to 3 if it lays in Australia, to 4 if it lays in Europe and to 5 if it lays in Asia, ε_i is a white noise, β_i are coefficients.

This model should provide information whether the total number of listed warrants is affected by above mentioned factors.

4 Results and Discussion

First results we read from Table 1. We get the information that warrants are traded only in 1 out of 12 secondary emerging markets. That makes approximately 8%. In advanced emerging markets warrants are traded in 7 out of 10 of them. That makes 70%. In Leader market it is clearly 100%. The difference is obvious. We see the relation between sum of traded warrants and the level of development of financial markets.

The next fact we get from Table 2. It is evident that there are less listed warrants in emerging markets than in the leader markets. The only exception is Taiwan. Perhaps it opens a space for discussion if Taiwanese financial market really belongs to the emerging markets or if it is developed enough to abandon this group.

This paper supports the fact that warrants are mostly traded in Europe and north-east Asia. On the contrary we would not find many of them in America, if any.

From Model 1 and Model 2 we get following results, see Table 3 and Table 4.

Table 3 Model 1: Logit, Dependent variable: Warr

	Coefficient	Std. Error	z	p-value
const	-9.69636	4.04753	-2.396	0.0166 **
Emerging	4.05781	1.38594	2.928	0.0034 ***
Distance	1.60777	1.38688	1.159	0.2463

Source: Author's own calculation using Gretl software

Table 4 Model 2: Logit, Dependent variable: Warr

	Coefficient	Std. Error	t-ratio	p-value
const	-7.89052	3.05429	-2.583	0.0098 ***
Emerging	3.64173	1.28994	2.823	0.0048 ***
Region	0.454896	0.405528	1.122	0.2620

Source: Author's own calculation using Gretl software

According to the results of Model 1, variable Distance is not significant on 5% confidence level, variable Emerging is significant on a 5% confidence level. According to the results of Model 2, variable Region is not significant on 5% confidence level, variable Emerging is significant on a 5% confidence level. It means that the distinction between stock exchanges where warrants are traded and stock exchanges where they are not traded does not depend on region in which the stock exchange lays neither it depends on the distance from other stock exchanges. The only important fact is if the market is considered to be emerging or not. Adjusted R-squared of Model 1 is 41%, number of 'correctly predicted' cases makes 86.2%, which is a good result. Adjusted R-squared of Model 2 is 40,5%, number of 'correctly predicted' cases makes 86.2%, which is also a good result. Models also do not exhibit any other problem therefore we believe they are valid.

From Model 3 we get following results, see Table 5.

Table 5 Model 3: Logit, Dependent variable: Listed

	Coefficient	Std. Error	z	p-value
Emerging	4.33806	1.08835	3.986	<0.0001 ***
Distance	0.306111	0.733386	0.4174	0.6764
Region	0.684026	0.401475	1.704	0.0884 *

Source: Author's own calculation using Gretl software

According to the results of Model 3, explanatory variable Distance is not significant on any confidence level, variable Emerging is significant on 1% confidence level and variable Region is significant on 10% confidence level. It means that the total number of listed warrants on a particular stock exchange does not depend on variable Distance. Number of 'correctly predicted' cases is 58.6%. This model could be improved. Linked to the Model 1 and Model 2 we conclude that even if there is a relationship between the region in which the particular market lays and sum of listed warrants there is no proved relationship between the region in which the particular market lays and listing of warrants on that market.

In the following research author see a lot of space for improvement. Twenty-nine stock exchanges were examined. In that part the paper could be extended to the greater number of stock exchanges. Author worked with the current situation in the markets. Historical evolvement could be examined. That would be helpful to understand the distinguishing between emerging and developed countries, because the fact is that on some stock exchanges warrants are not traded now although they were in the past few years (e.g. Czech Republic, China). Explanatory variables could be broaden as well. Author is willing to consider law restrictions, political regime, macro-economical determinants as other possible factors.

5 Conclusions

This paper focuses on differences of trading warrants in the emerging countries and non-emerging markets. From literature we know that there are some problems in pricing warrants and moreover there are some specifics about emerging markets in comparison with developed ones. Author made a brief comparison of 29 world stock exchanges which were divided into three groups: Secondary Emerging Markets, Advanced Emerging Markets and Leader Markets. As factors which could affect number of listed warrants on a particular stock exchange, emerging level, distance from other stock exchanges and region of origin have been chosen. Modelling has been made by using nonlinear regression, logit method. The results are following: Only in 8% of Secondary emerging markets warrants are traded and in 70% of Advanced emerging markets warrants are traded. The only secondary emerging market where warrants are traded is Philippine Stock Exchange. Taiwan appeared in both emerging and leader group which needs further investigation. The theory that warrants are traded mainly in Europe and Asia and not in America was confirmed. Using a model the hypothesis that emerging level affects trading warrants has been confirmed. At the same time hypothesis that distance and region affects trading warrants has been rejected. Results from the second models are following: the factor of emerging level and region affect total number of listed warrants significantly, but distance does not affect it. Author is willing to investigate more determinants and longer time period in the future.

Acknowledgments

Support of Masaryk University within the project MUNI/A/0786/2013 "Analysis and Prediction of financial and investment products performance" is gratefully acknowledged.

References

[1] Black, Fischer – Scholes, Myron. (1972). The Pricing of Options and Corporate Liabilities. *Journal of Political Economy,* vol. 81, no. 3, pp. 637–654.

[2] *Country Classification*. In: FTSE.com. (2014) Available at: http://www.ftse.com/products/indices/country-classification

[3] Hull, J. (2012). *Options, futures, and other derivatives*, 8th ed. Boston, [Mass.]: Pearson.

[4] *Latest Statistics*. In: World Federation of Exchanges. (2014) Available at: http://www.world-exchanges.org/statistics/monthly-reports.

[5] Sechel, I. – Ciobanu, G. (2014). Characteristics Of The Emerging Market Economies – BRICS, From The Perspective Of Stock Exchange Markets, *Annals of the University of Oradea, Economic Science Series*, vol. 23, no. 1, pp 40-49.

[6] Verbeek, M. (2008). *A guide to modern econometrics*. 3rd ed. Chichester: John Wiley & Sons.

TRENDS IN PUBLIC SPENDING ON EDUCATION IN SELECTED EUROPEAN UNION COUNTRIES

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ABSTRACT

Education is a global phenomenon. Generally, the expansion of education and the general increase in the level of skills available in the population should imply a growing and more highly skilled workforce. Governments invest in educational institutions to help foster economic growth, enhance productivity, contribute to personal and social development or reduce social inequality. The level of expenditure on educational institutions is affected by many factors and there are significant differences between countries. The aim of this paper is to demonstrate the effect of the change in overall tax revenues on the education expenditure in selected Member States of the European Union. For the analysis of the collected data for individual countries the panel data regression model was chosen in the econometric program Gretl.

Keywords: spending on education, revenues from taxes, panel data regression model

JEL codes: I22, H20, H52

1 Introduction

Generally, the governments are the providers of key public services such are education, health care, public safety, judicial services, etc. In order to fulfil their functions at all levels they must have adequate financial resources. In all countries, governments collect revenues through taxation - taxes represent the main income of the state budget. After that they redistribute this public money, often in the form of mandatory spending on social programs such as education or health care. The use of tax expenditures of government is omnipresent and increasing [10].

The deep structural changes that have occurred in the global labour market over the past decades suggest that better-educated individuals will continue to have an advantage as the labour market becomes increasingly more knowledge-based. A better educated workforce also contributes to higher economic growth and consequently, a more prosperous society. A lack of skills only strengthens the risk of unemployment and the differences in skills have an impact on earnings. Higher levels of educational attainment are associated with better health, more social engagement and higher employment rates. They are also perceived as a gateway to better labour opportunities and higher relative earnings [9].

Education becomes more and more important, which is proved by the following facts. About 75% of adults on average in OECD countries have attained at least upper secondary education. In some OECD countries, younger adults have higher tertiary attainment rates than older adults, leading by more than 20 percentage points on average. Women aged 25-34 have higher attainment rates in both upper secondary and tertiary education than men of the same age. Individuals have strong incentives to pursue more education, and governments have incentives to build on the skills of the population through education [8].

2 Literature Review

Data sets that combine time series and cross sections are common in economics. Many recent studies have analysed panel (longitudinal) data sets. [5]. Panel data models combines *cross-section and time-series* data jointly and this process is called *pooling* the data. Panel data models study the same group of entities or units (e.g. consumers, firms, regions, states, countries) over time. Panel data regression model is more complete and efficient estimation approach since it combines cross-section and time-series data information in the same model [11].

Panel data sets for economic research possess several major advantages over cross-section or time-series data sets. Panel data usually give the researcher large number of data points, increasing the degrees of freedom and reducing the collinearity among explanatory variables – hence improving the efficiency of econometric estimates. What is more important, the panel data allow a researcher to analyse a number of important economic questions that cannot be addressed using cross-sectional or time-series data sets [6]. There are several benefits from using panel data:

- in panel data models we use a larger number of observations,
- the regression results are more robust since more degrees of freedom are used turning statistical inferences more credible,
- panel data models are more appropriate to study the dynamics adjustments than cross-section data models,
- using panel data we get more data information, more variability and less collinearity among the explanatory variables [1], [11].

There are three types of panel data models that are commonly used:

- *The pooled model* – the simplest one; homogeneity is assumed for the intercept and the slope coefficients:

  $$Y_{it} = \alpha + \beta_1 X_{1,it} + \cdots + \beta_k X_{k,it} + \varepsilon_{it} \quad (1)$$

  α and β´s are the same for all units.

- *The fixed effects model* – heterogeneity is assumed in the intercept and homogeneity in the slope coefficients:

  $$Y_{it} = \alpha_i + \beta_1 X_{1,it} + \cdots + \beta_k X_{k,it} + \varepsilon_{it} \quad (2)$$

  α_i is different for each unit capturing specific unit characteristics which are time invariant, and β´s are the same for all units.

- *The random effects model* – assumes that the intercept values of each unit are random captured in the disturbance term:

  $$Y_{it} = \alpha + \beta_1 X_{1,it} + \cdots + \beta_k X_{k,it} + (v_i + \varepsilon_{it}) \qquad \text{with } a_i = a + v_i \quad (3)$$

  v_i is the random unit characteristic not observable [5], [11].

3 Data and Methodology

The contribution is focused on the demonstration of the effect of the change in overall tax revenues on the education expenditure in selected Member States of the European Union. For the analysis of the collected data for individual countries we have chosen the panel data regression model in the econometric program Gretl. A panel data regression differs from a

regular time-series or cross section regression in that it has a double subscript on its variables, i.e.:

$$y_{it} = \alpha + X_{it}^{'}\beta + u_{it} \qquad i = 1, \cdots, N; t = 1, \cdots, T \tag{4}$$

with i denoting households, individuals, firms, countries, etc., and t denoting time. The i subscript, therefore, denotes the cross-section dimension whereas t denotes the time-series dimension. α is a scalar, β is Kx1 and X_{it} is the it-th observation on K explanatory variables [1].

The *pooled model* can be estimated by OLS assuming a common constant for all units. However, the pooled model is very restrictive since it does not assume any heterogeneity between the units. This model could be suitable in cases where the chosen units are homogeneous, which is not very probable that will happen. As an alternative to the pooled model are the *fixed effects* or *random effects* models – they admit fixed or random heterogeneity between the sample units [5], [11].

To decide which model is the most appropriate one we need to implement three panel diagnostic tests:

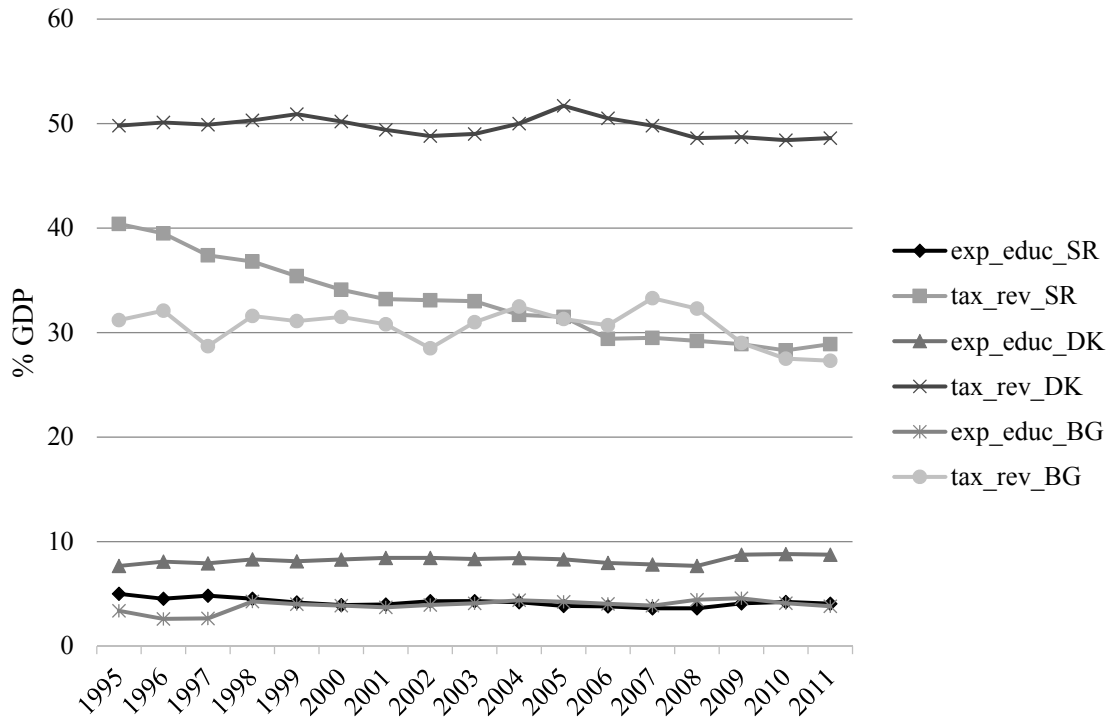
- *The F-test* – it decides between the pooled model and the fixed effects model which one is the most appropriate,
- *The Breusch-Pagan LM test* – it decides between the pooled and the random effects models, which one of them is the most appropriate,
- *The Hausman test* - it decides between the fixed and the random effects models, which one is the most appropriate [11].

3.1 Tax revenues and expenditures on education in selected countries

The analysed data are obtained from Eurostat. The period of years monitored is from 1995 to 2011. For the panel data analysis a nineteen Member States of the European Union was selected (because of the completeness of data for a given period of time for both selected variables) – Bulgaria, Denmark, Estonia, Ireland, Spain, France, Italy, Cyprus, Latvia, Lithuania, Hungary, Netherlands, Austria, Poland, Portugal, Slovakia, Finland, Sweden and United Kingdom.

In this contribution we will demonstrate the effect of the change in overall tax revenues on the education expenditure. The following graph *(Figure 1)* shows the development (trends) of total public expenditure on education and total tax revenues for the years 1995 - 2011 in the three selected states of the European Union (i.e. Slovak republic, Denmark and Bulgaria). The two states besides Slovakia are in the graph for a better illustration of the position of the Slovak Republic among the Member States of the European Union. The first is Denmark, because it shows the relatively highest values of both selected variables among the selected countries of the European Union. The second country is Bulgaria, because it shows the relatively lowest values of both selected variables among the selected countries of the European Union.

Figure 1 Total public expenditure on education and total tax revenues in selected countries – Slovak republic, Denmark and Bulgaria in the years 1995 - 2011 (as % of GDP)



Source: own processing based on data from [2], [3]

4 Results and Discussion

For the dependent variable we have chosen *exp_educ* - total public expenditure on education as % of GDP. For independent variable we have chosen *tax_rev* - total receipts from taxes and social contributions as % of GDP. After that we have estimated the pooled model in the Gretl program using the *Ordinary Least Squares estimator*, so-called OLS model (see *Table 1*).

Table 1 Pooled OLS, using 323 observations; Included 19 cross-sectional units; Time-series length = 17; Dependent variable: exp_educ

	Coefficient	**Std. Error**	**t-ratio**	**p-value**	
const	1.82172	0.284796	6.3966	<0.00001	***
tax_rev	0.0976911	0.00746661	13.0837	<0.00001	***

Mean dependent var	5.490341	S.D. dependent var	1.108181
Sum squared resid	257.9020	S.E. of regression	0.896344
R-squared	0.347805	Adjusted R-squared	0.345773
F(1, 321)	171.1841	P-value(F)	1.21e-31
Log-likelihood	-421.9679	Akaike criterion	847.9359
Schwarz criterion	855.4912	Hannan-Quinn	850.9519
rho	0.940141	Durbin-Watson	0.154302

Source: own processing in Gretl based on data from [2], [3]

After the estimation of the pooled OLS we have to decide which model is the most appropriate (pooled, fixed effects or random effects). We have done the panel diagnostic tests (see *Table 2*).

Table 2 Panel diagnostic tests

Test	Hypotheses	Reject H_0 if	Results from Gretl	Result
F-test	H_0: $a_1 = a_2 = ... = a_N$ (pool, OLS) H_A: $a_1 \neq a_2 \neq ... \neq a_N$ (fixed effects)	$F_{stat} > F_{(N-1,NT-N-k)}$ *or* p-value < 0.05	$F_{stat} = 50.6582$ > $F_{(18,303)} = 1.63799$ *and also* p-value ($3.83225e^{-080}$) < 0.05	Reject H_0
Breusch-Pagan LM test	H_0: $\sigma^2 = 0$ (pool, OLS) H_A: $\sigma^2 > 0$ (random effects)	$LM > \chi^2_1$ *or* p-value < 0.05	LM = 1,382.25 > $\chi^2(1) = 3.84146$ *and also* p-value ($1.51277e^{-302}$) < 0.05	Reject H_0
Hausman test	H_0: cov (v_i, X_{it}) = 0 (random effects) H_A: cov (v_i, X_{it}) ≠ 0 (fixed effects)	$H_{statistic} > \chi^2_k$ *or* p-value < 0.05	H = 0.86469 < $\chi^2(1) = 3.84146$ *and also* p-value (0.35243) > 0.05	Not reject H_0

Source: own processing [11]; results from Gretl based on data from [2], [3]

We have found that in this case the random effects model is more adequate. We have estimated the random effects model (see *Table 3*) - for the dependent variable *exp_educ* - total public expenditure on education as % of GDP and for the independent variable *tax_rev* - total receipts from taxes and social contributions as % of GDP - in the Gretl program using the panel model (not the OLS model).

Table 3 Random-effects (GLS), using 323 observations; Included 19 cross-sectional units; Time-series length = 17; Dependent variable: exp_educ

	Coefficient	Std. Error	t-ratio	p-value	
const	2.65432	0.496364	5.3475	<0.00001	***
tax_rev	0.07552	0.0122409	6.1695	<0.00001	***

Mean dependent var	5.490341	S.D. dependent var	1.108181
Sum squared resid	264.9860	S.E. of regression	0.907159
Log-likelihood	-426.3441	Akaike criterion	856.6883
Schwarz criterion	864.2436	Hannan-Quinn	859.7043

Source: own processing in Gretl based on data from [2], [3]

The result of *random effects model (GLS)* is the following equation with basic information:

^exp_educ = 2,65 + 0,0755*tax_rev
(0,496) (0,0122)

n = 323, loglikelihood = -426
(standard errors in parentheses)

5 Conclusions

Governments invest in educational institutions to help foster economic growth, enhance productivity, contribute to personal and social development or reduce social inequality. The level of expenditure on educational institutions is affected by many factors and there are significant differences between countries. The total amount of revenues collected by governments is determined by past and current political decisions that are themselves based on cultural expectations for social redistribution, fiscal constraints and economic fluctuations and performance [7].

The output of the random effects model shows that if there was a unit increase in the tax revenues (*tax_rev)*, then expenditures on education (*exp_educ)* will grow on average by 0.07552. The result can be interpreted in another way, because the individual parameters are representing elasticities. Then the parameter β_1 expresses, that if the total tax revenues increase by 1%, then the total expenditures on education will increase on average by 0.076%. Despite the fact, that the value of the given parameter is low, it indicates the effort, even if small, of the governments in selected Member States of the European Union, to invest in education. A greater level of education in the entire nation tends to foster a higher rate of aggregate growth and it also results in higher labour productivity [4].

Acknowledgments

This contribution is the result of the project VEGA (1/0008/11) Effectiveness of using tax revenues and public expenditures in relation to long-term sustainability of public finances and new unconventional possibilities of budget revenues.

References

[1] Baltagi, B. H. (2008). *Econometric Analysis of Panel Data*, 4th ed. UK: John Wiley & Sons Ltd. Retrieved from: http://books.google.sk/books?id=oQdx_70Xmy0C&printsec=frontcover&hl=sk&source=gbs_atb#v=onepage&q&f=false

[2] EUROSTAT (2014). *Expenditure on education as % of GDP or public expenditure.* from: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=educ_figdp&lang=en

[3] EUROSTAT (2014). *Main national accounts tax aggregates.* from: http://appsso.eurostat. ec.europa.eu/nui/show.do?dataset=gov_a_tax_ag&lang=en

[4] Goldin, C. D. - Katz, L. F. (2008). *The Race Between Education and Technology*. USA: Harvard University Press. Retrieved from: http://books.google.sk/books?id=mcYsvvNEUYwC&printsec=frontcover&dq=education&hl=sk&sa=X&ei=QdYBVLnBM-Gl0QXg24FY&redir_esc=y#v=onepage&q=education&f=false

[5] Greene, W. H. (2008). *Econometric Analysis*, 2nd ed. New Jersey: Prentice-Hall. Retrieved from: http://books.google.sk/books?id=Vn_CAwAAQBAJ&pg=PA451&dq=greene+econometric+analysis&hl=sk&sa=X&ei=sZ9oVM-iEIHqyQO_hIDYDA&redir_esc=y#v=one page&q=greene%20econometric%20analysis&f=false

[6] Hsiao, Ch. (2003). *Analysis of Panel Data*, 2nd ed. Cambridge: University Press. Retrieved from: http://books.google.sk/books?id=i9iPG7C3EP4C&printsec=frontcover&dq=panel+data+analysis&hl=sk&sa=X&ei=VbRfVLS2O4Ws7AayjYCgBw&redir_esc=y#v=onepage&q=panel%20data%20analysis&f=false

[7] Hudoková, K. (2014). The impact of tax revenues on expenditures on education in the Slovak republic. In *EDAMBA 2014 : proceedings of the international scientific conference for doctoral students and young researchers : 13th - 14th November 2014, Bratislava, the Slovak Republic.* Bratislava : Publishing House EKONÓM, pp.xx.

[8] OECD (2014). *Education at a Glance 2014: Highlights*. OECD Publishing. Retrieved from: http://dx.doi.org/10.1787/eag_highlights-2014-en

[9] OECD (2014). *Education at a Glance 2014: OECD Indicators.* OECD Publishing. Retrieved from: *http://dx.doi.org/10.1787/eag-2014-en*

[10] OECD (2010). *Tax expenditures in OECD countries*. Paris : *OECD*.

[11] Soukiazis, E. (2013). The linear regression model (LRM). In *Applied Macro-econometrics – Summer course for PhD. students.* Portugal: Faculty of Economics of the University of Coimbra.

CHARACTERISTICS OF CASH FLOW RETURN ON INVESTMENT IN TERMS OF FINANCIAL PERFORMANCE MANAGEMENT

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ABSTRACT

Value based financial performance measures are presented by their proponents as a major improvement over the traditional performance measures. By including a company's cost of capital in their calculation they could be applied in order to evaluate the value creating potential of a company. In this paper the measure Cash Flow Return on Investment (CFROI) will be investigated. It provides a definition of CFROI, outlines the calculation of the measure. Furthermore it focuses on the interpretation of the measure and considers the link between CFROI, Net Present Value (NPV) and Economic Value Added (EVA).

Keywords: value based performance measures, CFROI, EVA, NPV, shareholder wealth, cash-flow

JEL codes: G3, G32

1 Introduction

One of the problems of EVA as a value based performance measure is that it is difficult to compare the value of the measure across different companies. Differences in the accounting treatment of certain items, as well as differences in the average age of assets, could result in EVA values that are not comparable. EVA is also distorted by inflation, and cannot be used as performance measure during periods of inflation[1]. The measure CFROI could overcome some of these limitations since it is calculated by using cash flows, and there is also an effort made for converting all the cash flows into inflation-adjusted values. While EVA is predominantly used as corporate financial performance measure, CFROI is also applied by investments analysts. In this paper the measure CFROI will be investigated, its definition, calculation, interpretation of the measure, and also the link between CFROI, EVA and NPV.

2 Definition and calculation of CFROI

CFROI compares the inflation-adjusted cash flow generated by a company with the inflation-adjusted cash investment required to achieve it [8]. By including the estimated lifetime of the company's depreciable assets and the expected residual value of its non-depreciable assets, an internal rate of return is calculated. This CFROI figure is then compared to the company's real cost of capital. If CFROI is less than the company's real cost of capital, additional investment would yield a negative NPV and the investment would not contribute to the creation of shareholder value. Alternatively, if the CFROI is greater than the real cost of capital an increase in investment would provide a positive NPV and shareholder value would be created.

[1] Comparing EVA figures for different companies from different countries over different years could be problematic due to the distorting effects of inflation.

The main characteristics of this measure are listed below:

- The calculation of the measure is similar to that of an internal rate of return (IRR), but it should not be interpreted in the same way as an IRR.
- CFROI values are calculated for each financial year[2].
- Since its calculation is based on cash flows it removes the influences of accrual accounting even more than EVA.
- The measure is inflation-adjusted.
- It focuses on the return offered to all the capital providers of the company and not only the shareholders.
- CFROI may be viewed as a return on investment (ROI). However, it is not calculated for individual projects, but rather for the company as a whole.

Calculation of CFROI

The four inputs required to calculate the measure are as follows [5]:

1. The average life of the depreciating assets.
2. The total amount of assets (depreciating and nondepreciating assets) adjusted for inflation.
3. The inflation-adjusted cash flows generated by the assets over their lifetime.
4. The final inflation-adjusted residual value of the non-depreciating assets at the end of the asset lifetime.

The asset lifetime is the estimated average economic life of the tangible depreciating non-current assets of the company. This figure provides an indication of the remaining period over which the cash flow will be generated. It is calculated as follows[3]:

$$Asset\ life = \frac{Adjusted\ tangible\ non-current\ assets}{Depreciation\ on\ the\ tangible\ non-current\ assets} \quad (1)$$

The inflation-adjusted total assets amount is calculated as the total of the depreciating and the non-depreciating assets. The inflation-adjusted depreciating assets amount is calculated as follows:

Current cost depreciating assets = Inflation-adjusted Tangible Non-current Assets + Construction in Progress + Inflation-adjusted Gross Leased Property + Adjusted Intangibles.

The inflation-adjusted non-depreciating assets are included in the total asset figure invested in the beginning of the period considered. At the end of the asset lifetime this value represents a cash inflow. The assets consist of:

Current cost non-depreciating assets = Monetary assets – Adjusted current liabilities + Investments and loans granted + Current cost inventories + Current cost land and improvements

The amount of inflation-adjusted gross cash flow should be a reflection of the total cash flow generated by the company's operations, and ignores the method of financing[4]. The amount is calculated as follows:

[2] A company makes efforts to generate higher CFROI values than its cost of capital, but it also attempts to improve its CFROI value over time. Unexpected improvements in the value of the measure should contribute to the creation of shareholder value.

[3] Land and improvements, as well as construction in progress are excluded from this figure since no depreciation is provided on these items. The amortisation of goodwill should not be included in this figure.

[4] The figure is calculated for a specific financial year, and it is assumed that the same amount will be generated for each of the years included in the asset lifetime.

Net profit after tax

+ Depreciation and amortisation

+ Adjusted finance cost

+ Rental expense

+ / - Monetary holding gain / (loss)

- Cost of sales adjustment for replacement value of inventories

+ Net pension expense

+ Minority interest

+ Special item after tax

= Inflation-adjusted gross cash flow

Based on these inputs the company's CFROI value is calculated as the discount rate that would ensure that the present value of all the future cash flows (the equal annual inflation-adjusted gross cash flows, as well as the terminal non-depreciating assets amount) is equal to the initial investment (total non-depreciating and depreciating assets). The CFROI is then calculated as follows[5]:

$$CFROI = \frac{Sustainable\ cash\ flows}{Current\ cost\ gross\ investment} \quad (2)$$

3 Interpretation of CFROI

The absolute level of a company's CFROI does not indicate whether the company is creating or destroying shareholder value. In order to determine this, the measure needs to be compared to a benchmark value [6].

HOLT Value Associates[6] use a company-specific discount rate when evaluating CFROI. This discount rate is based on the CFROI level, the sustainable asset growth rate, as well as a market derived discount rate[7]. It has two major benefits over the CAPM. Firstly, it considers the expected future cash flows of the market, while the CAPM is based on historical information. Furthermore, the market derived discount rate is a product of the CFROI valuation model itself.

Company-specific discount rates are obtained in a similar way. By comparing with the market rate a risk differential can be calculated. The approach applied by HOLT Value Associates assumes that a company's risk is a function of its size and financial leverage, and that this risk cannot be eliminated by means of diversification. The risk differential can consequently be applied to evaluate the risk associated with a specific company.

In those cases where the CFROI value exceeds the company-specific discount rate, the company's NPV is positive [3]. Consequently, shareholder value is created, while it is destroyed by CFROI levels below the discount rate [8].

[5] The sustainable cash flow is calculated after subtracting a sinking fund depreciation amount from the inflation-adjusted gross cash flow. The amount of non-depreciating assets is also excluded from the calculation.

[6] The consulting firm that promotes CFROI.

[7] The market derived discount rate is obtained by considering a large representative sample of companies. Firstly, the total market value of their equity and debt at a certain point in time is calculated. The next step is to estimate the expected future cash flow generated by these companies for the next financial period. These cash flow estimates are obtained by considering earnings expectations published by market analysts.

It is also possible to compare CFROI to a real rate calculated for an industry [6]. This enables to identify the greatest shareholder value creators in an industry. Furthermore, it is also important to consider whether a company is able to maintain or improve its level of CFROI.

Advantages and disadvantages of CFROI

B. J. Madden considers the application of inflation-adjusted cash flows for the CFROI calculation as one of the major benefits of this measure since it enables comparisons over time, and also between companies in different countries. He also suggests that CFROI solves the problem associated with accounting reserves. These reserves are usually easy to manipulate and could distort the financial performance of a company [5]. According to the CFROI approach these reserves are excluded from the calculations.

Since it removes some of the accounting distortions, P. P. Peterson and D. R. Peterson also regard the use of cash flows instead of accounting figures as a benefit associated with CFROI [7].

A. Dzamba also indicates that CFROI represents the future risk exposure of the company, since it is a risk-adjusted discount rate. Because the CFROI calculation focuses on cash it may also be a more applicable measure for shareholders, who tend to focus on cash dividends [2].

When calculating CFROI, gross investments are included. Accumulated depreciation amounts are added back to the book values of the assets employed to generate cash flows. As a result of this, the measure removes the problem of heavily depreciated assets as well as different depreciation policies [6].

The primary advantages of CFROI could be summarized as follows:

- The conversion of accounting profits into cash flow figures
- The use of inflation-adjusted total cash flows rather than the depreciated book values
- The recognition of the life time of the assets utilised to generate the cash flows
- The expression as a return percentage, rather than a monetary amount[8].

On the other hand, there are some disadvantages experienced with the CFROI approach:

- Complexity of its calculation (a large number of accounting adjustments need to be completed)
- In the case of start-up operations large capital outlays are usually combined with low or negative cash flows, so CFROI may not be the ideal performance measure to apply.
- A company consists of a large portfolio of different projects with varying levels of CFROI. The company value for CFROI is an average for the portfolio and it is difficult to identify projects with low or high levels of CFROI.
- Difficulties to communicate it to all levels of a company
- Since the inflation adjustments are only estimates, the quality of the estimates could greatly influence the measure.
- The CFROI approach mixes operating and financing decisions. As a result it is not always possible to determine whether changes in CFROI are the result of operating changes, or financing changes. It is, therefore, important to include the level of financial leverage when comparing different companies [1].

[8] This ensures even greater comparability between different companies, since the measure is not influenced by the size of the investment.

4 Relationship between CFROI, NPV and EVA

In a single-period wealth creation model it is possible to express the NPV of a company in terms of CFROI and EVA. CFROI is considered to be the discount rate that ensures that the present value of a company's cash flows equals the investment required to generate those cash flows. According to that, the following relationship should be observed over a single return period, where the invested capital ($Capital_0$) is returned at the end of the period:

$$\frac{NOPAT}{(1+CFROI)} - Capital_0 = 0 \tag{3}$$

$$NOPAT = Capital_0 * (1 + CFROI) \tag{4}$$

Based on this NPV of the company is:

$$= \frac{NOPAT}{(1+c^*)} - Capital_0 =$$

$$= \frac{Capital_0 * (1+CFROI)}{(1+c^*)} - Capital_0 * \frac{(1+c^*)}{(1+c^*)}$$

$$= \frac{Capital_0 * (CFROI - c^*)}{(1 + c^*)}$$

$$= \frac{EVA}{(1+c^*)} \tag{5}$$

where

NOPAT net operating profit after tax

c cost of capital

The sign of the company's NPV (positive or negative) is thus determined by the spread between CFROI and its cost of capital. In terms of value creation, it is consequently equivalent to the maximisation of EVA. A positive NPV is obtained either by ensuring that CFROI exceeds the cost of capital, or generating a positive EVA value [3] [4].

5 Summary

In this paper, an introduction to a value based financial performance measure CFROI was provided. This measure compares the inflation-adjusted cash flows generated by a company with the inflation-adjusted cash investment required to achieve it. By including the estimated lifetime of the depreciable assets and the expected residual value of the company's non-depreciable assets an internal rate of return is calculated and compared to the company's inflation-adjusted cost of capital. If a company is able to generate CFROI values in excess of its real cost of capital, it is argued that shareholder value should be created. Amongst the benefits ascribed to CFROI the focus on cash flow and the inclusion of the inflation adjustments are considered to be particularly valuable. The complexity of its calculation, and the fact that it exhibits some of the same problems associated with IRR measures, however, are mentioned as limiting factors.

Proponents present the value based measures as a major improvement over the traditional measures, and report high levels of correlation between them and share returns. A number of empirical studies investigating EVA (as the most popular value based measure) report conflicting results, and it is consequently not clear whether this value based measure is able to outperform the traditional financial performance measures in explaining the variation in share returns. There is little empirical evidence of the role of CFROI. Based on the results of one study it appears as if the value based measure $CFROI_{Margin}$ (difference between CFROI and the

real cost of capital) is not able to outperform earnings in explaining the variation in market adjusted share returns. It is necessary to continue in research and bring empirical evidence of the role of CFROI in this context.

Acknowledgments

The paper is an outcome of the ongoing project VEGA No. 1/0238/13 "Dane a efektívnosť nástrojov finančného reinžinieringu pri zvyšovaní výkonnosti podnikov v čase krízy".

References

[1] Clinton, B.D. – Chen, S. (1998). Do new performance measures measure up? *Management Accounting*, 38 (October), pp. 40-43.

[2] Dzamba, A. (2003). Focus on CFROI analysis to boost your firm's growth in 2004. *IOMA's Report On Financial Analysis, Planning & Reporting*, 3 (11), pp. 10-12.

[3] Fabozzi, F.J. – Grant, J.L. (2000). *Value-based metrics: Foundations and practice*. New Hope: Frank J. Fabozzi Associates.

[4] Grant, J.L. (2003). *Foundations of economic value added,* 2nd ed. Hoboken, New Jersey: John Wiley and Sons.

[5] Madden, B.J. (1999). *CFROI valuation: A total system approach to valuing the firm*. Boston: Butterworth-Heinemann.

[6] Martin, J.D. – Petty, J.W. (2000). *Value based management: The corporate response to the shareholder revolution*. Boston: Harvard Business School Press.

[7] Peterson, P.P. – Peterson, D.R. (1996). *Company performance and measures of value added*. Charlottesville: The Research Foundation of The Institute of Chartered Financial Analysts.

[8] Young, S.D. – O'Byrne, S.F. (2001). *EVA and value-based management: A practical guide to implementation*. New York: McGraw Hill.

THE CONCEPT OF EUROPEAN CREATIVITY INDEX

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ABSTRACT

This paper focuses on the construction of open-source creativity index for European Union member states. Our index is based on 3T concept – hence it comprises the dimensions of technology, talent and creativity. We describe in detail the elaboration of the index and the variables included therein.

Keywords: creativity, human capital, innovations, tolerance

JEL codes: J24, O32, O47

1 Introduction

The academics and the policy-makers are looking for the strategies to avert the consequences of the economic crisis and revive the countries' economies. However, there are numerous challenges on the road to achieving this goal – the governments are deeply in debt, forced to adopt various austerity measures and unable to provide the traditional Keynesian stimuli; even if they do so, they do not work in traditional way because of the openness of the economies; the households in so-called developed economies are indebted, as well and are refusing to fuel the debt-driven demand further; and on the top of everything the nowadays' monetary system imposes the obligatory growth on the economies just to keep the things running as they are and not get worse.

Yet economy, as the paradigm of ecological economy teaches us, is only subset of, or better to say is nestled in the society. The society forms the wider environment of economy and people are the basis of each society. At the same time, the creativity is one of the most fundamental features of human beings. So if we are dreaming about the economic growth, preferably long-term and sustainable growth, why not base it on creativity? There are plenty of scientific studies focused on the relationship between creativity and economic performance (see [2] for the summary of the studies on this topic) but if we are to support creativity, we should be able to measure it.

When looking for the proxy variables for creative capacity of the respective economies, one comes to conclusion that there exist certain creativity indexes, but these have a few shortcomings when it comes to practical application. Firstly, they are constructed in the form of cross-section data and thus are not very useful when it comes to work with time series for example for the purpose of modelling the economic growth in time. Secondly they are usually not freely available, i.e. they are practically not available for wider academic public – the low-budget projects, thesis elaboration or demonstration in the pedagogic process. And thirdly they come often more-less in the form of "black box" that means the potential user is not entirely sure what is inside – exactly which variables from which source were used, how the weights were determined and – especially important when it comes to construction of consistent time series – how was the missing data issue coped with. Our work aims to fill this gap and offer

open source creativity index for the European Union member states in the form of panel data, i.e. with the cross-section and time series dimensions.

2 Literature Review

The attempts to measure creativity are not new. Since creativity is intuitively connected more with the individuals than with the whole society, the index of creativity for individuals preceded the index of creativity for the society (see [9] for some early references). Our object of interest, however, is the society.

In recent years, one of the world-known promoters of creativity is Richard Florida. In [4] he proposes the model of economic growth where there are also other equally important dimensions besides technology – talent and tolerance. This is the core of the so-called 3Ts theory – talent, technology tolerance. He defines "creative class" as the most important ingredient of post-industrial cities wishing to move forward. The central idea of Florida's line of reasoning is the notion that companies, job opportunities and technologies are important but they are following the creative people and not the vice versa. Florida is also one of the pioneers of creativity index as quantitative measure suitable for comparison between countries.

Florida and Tinagli [6] constructed Euro-Creativity Index. It was based on the 3Ts theory and thus consists of technology, talent and tolerance sub-indices. The index was calculated for 14 European countries and used the data from 1995 to 2002, subject to availability for various indicators needed. This clearly enlightening and promising concept offered the solid ground for the discussion where the European countries were heading in terms of creativity.

Hui et al. [7] proposed the Hong Kong Creativity Index (HKCI). They broadened the former one and included the cultural infrastructure, social connectedness, cultural participation and cultural policies. The resulting index was thus combination of the sub-indices referring to the outcomes of creativity, to the four forms of the capital – structural/institutional, human, social and cultural. This index comprised the respectable number of variables – more than 80.

Bowen et al. [3] developed the Composite Index of the Creative Economy (CICE) to compare the creative capacity of nine regions from Europe and North America. This index measured three key dimensions: Innovation, Entrepreneurship and Openness. The unique feature of this index was the weighting – the endogenous weighting method. This method isolates achievement on the underlying dimensions as the source of a higher or lower CICE score value – it gives the highest value to the sub-index where the given region scored the best and thus emphasizes the its strong points. The data used were from 1999 to 2005.

Kern and Runge [8] proposed the design of the European Creativity Index as a part of study made for European Commission to evaluate and impact of the culture on the creativity. The concept was built upon indicators related to culture-based creativity and their inclusion into the existing socioeconomic indicator schemes (i.e. European Innovation Scoreboard). This index remained only as a theoretical concept.

Florida et al. [5] broadened the previous work and created the Global Creativity Index (GCI). Similar to the Euro-Creativity Index the GCI is made of the Talent, Technology and Tolerance sub-indices. It was constructed for 82 nations, however not including the time series dimension. The data used for its composition are from the period 2000-2009 although different years are used for the different variables.

Creativity index proposed and developed by Florida is the most suitable for a comparison of the creative dimension of the different countries. The HKCI is very detailed and it was elaborated in depth particularly for Hong Kong. Its usage for international comparison is limited

because there is no source of coherent data necessary for index computation. The CICE has been constructed specifically for the comparison of the selected regions and cannot be used for countries' comparison either. The use of endogenous weighting method within the time series framework is questionable because the weights themselves would generally have to change in time thus leading to very inconsistent and even arbitrary index. The usability of work of Kern and Runge for practical purposes is questionable, since they did not use any data.

3 Data and Methodology of index construction

3.1 Selection of variables

The creativity index design proposed in [6] is adopted in this study. Thus our Creativity index consists of 3 indices – Talent, Technology and Tolerance, each composed of three sub-indices. Creativity index is calculated for 30 European countries (Austria, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Turkey, United Kingdom) for the time period 2000-2011 due to data availability.

Talent index is comprised of the creative class, human capital and scientific talent. Creative class consists of 3 groups of creative people: creative core, creative professionals and bohemians. Table 3 gives overview of the creative class composition according to ISCO-88 code within the 3 groups. Human capital is determined by labour force with tertiary education and public spending on education. Public expenditure on education is measured by 5 variables: total public spending on education, total public expenditure on education (all levels combined), total public expenditure on education (tertiary level), annual expenditure on public and private educational institutions per pupil or student (tertiary level) and annual expenditure on public and private educational institutions per pupil or student (all levels combined). Scientific talent includes variables: researchers in R&D, human resources in science and technology and scientific and technical journal articles.

Technology index contains innovation, high tech innovation and research and development sub-indices. Innovation is measured by number of patent applications (filed both through the Patent Cooperation Treaty and the European Patent Office). High tech innovation is determined by two measures: the European high-technology patents and the royalty and license fees. Royalty and license fees are calculated from 3 variables. The royalty and license fees receipts and the international transactions in royalties and license fees export carry the same information. Both of them are used in order to deal with the missing data issue. Third one is the balance of international transactions in royalties and license fees. Research and development is measured by research and development expenditure; both the World Bank and the Eurostat data are used to cope with the missing data issue.

Tolerance index is composed from attitudes index, value index and self-expression index. Attitudes index is measured with tolerance of homosexuality; value index with the proportion of population with the protestant denomination. Both measures come from European Values Study (EVS). The tolerance of homosexuality is a standard component of Florida's creativity index. The proportion of population with the protestant denomination was chosen based on the famous Weber's study [10] where they attribute the economic success of early USA to the protestant virtues. Self-expression index uses 2 measures. One of them is "Voice and accountability score" from the Worldwide Governance Indicators (WGI). It captures perceptions of the extent to which a country's citizens are able to participate in selecting their

government, as well as freedom of expression, freedom of association, and a free media. The second one is "Control over life and freedom of choice" coming from the EVS. It measures the degree how much people perceive they have completely free choice and control over their lives. The Florida's self-expression index captures the degree to which a nation values individual rights and self-expression. It is based on questions covering attitudes toward self-expression, quality of life, democracy, leisure, the environment, trust and more; it was derived from the World Values Survey in the period 1995-1998. The two measures used in this study are suitable proxies capturing the same dimension; these measures also express evolution in time.

3.2 Normalization of variables

Each variable is measured in different units of measurement and even though the "size" effect of the economy is eliminated (each variable is expressed either as a score or as a ratio) in order to construct the overall indicator as a linear combination of the variables each value needs to be transformed to the score between 0 and 10, 10 being the highest value, meaning the best impact on the creative capacity of the economy. Two points are necessary for the linear transformation to be performed. Instead of minimum corresponding to 0 and maximum corresponding to 10 (for certain variables where the high value suggests the low creative capacity it is vice-versa) we decided to take 5th percentile to be transformed to 0 and 95th percentile to 10 in order to eliminate the potential influence of outliers. Both 5th and 95th percentiles are determined from the database of all 30 countries. Technically the linear transformation is performed according to the following equation:

$$y = a + bx \tag{1}$$

y is the value of the score, x is the value of the variable, a and b are the constants calculated for each indicator separately based on the following equations:

$$a = \frac{10 * 5th\_percentile}{5th\_percentile - 95th\_percentile} \tag{2}$$

$$b = \frac{10}{95th\_percentile - 5th\_percentile} \tag{3}$$

The only exception from this rule is the group of variables from the European Values Study – there was no danger of outliers here since the lowest and highest possible values were clearly given. Thus the values 0 and 10 of the newly formed transformed variables corresponded to the minimum and maximum values (or vice-versa) based on the questionnaire design. This way it is assured that each transformed variable takes on the value from 0 to 10 and so does the resulting index, 0 meaning the least creative capacity of the country and 10 the greatest one.

3.3 Coping with the missing data issue

Since our intention was to construct the creativity index for the group of the V4 countries in the form of panel data, there was a necessity to deal with the fact that not the all data for the desired variables were available. Two specific issues regarding this point had to addressed: firstly regarding the data from the European Values Study and secondly the missing data from the other sources.

The missing data problem from the European Values Study was specific in that there were only four waves of the study conducted within the span of nearly 30 years – the first study was undertaken in 1981 and the last in 2009, with three rather isolated observations per country in case of the countries under research. Moreover, the data were collected via extended surveys and thus there is possibility of biases. However, they gave a good measure regarding the trends

in the shifts of preferences and ideas of the citizens of the individual countries. That is why to compensate for the years when no survey was conducted and at the same time to compensate for the possible selection bias the fitted values from simple logarithmic trend models instead were used.

The qualitatively different issue was the missing data from the other sources. Unlike the missing data from EVS here the problem lied not in isolated observation in time domain but in the fact that some of the time series were not long enough. To address this issue the following approach was taken: the observation for the given country and the year was used (in order to calculate the value of the creativity index) if there had been at least one variable with the valid value for each of the nine sub-sectors. However, the weights of the remaining variables in the sub-sector for the given observation had to be re-calculated. The re-calculation was performed in such a way that the ratios of the weights of the variables with non-missing data were retained. The similar approach was taken in construction of the Worldwide Governance Indicators by the World Bank.

3.4 Determination of weights

When forming any composite index the determination of weights is of the great importance. We use the three levels of weights (see table 2 for details) – the first level is the level of three indices, the second level refers to the nine sub-indices and the last one corresponds to individual indicators (or variables). In this stage of work the decision was made to use the equal weights on the first and the second levels. We consider this method to be the best first shot in the situation when there is no other information available. In the third level there are alternations from the equal weighting in some cases; it was exclusively in the situation when there were a few variables expressing the similar concept – in this case the weights were lowered, usually in such a way that the sum of the lowered weights equals to the weights of other indicators in the same sub-index.

4 Discussion

The European creativity index is described in more detail in Table 1. The index is still considered to be a work in progress. So far it was used to compare the development of creative capacity of Visegrad Four countries (see [1]). Before publication and making it available to academic public, some minor changes may be made.

5 Conclusions

In this paper we described the construction of the creativity index based on Florida's 3Ts concept and calculated the index in the format of panel data. The index was calculated for 30 European countries for years 2000-2011. Talent, technology and tolerance indices were also calculated individually. Thus we provide the open source creativity index, description of variables with their source and also disclosed the weights of respective variables and how they were determined.

Table 1 European creativity index – indicators and their weights

W1	Index	W2	Sub-index	W3	Indicator	Source
1/3	Talent	1/3	Creative Class	1	Employed in creative occupations	Eurostat
		1/3	Human Capital	0.5	Labour force with tertiary education (% of total)	WDI
				0.1	Public spending on education, total (% of GDP)	WDI
				0.1	Total public expenditure on education, all levels combined	Eurostat
				0.1	Total public expenditure on education, tertiary level	Eurostat
				0.1	Annual expenditure on public and private educational institutions per pupil/student, tertiary level	Eurostat
				0.1	Annual expenditure on public and private educational institutions per pupil/student, all levels combined	Eurostat
		1/3	Scientific Talent	0.3	Researchers in R&D	WDI
				0.3	Human resources in science and technology	Eurostat
				0.4	Scientific and technical journal articles	WDI
1/3	Technology	1/3	Innovation	0.5	Patent applications filed through the Patent Cooperation Treaty, residents	WDI
				0.5	Patent applications to the European Patent Office	Eurostat
		1/3	High Tech innovation	0.5	European high-technology patents	Eurostat
				0.1	Royalty and license fees, receipts (BoP, %GDP)	WDI
				0.1	International transactions in royalties and licence fees: export	Eurostat
				0.3	International transactions in royalties and licence fees: balance	Eurostat
		1/3	R&D	0.5	Research and development expenditure (% of GDP)	WDI
				0.5	Gross domestic expenditure on R&D (GERD) in % of GDP	Eurostat
1/3	Tolerance	1/3	Attitudes index	1	Tolerance of homosexuality	EVS
		1/3	Values Index	1	Proportion of population with protestant denomination	EVS
		1/3	Self Expression Index	0.5	Voice and accountability	WGI
				0.5	Control over life and freedom of choice	EVS

Abbreviations: W1, W2, W3 are weights corresponding to index level (W1), sub-index level (W2) and indicator level (W3)

Sources of data: Eurostat, WDI (World Development Indicators), EVS (European Values Study), WGI (Worldwide Governance Indicators)

Acknowledgments

The paper is an outcome of the research project APVV-0101-10 KRENAR.

References

[1] Alexy, M – Káčer, M. (2014). Measuring creative capacity of Visegrad Four countries' economies. *Region Direct*, forthcoming.

[2] Archibugi, D – Michie, J. (1998). *Trade, growth and technical change*. Cambridge: Cambridge University Press.

[3] Bowen, HP - Sleuwaegen, L - Moesen, W. (2008). A composite index of the creative economy with application to regional best practices. *Review of Business and Economy*, vol. 4, pp. 375-397.

[4] Florida, R. (2002). *The Rise of the Creative Class: And How Its Transforming Work, Leisure, Community and Everyday Life*, New York: Basic Books.

[5] Florida, R – Mellander, C – Stolarick, K – Silk, K – Matheson, Z – Hopgood, M. (2011). *Creativity and Prosperity: The Global Creativity Index*. Toronto: Martin Prosperity Institute.

[6] Florida R – Tinagli I. (2004). *Europe in the Creative Age*. Demos.

[7] Hui, D – NG, C – Mok, P – Fong, N – Chin, W – Yuen, C (2004). *A study on Hong Kong Creativity Index*. Commissioned by the Home Affairs Bureau, The Government of Hong Kong Special Administrative Region.

[8] Kern, P. – Runge, J. (2009). *KEA briefing: towards a European creativity index. Part of the KEA's report 'The contribution of culture to creativity'*. Conducted for the European Commission in 2008-2009.

[9] Ohnmacht, FW. (1966). A note on indices of creativity. Perceptual and Motor Skills, vol. 22, pp. 370.

[10] Weber, M – Parsons, T. (2003). *The Protestant Ethic and the Spirit of Capitalism*, Dover Publications.

LONG-TERM FISCAL SUSTAINABILITY OF PUBLIC SECTOR ENTITIES' FINANCES

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ABSTRACT

Reporting on the long-term fiscal sustainability information belongs to actual problems of public sector accounting. Long-term fiscal sustainability of public sector entities' finances is an ability of an entity to meet service delivery and financial commitments. Public sector financial statements should be presented information about the long-term fiscal sustainability of public sector entities' finances to certain users. The article deals with requirements on reporting on the long-term fiscal sustainability information in the general purpose financial statements of the public sector entities. Public sector entities reporting long-term fiscal sustainability information are encouraged to follow Recommended Practice Guideline No. 1 (RPG 1 – Reporting on the long-term sustainability of an entity's finance). Reporting on the long-term fiscal sustainability information provides an indication of the projected long-term sustainability of the public sector entities' finances over a specified time horizon in accordance with stated assumptions.

Keywords: finances, public sector, long-term fiscal sustainability, accounting, financial statements

JEL codes: H83, M40

1 Introduction

There are many definitions of long-term fiscal sustainability of public sector finances. According to the International Public Sector Accounting Standards Board, long-term fiscal sustainability of public sector finances is the ability of the entity to meet services delivery and financial commitments both now and in the future. Fiscal sustainability of public sector finances is a situation when "the present value of future primary surpluses equals the current level of debt, if this condition is met, the government avoids excessive debt accumulation, is able to roll over its debt and there is no risk of insolvency" [5; p. 2]. "Fiscal sustainability of public sector finances can be defined as a development of the economy where future generations will be able to repay the debt of the government, which is formed by past generations, without deterioration of their economic situation and without compromising the status quo level of development of past generations." [7; p. 51]. "Fiscal sustainability of public sector finances means the ability of a country to maintain current fiscal operations without the threat of a crisis that would require a drastic change in policy." [1; p. 117].

Fiscal sustainability of public sector finances includes several concepts. The most important of them are solvency (it means, whether a government could repay all its debt over a given time

period) and liquidity (it means, whether the government has the resources needed to meet payment obligations at maturity day). "Although fiscal sustainability of public sector finances can depend on the government's short-term liquidity, sustainability assessments are typically based on the outlook for the ratio of public debt to gross domestic product." [1; p. 117]. In assessing fiscal sustainability of public sector finances, it should be taken into account several factors such as the feasibility of attaining the revenue and expenditure forecasts in the government budget, the affordability of key programs, the structure of public debt and the fiscal contingencies.

Reporting on information about the long-term fiscal[1] sustainability of public sector entities' finances (long-term fiscal sustainability information) in the general purpose financial reports[2] belongs to current problems of the public sector accounting. Reporting approach to this information allows increasing the quality and consistency of this information and thereby further strengthening accountability and transparency of public sector entities' finances.

The issue of reporting on information about the long-term fiscal sustainability of public sector entities' finances is provided for Recommended Practice Guideline No. 1 entitled RPG 1 – Reporting on the long-term sustainability of an entity's finances issued by the International Public Sector Accounting Standards Board (IPSASB). "Recommended Practice Guidelines provide guidance on good practice that public sector entities are encouraged to follow." [4; p. 20]. The objective of reporting on information about the long-term fiscal sustainability of public sector entities' finances is to provide information of the projected long-term fiscal sustainability of public sector entities' finances over a specified time horizon in accordance with the stated assumptions. It is an expression of the impact on current policies and decisions taken at the reporting date for future ensuring of finance and for related information in the general purpose financial statements.

2 Literature Review

The researched object that is long-term fiscal sustainability of public sector entities' finances was chosen because of its timeliness and dynamic development. We got information about the researched object from book and magazine sources, conference proceeding and from our own previous knowledge of the research activities. We have worked with the current literature published in 2014, which was mainly in English. This literature is listed in the references section. The above issue deals mainly with Recommended Practice Guideline No. 1 entitled RPG 1 – Reporting on the long-term sustainability of an entity's finances that is a part of the Handbook of International Public Sector Accounting Pronouncements and was published in 2014 on the IFAC website http://www.ifac.org/publications-resources/2014-handbook-international-public-sector-accounting-pronouncements. We also used Conceptual Framework for General Purpose Financial Reporting by Public Sector Entities that is a part of the Handbook of International Public Sector Accounting Pronouncements and was published in 2014 on the IFAC website http://www.ifac.org/publications-resources/conceptual-framework-general-purpose-financial-reporting-public-sector-enti-8. We also used the provisions of IPSAS that are listed in the Handbook of International Public Sector Accounting Pronouncements, which was published in 2014 on the IFAC website. The knowledge gained forms the basis for the processing of results and discussion.

[1] Term "fiscal" is used with a broader meaning to include both inflows and outflows (not only has a narrow interpretation related to taxation).

[2] General purpose financial reports are the financial reports intended to meet the information needs of users who are unable to require the preparation of financial reports tailored to meet their specific information needs.

3 Data and Methodology

The aim of this paper is to describe and analyze requirements on reporting on the long-term fiscal sustainability information in the general purpose financial statements of the public sector entities. We applied epistemology as a basic method for researching this problem. Standard research methods, such as selection, analysis and synthesis, presenting basic methodical approach to paper processing are applied. We combined the obtained knowledge to form new, higher level of knowledge of research problems. In particular, ways of understanding and explaining dimensions of the long-term fiscal sustainability, projections of future inflows and outflows and reporting on the long-term fiscal sustainability information, the inductive-deductive and analytic-synthetic logical scientific methods are used. In conclusion, we stated opinions, in which we highlighted the importance of reporting on the information about the long-term fiscal sustainability of the public sector finances.

4 Results and Discussion

Long-term fiscal sustainability of public sector finances is the ability of the public sector entity to meet services delivery and financial commitments both now and in the future. Information on long-term fiscal sustainability of the public sector entities' finances include projected inflows[3] and outflows[4] related to the provisions of goods and services delivery and the programs providing social benefits for the certain period of time. It is necessary to take into account the decisions made by the public sector entity on or before the reporting date that result in future outflows and that do not meet the definition of a liability and the recognition criteria for a liability at the reporting date. It is also necessary to take into account future inflows that do not meet the definition of an asset and the recognition criteria for an asset the reporting date.

In assessing the long-term fiscal sustainability of the public sector finances, public sector entity will take into account the financial and non-financial information about the future economic and demographic conditions, the nature of the country and global trends, such as productivity, competitiveness of the economy of the country (national, state or local), and expected changes in demographic variables, such as age, mortality, morbidity, fertility, gender, income, education and workforce participation. When the public sector entity wants to report information about the long-term fiscal sustainability of finance, it is required to assess whether there are potential users of the prospective financial information. The relevance of reporting information about the long-term fiscal sustainability of the public sector entities' finances should be considered in the context of determining the level of funding and service delivery provisions. Users of information about the long-term fiscal sustainability of the public sector finances have the following characteristics:

- "Significant tax and other revenue raising powers;
- The power to incur significant debts; or
- The power and ability to determine the nature, level and method of service delivery including the introduction of new services" [3; RPG 1; p. 1590].

Application of the same approach to reporting on information about the long-term fiscal sustainability of the public sector entities' finances increases the relevance, understandability and usefulness of this information for the users of the general purposes financial reports.

[3] Inflows are cash and cash equivalents projected to be received or accrued by the entity over a time horizon of the projections.
[4] Outflows are cash and cash equivalents projected to be paid or accrued by the entity over a time horizon of the projections.

Information about the long-term fiscal sustainability of the public sector finances enable users to assess various aspects of the long-term fiscal sustainability of the public sector entities' finances, including the nature and extent of financial risks the public sector entity faces. The form and content of information about the long-term fiscal sustainability of the public sector entities' finances varies depending on the nature of the public sector entity and the regulatory environment in which it operates.

Information about the long-term fiscal sustainability of the public sector finances should be reported in order to ensure objective of financial reporting that means to "provide information about the public sector entities useful to users of general purpose financial reports for accountability purposes and for decision-making purposes" [2; p. 13]. Reported information about the long-term fiscal sustainability of public sector finances shall meet the qualitative characteristics of financial reporting, such as "relevance, faithful representation, understandability, timeliness, comparability and verifiability" [6; p. 28] while taking into account the constraints, such as materiality, cost-benefit and the balance between qualitative characteristics. Reported information about the long-term fiscal sustainability of the public sector finances shall include the following components:

- "The projections[5] of future inflows and outflows, which can be displayed in tabular statements or graphical formats, and a narrative discussion explaining the projections;
- A narrative discussion of the dimensions of the long-term fiscal sustainability including any indicators used to portray the dimensions;
- A narrative discussion of the principles, assumptions and methodology underlying the projections" [3; RPG 1; p. 1591].

The projections reported in information about the long-term fiscal sustainability of the public sector entities' finances reflect the conditions of uncertainty and are derived from models that are based on assumptions of uncertainty. In order for information the long-term fiscal sustainability of the public sector entities' finances to faithfully represent the public sector entities' projected future inflows and outflows, assumptions should be based on the best available information. Information about the long-term fiscal sustainability of the public sector entities' finances are published as a separate report or as part of other reports at the same time or at a different time as the general purpose financial reports.

Public sector entities present projections of future inflows and outflows, including capital expenditures. The projections shall be prepared in accordance with current policy assumptions, and assumptions about the future economic and the other conditions. Public sector entities assesses the extent to which it can draw on the assumptions, projections and indicators prepared by other entities, such as the Ministry of Finance, or from other sources of information for the purpose of reducing the cost of reporting and these information shall meet qualitative characteristics of financial reporting. When the public sector entities have budget or forecasts that meet the definition of the projection, this information can be used for a relevant time period. The projections are displayed in tabular statement or graphical formats and provide detailed information about the programs and activities that increasing outflows and identifying the sources of inflows. Tabular statement or graphical formats shall be designed to meet balance considerations of understandability and relevance and the information contained therein shall be consistent and comparable between the reporting periods. In selecting a suitable time horizon the public sector entities need to balance the qualitative characteristics of verifiability, faithful presentation and relevance. The length of the time horizon depends on the nature of the public

[5] A projection is forward-looking financial information prepared on the basis of the entity's current policy assumptions, and assumptions about future economic and other conditions.

sector entity; including aspects such as the longevity of key programs, the level of dependence on financing from other entities and the time horizon adopted by other entities providing comparable prospective information.

Public sector entities reporting on the information about the long-term fiscal sustainability of public sector finances shall include a narrative discussion on each of the dimensions of the long-term fiscal sustainability of public sector finances, such as service dimension, revenue dimension and debt dimension. These three dimensions are inter-related which means that one dimension influence the other dimensions, for example, future services and entitlements to beneficiaries are financed by revenue and (or) debt. Public sector entities can analyze a single dimension while holding the other two dimensions constant, for example, the public sector entity can analyze the effect of current assumptions on the level of the debt while holding the existing levels of the current services and revenue policies constant, the public sector entity can analyze the effect of current assumptions on the level of the revenue while holding the existing level of current services and debt constraints constant, the public sector entity can analyze the effect of current assumptions on the level of the current services while holding the existing levels of the revenue policies and debt constraints constant.

Each dimension is characterized by two aspects, such as capacity and vulnerability. Capacity is the ability of the public sector entity change or influence the dimension. Vulnerability is the extent of the public sector entity's dependence on factors outside its control or influence. Capacity of the service dimension is the ability of the public sector entity to maintain or vary services and entitlements to beneficiaries. Vulnerability of the service dimension is the extent of the public sector entity's dependence on factors, such as viability of reductions in services and entitlements to beneficiaries. Capacity of the revenue dimension is the ability of the public sector entity to vary existing taxation levels or introduce new revenue sources. Vulnerability of the revenue dimension is the extent of the public sector entity's dependence on factors, such as viability of increases in taxation levels or dependence on revenue sources outside public sector entity's control. Capacity of the debt dimension is the ability of the public sector entity to meet financial commitments or refinance or increase debt. Vulnerability of the debt dimension is the extent of the public sector entity's dependence on factors, such as market and lender confidence and interest rate risk.

The public sector entities presents information about the dimensions of the long-term fiscal sustainability of public sector finances through the relevant indicators, such as total gross debt[6], net debt[7], net financial worth[8], net worth[9], overall balance[10] and primary balance[11].

The service dimension takes into account the extent and quality of services and entitlements to beneficiaries over the period of the projections in relation to the current policy assumption on revenues from taxation and other sources, while maintaining debt constraints. This dimension focuses attention on the capacity of the public sector entity to maintain or vary services it provides and entitlement programs it delivers. Public sector entities also focus their attention to the extent of the public sector entity's dependence on factors, such as willingness of recipients of beneficiaries to accept a reduction in the services and entitlements or the inability to determine and vary service levels. Information about the long-term fiscal sustainability of

[6] Total gross debt consists of all liabilities that are debt instruments.
[7] Net debt is calculated as gross debt minus financial assets corresponding to debt instruments.
[8] Net financial worth of an entity is the total value of its financial assets minus the total value of its outstanding liabilities.
[9] Net worth of an entity is the total value of its assets minus the total value of its outstanding liabilities.
[10] Overall balance is the sum of net borrowing by the government, plus the net decrease in government cash, deposits, and securities held for liquidity purposes.
[11] Primary balance is the overall balance, excluding interest payments.

public sector finances can present information about the provisions of services by reflecting the impact of the current policy assumptions on revenue from taxation and other sources, and on debt. Users can compare this information with the public sector entity's service delivery commitments and thereby asses the sustainability of the service delivery.

Revenue dimension takes into account the taxation levels and other revenue sources over the period of the projections in relation to the current policy assumptions on the provision of services to recipients and entitlements for beneficiaries while maintaining debt constraints. This dimension focuses its attention to the capacity of the public sector entity vary existing taxation levels or introduce new revenue sources. Public sector entities also focus their attention to the extent of the public sector entity's dependence on factors, such as unwillingness of taxpayers to accept increases in taxation levels and the dependence on revenue sources outside public sector entity's control. Information about the long-term fiscal sustainability of public sector finances can present information about the level of revenue required to fund current polices by reflecting the impact of the current policy assumptions for the provision of service and for managing debt. This information helps users to assess the ability of the public sector entity to maintain or increase its levels of revenue and thereby to evaluate the sustainability of its revenue sources.

The debt dimension debt takes into account the debt levels over the period of the projections in relation to the current policy assumptions on the provision of services to recipients and entitlements for beneficiaries, and revenue from taxation and other sources. This dimension focuses its attention to the capacity of the public sector entity to meet its financial commitments as they come due or to refinance or increase debt as necessary. Public sector entities also focus their attention to the extent of the public sector entity's dependence on factors, such as, market and lender confidence and interest rate risk. Information about the long-term fiscal sustainability of public sector finances can present information about the projected levels of net debt[12] by reflecting the impact of the current policy assumptions for the provision of service and for revenue from taxation and other sources. This information helps users to assess the ability of the public sector entity to meet its financial commitments as they come due or to maintain, refinance or increase its level of debt and thereby to evaluate the sustainability of its debt.

In making the projections, public sector entities take into account principles and methodologies such as updating projections and frequency reporting, impact of legal requirement and policy frameworks, current policy, demographic and economic assumptions, inflation and discount rates and sensitivity analysis.

In making the projections, public sector entities take into account updating projections and frequency reporting. The public sector entities may update projections of inflows and outflows for certain time period. During the periods of global financial volatility of the risk, projections made before the reporting date may become outdated and thus the ability of this information to meet the objectives of financial reporting, such as accountability and decision making is reduced. In this situation, the public sector entities frequently updated its projection. Other cases are significant or unexpected events such as natural disasters and other emergencies.

In making the projections, public sector entities take into account the impact of legal requirement and policy frameworks. In some countries, the reporting on the information about the long-term fiscal sustainability of the public sector finances is governed by the legal or regulatory framework applied at the national or the state level or through international

[12] Net debt represents the amount expended on the past provision of goods and services that has to be financed in the future.

arrangements. These requirements specify or influence principles, assumptions and methodologies used by the public sector entities in the case of calculating and disclosing its projections.

In making the projections, public sector entities take into account current policy and demographic and economic assumptions. Current policy assumptions shall be based on the continuation of current legislation or regulation. They shall be applied consistently throughout the projection period and be in force. There may be instances where a departure from current legislation or regulation may be appropriate, for example where changes to current legislation or regulation have been enacted before the reporting date and these changes have a specific date for implementation in accordance with time horizon of the projections, where the provisions in current legislation or regulations are contradictory and where the current legislation or regulation has a termination date. The demographic assumptions include an assessment of fertility, mortality, migration rates and workforce participation rates. The economic assumptions include an assessment of economic growth rates and inflation. Other economic assumptions may include an assessment of an impact of environmental factors on economic growth. These factors are a depletion and degradation of ecosystems, depletion of water resource and finite natural resources.

In making the projections, public sector entities take into account inflation and discount rates. There are two approaches in the application of the impact of price inflation in projections. The impact of an inflation is taken into account in making projections or the projections themselves are made at current prices (prices prevailing at the reporting date). If the projections include inflation, then the discount rate also should reflect the impact of inflation. If the projections take into account current prices, then the discount rate should not reflect the impact of inflation.

In making the projections, public sector entities take into account the sensitivity analysis. The assumptions underlying the projections are inherently uncertain. In some cases small changes in variables can have significant impact on the projections. Using sensitivity analysis helps users to understand the impact of the significant changes in the demographic and economic assumptions on the projections.

Public sector entity discloses information about long-term fiscal sustainability of finances that enables users to assess the projected long-term fiscal sustainability of the public sector entity.

"Public sector entity discloses the following information:

- The name of the entity;
- The financial statements to which the long-term fiscal sustainability information relates;
- The date at which the projections were made;
- The basis and timing of further updating of the projections; and
- When the entity uses projections and indicator prepared by other entities or from other sources of the information, the names of those entities or other sources and the information that has been used." [3; RPG 1; p. 1598]

"Public sector entity discloses the following information about discussion of the projections:

- The sources of significant revenue inflows from taxation and other sources;
- An overview of the current policy assumptions for significant revenue inflows from taxation and other sources;
- The sources of significant outflows including capital expenditure;

- An overview of the current policy assumptions for the significant outflows including capital expenditure;
- Whether the projections are modelled individually or in aggregate;
- An explanation of the changes in projections between reporting dates and the reasons for those changes;
- An explanation that the projections are not forecasts and that it is unlikely that the projections over the specified time horizon will match the actual outcome and extent of the difference will depend upon a range of factors;
- An explanation of any modifications of formats between reporting periods and the reasons for such changes;
- The time horizon used for the projections and the reasons for selecting that time horizon; and
- Where an entity changes the time horizon from that used in the previous reporting period, the reasons for such a change." [3; RPG 1; p. 1598]

"Public sector entity discloses the following information about the dimensions of long-term fiscal sustainability:

- An analysis of significant changes in the indicators compared with those of the previous reporting period;
- Changes in the indicators used to report long-term fiscal sustainability information from the previous reporting period, and the reasons for such changes; and
- Where an entity uses indicators that are based on amount derived from non-IPSAS-based information and the indicators affected." [3; RPG 1; p. 1599]

"Public sector entity discloses the principles, assumptions and methodology that form the basis for the making of the projections including the following information:

- Key aspects of governing legislation and regulation;
- Underlying macro-economic policy and fiscal framework, including details of where other publicly available reports on these policies and frameworks can be accessed;
- The key current policy assumptions and the key demographic and economic assumptions that underlying the projections;
- Its policy for reviewing and updating of current policy assumptions and demographic and economic assumptions;
- An explanation of any significant current policy assumptions that depart from current legislation or regulation;
- An explanation of significant changes in the principles, assumptions and methodologies from the previous reporting period, the nature and extent of these changes, and the reasons for such changes;
- The results of any sensitivity analyses that could have a significant impact on the projections;
- The discount rates applied and the basis on which the discount rate has been determined; and

- The approach to inflation and the reason for this approach."[3; RPG 1; 1599]

5 Conclusions

In this paper, knowledge about the reporting on the information about the long-term fiscal sustainability of public sector entities' finances is processed. Reporting on information about the long-term fiscal sustainability of the public sector entities' finances belongs to the actual problems of the public sector accounting. The aim of this article was to describe and analyze requirements on reporting on the long-term fiscal sustainability information in the general purpose financial reports of the public sector entities. Dynamic development takes place in this area at present time and it is therefore addressed in the Recommended Practice Guideline No. 1 entitled RPG 1 – Reporting on the long-term sustainability of an entity's finances. The objective of this recommended practice guideline is to provide guidance on reporting on the information about the long-term fiscal sustainability of the public sector entities' finances and this guideline represents good practice for public sector entities. The reporting on the information about the long-term fiscal sustainability of the public sector entities' finances over a specified time horizon in accordance with the stated assumptions at the reporting date has the important impact on the future ensuring of public sector entities' finances and thereby allows increasing transparency of public sector entities' finances.

Acknowledgments

This article is an output of the project of the Scientific Grant Agency of the Ministry of Culture of the Slovak Republic and Slovak Academy of Sciences (VEGA) no. 1/0069/13 (2013-2015) "Concept of sound and true presentation of facts in the context of applied accounting legislation from the perspective of Auditing Profession."

References

[1] Greene, J. E. (2012). *Public Finance An International Perspective.* 1st ed. Singapore: World Scientific Publishing. ISBN: 978-981-4365-04-8.

[2] IPSASB (2014). *Conceptual Framework for General Purpose Financial Reporting by Public Sector Entities*. 121 p. ISBN 978-1-60815-192-9. Retrieved from: http://www.ifac.org/publications-resources/conceptual-framework-general-purpose-financial-reporting-public-sector-enti-8

[3] IPSASB (2014). *Handbook of International Public Sector Accounting Pronouncements*. 1695 p. ISBN 978-1-60815-182-0. Retrieved from: http://www.ifac.org/publications-resources/2014-handbook-international-public-sector-accounting-pronouncements http://www.ifac.org/sites/default/files/publications/files/Handbook-of-International-Public-Sector-Accounting-Pronouncements-Volume-1.pdf http://www.ifac.org/sites/default/files/publications/files/Handbook-of-International-Public-Sector-Accounting-Pronouncements-Volume-2.pdf

[4] IPSASB (2013). *Handbook of International Public Sector Accounting Pronouncements*. 1712 p. ISBN 978-1-60815-151-6. Retrieved from: http://www.ifac.org/publications-resources/2013-handbook-international-public-sector-accounting-pronouncements

[5] Krejdl, A. (2006). *Fiscal Sustainability – Definition, Indicators and Assessment of Czech Public Finance Sustainability*, Working Paper Series 3, Czech National Bank. Retrieved from:

http://www.cnb.cz/miranda2/export/sites/www.cnb.cz/en/research/research_publications/cnb_wp/download/cnbwp_2006_03.pdf

[6] Kršeková, M. (2011). *Medzinárodné účtovné štandardy pre verejný sektor – IPSAS,* 1. vydanie. Bratislava: IURA EDITION. ISBN 978-80-8078-390-7.

[7] Ochotnický, P. (2012). *Fiškálna udržateľnosť,* 1. vydanie. Bratislava: IURA EDITION. ISBN 978-80-8078-538-3.

RISK IN FINANCE FROM THE PERSPECTIVE OF AN ACCOUNTING THEORY

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ABSTRACT

Risk has traditionally been defined in terms of the possibility of injury, danger, loss or other adverse consequences. Risk in finance and accounting is considered in terms of valuation, distribution of recognised gain, cost-volume-profit analysis, cash flow, capital assets pricing models and hedging techniques, etc. Paper is oriented to analysis of risk management in organisations and in particular how risk management impacted on both accounting and internal controls followed by comprehensive description and the statistical analysis of the research. The purpose of the paper is to understand the relationship between risk and finance. This involved consideration of how risk was enacted in finance and how managerial perceptions of risk influenced the process and content of accounting.

Keywords: risk management, accounting theory, distribution of recognized gain, equity

JEL codes: M40

1 Introduction

Despite the traditional accounting and finance emphasis, many risks are not objectively identifiable and measurable but are subjective and qualitative. There is an important distinction between objective, measurable risk and subjective, perceived risk [2]

The purpose of the paper was to understand the relationship between risk and distribution of recognised gain. This involved consideration of how risk was enacted in recognised gain and how managerial perceptions of risk influenced the process of distribution. The issue of recognised gain quantification and its subsequent distribution is current. The problems are in companies with recognised gain, but cash flows are not allowing them to pay out the shares smoothly. This means the company needs to indebt itself to be able to pay out the shares, which leads to the expensive and uneconomic equity capital.

2 Literature Review

Numerous studies have attempted to explain the importance of considering risk. The survey found that Galbraith (1977) found that risk management systems appeared to improve the organisational capacity to process information, both through vertical information systems but also through the role of risk managers [5].

Adams (1995) has shown that everyone has a propensity to take risks (from being risk averse to risk seeking), but the propensity to take risks varies from person to person, being influenced by the potential rewards of risk taking and perceptions of risk which are influenced by

experience of 'accidents'. Hence individual risk taking represents a balance between perceptions of risk and the propensity to take risks [1].

Solomon (2000) developed a useful model for understanding how risk management practices are introduced and develop over time [10].

3 Data and Methodology

We conducted qualitative case studies. The case study method is useful when field experience is developed and the objective is to understand contemporary complex social phenomena [3]. Based on the managers' perceptions, we conducted a retrospective methodology in our case studies [6].

4 Results and Discussion

The basis for the management decision-making is an accounting, either past-based (financial accounting), or future-predicting (management accounting). [4] It is a means of distributable gain quantification without an imperilment of business property of company that is one of the most important issues regarding further existence and development of a company. As the balance policy of a company is controlled by the management, a recognised gain is a value reflecting to a large extent the management's attitude to methodical means of accountancy. [11] With respect to the structure of investors, the distribution of the recognised gain, being approved by investors, is often motivated by a maximum amount of gain sharing payout each year. However, this attitude makes other activities of a company more difficult, if we speak of a distribution of a paper gain (recognised), or of company solidity in the time of a payout. It is therefore very important for the management and investors to respect ethical principles regarding requirements for gain sharing payout not to imperil further existence of a company, thereby a return and appreciation of investments in the long-time perspective [7].

Capital preservation in financial terms is ensured if equity (net assets) in monetary terms at the end of an accounting period is the same as at the beginning of this period, i.e. if the following applies: equity at the beginning of an accounting period (equity at the end of a previous accounting period) = equity at the end of an accounting period, when surplus is gain. **+ Gain / - Loss = Equity final - Equity initial** [8].

Business property of company maintenance requires under this understanding a pricing of property and liabilities in *regular prices* and gain can be determined in this way:

- when preserving components of assets

Company property is expressed in quantitative units and in value expression as units monetary in a *reproduction acquisition price*, while it is assumed that only the same number of particular types of fundamental property is able to secure at least the same entrepreneurial activity in the future. Distributable (real) gain is a final amount after a deduction of difference from re-evaluation of the property with reproductive acquisition prices changes from the difference of equities at the end and at the beginning of an accounting period. **+ Real Gain / - Real Loss = Equity final - Equity initial +gain/-loss (in current prices)**

- when preserving performance potential of business property of company

The main objective of business property of company preservation in this understanding is preserving the production capacity of a company, while production is a main indicator of profitability [9].

The results of case study indicate the lack of risk management in companies is perceived by practitioners as the main barrier for firms struggling to overcome contemporary challenges and consequently, as an important obstacle for growth within the firm. Through the analysis of the four companies, we observed the following step-wise growth in terms of risk management:

(1) In the '*Traditional Corporation'*, firms are only interested in making money and they are mainly concerned with their financial health in order to satisfy their shareholders. Little consideration is given to risk in finance.

(2) In the '*Modern Corporation'*, the firms' behavior has evolved. They are still interested in earning profits but their involvement in risk management is much stronger than in the traditional corporation. In other words, they are willing to be responsible and the financial health of the firm is still the most important goal.

(3) In the '*Post-Modern Corporation'* firms want to make money by doing well. Risk management is totally integrated into the core business of the firm and the only way to achieve such accomplishment is engaging fully with others.

Companies understanding and awareness regarding the risk management concept has improved in recent years thanks to the experience gained through risk management development, and to their commitment and engagement with stakeholders. Accordingly, the relationship between companies and their stakeholders has evolved and companies are getting more and more involved in risk management. We could also observe the willingness of companies to integrate risk management into the core business.

5 Conclusions

A choice of a proper concept of accounting unit's business property of company preservation and a corresponding way of gain quantification should be based on financial statements' user needs. Financial concept of capital preservation should be accepted, if financial statements' users focus predominantly on invested capital nominal value or invested capital purchase power preservation. If, however, the main interest of users is connected with operational capacities of an accounting unit, a concept of physical form of a business property of a company should be preferred, in a form of a business property of a company in asset components preservation, output preservation or company profit preservation.

One of the common conclusions is that only the gain quantified in a way that ensures a capital value unchanged, can be used for consumption. As the basic goal of economic activities means a satisfying of the needs, gain may also be defined as a surplus usable for consumption. Therefore the role of management accountants needs to shift towards a more strategic and value adding role, which by definition includes a consideration of risk, if management accountants are not to be marginalised in risk management processes.

Acknowledgments

This article is an output of a project of the Scientific Grant Agency of the Ministry of Culture of the Slovak Republic and Slovak Academy of Sciences (VEGA) no. 1/0069/13 (2013-2015) "Concept of sound and true presentation of facts in the context of applied accounting legislation from the perspective of Auditing Profession."

References

[1] Adams J. (1995). Risk. London: UCL Press

[2] Chartered Institute of Management Accountants. (2002). Risk Management:A Guide to Good Practice, London: CIMA Publishing

[3] Eisenhardt, K.M. (1989). Building theories from case study research. The Academy of Management Review, 14(4), 532-550.

[4] Eweje, G., & Wu, M. (2010). Corporate response to an ethical incident: The case of an energy company in New Zealand. *Business Ethics: A European Review, 19(4),* 379-392.

[5] Galbraith J. (1977). Designing Complex Organizations. Reading,Mass.:Addison-Wesley Publishing Company

[6] Miller, C.C., Cardinal, L.B. & Glick, W.H. (1997). Retrospective reports in organizational research: a reexamination of recent evidence. *The Academy of Management Journal, 40(1),* 189-204.

[7] Pakšiová, R. – Janhuba, M. (2005). Teória účtovníctva v kontexte svetového vývoja. Bratislava : Iura edition, 2012.

[8] Pakšiová, R. – Kršeková, M. (2014). Ethical Principles in Distribution of Recognised Gain in a company. In Branetix, Bratislava : Ekonóm, 2014, pp. 84-87

[9] Parajka, B. (2007). Rámcová osnova zostavovania a prezentácie účtovnej závierky : vznik a vývoj. In AIESA – Mladá veda 2007, Ekonóm, pp. 5-9

[10] Solomon, J.F et al. (2000). A Conceptual Framework for Corporate Risk Disclosure Emerging from the Agenda for Corporate

[11] Surový, V. (2010). Relationship between economy and ecology. In Chorizont 2020 pred ikonomičeskoto znanie i biznesa : jubilejna meždunarodna naučnopraktičeska konferencija, 7-8 oktomvri 2010, Svištov. - [Svištov] : Akademično izdatelstvo "Cenov", pp. 10

CHALLENGES TO A CORPORATE TAXATION IN SELECTED COUNTRIES

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ABSTRACT

The impacts of the economic and financial crisis were different in the selected countries and bring revaluation structure of tax administration and taxation techniques of several taxes. Most economies of the world implement tax reforms to stabilize the economy as a whole as well as the increase in the collection of tax revenues currently. Corporate tax with VAT is the most important part in the revenue estimates in most countries. The aim of this paper is to highlight the current issues related to the taxation of companies and outline the status of corporate tax in the tax systems of selected countries.

Keywords: Public finances, Corporate tax, Expenditures of a legal entity

JEL codes: H25

1 Introduction

In an income tax a direct tax structure is uniform and all EU Member States apply corporate income tax and a tax on personal income separately. Different opinions although are arising, whether the process currently applied represents tax harmonization or tax competition. [6] H. Hameakers argues that the existence of tax competition itself must lead to the so called spontaneous harmonizing effect, thus to spontaneous rates convergence, and therefore there is no need to harmonize tax systems artificially. [1] J. Mitchell points out that without the tax competition at tax harmonization, the governments can behave like a monopoly - imposing excessive taxes, and therefore the true tax harmonization implies a higher tax rates. If governments can make use of excessive taxes, they are not forced to the efficiency in sphere of public spending. [4] Reducing tax rates under tax competition does not always lead to a drop in tax collection. That is the area of direct taxation is characterized by precisely the opposite development. Edwards and Rugy are pointing out a fact that a tax competition may lead to reduction in tax bases of other countries and the distortion of capital allocation and services. [5] Reducing taxes has a positive effect in the country where it takes place, because there is an influx of capital and growth of the tax bases. In the rest of the countries, however, a tax competition has a negative effect because there is outflow of capital and tax bases arising and it comes to overall decline in economic growth.[1]

The tax harmonization in EÚ is in a field of direct taxes oriented mainly on an area of corporate income tax. According to comments on the corporate tax by Robert E. Hall and Alvin Rabushka in their book Flat tax, it is very difficult to define who pays corporate taxes. [2] It is important to distinguish between corporate tax technique and its impact, and the fact, which actually pays the tax. Companies file their revenues reduced by their business related expenditures. Although it seems that corporate income tax is being collected at business owners, economists disagree

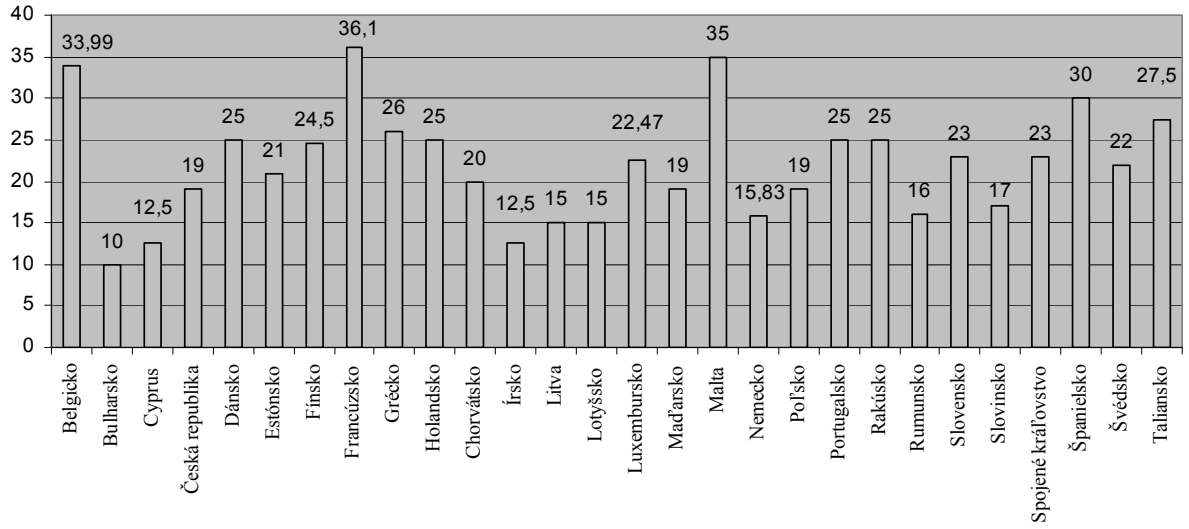
[1] Other countries have higher tax burden (compared with the country that has reduced the tax burden), and that is the reason in those countries, there is an outflow of capital, disinvestment and overall decline in growth of GDP.

with that and they are searching for the true incidence of this tax. Many economists argue that the corporate tax should in particular include the following types of incomes taxed at the company level: gains from the use of equipment, gains from the ideas contained in copyright, patents and trade secrets, gains of the past earnings, gains of key workers and owners as well as staff, rent from apartments and real estate that company owns, and employee benefits.

In the European Union the area of corporate tax is established by number of directives and comprises a very complex and complicated system. The process of corporate income tax harmonization is characterized especially by steps towards business simplification, reduction of administrative costs and more efficient corporate income tax collection. [3] The Common Consolidated Corporate Tax Base (CCCTB) is intended for companies doing business in several EU countries. A juridical person would then not be governed by tax laws of the Member States; it would apply the unitary system of a tax base calculation with obligation to file the only one summary tax return instead. The introduction of the CCCTB system should bring the companies a current cost savings of 7% according to the European Union estimates. Also companies planning expansion to the EU member countries markets should be involved in a significant business related expenses decrease. Savings would then bring also small and medium-sized businesses an opportunity to succeed in the European area, even those that did not have sufficient funds so far. Expanded tax base would exert a positive effect on tax revenues of the countries and would avoid jeopardizing an ongoing individual Member States public income consolidation.

Based on a data [11], the average amount of corporate income tax rate in the EU 28 in 2013 was around 22 %, while13 member countries had lower corporate income tax rates than it was applied in Slovak Republic (Figure 1).

Figure 1 Tax rate on corporate income in EU countries in 2013 (%)



Source: own processing according to [13]

The tax burden of companies operating in the EU [5] is gradually decreasing and is accompanied by a reduction of state contributions provided for juridical persons. Following the depreciation policy and the policy of tax credits, there are changes in definition of the tax base, in possibility of transferring loss to next period and applying a new structure of allowable items in the creation of a tax base as well. In the depreciation policy, given by the need of rapid variations in technological devices, there comes to a drastic reduction of the depreciation period, especially in information technology and a technology associated with an electronic trade development.

Table 1 History of a composite tax quota in selected EU countries (%)

Year	2005	2006	2007	2008	2009	2010	2011	2012
Germany	35,0	35,7	36,1	36,5	37,4	36,2	36,9	37,6
Greta Britain	35,4	36,3	35,7	35,8	34,2	34,9	35,7	35,2
Slovak Republic	31,5	29,4	29,5	29,5	29,1	28,3	28,7	28,5
Average OECD	34,8	35,0	35,0	34,5	33,6	33,8	34,1	-

Source: own processing according to [10] and [12]

Based on the data in table 1, the overall tax burden in Germany and in the United Kingdom is significantly higher than in Slovak republic (SR). It is a consequence of the application of progressive income taxation of physical persons and juridical persons, which is characteristic of the advanced economies of Northern and Western Europe.

2 Position of corporate income tax in tax system of The United Kingdom

The United Kingdom is the third most powerful economy of the European Union following Germany and France. The most significant changes in a tax system of the United Kingdom were recorded in 1965-1973, when there was introduced a separation of personal income tax from corporate income tax. [7] There occurred to simplification of calculation and reduction of corporate tax burden. Part of the corporate tax that have been already paid, was further included by individuals as tax relief for tax paid on dividends.[2]Despite considerable losses, which British economy suffered as an influence of the crisis, in the process of public finance recovery the United Kingdom focuses especially on reduction of public spending volume.

In the corporate income tax area the priority of the British Government has become forcing the process of corporate income tax rate reduction in order to support competitiveness and growth of the economy. The gradual reduction in the basic rate of corporate tax is being carried out in the UK despite the unfavourable situation caused by the crisis and value for 2013 dropped to 21 %, representing a decrease of 6% over the past 12 years. According to estimates of the United Kingdom's Treasury, the decline in rates will bring a decline in budgeted revenue of around one trillion pounds, but even despite this fact, the improvement in competitive tax environment in comparison with the US, France and Germany for the country brings ultimately advantages more significant than are disadvantages of the revenue loss.

In general, any trade, investment and capital gains are subject to corporate income tax in the United Kingdom. The income tax rate is defined according to business type and is classified into two groups. A lower income tax rate for small and medium-sized businesses that applies a progressive income taxation according to amount of profit reached is shown in table 2. A higher tax rate (basic) is intended for all other businesses.

Table 2 The tax rates according to the type of business in the UK in 2013

Taxable profit in GBP	Tax rate	Type of company
0 – 300 000	20 %	very small company
301 000 – 1 500 000	marginal relief	small and medium company
over 1 500 000	21 %	partnership

Source: own processing according to [8]

Oil and gas mining companies are taxed at the basic rate of 30%. Tax rates do change every year and are published together with the state budget draft. A particularity of the tax payment

[2] That means an individual who has received dividends was obliged for a tax return although it could reduce its tax liability by a portion of tax already paid in a corporate tax.

is that small and medium-sized businesses are taxed on January 1st and companies with a profit of more than £ 1.5 million pay an income tax on a quarterly basis. [9]

Generally all expenses of the juridical person in the United Kingdom related to the achievement of income are tax deductible. The purpose of the tax expenditure is to support the taxpayer's activities, and such a relief is often an alternative to public spending with the similar effect. Small and medium-sized companies have the opportunity to be recognized for tax purposes in the form of tax relief for a science and research related expenses. Common tax deductible expenses primarily include interest incurred for the purpose of business, charges associated with the granting of licenses and patents and statutory payments to employees. Costs related to commercial transactions, where the agreed price does not correspond to the rules of an independent business, belong to non-tax-allowable expenses. [14]

Among a significant tax allowable expenses of juridical person also in the United Kingdom are deprecations. In the nineties there have significant changes in depreciation policy occurred. Prior to 1984 there was a possibility of depreciation of machinery and equipment in the first year in amount up to 100% of the purchase price.[3] Comprehensive tax reform unified the amount of annual depreciation on 25%. Depreciation is calculated per each tax period and must be included in the tax return, while several exceptions exist. Depreciation rates depend on the type of acquired asset and its usable life (Table 3). In certain cases, the rate is increased in the first year of use. In subsequent years, the depreciation is calculated on the basis of the same depreciation rate.

Table 3 Annual depreciation rates and methods in the UK

Rate	Methods	Description of property
25 %	Accelerated depreciation	Machinery and equipment used in selected business areas, patents, know-how
20 %	Accelerated depreciation	Machinery and equipment for mining and quarrying
10 %	Accelerated depreciation	Machinery and equipment for overseas leasing
6 %	Accelerated depreciation	Machinery and equipment (long life)
4 %	Linear depreciation	Industrial and agricultural buildings, hotels

Source: own processing

An increased 100% depreciation in the first year of property use can be performed for selected types of investments. Increased depreciation can be applied for example to energy-saving investment, investment of small and medium-sized enterprises in IT, research and development, investment in specific business areas, equipment for efficient use of water resources.

3 Corporate Taxation in Germany

German economy is one of the most productive EU economies, where GDP per capita for the last six years has been reaching a value higher than the EU 28 average and varies in the range of 26,000 to 31,000 EUR.[4] The government tried to alleviate the impacts of the crisis, by the tax reform of the business environment, which decreased the corporate tax burden on companies from the original rate of 38.6% to 30%. At the same time Germany made an effort to attract foreign capital and new investments. From a macroeconomic perspective, the government's main objective is to reduce the level of public debt and focus on increasing the efficiency of public spending. Development of the economy in the last two years is also positively affected

[3] For industrial buildings it was 75% in the first year.

[4] The EU average ranges from 23,000 to 25,000 euros per capita. The Slovak Republic achieved a GDP per capita of the maximum amount of 18,000 euros which took place in 2012.

by the increases in wages and employment growth, causing that from 2013 there is a reduction of the tax burden.

A tax system of Germany is influenced mainly by historical background, which originated from joining the 16 constituent states into a single unit. For this reason, a tax system of the country is still characterized by a certain degree of independent taxation in individual constituent states. Major tax reform was implemented in 1919 resulting in creation of a single financial administration. The tax policy from that period to the presence is characterized by a gradual reduction of marginal tax rates of income tax and redisposition of the tax burden from direct to indirect taxes.

Revenue from a corporate income tax as a portion of total tax revenues amounted to 7.41% in 2013. The corporate tax has the biggest impact on a tax burden of companies in Germany. A solidarity surcharge of 5.5% is though additionally assessed along with this tax. Capital companies are at the same time subject to tax on trade. Under German law a juridical person is any legally competent person, except a physical one. Under the Income Tax Act the juridical persons mainly include share capital, profit cooperative, mutual societies and other forms of associations.[5] In terms of tax liability, as well as in the Slovak Republic Act defines a limited and unlimited tax liability. When defining exemption from the corporate income tax are companies divided into two groups. For example charitable organizations, political parties and state monopolies are subject to full exemption. Juridical person performing public activities simultaneously while being engaged in business is subject to partial corporate income tax exemption. Calculation of the corporate tax liability is based on economic result made under tax balance and adjusted for allowable (hidden payment of profit share) and deductible (donations, exempt investment allowances) items.

Even in German companies, the most significant tax expenses just after labour costs are depreciations of tangible and intangible assets. Taking into account the time or power factor affects a tax deductibility of depreciation,[6] while it had been possible to apply even a degressive depreciation method. Difference between accounting and tax depreciation is an item adjusting the tax base. Usage period of individual groups of assets is individual for each company, while the financial administration shall compile so called general depreciation tables, which serve as an aid to depreciation standardization. Assets with a value of less than 410 EUR excluding VAT may be included in the costs fully even in the year of acquisition.

The basic method of depreciation is a linear depreciation. The entry price is divided into equal parts throughout the period of depreciation of assets.[7] In this type of depreciation it is possible to depreciate assets based on performance depreciation, subgroup of linear depreciation, where for tax purposes in specific cases can be deprecated according to actual wear out associated with physical deprecation of assets. Declining balance depreciation method had been applied in practice in the period 2006-2008 and the period 2009-2010, as a form of support for the business environment after the crisis. Since 2011 only linear depreciation method is applicable.

Law on corporate tax also includes tax-non-allowable expenses. The most common non-tax expenses include income taxes and other personal taxes, court levied fines and half the remuneration of Supervisory Board members and advisory boards members relating to the supervision of the company management. Tax loss amortization is possible within the directly preceding period or in future tax periods. A particularity of corporate taxation in Germany is the application of non-taxable portion for companies. Allowance of 5,000 EUR can be applied

[5] Human resource companies do not belong with physical nor juridical persons under current legislation, thus they are not being subject to corporate income tax.

[6] Tax legislation does not use the term of depreciation, but applies the term of value decrease of assets in use.

[7] In the first year of depreciation is only a proportional part of depreciation applied according to number of months.

by company exempt from corporate tax if it achieves income from the business activity. Companies operating in the agriculture and forestry can apply deduction in the amount of 15,000 EUR per year.

5 Selected areas of corporate income tax in the Slovak Republic

Even in the Slovak Republic there are also constant tax changes whose treatment is necessary in order to ensure fiscal consolidation, gradual reduction of the government deficit and higher tax collection. Reduction in government deficit is currently accompanied by the growth of tax - levy burden that affects not only juridical but also physical entities. From January 2013 a corporate income tax rate has been increased to 23%. Concurrently a special bank levy and a special levy were introduced for enterprises operating in regulated sectors.

Since the formation of Slovak republic in 1993 there were two complete fiscal reforms realized. Comprehensive tax reform entered into force on January 1st, 1993. The corporate income tax rate for the tax period of 1993 was set at 45% and remained unchanged until the end of 1999. In January 2000, a new tax law entered into force and a corporate income tax rate dropped to 29%. Over the next two years the tax rate was reduced again, reaching 25%. The year 2004 was the first year of the tax reform aimed to unify and simplify the previously complicated tax system while the income tax rate decreased to 19% for all types of companies.[8]In general, in the Slovak Republic a subject to corporate income tax shall be all juridical persons with unlimited tax liability, which have residence or headquarters in SR and have their income resulting from sources in Slovakia and from sources abroad taxed in SR.

Tax-deductible expenditure must, according to Slovak legislation, satisfy the condition of objectivity (expenditure relates to business objective), provability (expenditure is physically documented), the condition of registration (expenditure is recorded in the taxpayer's accounting) and condition of range (expense may be tax deductible only to the extent provided, either directly in the Income Tax Act or in other legal regulation).

Significant changes in depreciation policy took place in 2012. From this period tangible assets shall be depreciated on a monthly basis, and therefore juridical person is allowed in the year of assets being put in use, to apply only a proportion of the annual depreciation corresponding the number of months in which the property was used. The remaining portion of the depreciation, which was not applied to tax expenditures in the year of assets being put into use, can be applied not earlier then in the subsequent tax period. Tangible assets are classified into 4 depreciation groups, being subject to depreciation period of 4-20 years. A taxpayer can choose whether to use a method of linear or accelerated depreciation.

A particularity of depreciation policy is possibility to interrupt tax depreciation of assets. Juridical persons may use interruptions of tangible assets depreciation for tax purposes within the tax optimization.[9] Interruption of assets depreciation can last for one full tax period or more full tax periods. In the next tax period, the taxpayer continues to depreciate as it would not be interrupted, while the total amortization period shall be extended for a period of depreciation interruption.

When setting up new companies and registering them in the commercial register in Slovak Republic an approval of the tax authorities is from January 2013 required, stating the founding company has no tax arrears greater than 170 Eur. The same confirmation from the tax authorities has to be provided also in case of share transfer, where confirmation shall be filed

[8] Returns made of companies profit pre-tax have increased by almost 70%.
[9] §22 paragraph. 9 of the Income Tax Act

by a seller as well as a shares acquirer. In parallel with the tax measures are also measures of non-tax character being put in place, although having a significant impact on companies, too. There has been a tightening of business conditions for existing and especially for emerging companies in Slovakia and one of the main objectives of the current government is also more effective collection of tax revenues aimed at reducing tax frauds and prevention of new tax evasion. Non-tax measures are aimed at criminal and commercial law treatment. The increase in the tax burden on companies has been caused not only by a growth of nominal tax rates but also by introducing an institute of tax license. That is the minimum amount of corporate income tax. If a tax loss or low tax liability is recognized by a company for a tax period, it is required to pay a company income tax in minimum amount within the range of 480 to 2,880 EUR a year. Public companies, companies set up within the past year, taxpayers in liquidation, companies - Sheltered workshops, or non-profit organizations, National bank of Slovakia and the National Property Fund shall not be subject to tax license payment.

6 Results and Discussion

Investigation of methods and solutions of public deficits in the selected EU countries has confirmed that lack of funds in the budget is in different countries being handled in different ways. The general trend of the Member States was reducing income tax rates for companies. Such a trend of gradual reduction of the tax burden of companies is recognized since 2000, whereby a corporate income tax rate decrease occurred in the EU during the past period by 8 percentage points. The main arguments of the aforementioned development are new jobs creation, and economic growth and investment promotion.

Based on the analysis of the current tax policy it can also be stated that selected countries are introducing unsystematic transitional measures especially in the form of taxation in selected economy sectors. All countries in the survey except the Slovak Republic apply various corporate income tax rates, which are linked in particular to an amount of profit or a type of company. The biggest differences in a corporate income tax with its impact on tax burdens of companies are identifiable in specific allowances including gifts, spending on science and research, investment in new technologies and solutions of bad debts overdue. Development of a proportional indicator of companies' tax share revenues to GDP also shows that in the period from 2005 to 2012 the highest share during the entire period has been reached in the United Kingdom (2.8% - 3.9%), followed by the Slovak Republic (2.4% - 3.1%) and Germany (1.4% - 2.3%).

Tax depreciation methods and rates take fiscal interests of the state and government's approach to enterprise investment activities stimulation into account. A depreciation policy of each country is focused and is used as a financial instrument of innovation financing in company. A common feature in depreciation policies of selected economies is that the costs of acquisition of property acquired for the business purpose are not tax deductible expenditures in whole amount in year of acquisition. They become the tax expenditures progressively through items reducing a tax base of the company in subsequent tax periods. The actual amount of depreciation rates in selected countries does not depend on the method of financing, while the decisive factors are a type of acquired asset and its usable life. In recent years, especially as an impact of the crisis in the Europe, there has been a discussion about the tax deductibility of interest in the tax base especially for companies with higher capital intensity.

7 Conclusions

Among the greatest advantages of British tax system, there are: a quantity of tax reliefs and low employer's contributions to social security and health insurance. The United Kingdom plans to gradually reduce the corporate tax rate in the next years, as a result of improvement of tax competitiveness within the single European market. From April 2015 British government plans to reduce a corporate income tax rate again down to 20%. A particularity in the UK tax system is also the fact that term of tax return submission depends on the size of a company.

A particularity in tax policy of Germany's corporate tax law is that all companies are liable to advance income tax payment within quarterly intervals, due to continuous assurance of country's budget revenues. A negative of German companies taxation is the complicated tax liability calculation, whereas all juridical persons are liable to pay the tax on trade as well, which ultimately is the allowable item in calculation of corporate tax base. At the same time for calculating the very foundation of corporate tax it is necessary to calculate also a capital gains tax (withholding tax). Even the final income tax amount after all partial adjustments shall be yet adjusted for the solidarity allowance. This fact is thus causing a relatively high tax burden on companies, despite the low nominal corporate tax rate of 15%.

In the past two years Slovak Republic comes to adjustments not only in tax policy but also in social policy, criminal and business law. All these measures have fiscal consolidation and gradual reduction of the government deficit in common. Slovak Republic increased a corporate tax rate to 23% in 2013 as the only from the countries in research. From January 2015 the major changes will also affect the depreciation policy and the possibility of an accelerated depreciation method. The accelerated depreciation method will be applicable only for the second and the third depreciation group. At the same time the number of deprecation groups will increase from 4 /in presence/ to 6 meaning that two new depreciation groups will be introduced. They will be: the third group with a depreciation period of 8 years for capital technology (so far being depreciated for 12 years) and sixth depreciation group with a depreciation period of 40 years for non-production buildings and facilities (so far being depreciated for 20 years).

Acknowledgments

This contribution/publication is the result for the project VEGA č.1/0238/13 „Taxes and effectiveness of financial re-engineering tools to improve the performance of companies in the time of the crisis“ and for the project VEGA č. 1/0008/11 „Efektívnosť využitia daňových príjmov a verejných výdavkov v nadväznosti na dlhodobú udržateľnosť verejných financií a nové netradičné možnosti rozpočtových príjmov“.

References

[1] Hameakers, H. 1993. *Fiscal Sovereignity and Tax Harmonization in the EC, European Taxation,* 1993, Vol. 33, No. 1, p. 25-27, ISSN 0014-3138.

[2] Hall, R. E. – Rabushka, A. 2007. *The Flat Tax (second edition*), Hoover Institution Press publication 423,ISBN: 978-0-8179-9311-5.

[3] Hocman, F. *Quid pro quo risk*. In Problemi socialʹno-ekonomičnogo rozvitku pidpriemnictva: zbirnik materialiv mižnarodnoj naukovo-praktičnoj internet-konferenciji, Dnipropetrovsk. - Dnipropetrovsk : Gerda, 2013. - ISBN 978-617-7097-08-1. - S. 16-21.

[4] Mitchell, J. 2001. *A TAX Competition Primer: Why Tax Harmonization and Information Exchange Undermine America's Competitive Advantage in the Global Economy.* Heritage Foundation Backgrounder. No. 1460, 2001.

[5] Eurostat, 2011. *Taxation Trends in the European Union*. Edition. Luxemburg: European Communities. ISBN 978-90-79-19644-7.

[6] VÁLEK, J. NEUPAUEROVÁ, Z.: *Historický vývoj daní ako hlavný zdroj financovanie verejných potrieb na území Slovenska*. In Financie a riziko : prístupy mladých ekonómov: elektronický zborník príspevkov z XI. ročníka medzinárodnej vedeckej konferencie : Bratislava, 30. november 2009. - Bratislava : Vydavateľstvo EKONÓM, 2009. - ISBN 978-80-225-2868-9. - S. 92-103.

[7] Edwards, Ch. – Rugy, V. 2002. *International Tax competition A 21 st. - Century Restraint on Government*. Cato Institute, Policy Analysis No. 431.

[8] *Her Majesty's Revenue and Customs (HMRC)* Retrieved from: http://www.hmrc.gov.uk

[9] *Her Majesty's Revenue and Customs (HMRC)* Retrieved from:

www.direct.gov.uk/en/MoneyTaxAndBenefits/Taxes/TaxOnSavingsAndInvestments

[10] www.Worldwide-Tax.com

[11] www.eurostat.sk

[12] http://www.oecd-ilibrary.org/taxation/total-tax-revenue_20758510-table2.

[13] http://www.bundesfinanzministerium.de/ContentDE/Standardartikel/Themen/Steuern/Steuern/Steuerschaetzungen_und_Steuereinnahmen/2014-01-31-Steuereinnahmen-Kalenderjahr-2013.pdf?_blob=publicationFile&v=4

[14] HM Revenue & Customs (2012a). Who is liable for corporation Tax? Retrieved from: http://www.hmrc.gov.uk/ct/getting-started/new-company/who-is- liable.htm#1.

THE IMPACT OF INTEREST RATE SPREADS FOR EURO DENOMINATED LOANS ON THE LEVERAGE RATIO OF ROMANIAN LISTED COMPANIES

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ABSTRACT

It has been recently showed in the literature that financial markets integration matters not only from a macroeconomic perspective but also at microeconomic level. In this context, the present paper aims at investigating the impact of integration between the banking markets in Romania and the euro area on the financing decisions of Romanian companies. The research is based on a sample of listed companies and uses quarterly data. By employing measures of integration between the Romanian and the euro area banking markets based on interest rate spreads to euro denominated loans – over the euro area average – granted by monetary financial institutions to non-financial corporations, the results show that there is a limited effect of integration between the two markets on the leverage ratio of Romanian companies. The impact of traditional firm-level factors is broadly confirmed.

Keywords: banking markets integration, interest rate spreads, leverage, Romanian listed companies

JEL codes: G15, G32, F36

1 Introduction

Financial integration has become a major topic in finance literature in the last decade, given that it has implications not only at macroeconomic level but also at microeconomic level, especially company level. Moreover, it has been recently spurred following the outbreak of the recent financial crisis. Integration in financial markets should be analyzed for each market segment separately given that the level of integration is not uniform across all market segments, according to the European Central Bank (ECB) [11] and that different segments of the market integrate at different speeds [8]. Moreover, previous literature has showed that financial integration is a time-varying process [1]. Related to this aspect, it has been documented that the recent financial crisis led to a reversal in the integration process, especially within the EU15 group of countries [8]. Over the last two years, however, ECB reports that positive developments have taken place in most of the segments of the financial markets, although some segments are still exhibiting considerable levels of fragmentation [12]. One of the segments that raise significant concerns is the banking market, given the still high level of dispersion in interest rates for loans to non-financial corporations, especially for small and medium-sized enterprises (SMEs) [12]. Or, one of the alleged benefits for companies stemming from financial integration is represented by the expected lower cost of capital, including cost of debt [6].

In this context, it is worth investigating to what extent the dispersion in interest rates has effectively impacted on the access to finance, especially to bank loans, of NFCs in the euro area. However, the focus in this paper is not on NFCs located in the euro area but on NFCs located in Romania. Starting from the result mentioned above [12], and given that interest rate

spreads are frequently used as measures of financial markets integration, the present paper aims at investigating the effect, if any, of interest rate spreads – over the euro area average – for euro denominated loans to non-financial corporations (NFCs), granted by monetary financial institutions (MFIs) on the leverage ratio of Romanian listed companies. The rationale underpinning the relevance of such a research question comes from the high presence of foreign banks on the Romanian banking market. According to the National Bank of Romania (BNR) [13], in June 2014, there were 24 banks where the foreign capital share is dominant (including foreign bank branches) out of a total of 40 credit institutions acting on the Romanian banking market and these credit institutions hold 80.2% of the total aggregate net balance sheet assets of the credit institutions. BNR statistics does not provide a breakdown of net holdings on foreign banks location but, using the consolidated statistics reported by the Bank of International Settlements (BIS), and based on the authors' own calculations, it results an average quarterly level of 79.78% for 2007-2013 for the share of foreign claims reported by (domestically owned) banks located in the euro area to foreign claims reported by banks located in European countries having Romania as counterpart in both cases. Although complete data was available only for eight euro area countries (Austria, Belgia, Germania, Grecia, Italia, Olanda, Portugalia, Spania), they can be considered representative enough and suggests a high presence of euro area banks on the Romanian banking market and support the research question of the present paper.

Although the focus on this paper is on interest rate spreads to loans for NFCs between the Romanian and the euro area banking markets, as price-based measures of banking markets integration, I employ several additional variables used to control for firm-level factors that previous literature have found to impact on firms' capital structure. Firm-level factors have traditionally been considered as explanatory factors for firms' capital structure – usually proxied by leverage ratio – and are derived from the theoretical background of capital structure theories – such as, tradeoff theory, agency theory and pecking order theory.

In this paper, I use a sample of Romanian companies listed on the Bucharest Stock Exchange for which financial data has been collected. Interest rate spreads are determined using data on interest rates to loans for NFCs for the Romanian and euro area (average) banking markets coming from the ECB and BNR databases, respectively. All data series are at quarterly frequency for the period 2007-2012. The paper employs a firm-fixed effects model in order to control for the unobserved heterogeneity at firm-level.

The results suggest two broad conclusions. Regarding the influence of the traditional firm-level factors – size, assets structure, profitability and growth – it is significant and it is consistent with previous findings in the literature, when leverage is measured as broad leverage ratio – total liabilities to total assets (book values). When leverage is measured in a narrow sense – as total debt / total assets (book values), profitability is the only significant firm-level factor. As for the variables measuring banking market integration, the results are less significant in statistical terms and only, as expected, when the leverage ratio is measured in the narrow sense.

The next sections briefly review the literature (2), present the data and methodology (3) and present and discuss the results (4). The final section gives the concluding remarks.

2 Literature Review

The literature regarding the determinants of firm' leverage or capital structure is considerable rich. Is not the aim of this paper to review it in an exhaustively manner. Consequently, I will focus on the most relevant previous findings in the context of the current research question. The literature on financial markets integration is also rich although of a younger age. The capital structure theories are used to derive the firm-level factors recognized as determinants of

leverage ratio. The most important firm-level determinants of capital structure are represented by tangibility, growth opportunities, size and profitability [10] and they are found virtually in almost every study regarding the corporate capital structure (for example, [2] and [6]) and will be employed in the current study also. Their predicted sign is according to the theoretical perspective regarding the capital structure which is adopted. With respect to profitability, pecking order theory suggests a negative correlation with leverage [4] [2] while the tradeoff theory predicts a positive one [4]. Regarding growth opportunities, measured as market to book values of assets, the agency theory suggests a negative correlation [4] [2]. Tangibility as an expression of firm's assets structure is expected to be positively correlated with leverage, according to both agency theory and tradeoff theory [2]. Some studies [2] suggest that both tradeoff and pecking order theories predict a positive association between size and leverage although conflicting opinions regarding its impact are possible [10]. The cited papers, among others, give a more detailed explanation of the rationale underpinning the expected sign.

The focus on this paper yet is on variables measuring banking markets integration. Previous findings show that financial integration positively impact on firms' leverage and one of the ways the effect is propagated is by reducing the cost of debt. It has been documented [6] that credit markets integration leads to greater leverage for firms in transition economies and that integration in interbank markets leads to lower interest rates and thus to greater leverage for firms, and even to overleverage, in the case of the most integrated markets [9]. Given that none of these two papers use data for Romanian companies, there is an opportunity to test if the previous findings hold in a Romanian context.

The previous findings mentioned above offer support for stating the current research hypotheses. Consequently, the present paper aims at empirically testing the following research hypothesis: *there is a negative correlation between the interest rate spreads for euro denominated loans and the leverage ratio of Romanian companies.*

3 Data and Methodology

This section will briefly describe the data set used as well as the methodology employed for deriving the results presented in this paper. Regarding the data, two main data sets were used. Given that the research question of this paper is to investigate the impact of interest rate spreads for euro denominated loans on the financing choices of Romanian listed companies, the first dataset refers to firm-level data and comprises financial accounts data. The sample contains 41 companies listed on Bucharest Stock Exchange (BSE) for which quarterly financial accounts were collected over the period 2007-2012. Data was retrieved from Thomson Reuters Eikon database. The reduced number of sampled companies is primarily motived by the total reduced number of companies listed on BSE. A number of other reasons acted as restrictions in the same direction. It can be mentioned here the poorer coverage for quarterly data as compared to yearly data. Last but not least, companies from the financial sector and regulated industries, were excluded, and this subsequently reduced the number of observations, given the recommendations in the literature [10] [11] [2] [3]. To a limited extent, missing values were corrected by using averages of the neighbor values. This data set was used for calculating the firm-level variables as proxies for firm-level attributes that are traditionally considered the main determinants of companies' financial structure.

The second data set contains data series used to assess the level of integration between the Romanian and the euro area banking markets. As already stated, this paper uses only price-based measures of financial integration. They are determined as interest rate spreads to loans granted to NFCs by MFIs located in Romania and euro area, respectively for different types of

loans. For greater comparability, only interest rates to loans denominated in euro were used. The interest rates spreads were determined as the difference between the interest rate for loans granted by MFIs to NFCs located in Romania and the corresponding average interest rate for loans granted by MFIs to NFCs located in the euro area. The average interest rates for the euro area are used as benchmark interest rates. Data for euro area interest rates come from the ECB database while data for Romanian interest rates come from the National Bank of Romania (BNR) database. Three interest rate types were used: (a) interest rate for new loans with up to 1 year original maturity or initial rate fixation (euro area) or with floating interest rate or initial rate fixation of up to 1 year (Romania) and with an amount up to and including EUR 1 million; (b) interest rate for new loans with up to 1 year original maturity or initial rate fixation (euro area) or with floating interest rate or initial rate fixation of up to 1 year (Romania) and with an amount exceeding EUR 1 million; (c) interest rate for outstanding loans (total amount) with the original maturity over 5 years. Interest rate data were collected as monthly series and were averaged across three months periods to transform them into quarterly series to correspond with the firm level data. Regarding the method, the paper employs a panel data regression model with firm-fixed effects model used to control for the firm unobserved heterogeneity. The empirical model is stated as in equation (1).

$$LR_{it} = LN\_TA_{it} + TANG_{it} + PROF_{it} + GR\_S_{it} + \mu_i + IRspreads_t + \varepsilon_{it} \quad (1)$$

The dependent variable, LR stands for leverage ratio and it is measured in a broad sense – as total liabilities to total book value assets (TL_TA) – as well as in a narrow sense – as total debt to total book value assets (TD_TA). In both cases, long-term as well as short-term liabilities / debt are taken into account. Size (LN_TA) is expressed as natural logarithm of the total assets (thousands of euros). Tangibility (TANG) is a measure of assets structure and represents the ratio of fixed assets (property, plant, equipment) to total assets. Profitability (PROF) measures the efficiency of the company's core activity and is given by the ratio of operating income to total assets. Growth (GR_S) measures the company's (past) growth rate and is given by the difference in natural logarithms of sales between the current and previous period (quarter). Therefore, it is a backward-looking measure of growth rather than a measure of future growth opportunities available to the company. The level of integration between the Romanian and the euro area banking markets, as already mentioned, is measured through the interest rate spreads (IRspreads). The three measures used are coded as follows: IRS1, for new loans with a maturity or initial rate fixation of up to 1 year and not exceeding EUR 1 million; IRS2, for new loans with a maturity or initial rate fixation of up to 1 year and exceeding EUR 1 million; IRL for outstanding loans with a maturity of over 5 years, regardless the amount. The subscripts *i* and *t* stand for firm and period, respectively. The terms μ_i and ε_i denote the firm-fixed effects and the disturbance term, respectively. The model will be estimated in first difference in order to remove the firm fixed effects.

4 Results and Discussion

The current section will briefly present the most important results and will discuss them in the light of the previous findings present above. Before estimating the empirical model, the correlation matrix was calculated. It is presented in table 1. Regarding the correlation between short term interest rate spreads, the correlation is negative with the broad leverage measure and positive with the narrow leverage measure. As concerns the long-term interest rate spread, the correlation is negative with both measures of leverage. Another important result refers to the correlations among the explanatory variables. It can be easily seen that the strongest correlation between any two explanatory variables (except the interest rate spreads) is less far less than even 0.300 which means that multicollinearity does not pose any problem. There is a strong

correlation (0.781) between the two short-term interest rate spreads; however, they will not be simultaneously introduced in the same equation specification.

Table 1 Correlation matrix

	TL_TA	TD_TA	LN_TA	TANG	PROF	GR_S	IRS1	IRS2	IRL
TL_TA	1,000	0,342	0,136	-0,050	-0,305	0,043	-0,077	-0,026	-0,094
TD_TA	0,342	1,000	0,110	-0,047	-0,115	0,024	0,000	0,123	-0,230
LN_TA	0,136	0,110	1,000	0,025	0,039	0,031	0,001	-0,006	0,020
TANG	-0,050	-0,047	0,025	1,000	-0,237	-0,007	0,044	0,055	-0,011
PROF	-0,305	-0,115	0,039	-0,237	1,000	0,154	-0,037	-0,087	0,104
GR_S	0,043	0,024	0,031	-0,007	0,154	1,000	-0,011	-0,041	0,013
IRS1	-0,077	0,000	0,001	0,044	-0,037	-0,011	1,000	0,781	0,110
IRS2	-0,026	0,123	-0,006	0,055	-0,087	-0,041	0,781	1,000	-0,305
IRL	-0,094	-0,230	0,020	-0,011	0,104	0,013	0,110	-0,305	1,000

Source: own results (* significant at 1%, ** significant at 5%, *** significant at 10%)

Also, before estimating the model, the series should be checked for unit root presence. The results of the summary of the panel unit root tests employed are given in table 2. The first set of values is for the Levin, Lin & Chu test while the second one is for the Breitung test.

Table 2 Unit root test results

	TL_TA	TD_TA	LN_TA	TANG	PROF	GR_S	IRS1	IRS2	IRL
Level	0.629	0.903	0.170	0.000*	0.000*	0.000*	0.259	0.000*	1.000
	0.835	0.005*	0.161	0.499	0.000*	0.000*	0.067***	1.000	0.001*
First diff.	0.000***	0.001***	0.000***	0.000***	0.000***	0.000***	0.305	0.000***	0.016**
	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000*

Source: own results (* significant at 1%, ** significant at 5%, *** significant at 10%)

It can be seen from table 2 that not all of the variables are stationary but they all become stationary by taking the first difference except for the interest rate spread to loans not exceeding EUR 1 million when using the Levin, Lin & Chu test for panel unit root [5].

The results of estimating the model are given in table 3 and 4, corresponding to the two measures of leverage. Three models were estimated in each case corresponding to the three interest rate spreads used.

The results presented in tables 3 and 4 suggest that all the three models are statistically robust. As concerns the individual variables significance, the results are mixed for the series of models. Not all the variables are statistically significant at conventional levels of significance. When the total leverage is used, all the firm-level variables are significant at 1%. When the narrow leverage is used as dependent variable, only size and tangibility are significant (at 1% and 10% respectively). Also, the lagged dependent variable is statistically significant at 1% for two lags (two quarters) for the second series of models. Regardless the firm-level variables are significant or not, their sign is the same across all the estimated models, namely: size and leverage are negatively correlated, tangibility and leverage are negatively correlated, and

profitability and leverage are negatively correlated while growth in sales and leverage are positively correlated. Except the sign for tangibility, all the other are consistent with the predicted signs. However, the negative correlation between tangibility and leverage for Romanian companies has previously been obtained [7].

Table 3 Results of estimating the models with TL_TA as dependent variable

	Model 1		**Model 2**		**Model 3**	
C	0.003	(0.313)	0.003	(0.274)	0.003	(0.381)
d(LN_TA)	-0.152	(0.000*)	-0.153	(0.000*)	-0.152	(0.000*)
d(TANG)	-0.064	(0.000*)	-0.064	(0.000*)	-0.064	(0.000*)
d(PROF)	-0.671	(0.000*)	-0.670	(0.000*)	-0.672	(0.000*)
d(GR_S)	0.013	(0.000*)	0.013	(0.000*)	0.013	(0.000*)
d(IRS1)	-0.901	(0.324)				
d(IRS2)			-0.392	(0.726)		
d(IRL)					-1.482	(0.510)
Adj. R-sq.	0.208		0.208		0.208	
DW	2.11		2.11		2.11	
Probab. (F-stat.)	0.000		0.000		0.000	

Source: own results; the table contains the estimated coefficients along with the associated p-values given in (); * significant at 1%, ** significant at 5%, *** significant at 10%.

Table 4 Results of estimating the models with TD_TA as dependent variable

	Model 1		**Model 2**		**Model 3**	
C	0.052	(0.000*)	0.054	(0.000*)	0.051	(0.000*)
TD_TA(-1)	-0.761	(0.000*)	-0.762	(0.000*)	-0.767	(0.000*)
TD_TA(-2)	0.239	(0.000*)	0.233	(0.000)*	0.246	(0.000*)
d(LN_TA)	-0.058	(0.009*)	-0.060	(0.006*)	-0.057	(0.010*)
d(TANG)	-0.014	(0.093***)	-0.014	(0.093***)	-0.015	(0.087***)
d(PROF)	-0.036	(0.586	-0.030	(0.651)	-0.040	(0.550)
d(GR_S)	0.003	(0.402)	0.002	(0.505)	0.003	(0.396)
d(IRS1)	-1.225	(0.229)				
d(IRS2)			-2.575	(0.039**)		
d(IRL)					-3.526	(0.179)
Adj. R-sq.	0.334		0.337		0.335	
DW	1.990		1.999		1.979	
Probab. (F-stat.)	0.000		0.000		0.000	

Source: own results; the table contains the estimated coefficients along with the associated p-values given in (); * significant at 1%, ** significant at 5%, *** significant at 10%.

The variables of interest in this paper, measuring integration between the Romanian and the euro area banking markets, do not seem to greatly influence the leverage ratio of Romanian

companies, although, as expected, the results are more significant when leverage is measured in the narrow sense. The only significant result (5%) is obtained for the short-term interest rate spread to loans exceeding EUR 1 million when leverage is measured in the narrow sense. However, for all the six models estimated, the sign of the correlation is negative which means that the increase in interest rate spreads, synonymously to loans becoming more expensive, leads to a decrease in the leverage ratio and this provide some support, although limited, for the research hypothesis stated above. This result is consistent with that found in literature [9].

5 Conclusions

This paper aimed at investigating the impact of interest rate spreads to euro denominate loans – over the euro area as a whole – on the leverage ratio of Romanian listed companies for 2007-2012, using quarterly data. A negative correlation was predicted. The findings provide limited support for the research hypothesis and only for interest rate spread to short-term loans exceeding EUR 1 million. This might suggest that the Romanian and the euro area banking markets are not yet strongly integrated. At the same time, it might suggest that the Romanian listed companies are not relying to a great extent on euro denominated loans. The research conducted presents number of limitations such as the reduced sample size, the use of quarterly firm-level data, which is less reliable compared to yearly data, and some methodological limitations.

Acknowledgement

This work was cofinanced from the European Social Fund through Sectoral Operational Programme Human Resources Development 2007-2013, project number POSDRU/159/1.5/S/134197 „Performance and excellence in doctoral and postdoctoral research in Romanian economics science domain”

References

[1] Bekaert, G. – Harvey, C.R. (1995). Time-Varying World Market Integration. *The Journal of Finance*, vol.L, pp.2.

[2] de Jong, A. – Kabir, R. – Nguyen, T. T. (2008). Capital structure around the world: The roles of firm- and country-specific determinants. *Journal of Banking and Finance*, vol. 32, pp. 1954-1969.

[3] Gungoraydinoglu, A. – Öztekin, Ö. (2011). Firm- and country-level determinants of corporate leverage: Some new international evidence. *Journal of Corporate Finance*, vol. 17, pp. 1457-1474.

[4] Kayo, E. K. – Kimura, H. (2011). Hierarchical determinants of capital structure. *Journal of Banking and Finance*, vol. 35, pp. 358-371.

[5] Levin, A. – Lin, C.-F. – Chu, C.-S. J. (2002). Unit root in panel data: asymptotic abd finite-sample properties. *Journal of Econometrics*, vol. 108, pp. 1-24.

[6] Lucey, B. M. – Zhang Q. (2011). Financial integration and emerging markets capital structure, *Journal of Banking and Finance*, vol. 35, pp. 1228-1238.

[7] Nivorozhkin, E. (2005). Financing choices of firms in EU accessioin countries. *Emerging Markets Review*. vol. 6, pp. 138-169.

[8] Pungulescu C., 2013. European financial market integration in the European Union: EU15 vs. New Member States. *Emerging Markets Review*, 17, pp. 106-124.

[9] Popov, A. – Ongena, S. (2011). Interbank market integration, loan rates, and firm leverage. *Journal of Banking and Finance*, vol. 35, pp. 544-559.

[10] Rajan, R. G. – Zingales, L. (1995). What Do We Know about Capital Structure? Some Evidence from International Data. *The Journal of Finance*, vol. 50, pp.1421-1460.

[11] Sunder-Shyam, L. – Myers, S. (1999). Testing static tradeoff against pecking order models of capital structure. *Journal of Financial Economics*, vol. 51, pp. 219-244.

[12] European Central Bank (2014). *Financial integration in Europe*. Retrieved from http://www.ecb.europa.eu/

[13] Banca Naţională a României (2014). *Buletin lunar 6/2014*. Retrieved from http://www.bnr.ro/Publicatii-periodice-204.aspx

THE DETERMINANTS OF CAPITAL STRUCTURE: EVIDENCE FROM AUSTRIA

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ABSTRACT

In our paper we investigate internal and external capital structure determinants of business entities in Austria. The main panel data source utilized in the paper is a database of Annual accounts of Austrian companies and the Eurostat. Results of a linear regression model are compared with our previous study carried out in the conditions of business entities in Slovakia.

Keywords: Capital Structure Determinants, Business Entities, Regression Model, Austria

JEL codes: G 32

1 Introduction

Our previous research was focused on capital structure determinants in conditions of business entities in the Slovak republic. We found out that from 16 selected factors only 7 are statistically significant – 4 internal and 3 external factors. Factors influencing capital structure of Slovak companies were also analysed by Kubicová et al. [4]. In this paper we investigate 11 internal and 4 external capital structure factors in 8,008 Austrian companies represented by 21 regressors. An identification of statistically significant determinants and a comparison with our previous research of Slovak companies will be the results.

2 Literature Review

Several authors have investigated capital structure in Austria. Mokhova and Zinecker [5] observed leverage more than 100 % in Austria after 2009. They claim that this tendency has risen after the Global Financial Crisis, and one of the possible reasons is accumulating the losses of the previous periods. They found out positive relationship between tangibility, growth opportunities, non-debt tax shields and leverage. On the other hand they found negative relationship between profitability, size and leverage.

Jong et al. [3] investigated impact of tangibility, profit volatility, size, average tax rate, growth opportunities, profitability and liquidity on financial decisions. With the exception of growth opportunities and profitability all variables influence leverage in a positive way.

Bancel and Mittoo [1] pick up the threads of Graham's and Harvey's [2] survey of US CFOs and investigated managers' decisions in 16 European countries. They found out that financial flexibility and earnings per share dilution are primary concerns of managers in issuing debt and common stock. Firms determine their optimal capital structures by trading off costs and benefits of financing. Managers in Europe use factors similar to those used in the USA for their financing decisions. However, there are differences across countries on several dimensions, especially between Scandinavian and non-Scandinavian countries.

3 Data and Methodology

Main source of data employed is an e-database of annual accounts of Austrian companies *Sabina* and the Eurostat. We have exported only financial statements of companies with sales higher than € 10,000 in at least one year from 2006 to 2012. After this selection we have obtained a database containing 8,008 Austrian companies during 7 years. In Table 1 a composition of the dataset is stated.

Table 1 Composition of the dataset

Legal form	No. of companies
public limited company	760
private limited liability company	6,542
general partnership	37
limited partnership	41
GmbH & Co. KG[1]	471
registered co-operative	153
registered association	4
TOTAL	**8,008**

Source: Author

In our model we can use only 6 time periods because growth opportunities and volatility of profitability are expressed as a difference of values between two years. As a dependent variable we have chosen an extended Debt Ratio (*DR*) indicator stated in the equation 1.

$$Debt\ Ratio = \frac{Liabilities + Accruals\ \&\ Deferrals}{Total\ Assets} \tag{1}$$

An econometric model containing all expected independent variables that can determine capital structure of business entities expressed by debt ratio is written down in the equation 2:

$$\begin{aligned} DR_{it} &= \beta_0 + \beta_1 \times \ln(S_{it}) + \beta_2 \times \ln(A_{it}) + \beta_3 \times \frac{EBIT_{it}}{A_{it}} + \beta_4 \\ &\times \frac{EBIT_{it}}{S_{it}} + \beta_5 \times \frac{FTA_{it}}{A_{it}} + \beta_6 \times \frac{FIA_{it}}{A_{it}} + \beta_7 \times \frac{A_{it} - A_{it-1}}{A_{it-1}} + \beta_8 \\ &\times \frac{S_{it} - S_{it-1}}{S_{it-1}} + \beta_9 \times \frac{D\&A_{it}}{A_{it}} + \beta_{10} \times \frac{CR_{it} + FA_{it}}{CL_{it}} + \beta_{11} \times \frac{CA_{it}}{CL_{it}} + \beta_{12} \\ &\times \sigma_i + \beta_{13} \times \frac{EBIT_{it} - EBIT_{it-1}}{EBIT_{it-1}} + \beta_{14} \times \frac{CGS_{it}}{S_{it}} + \beta_{15} \\ &\times \frac{EBT_{it} - EAT_{it}}{EBT_{it}} + \beta_{16} \times \frac{I_{it}}{C_{it}} + \beta_{17} \times \ln(ITS)_{it} + \beta_{18} \times GDP_t + \beta_{19} \\ &\times EB_t + \beta_{20} \times HICP_t + \beta_{21} \times UR_t + \varepsilon_{it} \end{aligned} \tag{2}$$

[1] "Gesellschaft mit beschränkter Haftung & Compagnie Kommanditgesellschaft" is a special form of limited partnership in which a general partner is a limited liability company

where DR_{it} is Debt Ratio of a company i (i=1, …, 8,008) in year t (t = 2007, …, 2012), $\beta_0 - \beta_{21}$ are coefficients, ε is a residual and independent variables are explained in the Table 2.

Assumptions (Niňaj, [6]) about positive or negative influence are based on the trade-off model of the optimal capital structure. Supposing managers make rational decisions about capital structure of companies, they make a trade-off between advantages and disadvantages of debt financing.

Table 2 Variables

variable	definition	expected sign
$ln(S)$	size of a company measured by a natural logarithm of total sales of goods, products and services	+
$ln(A)$	size of a company measured by a natural logarithm of total assets	+
$\frac{EBIT}{A}$	profitability measured by a ratio: earnings before interest and tax to total assets (ROA)	+
$\frac{EBIT}{S}$	profitability measured by a ratio: earnings before interest and tax to total sales (ROS)	+
$\frac{FTA}{A}$	tangibility measured by a ratio: share of fixed tangible assets on total assets	+
$\frac{FIA}{A}$	intangibility measured by a ratio: share of fixed intangible assets on total assets	-
$\frac{A_t - A_{t-1}}{A_{t-1}}$	growth opportunities expressed as an annual percentage change of total assets	-
$\frac{S_t - S_{t-1}}{S_{t-1}}$	growth opportunities expressed as an annual percentage change of total sales	-
$\frac{D\&A}{A}$	non-debt tax shield measured by a ratio: depreciation and amortisation to total assets	-
$\frac{CR + FA}{CL}$	quick ratio (liquidity) measured by a ratio: current receivables and financial accounts to current liabilities	+
$\frac{CA}{CL}$	current ratio (liquidity) measured by a ratio: current assets to current liabilities	+
σ	volatility of profitability expressed as a standard deviation of earnings before interest and tax	-
$\frac{EBIT_t - EBIT_{t-1}}{EBIT_{t-1}}$	volatility of profitability expressed as an annual percentage change of earnings before interest and tax	-
$\frac{CGS}{S}$	product uniqueness expressed as a share of cost of goods sold, consumed raw materials, energy consumption, consumption of other non-inventory supplies, and services on total sales	-
$\frac{EBT - EAT}{EBT}$	effective tax rate measured by a ratio: difference between earnings before tax and earnings after tax to earnings before tax	+
$\frac{I}{C}$	effective interest rate measured by a ratio: interest expense to bank loans and short-term financial assistance	-
GDP	real gross domestic product growth rate	+
EB	EURIBOR rate with a maturity of 3 months at the beginning of a year	-
$HICP$	inflation rate expressed by Harmonised Index of Consumer Prices	+
UR	unemployment rate	+
$ln(ITS)$	interest tax shield measured by a natural logarithm of interest expense to bank loans and short-term financial assistance multiplied by an income tax rate	+

Source: Author, [6].

In the first step, we have estimated parameters of independent variables by ordinary least squares method. In the second step, we have examined which model is the most appropriate – pooled regression model, fixed effects model or random effects model.

4 Results

The results of the tests that the most adequate model for Austrian businesses is fixed effects model are stated in Table 3. This models will be used for further examination. Computed significant coefficients with their significance and regression statistics of the model are stated in the Table 4. Some variables have been removed because of weak statistical significance or because of present multicollinearity.

Table 3 Model testing

H_0: residuals for all companies are equal, H_1: there is at least one company with different residual.
Joint significance of differing group means: F(8,007, 40,033) = 8.52147 with p-value 0
A low p-value counts against the null hypothesis that the pooled OLS model is adequate, in favour of the **fixed** effects alternative.
H_0: $\sigma_c^2 = 0$, H_1: $\sigma_c^2 > 0$,
where σ_c^2 je a variance of unobservable random effects.
Breusch-Pagan test statistic: LM = 36,414.7 with p-value = prob(chi-square(1) > 36,414.7) = 0
A low p-value counts against the null hypothesis that the pooled OLS model is adequate, in favour of the **random** effects alternative.
H_0: cov $(v_i, X_{it}) = 0$, H_1: cov $(v_i, X_{it}) \neq 0$.
Hausman test statistic: H = 227.796 with p-value = prob(chi-square(7) > 227.796) = 1.45896e-045
A low p-value counts against the null hypothesis that the random effects model is consistent, in favour of the **fixed** effects model.

Source: Author, computed by Gretl software

Table 4 Model

Model: Fixed-effects, using 48,048 observations
Included 8,008 cross-sectional units
Time-series length = 6
Dependent variable: DR

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const.	0.0557613	0.00659785	8.4514	<0.00001	***
ln(A)	0.0397282	0.000620529	64.0232	<0.00001	***
FTA/A	0.140639	0.0150823	9.3248	<0.00001	***
ln(S)	-0.00155166	0.000504278	-3.0770	0.00209	***
$(S_t-S_{t-1})/S_{t-1}$	3.97746e-05	2.0875e-05	1.9054	0.05674	*
EBIT/S	4.57684e-05	2.16357e-05	2.1154	0.03440	**
ln(ITS)	0.00387411	0.000850985	4.5525	<0.00001	***
GDP	0.219855	0.081101	2.7109	0.00671	***

Mean dependent var.	0.651710	S.D. dependent var.	0.668259
Sum squared resid.	7,208.808	S.E. of regression	0.424348
R-squared	0.664025	Adjusted R-squared	0.596767

F(8,014, 40,033)	9.872918	P-value(F)	0.000000
Log-likelihood	-22,606.11	Akaike criterion	61,242.21
Schwarz criterion	131,613.6	Hannan-Quinn	83,326.56
rho	0.103681	Durbin-Watson	1.455274

Test for differing group intercepts -
Null hypothesis: The groups have a common intercept
Test statistic: F(8,007, 40,033) = 8.52147
with p-value = P(F(8,007, 40,033) > 8.52147) = 0

Source: Author, computed by Gretl software

In the Table 4 it is shown that variables representing size, tangibility, interest tax shield and gross domestic product are statistically significant at the significance level of 0.01, variable representing profitability is statistically significant at the significance level of 0.05 and variable representing growth opportunities is statistically significant at the significance level of 0.1.

The computed R-squared indicator means that 66.40 % of dependent variable variability is explained by the linear regression model. According p-value, R-squared is statistically significant at the significance level of 0.01. It means that the model as a whole is statistically significant.

Based on the calculations we can write down the econometric model for Austrian businesses as follows:

$$DR_{it} = \beta_0 + \beta_1 \times \ln(A_{it}) + \beta_2 \times \frac{FTA_{it}}{A_{it}} + \beta_3 \times \ln(S) + \beta_4 \times \frac{S_{it} - S_{it-1}}{S_{it-1}} + \beta_5 \times \frac{EBIT_{it}}{S_{it}} + \beta_6 \times \ln(ITS_{it}) + \beta_7 \times GDP_t + \varepsilon_{it} \quad (3)$$

$$\widehat{DR_{it}} = 0.0557613 + 0.0397282 \times \ln(A_{it}) + 0.140639 \times \frac{FTA_{it}}{A_{it}} - 0.00155166 \times \ln(S) + 0.0000397746 \times \frac{S_{it} - S_{it-1}}{S_{it-1}} + 0.0000457684 \times \frac{EBIT_{it}}{S_{it}} + 0.00387411 \times \ln(ITS_{it}) + 0.219855 \times GDP_t \quad (4)$$

5 Conclusions

We have examined 8,008 capital structure determinants of business entities in Austria from 2006 to 2012. From 15 selected factors only 6 are statistically significant (5 internal and 1 external) – size, tangibility, interest tax shield, gross domestic product, profitability and growth opportunities. Only an increase of sales has negative influence on leverage and other variables have positive influence on leverage. These results are not consistent with findings of Jong [3] nor Mokhova and Zinecker [5].

Compared to Slovak companies – according our previous research there is positive relationship between profitability, growth opportunities, EURIBOR, inflation, unemployment and leverage. Negative correlation is observed between size, tangibility and leverage. It means that only

profitability and growth opportunities are statistically significant and have the same (positive) influence on leverage in Slovak and also Austrian business entities.

Interesting difference between Slovak and Austrian econometric models is that coefficient of determination in Austrian model is much higher (66.40 %) than the coefficient of determination in Slovak model (19.64 %). For further examination we propose a selection of companies according their legal form.

Acknowledgments

This paper was prepared with a technical support of the Institute for Austrian and International Tax Law, Department of Public Law and Tax Law, Vienna University of Economics and Business.

References

[1] Bancel, F. – Mittoo, U. R. (2004). Cross-Country Determinants of Capital Structure Choice: A Survey of European Firms. In *Financial Management*, Vol. 33, No. 4, pp. 103-132.

[2] Graham, J. R. – Harvey, C. R. (2001). The theory and practice of corporate finance: evidence from the field. In *Journal of Financial Economics*, Vol. 60, No. 2-3, pp. 187–243.

[3] Jong, A. de – Kabir, R. – Nguyen, T. T. (2008). Capital Structure around the World: The Roles of Firm- and Country-Specific Determinants. In *Journal of Banking and Finance*, Vol. 32, No. 9, pp. 1954–1969.

[4] Kubicová, J. et al. (2014). The Impact of Thin Capitalization Rules on the Capital Structure of Companies in Slovakia. In *SGEM Conference on Political Sciences, Law, Finance, Economics and Tourism. Conference Proceedings Volume II*. Albena, Bulgaria, pp. 761-769.

[5] Mokhova, N. – Zinecker, M. (2013). The Determinants of Capital Structure: The Evidence from the European Union. Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis, Vol. 61, No. 7, pp. 2533-2546, ISSN 1211- 8516.

[6] Niňaj, M. (2014). The Determinants of Capital Structure: Evidence from the Slovak Republic. In *SGEM Conference on Political Sciences, Law, Finance, Economics and Tourism. Conference Proceedings Volume II.* Albena, Bulgaria, pp. 729-745.

INCREASE IN DEBT OF LOCAL GOVERNMENT UNITS AS A THREAT TO NATIONAL FISCAL STABILITY. THE CASE OF POLAND

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ABSTRACT

The aim of this article is to identify the threat to national fiscal stability after 2007, which came about as a result of the financial crisis. The financial crisis brought with it an increasing imbalance in the finances of local government units, which poses a threat to the national economy in the form of increased public debt and fiscal instability in Poland. A reaction to the threat to fiscal stability in Poland has in recent years been the introduction of fiscal rules in the Public Finance Act that protect the local government units against loss of liquidity and excessive debt. Preventative measures imposed by central government meant that between the years 2010 and 2013, despite relatively weak economic growth, there was a reduction in the number of reported deficits in operating budgets, and an increase in the total level of surplus in the operating budgets of local government units.

Keywords: general government debt, local government debt, fiscal stability, fiscal rules

JEL codes: E62, H63, H72

1 Introduction

One outcome of the 21st century world financial crisis, which started with the collapse of the USA mortgage market in 2007, is the difficult budget situation reflected in excessive deficit and high public debt in many EU countries (e.g. PIIGS countries). According to convergence criteria initially stipulated in the Maastricht Treaty (currently in the Treaty on the functioning of the European Union), of 7 February 1992, member countries of the EU are obligated to comply with a maximum level of General Government deficit of 3% to GDP, and public debt of 60% to GDP. Non-compliance with these criteria may trigger an excessive deficit procedure against the country, which is aimed at improving the state of public finance through the strengthening of budgetary procedure. The scale of the collapse of public finance due to the financial crisis of 2008 and 2009 is evidenced by the fact that as of December 2010, 24 out of the 27 EU member states had an excessive deficit procedure launched against them [9]. As of November 2014, 11 of the 28 European Union countries are going through the procedure [10].

Poland is amongst those countries, because from 2008 the deficit threshold to GDP was exceeded. The deficit in 2009 was at 7,5% of GDP, and in 2010 at 7,8% of GDP. The sudden increase in deficit was accompanied by a jump in public debt, although it did not cross the 60% of GDP threshold. An analysis of the national public debt by different public finance sectors between the years 2008-2013 shows a growth in debt in the local government sector from PLN 28,1 bn to PLN 68,4 bn [4]. The increase in local government debt is mainly caused by spending on infrastructure projects, including those subsidized by the European Union. However, it is worthwhile to note the extent to which the increased local government debt is a result of the financial crisis, and how it is due to other factors, e.g. inappropriate legislative decisions concerning tax revenues and local payments; a drop in income at local government level, etc.

In 2009, an excessive deficit procedure was opened for Poland, which triggered a number of public finance reforms. Changes in legislation aimed at increasing the stability, safety, effectiveness and rationality of public finance were launched after 2008 and closed with the passing of Public Finance Act in 2009. Emphasis was placed upon: legal and organizational public sector entity forms; performance budgeting; lengthening financial planning through the introduction of a Multi-Year Financial Plan of the State in Poland, and local self-government multi-year financial forecast; sharpening of safety norms and correctional procedures in the relationship between national public debt and the GDP; the separation of European funds from the national budget, as well as the introduction of management controls in the public finance sectors. Additionally, structural reforms that helped financial consolidation were carried out – the process to increase the retirement age to 67 was started, making retirement age the same for men and women, as well as the introduction of open retirement funds. The next stage was the strengthening of the national fiscal framework through the introduction of new fiscal regulations – expenditure rules and local self-government rules. At first, temporary disciplinary rules were introduced in 2011 and replaced with stabilizing rules on 28 December 2013. From the local government point of view the most significant changes were the introduction of fiscal rules concerning the balancing of local government budgets in operations (from 2011) and the introduction of the individual debt ratio (from 2014). The obligation for local government units to balance their operating (current) budget is seen as key. The operating budget is one of the most significant indicators of the financial condition of a local government unit, showing the degree to which expenditure is covered by current income.

The aim of the rules is the medium-term stabilization of the government institutions sector results to the level of the medium-term objective (MTO), which was set for Poland as -1% of GDP [13].

Therefore, the aim of this article is to point to phenomena which have been threatening the fiscal stability of the country since 2007, that have come about as a result of the financial crisis, showing as an imbalance in the finances of local government units with reference to the results achieved by the preventive measures undertaken by central authorities in the form of fiscal rules for the local government sector.

2 Literature Review

The 21st century financial crisis and its consequences have contributed to more emphasis being placed on the safety and stability of financial policies. Literature on the subject does not have a uniform approach to establishing stable budget policies. There is common agreement that budget policy should be transparent, with a medium or long-term focus adjusted to changes in the economic cycle. In practice, these guidelines are not always adhered to, and their omission or inclusion is based on fiscal rules [7].

The theoretical foundations for budget policy based on rules were outlined in an article by J.R. Lucas which undermined the use of econometric macroeconomic models as an assessment tool for economic policy performance [6]. A fiscal policy rule is defined in context of macroeconomics as a constant constraint on fiscal policy usually applied to a quantity, an indicator, or a procedure [5]. It should be noted that stability means a permanent basis of a given rule regardless of the political or economic situation at a national or international level in a given country [12].

Research and literature on the subject outline reasons for implementing fiscal rules. The launching of rules is a result of so-called lateness and inconsistencies of budget policy over time; the phenomenon of "tendency towards deficit" and the creation of the Euro zone [7]. The

IMF lists four types of fiscal rules: debt, budget balance, expenditure and revenue [14], where the most effective are the budget balance and expenditure rules.

European Union states use national and/or supranational fiscal rules. In Poland, national fiscal rules were written into the Polish Constitution and Public Finance Act of 1998, 2005 and 2009.

The issue of the safety of public finance is linked to the problem of the safety of local government finance, which has received increased attention since 2006. It is predominantly because local government units are the main recipients of EU grants through their various programmes and projects. According to the EU principle of subsidiarity the completion of these projects and programmes requires co-financing. Therefore, a dangerous situation has arisen in that the profitable absorption of EU funding by local governments might be accompanied by another, more negative, phenomenon of raising debt by local government units. The focus on completion of EU projects and programmes and the subsequent increase in debt, especially by the gminas which may incur high debt service costs may jeopardize the local governments' ability to deliver basic public and social services to its citizens.

Regulations regarding the safety of local government finance, in other words, the permissible debt limits for local government units, which were in place until the end of 2013, have been replaced by the individual debt ratio. Another fiscal rule for balancing the budget of local government operations was introduced in 2011 (see Schedule 1). The introduction of the latter, also called the expenditure rule should assist with accurate budget planning as well as shaping the decisions of local governments towards more savings-oriented policies in the realm of current expenditure.

Schedule 1 Fiscal rules regarding local government under the law in force

	between 2009 – 2013	**2014**
Debt rule* ratio of liabilities to income	**60%**	**None**
Exclusions from the debt rule	Issuing of promissory notes, credit and loans entered into on the basis of an agreement with an EU funding entity (for financing and co-financing)	
Service cost rule (capital + interest) for income	**15% (12%)****	**individual debt ratio**
Exclusions from cost of debt service rule	Servicing of liabilities for liabilities incurred for the completion of EU funded projects	Servicing of liabilities for liabilities incurred for the completion of EU funded projects and Eurobonds issued prior to the entry into force of the Public Finance Act 2009. (without interest)
The rule of operating budget balance	**None between 2009 – 2010, in existence since 2011**	

*In December 2010 the criteria for public debt was tightened. Due to the introduction of the *de facto* economic criteria classification of debt, the possibility of disregarding the debt limit of 60% of revenue was effectively limited.

**12% when national public debt exceeds 55% of GDP

Between 2013-2018 an exemption from fiscal rules is in place for liabilities incurred by independent public health centers that have been taken over by local government units.

Source: [11]

As mentioned earlier, quantitative debt limits applied to all types of local self-government. The first limit (service cost rule), could not exceed 15% of the budgeted income for the given local government unit. The second limit (debt rule) could not exceed 60% of the budgeted income for that year for a given local government unit. During the budget year, the total debt of the

local government unit at the end of a quarter could not exceed 60% of the income budget for that year. The main criticism of these solutions was focused on the assertion that the debt limits had no reference to the financial potential of the individual local government units. It was argued that these solutions created an obstacle to local development. According to critics, the limits did not take into account the potential income of local governments. It was highlighted that in some cases staying within the debt limit did not mean having no difficulties in repaying the debt in a timely manner [3]. The need for change was noticed not only within local government, but also in academic and central government circles. In 2006 the Ministry of Finance created a formula for the new individual debt ratio based on the current budget figures of each local government unit. After negotiations, the final outcome of the individual debt ratio was documented as a numerical formula in the Public Finance Act of 2009. According to entries made in a given budget year, the ratio of liabilities plus their service costs against overall budget income could not exceed the arithmetic mean of the last three years of current income ratio plus income from the sale of assets minus current expenditure versus general budget income. Moreover, the governing body could not pass a budget in which the formula for this ratio was not complied with.

Paradoxically, the dynamic increase of local government debt in 2009 and 2010 was explained as an "escape" local governments used before the individual debt ratio came into power, due to its restrictive nature. Amongst the shortfalls of the first debt ratio indicator the following can be listed: 1) calculations based on historical data; 2) sale of communal assets to improve debt servicing capabilities; using figures from the economic slowdown of 2011-2013 to calculate the first budget results indicator for local government units; 3) the method of calculating operating surplus; 4) banning additional debt for local governments that did not achieve an operating surplus, etc. [8]. The economic evaluation of the individual debt ratio comes down to paying close attention to the level of operating surplus. According to article 242 of the Public Finance Act, a local government body cannot pass a budget in which current expenditure is greater than the planned current income plus operating surplus from previous years and other available funds. This ratio should also be kept at the end of the budget year. This excludes expenditure financed from the European Union budget and non-refundable funds obtained as help from EFTA member states, if those funds were not given within the same budget year [18].

According to estimates by the Ministry of Finance and the Financial Supervision Authority over the National Council of the Regional Chambers of Audit in Poland, one of the threats resulting from the introduction of the individual debt ratio is the inability to pay off liabilities due to the negative value of this indicator [15]. Additionally, literature on the subject has pointed out the shortsightedness of this solution, which could increase the risk of insolvency for local governments in the future. This situation could occur, for example, when it is not required for local government units to make their own financial contribution if they prefer access to EU funds in the period 2014-2020. It also seems a mistake to leave the individual debt ratio formula unfinished, as apart from the limitations there are also debts paid with expenditure (forfaiting), or liabilities that are not classified as debt (leaseback) [2].

In the context of growing debt in the local government sector, it is important to identify the main factors that threaten national fiscal stability and to establish to what extent local government units satisfied the "old" debt limits, and whether expenditure rules are a more effective practical method of increasing budgetary discipline at local government level.

3 Data and Methodology

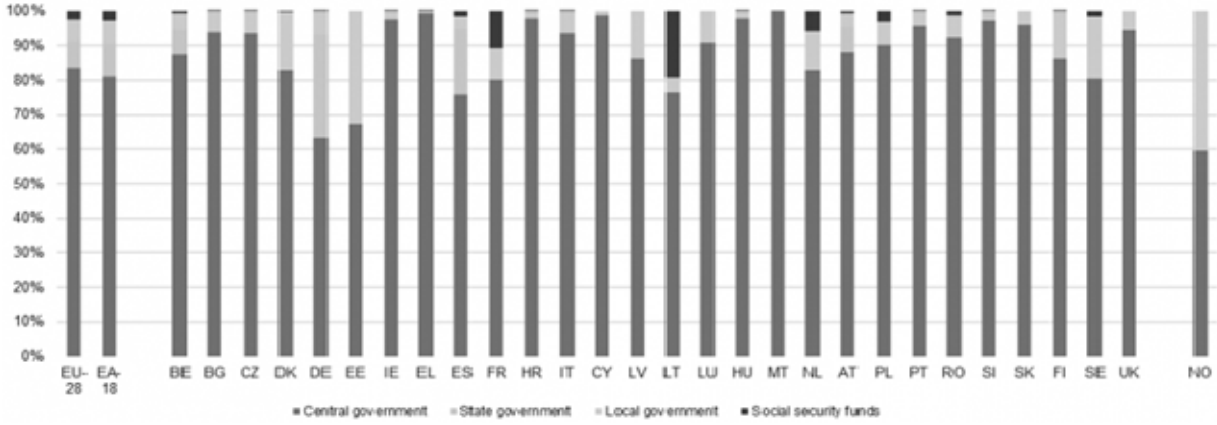
Research into local government debt in Poland as well as operating surplus between the years 2008-2013 will be carried out in a number of stages. The first stage is going to be based on data

made available by Eurostat, aimed at defining the contribution that local government debt makes to the General Government debt in Poland and EU states. The next stage will be to indicate the level of public debt in Poland, including local government debt based on data from the Ministry of Finance. Reports from the National Council of the Regional Chambers of Audit and reports detailing the completion of budgets by local government units over the years presented by the Ministry of Finance will help to estimate the structure of local government debt based on the type of local government unit in Poland as well as debt limits. The last stage of the research will be the measure of effectiveness of the expenditure rule. The analysis will also include a measure of quality control, as the implementation of changes is dependent on the surrounding institutional and legal conditions.

4 Results and Discussion

4.1 Local government sector debt in European Union states

Figure 1 General government gross debt by subsector, percentage of total gross debt, non-consolidated between subsectors, 2013



The level of local debt puts Poland amongst countries with a low level of that.
Source: http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Structure_of_government_debt

4.2 Level of national public debt in Poland between the years 2008-2013

The data in table 1 shows the level of national public debt calculated using Polish and EU methodology. The presentation of the data is intended to ascertain to what degree Poland meets the criterion of coherence and the limits described in the Public Finance Act with regards to public debt (safety and remedial procedures). The main difference in the already-mentioned method of calculating debt is the approach to the definition (scope) of the public finance sector. Additionally, in 2010, Poland and 8 other EU member states were involved in a dispute with the European Commission and the other member states, regarding the statistical classification of open pension fund contributions used in calculating debt and deficit. An agreement could not be reached and according to European statistical principles, open pension fund contributions increase the deficit and debt of the public finance sector.

Table 1 Public debt in Poland as a percentage of GDP between 2008-2013

Year	2008	2009	2010	2011	2012	2013
***General Government* sector debt**	47,1	50,9	54,9	56,2	55,6	57,1
National public debt	46,9	49,8	52,8	53,4	52,6	53,9

Source: [16]

During the period under research Poland did not exceed the supranational rule, i.e., the maximum level of General Government sector debt of 60% of GDP. From a national regulatory perspective, there are three thresholds that reflect the level of debt as a percentage of GDP, as well as corrective actions that must be taken after a given threshold is exceeded. In 2009 and 2010, the first safety debt threshold was set at 50% of GDP and it was exceeded in 2010. Because there was also a risk of exceeding the second threshold of 55% of GDP, which would mean the introduction of remedial action to public finances consisting of, amongst others, curbing local and central government spending, the Public Finance Act was amended in 2011.

After the amendment of the Public Finance Act, the first threshold was set at 55% and has not been exceeded. The Ministry of Finance attributes the increase in public debt to the financial situation of public sector units, among them mainly national budget borrowing and the current macroeconomic situation (rate of GDP growth, level of foreign currency exchange and interest rates) [1].
Further analysis will be carried out on the structure of national public debt (see table 2)

Table 2 National public debt in Poland in the years 2008-2013 according to public finance sector in PLN billion

	2008	2009	2010	2011	2012	2013
National public debt, including:	**597,8**	**669,9**	**747,9**	**815,3**	**840,5**	**882,3**
1. Central government debt	566,9	623,6	692,4	748,8	770,8	813,5
2. Local government sector debt, including:	28,1	39,3	53,4	64,2	67,4	68,4
2.1. Debt of local government units and their associates	***25,0***	***36,3***	***50,6***	***61,2***	***64,0***	***65,2***

Source: [1]

In the structure of national public debt, the part played by government sector debt ranges from 94,8% in 2008 to 92,2% in 2013. Debt of local government units and their associates increased in 2009 by 45,7%, in 2010 by 39,1% and in 2011 by 21,0%. However, in 2012 the same debt increased by 4,6% and in 2013 by 1,9%. The debt of local government units and their associates in the structure of national public debt constituted 4,2% in 2008 and in subsequent years 4,1%, 6,8%, 7,5% and 7,7%, reaching 7,4% in 2013. The part played by local government units in the national public debt was quite small, but more dynamic than the government sector debt. This category of debt increased 2,5 times compared to 1,5 times for government sector debt.

Among the reasons for the increase in local government debt are: 1) an increase in the number of investments, including those with EU funding (investment spending was around 95% of asset-related expenditure); 2) a drop in income caused by the economic slowdown in Poland; 3) the handing over of new tasks to local government units. Table 3 shows the debt as a percentage of income for all local government units.

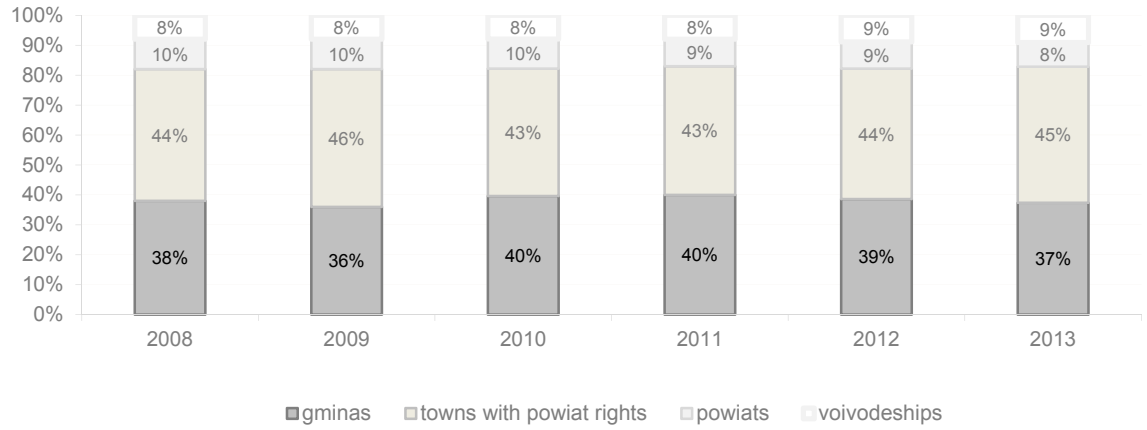
Table 3 Debt indicator in local self-government units in Poland in the years 2008-2013

Debt indicator	2008	2009	2010	2011	2012	2013
debt versus total revenue in %	20,2	26,0	33,8	38,4	38,2	37,7
Debt unrelated to completion of projects and programmes with EU funding versus total revenue in %	18,7	24,5	30,8	34,3	34,6	32,1

Source: [4]

The ratio between the total debt amount and income was below the statutory 60% (effective until 31 December 2013), and in 2012 it dropped for the first time since 2008. Analyses carried out by the Ministry of Finance regarding local government units' liabilities show they tend to increase in the last quarter of a budget year. The growth in local government units' debt between the years 2009-2011 caused fears that local government units might lose their financial liquidity, which brought under scrutiny the magnitude of the debt according to the type of local government unit and the ratio between liabilities and revenue [16].

Figure 2 Structure of debt in local government units by tier in the years 2008-2013



Source: own work based on data from: [16]

The analysis of the debt structure of local government units according to their place in government hierarchy leads to the conclusion that there are no significant differences between the various tiers, with the main weight of debt resting on the gminas and towns with powiat rights (these units undertake the largest number of tasks). Between 2008-2013, Poland had a total of 2808 local government units of which over 95% were in debt. Under these circumstances, it is worthwhile investigating how many local government units exceeded the debt rule and the expenditure rule (see table 4 and 5).

Table 4 Debt rule in local government units in the years 2008-2013

	Total		Gminas		Towns with powiat rights		Powiats		Voivodeships	
	Year		Year		Year		Year		Year	
Number of units in debt	2008	2660	2008	2273	2008	65	2008	306	2008	16
	2009	2663	2009	2245	2009	65	2009	311	2009	15
	2010	2743	2010	2351	2010	65	2010	311	2010	16
	2011	2696	2011	2305	2011	64	2011	311	2011	16
	2012	2690	2012	2300	2012	64	2012	311	2012	16
	2013	2697	2013	2307	2013	66	2013	308	2013	16
Number of units in debt exceeding 60%	2008	2	2008	2	2008	0	2008	0	2008	0
	2009	7	2009	7	2009	0	2009	0	2009	0
	2010	70	2010	68	2010	2	2010	0	2010	0
	2011	32	2011	31	2011	0	2011	1	2011	0
	2012	30	2012	26	2012	0	2012	3	2012	1
	2013	37	2013	31	2013	1	2013	4	2013	1

Source: own work based on data from: as per table nr 2.

Table 5 Expenditure rule in local government units in the years 2008-2013

Year	2008	2009	2010	2011	2012	2013
	Number of local government units					
Operations deficit	87	223	473	182	102	39
Operating surplus	2721	2 585	2 336	2 627	2 707	2 770

Source: own work based on: [15]

During the period under research, the number of local government units that exceeded the debt limit rose in 2010 – these were mainly gminas. In the case of the expenditure rule, the vast majority of local government units in which current expenditure exceeded current income, covered the difference from the surplus of previous years and available funds. The remaining units that experienced problems with keeping the expenditure rule which was introduced in 2011, apart from the reasons mentioned in the Public Finance Act, such as implementing a repair plan, indicated difficulties with achieving their planned current income from tax revenues (property tax, personal income tax). And so, for example, in 2013, out of the 39 units that reported an operations deficit, 24 units covered it with surplus from previous years and available funds, 8 reported reasons exempted by the statute (unclear), and 7 units had planned current income figures that were too high [15].

After 2012, the rate of increase of local government debt dropped. Based on a report by FitchRatings Agency it appears that "local governments revised their investment plans and focused on completing EU subsidized projects that had already been started. At the same time, they postponed projects which had not secured EU funding, and/or smaller projects" [17]. Introduced in 2011, the expenditure rule caused more robust budget planning, evidenced by the decreasing number of local government units which closed their current budget with a deficit. The expenditure rule, as well as the individual debt ratio indicator are the basis for legislating the long-term financial forecast (a modern instrument to manage finance, which became mandatory from 2011), which if not set in adherence to these fiscal rules, is accompanied by the launching of a repair program. Despite the fact that the individual debt ratio has been used in setting budgets only since 2014, it has been a component of long-term financial forecasts since 2011. In the analyses of the National Council of the Regional Chambers of Audit it is emphasized that the number of units for which the new limit is more advantageous after the arithmetic mean is calculated, is dropping, for example, in 2013 there were 135 such units [15].

5 Conclusions

The increased debt in local government units during the period under analysis is a worrying phenomenon because of the share that local government debt has in the national public debt. However, an analysis of the structure of the debt reveals that the bulk of debt burden rests in the central government sector, and the share of local government debt is not significant. A dangerous phenomenon is its rapid growth, which rose to 2,5 times its original size in 2008. Reasons for fiscal instability in local governments must be sought in incomes that are too low while costs of public projects are high. The legislators interpret the principles of raising revenue based on legal acts as permanent and unchanging. However, in 2010 a significant change took place regarding personal income tax, which is also a source of income for local governments. The change involved lowering tax thresholds, which resulted in a drop in the inflow into the budgets of local governments.

The fiscal rules implemented by the central powers were aimed at bringing more discipline into the budget policies of local governments. The departure from "rigid" debt indicators of 15% and 60% and the possibility for local governments to determine the level of debt based on the

current surplus being generated reflects the financial state of the unit. The concurrent introduction of the necessity to balance the current budget is justified on the condition that budget planning is accurate. There are doubts surrounding the construction of the individual debt ratio, for which local government circles have proposed further amendments [17].

References

[1] *Budget fulfilment report for the years 2008, 2009, 2010, 2011, 2012, 2013*, The Cabinet, Warsaw, (*Sprawozdanie z wykonania budżetu państwa za poszczególne lata, Rada Ministrów, Warszwa),* www.finanse.mf.gov.pl

[2] Cyrankiewicz M. *Pułapka indywidualnego wskaźnika zadłużenia*, http://prawo.rp.pl/artykul/1114479.html

[3] Gonet W. Wielkość maksymalnego zadłużenia jednostek samorządu terytorialnego w projekcie nowej ustawy o finansach publicznych. *Finanse Komunalne*, No. 11/2008, pp. 11-15.

[4] *Information about budget fulfilment for local government units for the years 2008,2009, 2010, 2011, 2012, 2013,* The Cabinet, Warsaw, *(Informacja o wykonaniu budżetów jednostek samorządu terytorialnego za poszczególne lata,* Rada Ministrów, Warszawa), www.finanse.mf.gov.pl

[5] Kopits G., Symansky S. (1998). Fiscal Policy Rules. *IMF Occasional Paper,* No 162, pp. 1-40. (Washington, D.C.: International Monetary Fund).

[6] Lucas R. J. (1976), *Econometric Policy Evaluation: A Critique*, in: Brunner K., Meltzer A.H. (eds), *The Phillips Curve and Labor Markets*, Carnegie-Rochester Conference on Public Policy 1: pp. 19-46, Amsterdam: North Holland.

[7] Marchewka-Bartkowiak K. (2010). Reguły fiskalne. *Analizy,* No. 7 (32), Biuro Analiz Sejmowych, pp. 1-7.

[8] Marchewka-Bartkowiak K., Wiśniewski M. (2012). Indywidualny wskaźnik zadłużenia JST – ocena krytyczna i propozycje zmian. *Analizy,* No. 21 (88), Biuro Analiz Sejmowych, pp. 1-6.

[9] Monitor konwergencji nominalnej, Ministerstwo Finansów, No. 12/2010, pp. 1-8, www.finanse.mf.gov.pl

[10] Monitor konwergencji nominalnej, Ministerstwo Finansów, No. 11/2014, pp. 1-7, www.finanse.mf.gov.pl

[11] *Multi-Year Financial Plan of the State in Poland for the years 2014-2017 including Convergence Programme – 2014 Update*. Warsaw, 22 April 2014, (*Wieloletni Plan Finansowy Państwa na lata 2014-2017 zawierający Program konwergencji. Aktualizacja 2014*, Warszawa, 22 kwietnia 2014 r.), pp. 1-79, www.mf.gov.pl

[12] Piwowarski R. (2011). Reguły fiskalne oraz instrumenty nowego zarządzania publicznego jako narzędzia przejrzystej polityki fiskalnej. *Studia Ekonomiczne,* No. 3 (LXX), pp. 251-274.

[13] *The Convergence Programme – 2012 update,* Warsaw – April 2012 (*Program Konwergencji. Aktualizacja 2012*, Warszawa kwiecień 2012), pp.1-52, www.finanse.mf.gov.pl

[14] Schaechter A., Kinda T., Budina N. (2012). Weber A., Fiscal Rules in Response to the Crisis—Toward he "Next-Generation" Rules. A New Dataset, *IMF Working Paper,* Np. 12/187, pp. 1-49.

[15] *Sprawozdanie z działalności Regionalnych Izb Obrachunkowych i wykonania budżetu jednostek samorządu terytorialnego za lata 2008, 2009, 2010, 2011, 2012, 2013,* Warszawa, Krajowa Rada Regionalnych Izb Obrachunkowych, www.rio.gov.pl

[16] *The Public Finance Sector Debt Management Strategy in the years 2015-2018, Ministry of Finance, September 2014,* (*Strategia zarządzania długiem sektora finansów publicznych w latach 2015-2018,* Ministerstwo Finansów, wrzesień 2014), pp. 1-68, www.finanse.mf.gov.pl

[17] Tartanus-Oryszczak M. Indywidualny wskaźnik zadłużenia samorządów terytorialnych - znaczenie dla dalszego rozwoju i propozycja korekty. *Finanse Komunalne*, No. 1-2/2014, pp. 110-113

[18] *Public Finance Act of 2009* (Ustawa z dnia 27 sierpnia 2009 r. o finansach publicznych, Dz. U. 2009 Nr 157 poz. 1240).

MANAGEMENT OF BANKING RESOURCES

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ABSTRACT

The article deals with the issue of the management of banking resources. The role of the banking system in the functioning of the economy is shown. The need to consider the "golden rule" in the activity of banks is proved. Particular attention is paid to the role and place of transformation processes of demand deposits. Some common problems in the management of banking resources in banks of Ukraine are singled out.

Keywords: management, assets, banking resources, demand deposits, transformation

JEL codes: G1, G21

1 Introduction

The issue of banking resources management is being an important one nowadays. The global financial crisis has made significant adjustments in the functioning of national banking systems. Today it is a necessary to form significant reserves for banking security. National banking system is a guarantee for social and economic development, and therefore an important aspect of banking stability is the effective management of banking resources.

According to “the golden banking rule”, the volume and timing of the bank financial savings must be equal to the volume and timing of its obligations. However, such banking practice is rare. Ensuring compliance of the "golden rule" with the practice is provided by maintaining a constant balance of assets and liabilities.

2 Literature Review

As noted by Z. Gerasymchuk, this case raises the issue of economic security banking, i.e. the condition for economic development and stability of the bank, guaranteed protection of its financial and material resources, the ability to adequately and economically respond to changes of internal and external situations. It should be noted that the particular importance of economic security in the system of bank security is conditioned by the desire of market entities to increase profits, intense competition, the diversity of interests within business banking market, market entities desire to increase profits, unstable economic situation and so on. Thus, the current terms of banking services and the level of influence of factors threatening internal and external environment require of banking institutions to raise security measures [1].

A. Vovchak analyzes the problem of providing banking services in some countries and compares the corresponding situation with Ukraine, stating: "Accordingly, it is possible to conclude about significant difference in the level of providing banking services across the country. The relevance of this problem is compounded by the fact that, as the experience and statistics show, the better developed banking system in the region is, the better its business

develops. Accordingly, economic processes are stimulated, which further leads to improved living standards. The economy of some regions is not supported by the banking system, which adversely affects the socio-economic processes taking place there. And the least developed banking infrastructure is in regions with low socio-economic development.

As the studies show, Ukraine has neither policy, nor clear strategy for regional development of the banking system. Moreover, there is no clear legal and regulatory framework of the functioning of regional banks. Therefore, there is a need to review the strategic goals and objectives of the banking system of Ukraine, its organizational structure and functional orientation on the way of joining the global and national regional processes. Among these tasks a special place should occupy regional banking system development, its goals and directions.

The essence of the process of regionalization is in the transfer of powers from the center to the regions. A vivid example of this process is the situation in the European Community. The most important focus of policy here is the institutional and economic support to the regions, there was even a slogan proclaimed: "From the union of countries, to the union of regions."

Having examined its organizational aspect, it can be argued that most Ukrainian banks position themselves as nationwide and carry out or intend to carry out its activities in several parts of the country. Regional banks are quite a few and they do not really affect the development of the whole economy and the regions where they are located. There is no segment of specialized banks in Ukraine, which would be involved in implementation of similar types of services; cooperative banks are absent, either"[2].

German scientist J. Stein notes, "An important task is the transformation of banks ... terms. Since the majority of depositors prefer binding equity for the short term, and funding for investment in the economy mostly requires long terms, banks should ensure coordination between the different views on the timing of binding capital. The task of transforming banks is also adapting to different values to each other. It is based on the fact that a substantial number of small deposits opposed to a small number of large loans. Transforming risks, terms and values is the central function of banks in the economy." [3]

The transformation processes are quite reasonably justified by M. Savluk, A. Moroz and M. Puhovkina who have discovered that transformation depends on variations in quality characteristics of the cash flows that pass through banks. Changing quality means that the set of "short" money changes to "long" resources, and the set of minor deposits transforms into a significant amount of resources able to meet customer needs in necessary capital to make required investment. The essence of the transformation process is to stabilize the bank mobilized funds [4].

E. Shirinska considers the problem of resources transformation not on the balance of some current accounts, but on current liabilities as a combination of the bank deposits. "The basis of the bank's funding base consists on attracted remedies which stability is one of the liquidity factors. By fixing terms, attracted resources are divided into two groups: managed resources and current liabilities. The first group includes term deposits attracted by banks and interbank loans. The second group includes the remains of the settlement, current accounts, correspondent loro accounts, and payables. Each group of liabilities should match its type of assets in terms of size and location. So, managed liabilities form the basis for targeted, program loans and current liabilities are the basis for market operations with "short" money [5].

Some authors distinguish between different types of transformation. Thus, M. Savluk, A. Moroz and M. Puhovkina indicate, "The transformation of capital means that mobilizing large amounts of small contributions, the banks are able to accumulate large masses of capital to implement large-scale projects." "Transforming the risk lies in the fact that banks whose activities are

associated with high risk can reduce these risks to their investors and shareholders to a minimum by taking appropriate measures." "The space transformation means that banks can accumulate resources from many regions ... and send them to finance projects in one region ... Thereby, the geographical scope of money market expands..."[4].

Vozhzhov A. summarizes the views of scientists, "Transformation of banking resources is the process converting accumulated assets in a condition that meets the requirements for placing them in the assets, i.e. the process of converting the accumulated funds in the form required for their transformation into resources and bank capital. The processes of transformation are provided by a qualitative change of settings from the accumulated bank assets and bringing them into conformity with the requirements of lending, investment banking and maintaining the required liquidity. As a result, options of the entire set of the means being at its disposal are taken in accordance with the settings of all the profitable bank assets in each present moment"[6].

Deep analysis of the articles on issues of banking resources transformation has revealed different approaches of the scientists reflecting the economic relationships in a particular country, peculiarities of the banking system and the relationship "bank-client".

According to A. Vozhzhov, transformation here refers to the set of methods and means of the combination of short-term deposits and loans when a significant part of the total volume forms a permanent, stable, or irreducible balance [6].

3 Data and Methodology

Let's consider some calculation methods of banking resources transformation made by the scientists from different countries. Here are the examples of French banks practice given by P. Konyukhovsky and O. Lavrushin:

$$K = \frac{R - S}{S} * 100 \quad (1)$$

with K as transformation ratio of short-term resources in long-term ones (used by French banks); R as short-term resources; S as short-term loans and capital investments [7].

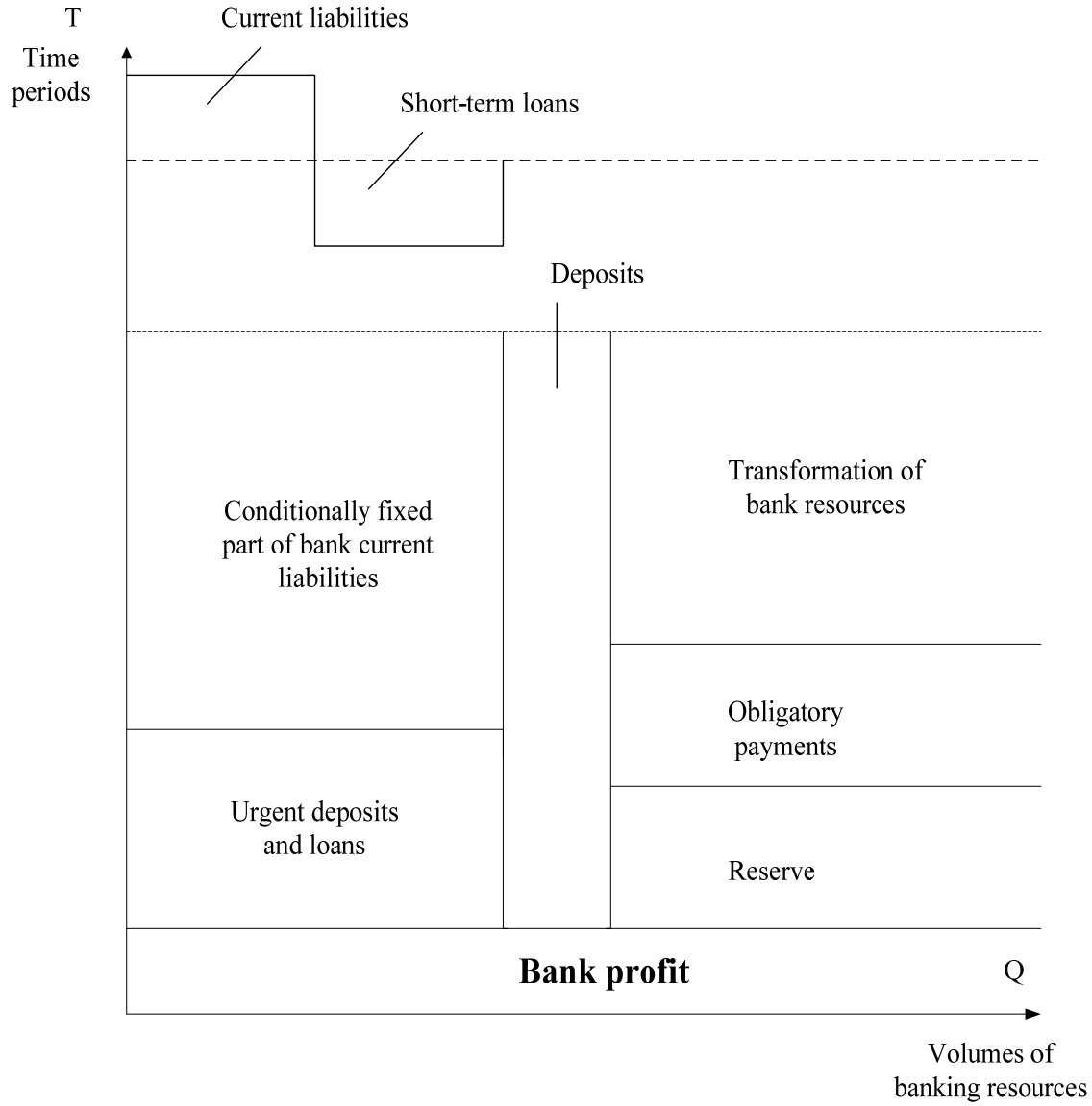
P. Konyukhovsky takes it in relation to the Russian banks in such a way:

$$K_T = 1 - \frac{Д_{ОБ}}{К_{ОБ}} \quad (2)$$

with K_T as transformation ratio of short-term resources in long-term ones (offered for the calculation by Russian banks); $Д_{ОБ}$ as debit turnover on issued short-term loans and other short-term deposits (up to one year's term); $К_{ОБ}$ as the credit turnover of capital inflows on savings accounts (up to 1 year's term) [8].

Accordingly, the scientific community has developed a theoretical and methodological support with specific analytical apparatus essential for the transformation of banking resources. Taking into account the views of scholars, it is possible to depict the processes of transformation of banking resources (Figure 1).

Figure 1 Transformation of banking resources



Source: [8]

As this scheme shows, by the effective management of inclusion and using bank resources in the process of transformation, the efficiency of banks is achieved.

It is necessary to explain the transformation peculiarities of the individual components of bank resources. Let's start with the demand deposits. A. Vozhzhov mentions, "Bank provides essential work to build-up the volume of assets for individuals. Now in this section important role belongs to the introduction of "salary", "pension" and other card designs. With small amounts of residues for each of the accounts, together they form significant current liabilities. An important feature of current liabilities is that they are essentially the only cheap resource that allows you to receive significant interest margin."[6].

P. Rose states that "... demand deposits are the most volatile and least stipulated sources of funds provided by the bank, with the lowest potential terms ..." [9].

E. Zhukov says, "The availability of customer accounts balances is related to settling funds for passive accounts in commercial banks during the period of time which is almost impossible to

establish at the moment of revenues to the account... Payments by request are basically volatile, which limits the scope of their usage by commercial banks. For this reason, account holders are paid low or no interest at all."[10].

O. Lavrushin has the opinion that the demand deposits are relatively cheap for the bank and "at the same time they are the least stable of the resources, banks need to have the higher operational reserve to maintain liquidity. Therefore, the best proportion of these funds in the bank's resources is up to 30-36%." [7].

D. Oliynyk on the basis of empirical studies has come to more certain conclusions on the possibility of placing demand deposits, "Exploring the dynamics of current accounts "on demand", we can conclude that the total balances in such accounts has surprisingly high level of relative stability. The obtained practical results of the study come in certain conflict with the theoretical assumptions which characterize this group of bank liabilities. Results of empirical studies ... have shown that during the calendar year a significant amount of balances "on demand" was not reduced below that level. This situation actually makes it possible to include a significant portion of current accounts of bank clients to medium and long term credit. This means that the bank can afford to invest some part of balances "on demand" in the medium and long-term assets with no threat to its liquidity. The main objective of the bank manager in this case is to determine the optimal investment horizons, namely, what part of the balances "on demand" and for how long the bank can invest with minimal risk to its liquidity." [11].

Thus, there are enough scientific assertions that demand deposits play an important role in the transformation of banking resources. These processes are mutually beneficial for both the bank and the client, as reported by A. Vozhzhov, "Clients work with "reserve funds", their accounts regularly form balances which dynamics indicates vigorous client activity. These customers are highly desirable for the bank: they are actively engaged in calculations (by giving commission income) and form cheap bank resources." [12].

Settling means on the account depends substantially on how skillfully and carefully the client manages its funds. A good customer makes sure that immediately after admission the funds are paid in accordance with his activity. This reduces his loan arrears, strengthens his reputation as a reliable partner and allows him to do business with less leverage. On this basis it is possible to expect that this type of customer balances will be minimal. However, research has shown that a number of factors prevent it: first, the customer is forced to generate some savings for payroll, transfers of tax payments and so on, and this leads to the accumulation of account balance. But the main factor is the inability to reset the client's current account with active credit turns on it during a business day. A customer transfers before the end of the operational time of the bank and means may come to his account even after that, till the end of business day. As a result, by the end of the day some balances are being formed even with the clients carefully handling their own means. The more the turnover on the current account and the higher the intensity (frequency) of revenues during the day are, the more the minimum balance is. The characteristic feature of the ordinary current account is its periodic resetting, the customers who work actively enough form their minimal balance even at high controllability account.

Thus, the reason of balance on the current account is the mismatch of revenue timing and its withdrawal from the account (account crediting and debiting) in the presence of constraints: preventing debit balance on current account and inability to account debiting by the customer at the end of the bank operation day as well as the need for the client to periodically accumulate funds on the account for obligatory payments. Balances on current accounts are formed as a result of the interaction of these factors and the dynamic balance revenues and outflows in the general limits imposed by peculiarities of current accounts, banking services and characteristics

of the client's operations, including its desire to minimize the balance on current account at the end of each business day." [6].

We shall explain the features of the banking resources transformation. Transformation of means by request automatically results in the allocation to the conventionally permanent part of current liabilities which gives rise to its self-stabilizing. But for the increase of this important component, the bank must constantly work to increase the number of clients on cash and settlement services, to increase the number of accounts for both private and corporate clients. Therefore, efforts of the bank management to improve T_{const} should be directed to attract and service new clients – legal entities and individuals, as well as to increase the number of correspondent banks that are active in loro accounts. Banks also have a direct interest in the prosperity and development of their clients, because the value of conditionally permanent part of current liabilities is directly proportional to the value of average balances in their current accounts.

Transformation of ultra-short unstable aggregate deposits in current liabilities with allocation of their conditionally permanent, irreducible part is the manifestation of "bank effect". Transformation of ultra-short and small funds that are accumulated in the long and extensive resources shows the essence of creative banking with setting and stabilizing of resources made of unstable credit means on demand. It is often assumed that the banking activity is speculative – buying funds at a low price, followed by higher reselling. This creates a somewhat negative attitude towards banking. Understanding the creative role of banks in establishing resources that meet the requirement of placing long assets should promote a positive attitude towards banking, awareness of the need for economic development. The essence of the transformation process not only reveals the creative generating function of banks in the economic system, but also allows reasonable approach to assessing the deposit and resource risks in banking.

According to the theory of probability, the range dispersion of a random variable X_i with normal distribution is within $-\infty < X_i < +\infty$. In practice, the range of dispersion values is within well-defined range, which is $\pm\ 3\sigma$. However, the situation may change in the force majeure circumstances that should be considered in practice and will be discussed further. To calculate the probability of normally distributed random variable hitting on the plot, symmetrical about the center of dispersion (m), we shall draw consecutive sections of length σ. Since the normal curve is symmetrical, it is enough to draw these segments in one direction only. The graph in Fig. 3 shows the dependence of the probability (P) of hitting events in different intervals. Probability of hitting a random variable Xi in the interval ($t < Xi < t\text{-}\sigma$) is equal to 0.34, in the interval ($t - \sigma < Xi < t - 2\sigma$) is equal to 0.14, in the interval ($t - 2\sigma < Xi < t - Z\sigma$) is equal to 0.02. For normally distributed random variable the probability of hitting into the range $Z\sigma$ is the sum of three values of probability (0.34, 0.14 and 0.02), that is 0.5 or 50%.

The probability that a random variable falls outside the range $-\ 3\sigma$, is very small and makes 0.0027. This means that under normal conditions, only 0.27% of the actual value of the conditionally permanent part of current liabilities $TП_{const}$ will be less than the estimated value, corresponding to a range of deviation $\pm\ 3\sigma$. Such events are considered to be unlikely and usually not taken into account in practice. However, according to the theory of probability, even the lowest probability of an event cannot be excluded. So, the minimum balance ($TП_{const}$) is constant, but by the fact that probability of lowering the target still exists (especially in the emergencies), this component of current liabilities is legally called not constant, but the relatively-constant part [6].

Another problem is the transformation of banking resources in their variable of current liabilities. The effect of this transformation is determined by the additional interest margin received by the bank using the variable part of current liabilities as a sustainable resource and

is based on a comparison of interest margin derived by the bank when placing liability on the part of the short-term interbank market and when placed in terms of urgent assets.

The value of the additional interest margin is defined as follows:

$$\Delta M = M_K - R_{SS} \tag{3}$$

with: ΔM as extra interest margin, which determines the effect of transforming the variable portion of the current liabilities of the sustainable and managed resources; M_K as the value of the margin received by the bank after the transformation of the variable part of the current liabilities into the part of the sustainable and managed resources; R_{SS} (Returns short-term sale) as income that the bank will receive when placing the total amount of the variable part of current liabilities in the interbank credit market (without using the mechanism of transformation).

When placing capitals in urgent assets, emergency funds and conditionally permanent part of current liabilities, all the variable of current liabilities (ranging A-C) can be placed on short-term interbank lending market. Revenues from the placement of variable part of current liabilities are determined by income from short-term interbank loans:

$$R_{SS} = V_{SS} \cdot I_{SS} \cdot t \tag{4}$$

with: V_{SS} (Value short-term sale) as active volume of interbank transactions; I_{SS} as the interest rate on short-term interbank loans; t as the time period for which the calculation is performed.

The amount of resources in the range of A-B (ie, the entire range of scattering) is equal to the math expectation value of customer accounts balances, and the formula can be represented as follows:

$$R_{SS} = m \cdot I_{SS} \cdot t \tag{5}$$

with m as the mathematical expectation (average value) of the flickering current liabilities.

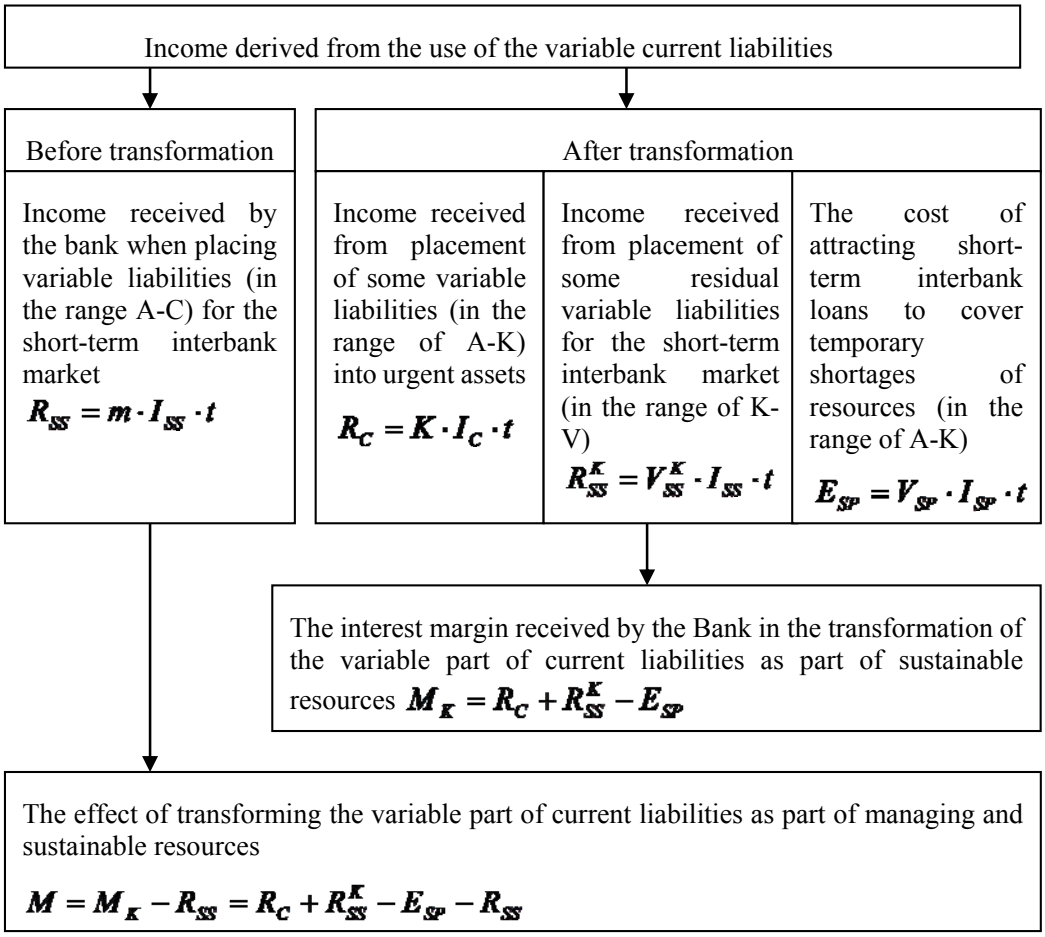
Stabilization of liabilities in the range of A-K for the increase in immediate active operations will result in the periodic occurrence of temporary shortage of resources at the end of business day, requiring short-term borrowing in the short-term interbank market. At the same time reduced amount of active interbank transactions are now limited in the range of K-V. The value of the interest margin to be received by a commercial bank after transformation is defined as follows:

$$M_K = R_C^K - E_{SP} + R_{SS}^K \tag{6}$$

with R_C^K (Returns from credit) as revenues from resource allocation of the variable part of current liabilities (range A-C) in urgent assets; R_{SS}^K (Returns short-term sale) as revenues from the placement of the variable current liabilities (range K-V) in the interbank credit market; $\boldsymbol{E_{sp}}$ (Expenses short-term purchase) as costs to attract short-term interbank loans (in the range A-K) to cover temporary deficit of resources.

Evaluation of effect from the use of variable part of current liabilities is shown in Fig. 2.

Figure 2 Evaluation of effect from the use of variable part of current liabilities for immediate active operations



Source: [6]

The effect of altered transformation of the current liabilities into part of the sustainable resources defines revenue from urgent loans and investments, formed by the fact that the bank sends means into the most profitable active transactions that were previously placed in short-term interbank loans.

4 Results and Discussion

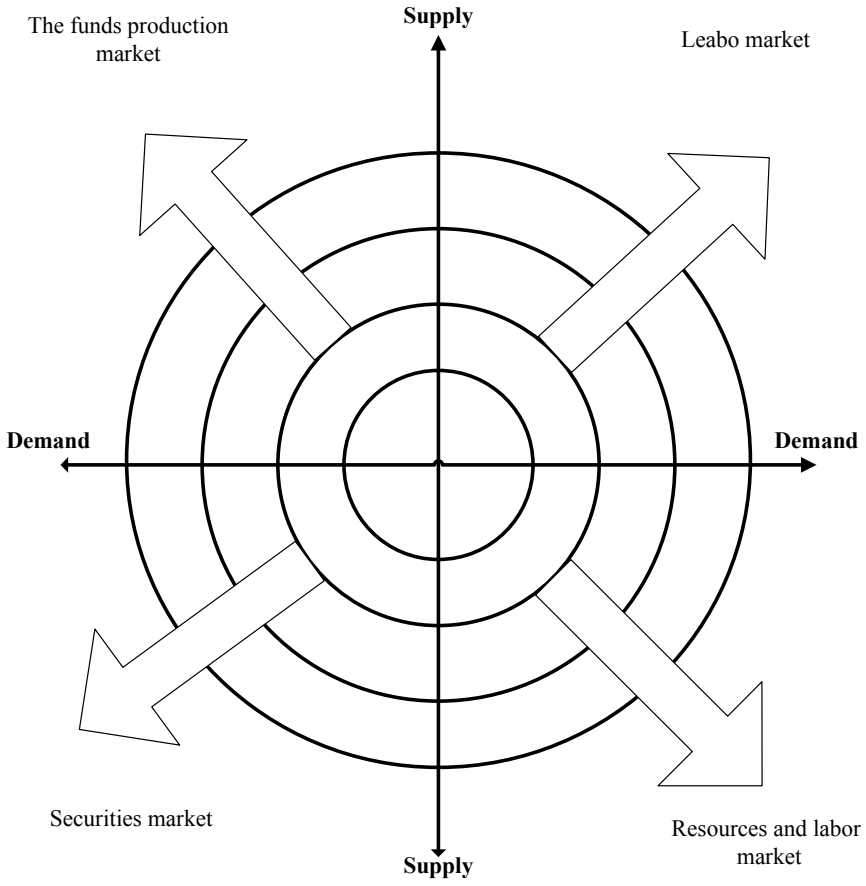
The following shows how it is implemented in practice in Ukraine in 2013. Analysis of the structure of loans to non-financial corporations within regions proved that most loans were received by trade, car repairs, household appliances and personal use – 219 325 million UAH (36% of all loans granted), manufacturing – 120 265 million UAH (20% of all loans granted) and real estate, renting and business activities – 105 021 million UAH (17% of all loans granted). The worst situation is on crediting for education, health and social work, fishing and fish farming. Amounts of funds received by these industries are so scarce that they make up almost 0% of total loans granted [13].

Particular characteristic of this situation typical for Ukraine in recent years is provided by Z. Gerasymchuk. The problem of regional economic development of priorities in the current banking system is being complicated. It is based on the stability of banks that is preventing the

bankruptcy of banks, ensuring its safety for investors, when in the world practice investing is a financial transaction, an integral part of which is receiving interest income and, therefore, the adoption of a particular risk of no return on investment. That is why it is necessary to slightly change the focus strategy of the banking system of Ukraine and to make it support the economy of the country and its regions. The better the economy is functioning, the better the average of profitability will be, it will lead to the increase in average wages and will not trigger inflation, as this increase will be underpinned by an increase in the mass of commodities and, consequently, will lead to the enrichment of the population. This enrichment will stimulate an increase in the share of income that goes to savings and therefore will increase the deposit base of banks [1].

The processes of transformation of banking resources may affect economic growth by affecting the supply and demand (Fig. 3).

Figure 3 Economic growth with balanced supply and demand changes in the economic system market



Source: [6]

This figure clearly shows the relationship between the most important markets of the financial system with the role of bank resources as a connector in these processes. This means that any problems in the banking system, particularly in the transformation of their resources, due to open markets affect economic growth through supply and demand.

Some situations in these relationships are caused as follows:
1. The proportional balanced increase of supply and demand in the turn-off market;

2. Misbalance of supply and demand on the market of production with the delay growth rates in relation to the turn-off market;

3. Misbalance of supply and demand on the stock market with excess of demand over supply;

4. Misbalance of supply and demand on the labor and resources market with excess of supply over demand.

5 Conclusions

This study on clarifying features of the functioning of the banking systems in individual countries and particularly in Ukraine, analyzing transformation processes of banking resources leads to the following conclusions:
1. It is necessary to provide security for banking stability and dynamic development in any country of the world.

2. The management of banking resources is a complex and variable process so the bank managers should constantly monitor the banking resources.

3. Today both theoretical and practical methods to control the transformation of banking resources are designed and implemented which contributes to stable operation of banks, in particular using the Agreement "Basel 3."

4. Bank resources, formed in an open environment of financial system are movable, so it is essential to have qualified professionals in the management structure of the banks.

References

[1] Banking (2000). Edit. by O. I. Lavrushina. – *Finance and statistics*. – Moscow

[2] Banks and banking (1997). A Textbook for High Schools: E. F. Zhukov, L. M. Maksimova, O. M. Markova: Edit. by prof. E. F. Zhukov. *Banks and exchange*. – Moscow.

[3] Buchwald B. (2002). *Banking techniques*. Moscow: Publishing House "Sirin". – 234 p.

[4] Commercial banks (1991). E. Reed, R. Cotter, Gill E. M: Publisher JV "Cosmopolis". – 396 p.

[5] Gerasimchuk Z. V. (2010). *The territorial organization of the banking system of Ukraine's regions: assessment and strategies to ensure its rationality*: monograph. Lutsk: RVV LNTU.

[6] Konyukhovsky P. V. (2001). *Microeconomic modeling of banking activities*. SPB: Piter.

[7] Matoukou J. (1994). *Financial systems in France and other countries*. Banks. V. 1., Moscow: JSC "Finstatinform". – 486 p.

[8] Money and Credit: Tutorial (2001). M. I. Savluk, A. M. Moroz, M. F. Pukhovkina. – K.: KNEU.

[9] Nechaev A. (2009). *Concentration and securitization of assets*. Modern Russian Economy: problems and perspectives. Retrieved from http://www.economyar.narod.ru

[10] Oliynik D. (2001). *The liquidity management of commercial banks based on the optimal use of current accounts of customers*. Banking, №2, 31-34.

[11] Rose Piter S. (1995). Bank management. Delo ltd, Moscow.

Shirinskaya E. B. *Operations of commercial banks: Russian and foreign experience*. Finance and statistics.

[12] Vozhzhov A. P. (2006). *The process of transformation of banking resources*: Monograph. – Sevastopol: Vid-vo SevNTU.

[13] Shtein Yu. Kh. (1991). Banking organization. Terroe. – Visbaden: Tabler.

COHESION FUND AS AN INSTRUMENT STIMULATING TRANSPORT INFRASTRUCTURE DEVELOPMENT IN POLAND

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ABSTRACT

Well developed infrastructure is seen as a precondition of regional economic integration. Transport infrastructure is an important part of technical infrastructure. Poland joined the European Union as a country with neglected transport infrastructure. EU financial assistance in the form of Cohesion Fund helped Poland to improve the state of this sector of the economy. An attempt has been made to analyse the so far implementation of Operational Programme Infrastructure and Environment 2007-2013 with focus on transport infrastructure. Selected projects co-financed by Cohesion Fund in the field of transport infrastructure were analysed. The analysis of the status of the implementation of OP Infrastructure and Environment 2007-2013 proved that Cohesion Fund promoted socio-economic development and stimulated transport infrastructure development in Poland.

Keywords: transport infrastructure, Cohesion Fund, Poland, European Union

JEL codes: F15, F36

1 Introduction

Poland joined the European Union in 2004. Accession to the EU created new conditions for the development of the Polish economy and society. Due to the fact that Poland is one of the poorest member states it has been offered considerable financial assistance from the European Union budget. For the period 2007-2013 Poland was the biggest net beneficiary of the EU budget. One should stress the importance of Poland's participation in Common Agricultural Policy and EU Policy of Economic, Social and Territorial Cohesion. As far as EU Policy of Economic, Social and Territorial Cohesion is concerned Poland has been granted assistance from both structural funds and Cohesion Fund.

Cohesion Fund was introduced by the European Union in 1994 in order to stimulate the development of those EU Member States whose Gross National Income per inhabitant was less than 90% of the EU average. It aims to reduce economic and social disparities and to promote sustainable development thanks to support to transport infrastructure projects and environmental protection projects.

An attempt has been made in the paper to present the use of Cohesion Fund in Poland from 2007 to 2013 with focus on transport infrastructure projects. Selected projects co-financed by Cohesion Fund in Poland in the field of transport infrastructure were analysed.

2 Literature Review

Infrastructure can be defined as a set of arrangements, mechanisms, appliances and institutions necessary for economy functioning. Those arrangements, mechanisms and appliances include

objects of public use, created by man, permanently localised, both linear and punctual, objects that constitute foundation and framework of socio-economic life, due to their functions in translocation both people and freight (transport), as well as messages (communication), energy (power engineering) and water (water management). Infrastructure objects are characterised by: technical and economic indivisibility, high capital intensity, long life, and possibly a long period of formation, the presence of significant externalities, many of which are deferred [3]. The main role of infrastructure is to create the conditions for the development of socio-economic system as a whole.

Transport infrastructure is an important part of infrastructure. It includes all created by man, permanently localised basic road devices (linear infrastructure) and transport points (punctual infrastructure). From economic point of view the most important feature of transport infrastructure is the public character of services it offers [4].

Transport is defined as a set of activities consisting in moving material goods or people from one location to another with the use of appropriate technical devices. Transport infrastructure is formed by: roads of all five modes of transport, transportation points (airports, harbours) and auxiliary devices used for direct service and attendance of both transport roads and transport points. Transport infrastructure consists in five main modes of transport: railway transport, road transport, air transport, pipeline transport, river and sea transport [24].

Bad condition of technical infrastructure, and in particular technical infrastructure, constitutes an important barrier for development, reduces mobility and adversely affects foreign trade. A limited number of good quality transport links (in internal and international relations) makes it impossible to fully use development opportunities of an economy.

Regional economic integration is a process of economic unification of economies. It can be carried out as: free trade area, customs union, common market, monetary union, economic union or political union. The deeper the integration: the more elements it includes, the more complicated it becomes, the more institutions it requires (the institutions which take over the powers of national authorities) [1]. The success of regional economic integration is (to some extent) determined by: level of economic development of countries that decide to integrate, complementarity of economic structures of countries that integrate, their geographical location, existence of pro-integration policy, well developed infrastructure (including transport infrastructure, communication infrastructure, energy system and water management system) [2].

The European Union is an example of deep regional economic integration. It consists of twenty eight economies. Some of them are well developed, others present medium level of economic development. Poland joined the European Union in 2004 together with nine other economies. Accession to the European Union is an important stage of Poland's economy opening and its integration with the world economy. Full membership in the European Union created both opportunities and challenges for the Polish economy, Polish companies and Polish citizens [25].

Cohesion Fund was created in the 1990s. Its establishment by the Maastricht Treaty was partly connected with prospects for Economic and Monetary Union (EMU) creation [8]. It was believed that disparities in economic development should be reduced before the introduction of EMU. Cohesion Fund helps finance transport infrastructure projects and environmental protection ones [20]. At first Cohesion Fund was offered to four EU Member States: Greece, Portugal, Spain and Ireland [23]. After the so called Eastern enlargement of the European Union it became obvious that practically all new Member States of the EU would need financial assistance also in the form of Cohesion Fund. The possibility to take advantage of Cohesion Fund is an important effect of Poland's integration with the European Union [5].

For the years 2004-2006 Poland was granted EUR 8.3 billion for the implementation of Common Regional Policy, in that EUR 4.2 billion from Cohesion Fund [26]. The National Development Plan 2004-2006 served as a legal basis for the implementation of this policy in Poland [18]. The Multiannual Financial Perspective 2007-2013 was much more advantageous for Poland. Poland was granted EUR 67.3 billion from the EU budget for the implementation of EU Policy of Economic, Social and Territorial Cohesion 2007-2013, in that EUR 21.95 billion from Cohesion Fund. The funds were used according to objectives and assumptions included in National Strategic Reference Framework / National Cohesion Strategy 2007-2013 [19].

3 Data and Methodology

Data presented by European Commission, Ministry of Infrastructure and Development (Poland) and former Ministry of Regional Development (Poland), as well as information revealed by individual beneficiaries of Cohesion Fund in the field of transport infrastructure in Poland were used for the analysis.

The following methods were used: literature studies, analysis and synthesis, descriptive method and case study method.

4 Results and Discussion

European Commission approved the Operational Programme Infrastructure and Environment 2007-2013 (presented by the Polish government) under the Decision of 7 December 2007. The total amount of EU funds involved in the implementation of OP Infrastructure and Environment was more than EUR 28 billion. It was the biggest operational programme in Poland for the period 2007-2013. It constituted 42% of all funds for the Cohesion Policy in Poland. OP Infrastructure and Environment aimed at improvement of Poland and its regions' investment attractiveness through the development of technical infrastructure at the same time protecting and improving the condition of environment, health, maintaining cultural identity and developing territorial cohesion [7].

EU funds available within OP Infrastructure and Environment were distributed between separate sectors as follows [14]:

- transport – EUR 19.6 billion
- environment – EUR 5.1 billion
- energy (power industry) – EUR 1.7 billion
- higher education – EUR 586.5 million
- culture – EUR 533.6 million
- health – EUR 395.7 million.

Fifteen priorities were implemented under OP Infrastructure and Environment, namely:

I - Water and sewage management – EUR 3697.4 million (including EUR 3142.8 million from CF);

II - Waste management and the protection of Earth - EUR 1208.1 million (including EUR 1026.9 million from CF);

III - Resource management and counteracting environmental risks - EUR 655.0 million (including EUR 556.8 million from CF);

IV - Initiatives aimed at adjusting enterprises to the requirements of environment protection - EUR 834.4 million (including EUR 250.0 million from NRSF);

V - Environment protection and promotion of ecological habits - EUR 105.6 million (including EUR 89.9 million from NRSF);

VI - TEN-T road and air transport network - EUR 10596.3 million (including EUR 8843.2 million from CF);

VII - Environment-friendly transport - EUR 11589.5 million (including EUR 7676.0 million from CF);

VIII - Transport safety and national transport networks - EUR 3596.1 million (including EUR 3056.7 million from NRSF);

IX - Environment-friendly energy infrastructure and energy efficiency - EUR 1403.0 million (including EUR 748.0 million from CF);

X - Energy security including diversification of the energy sources - EUR 1693.2 million (including EUR 974.3 million from NRSF);

XI - Culture and cultural heritage - EUR 651.3 million (including EUR 553.6 million from NRSF);

XII - Health security and improving the efficiency of healthcare system - EUR 465.6 million (including EUR 359.7 million from NRSF);

XIII - Infrastructure of higher education - EUR 690.0 million (including EUR 586.5 million from NRSF);

XIV - Technical assistance - European Regional Development Fund - EUR 52.1 million (including EUR 44.3 million from NRSF);

XV - Technical Assistance – Cohesion Fund - EUR 462.9 million (including EUR 393.5 million from CF) [16].

As far as transport infrastructure is concerned the following outcomes of the OP Infrastructure and Environment were expected (according to its ex ante analysis):

- 430 kilometres of constructed motorways in TEN-T network;
- 579 kilometres of constructed major ways in TEN-T network;
- 8 reconstructed airports in TEN-T network;
- 592 kilometres of modernized railway lines;
- 200 kilometres of constructed rail and trolleybus transport network;
- 12 modernized objects on water roads;
- the share of electric power generated from renewable sources in gross electric power consumption should increase to 7.5%;
- 1 million tonnes of annual production of bio fuels;
- 690 MW of additional capacity from renewable energy sources have been installed;
- 1000 kilometres of newly constructed transmission pipelines and 4900 kilometres of gas distribution pipelines;
- 418 kilometres of constructed electricity transmission networks [17].

The OP Infrastructure and Environment was implemented from resources of the European Union and the state budget. Financial means allocated for its implementation from 2007 to 2013 amounted to EUR 37.7 billion, including EU contribution – EUR 28.3 billion and the national one – EUR 9.4 billion. As far as the engagement of EU funds in the implementation of OP Infrastructure and Environment is concerned both European Regional Development Fund (ERDF) and Cohesion Fund (CF) were used. ERDF financial means amounted to EUR 6.35 billion (22.44%), while Cohesion Fund means amounted to EUR 21.95 (77.56%) [15].

According to data generated from the KSI SIMIK 07-13 National Information System, since the start of programmes until 9th November 2014, 300300 applications (correct from the formal point of view) were submitted for the global amount of co-financing (both Community and national funds) of PLN 609.6 billion. During the same period, 103,926 contracts for co-financing were signed with beneficiaries, for the amount of PLN 410.7 billion (EUR 97.7 billion EUR) amount of co-funding on the part of the EU of PLN 285.5 billion, which constituted 101.2 percent of allocation for the 2007-2013 period. The value of beneficiaries' expenditure recognised as eligible, resulting from submitted payment claims was PLN 303.4 billion (EUR 71.9 billion EUR), and in the part of EU co-financing – PLN 214.4 billion [14].

Tables 1 and 2 present the implementation of Operational Programme Infrastructure and Environment in Poland till September 30th, 2014. Table 1 includes information concerning number of presented applications, number of concluded financial agreement and the value of EU assistance for the concluded agreements. Table 2 contains information concerning total expenditure reported by beneficiaries, value of qualified expenditure reported by beneficiaries (its EU part), as well as value of refunds for beneficiaries from the EU.

Table 1 Implementation of OP Infrastructure and Environment: APPLICATIONS – state of play on September 30th, 2014

Field	Number of applications	Number of Financial agreements	Financial agreements - value of EU assistance (thousand PLN)
Environment	1524	939	20257927
Transport	398	345	83171485
Energy	1193	321	6973933
Higher Education	83	54	2626205
Culture	172	78	2290573
Health	487	355	1672081
Technical Assistance	502	494	1364275
TOTAL	4359	2586	118356477

Source: KSI SIMIK 07-13; report of 1st October, 2014.

According to official data presented by Ministry of Infrastructure and Development (KSI SIMIK 07-13; report of 1st October, 2014): the total number of applications in OP Infrastructure and Environment amounted to 4,359, of that 398 applications in the transport sector (i.e. 9.1%). 2,586 financial agreements were signed, 345 of them were related to the transport sector. The value of EU assistance for all 2,586 financial agreements in OP Infrastructure and Environment amounted to PLN 118.4 billion PLN, of that PLN 83.2 billion in the transport sector. Due to the character of transport projects they accounted for only 13.34% of all concluded agreements, while the value of EU assistance connected with them represented as much as 70.27% of total EU assistance for Poland from Cohesion Fund. Total expenditure reported by beneficiaries of OP Infrastructure and Environment amounted to PLN 157.7 billion, of that in the transport

sector: PLN 109.8 billion (69.6%). The EU part of qualified expenditure reported by beneficiaries of OP Infrastructure and Environment equalled PLN 81.8 billion, of which PLN 59.5 billion in the transport sector. The so far refunds from the EU funds for beneficiaries of OP Infrastructure and Environment amounted to PLN 78.69 billion, of which in the transport sector PLN 57.8 billion. Till September 30th, 2014 expenditure reported by beneficiaries in the transport sector accounted for 71.8% of EU commitment, and refunds in the transport sector accounted for 69.8% of EU commitments.

Table 2 Implementation of OP Infrastructure and Environment: EXPENDITURES and EU REFUNDS – state of play on September 30th, 2014 (thousand PLN)

Field	Total Expenditure Reported by Beneficiaries	Qualified Expenditure Reported by Beneficiaries – EU part	Refunds for Beneficiaries from the EU (thousand PLN)
Environment	24255495	11675100	10960763
Transport	109771797	59468411	57762312
Energy	14959628	4651770	4581579
Higher Education	2351871	1825976	1759639
Culture	3114283	1802564	1527416
Health	1779842	1348774	1257489
Technical Assistance	1471899	852777	837659
TOTAL	157704816	81825373	78686857

Source: KSI SIMIK 07-13; report of 1st October, 2014.

Projects in the area of transport are: very expensive, complex, time consuming. The process of the implementation of some of them will last till the end of 2015. Selected examples of the projects in the area of transport co-financed through Cohesion Fund in Poland from 2007 to 2013 were described below.

A good example of the project in the area of road transport is: "The construction of the A1 motorway, section Pyrzowice - Maciejów – Sośnica". General Directorate for National Roads and Highways (Generalna Dyrekcja Dróg Krajowych i Autostrad) was a beneficiary of the project. The project was implemented on the territory of Silesian Voivodship (the following poviats were involved: będziński, city of Gliwice, tarnogórski, city of Zabrze, gliwicki, city of Bytom, city of Piekary). The project was realised under OP Infrastructure and Environment, action: VI.1. The development of the road network of the TEN-T. The total value of the project amounted to PLN 5,859.8 million, with funding from the European Union of as much as PLN 4,652.6 million (79.40%). The project included, among others, a stretch of highway with a total length of 44.38km, construction of road junctions, roads and reconstruction of roads intersecting the highway. In addition to that: four service areas, toll stations, two-level motorway junctions, animal migration routes, culverts and other engineering structures, e.g. bridges, viaducts (including 80 engineering objects) were built. The construction works started in June 2008 and finished in July 2010. At present is the largest motorway junction in Poland and one of the largest in Europe [9].

A similar example of the project in the area of road transport is: "The construction of the A4 motorway section of Krakow - Tarnow, section Szarów node - the node "Krzyż"". General Directorate for National Roads and Highways (Generalna Dyrekcja Dróg Krajowych i Autostrad) was a beneficiary of the project. The project was implemented on the territory of Lesser Poland Voivodship (the following poviats were involved: bocheński, brzeski, tarnowski,

wielicki and the city of Tarnów). The project was realised under OP Infrastructure and Environment, action: VI.1. The development of the road network of the TEN-T. The total value of the project amounted to PLN 2,832.3 million, with funding from the European Union of PLN 887.3 million (31.33%) [10]. The project included a highway of total length of 56.9km, construction of four nodes: "Bochnia", "Brzesko", "Wierzchosławice" and "Krzyż", construction of roads serving the surrounding areas, construction of service stations, as well as 66 large objects like: viaducts, flyovers, bridges within and over the highway [6] .

An important area of the activity of OP Infrastructure and Environment implemented with co-financing of Cohesion Fund was railway infrastructure. An interesting example of the project in the area of railway transport is: "Modernization of the railway line No. 8, section Warszawa Okęcie - Radom (LOT A , B , F). PKP Polish Railway Lines (PKP Polskie Linie Kolejowe S.A.) was a beneficiary of the project. The project was implemented on the territory of Mazovia Voivodship (the following poviats were involved: piaseczyński, grójecki, city of Radom, capital city of Warsaw). The project was realised under OP Infrastructure and Environment, action: VII.1. The development of railway transport. The total value of the project amounted to PLN 1,807.5 million, with funding from the European Union of 883.0 million (48.85%) [12].

Another example of the project in the area of railway infrastructure is: "Modernization of the railway line E 65 / CE 65 on the Warsaw - Gdynia - the area of LCS Ciechanów". PKP Polish Railway Lines was a beneficiary of the project. The project was implemented on the territory of Mazovia Voivodship (the following poviats were involved: mławski, pułtuski, ciechanowski). The project was realised under OP Infrastructure and Environment, action: VII.1. The development of railway transport. The total value of the project amounted to PLN 1,547.4 million, with funding from the European Union of PLN 872.1 million PLN (56.35%) [13]. The project included a complete modernization of the railway line on the section covered by the LCS Ciechanów in: track systems (including dehydration), subgrade, catenary and power, electro-energy network and devices, rail traffic control and diagnostics, road – rail crossings, engineering objects (bridges, viaducts and culverts), platforms and small architecture, telecommunication engineering, minimizing the negative impact of the project on the environment [21].

Projects in the area of sea transport were not that common in Poland. I have chosen the project: "Modernization of Swinoujscie – Szczecin Track (Piastowski Canal and Mieliński Canal) - Phase II, East Side and West Side". Maritime Office in Szczecin was a beneficiary of the project. The project was implemented on the territory of West Pomerania Voivodship (city of Świnoujście). The project was realised under OP Infrastructure and Environment, action: VII.2 . The development of maritime transport. Its total value was PLN 318.8 million, with funding from the European Union amounting to PLN 267.4 million PLN (83.88%) [11]. The project included reconstruction and strengthening of canal shores in order to ensure the safety of navigation to the harbours of Western Pomerania, and to prepare the waterway Swinoujscie - Szczecin for deepening up to 12.5 m [22].

5 Conclusions

It has been ten years since Poland's accession to the European Union. Poland joined the EU as one of the poorest economies. The EU Policy of Social, Economic and Territorial Cohesion is of great importance for Poland. The amount of more than EUR 67 billion granted to Poland for the period 2007-2013 resulted in promoting socio-economic development on both national and regional level in Poland. Operational Programme Infrastructure and Environment constituted an important element of the National Cohesion Strategy / National Strategic Reference Framework in Poland for the years 2007-2013. It aimed at promoting the development of

transport infrastructure and environmental protection. The analysis of the status of the implementation of OP Infrastructure and Environment 2007-2013 (from the beginning of 2007 to the 30th September, 2013) proved that the agreements for 99.3% of total allocation for OP Infrastructure and Environment had been signed and payments for 66.5% of total allocation for OP Infrastructure and Environment had been made. When it comes to the field of transport the agreements for 100.4% were concluded with beneficiaries and payments for 69.8% of total allocation had been made. One can therefore suppose that a vast majority of funds will have been used by the end of the 2007-2013 financial perspective implementation (i.e. by the end of 2015).

It seems worth mentioning that the next multiannual financial framework of the European Union is even more advantageous for Poland, especially in the field of EU Policy of Economic, Social and Territorial Cohesion. Poland is to receive EUR 82.5 billion from the EU Policy of Economic, Social and Territorial Cohesion. It is crucial to use the EU funds in the best possible way.

Acknowledgments

Research was undertaken thanks to financial support from statutory activity of Department of International Economic Relations, University of Economics in Katowice, Poland in the year 2014.

References

[1] Borowiec, J. (2011). *Ekonomia integracji europejskiej*, Wrocław: Wydawnictwo Uniwersytetu Ekonomicznego we Wrocławiu, pp. 27-28.

[2] Bożyk, P – Misala, J (2003). *Integracja ekonomiczna*, Warszawa: Polskie Wydawnictwo Ekonomiczne, pp. 27-31.

[3] Coyle, J (2002). *Zarządzanie logistyczne*, Warszawa: Polskie Wydawnictwo Ekonomiczne, pp. 411-428.

[4] Gołembska, E (ed.) (2008). *Kompendium Wiedzy o logistyce*, Warszawa: Wydawnictwo Naukowe PWN, pp. 107-129.

[5] http://europa.eu/legislation_summaries/regional_policy/provisions_and_instruments/l60018_en.htm

[6] http://www.a4szarow-krzyz.pl/

[7] http://www.funduszeeuropejskie.gov.pl/wstepdofunduszyeuropejskich/strony/nss.aspx

[8] http://www.funduszspojnosci.gov.pl

[9] http://www.mapadotacji.gov.pl/projekt/1192453

[10] http://www.mapadotacji.gov.pl/projekt/1195709

[11] http://www.mapadotacji.gov.pl/projekt/1214794

[12] http://www.mapadotacji.gov.pl/projekt/1249489

[13] http://www.mapadotacji.gov.pl/projekt/1280117

[14] http://www.mir.gov.pl/english/european_funds/european_funds_2007_2013/implementation/strony/level_of_implementation.aspx

[15] http://www.paiz.gov.pl/europeanfunds#2

[16] http://www.pois.gov.pl/English/About_Programme/Strony/About_the_Programme.aspx

[17] http://www.pois.gov.pl/WSTEPDOFUNDUSZYEUROPEJSKICH/Strony/o_pois.aspx

[18] Ministerstwo Gospodarki, Pracy i Polityki Społecznej (2003). *Polska – Narodowy Plan Rozwoju na lata 2004-2006. Strategia Wykorzystania Funduszu Spójności*, Warszawa.

[19] Ministerstwo Rozwoju Regionalnego (2007). *Narodowe Strategiczne Ramy odniesienia 2007-2013 wspierające wzrost gospodarczy i zatrudnienie. Narodowa Strategia Spójności. Dokument zaakceptowany decyzją Komisji Europejskiej zatwierdzającą pewne elementy Narodowych Strategicznych Ram Odniesienia,* Warszawa.

[20] Ministerstwo Rozwoju Regionalnego (2007). *Zarządzanie i kontrola Funduszu Spójności. Ogólny podręcznik*, Warszawa, pp. 4-5.

[21] *"Modernizacja linii kolejowej E 65/C-E 65 odcinek Warszawa - Gdynia - obszar LCS Ciechanów" POIiŚ 7.1-1.1*, retrieved from: http://www.plk-inwestycje.pl/inwestycje/program-operacyjny-infrastruktura-i-srodowisko/poiis-71-11/

[22] *Modernizacja toru wodnego Świnoujście-Szczecin Kanał Piastowski i Mieliński* , retrieved from: http://www.prcip.pl/index.php?id=250

[23] Pelkmans, J (2006). *, European Integration. Methods and Economic Analysis. Third Ed.* Harlow: Prentice Hall and Pearson Education, p. 351.

[24] Rydzkowski, W (ed.) (2007). *Usługi logistyczne*, Poznań: Instytut Logistyki i Magazynowania, pp. 105-132.

[25] Sporek, T (ed.) (2009). *Procesy otwierania polskiej gospodarki na początku XXI wieku,* Katowice: Wzdawnictwo Akademii Ekonomicynej im. Karola Adamieckiego w Katowicach, pp. 21-32.

[26] *Strategia wykorzystania Funduszu Spójności na lata 2004-2006. Załącznik do rozporządzenia Ministra Gospodarki i Pracy z dnia 30 lipca 2004r.*, Dziennik Ustaw Nr 176, Poz. 1827.

REGULATION OF FINANCIAL RISKS – EXPERIMENTAL APPROACH

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ABSTRACT

Researchers are interested in eliciting decision makers' attitudes towards risk either to test theories or to understand the process of risky decision making. Financial decisions of investors do not essentially depend only on the amount of expected reward and it´s probability but as well as on the probability and amount of potential loss. Recently evidenced policy responses to the recession and financial crisis (bank and corporate bailouts, expansive monetary policy, extension of deposit insurance) may build an implicit belief among investors that the government will limit investment losses in the event of negative shocks in the future. In recent article we study the interaction of risk-taking with the possibility to limit the loss.

Keywords: Experiment, regulation, financial risk

JEL codes: G02

1 Introduction

The typical example for governmental regulative intervention is represented by solving market failures to improve market efficiency or increase social justice. Possible way how to overcome market imperfectness and increase social efficiency, according to classical literature, is to impose regulation. The area of our interest is to investigate how regulation of potential losses influences investment behavior of economic subjects. In line with real word legislative initiative, we focus on long term investment decisions (pension funds, long term savings accounts).

Recently evidenced governmental policy responses to the recession and financial crisis such as bank and corporate bailouts, expansive monetary policy, and extension of deposit insurance may build an implicit belief among investors that the government will limit investment losses in the event of negative shocks in the future. This may increase moral hazard in the risk-taking of individual investors and financial institutions [6].

What is the reaction to introduction of a limitation on investment losses? Will investors spend less or more? Our results represent an attempt to investigate the question of financial risk taking under the condition of limited losses. We conduct a laboratory experiment in which subjects decide about wagers on three risky assets with independent binary payoffs (gain or loss) and cash using the "low frequency" design of Gneezy and Potters [9].

Our main focus goes a step further, though. Using within-subject design, we study how the investors react to loss limitation on the net outcome. Such loss limitation may be of interest for designers of publicly-sponsored or mandated savings schemes, for example.

The remainder of the paper is organized as follows. In the first section, we provide the basic theoretical background and a literature review of the attempts to state regulation and results of

previous research. In the second part, we discuss the methodology used and the data. The next two sections cover the main results, their analysis and the resulting conclusions.

2 Literature Review

Based on economic theory, under ideal circumstances, markets function efficiently and there is little reason, if any, for governments to interfere. Theory also identifies factors which lead to an inefficient functioning of markets, such as imperfect competition and externalities. These insights are an important fundament on which government intervention in markets is based. At the same time, there is an assumption that economic agents are perfectly rational, focused only on their own material well-being, and the actions of different agents are assumed to be in equilibrium.

Regulation by the state can take a variety of forms. Some regulations are aimed entirely at redistribution, such as when we tax the rich and give to the poor. Other regulations seek to counteract externalities by restricting behaviour in a way that imposes harm on an individual basis but yields net societal benefits. The third form of regulation is paternalistic regulation that is designed to help on an individual basis. Paternalism treads on consumer sovereignty by forcing, or preventing, choices for the individual's own good, much as when parents limit their child's freedom to skip school or eat candy for dinner. [3]

Korobkin and Ulen state that recent research in behavioral economics has identified a variety of decision-making errors that may expand the scope of paternalistic regulation. One of examples is that individuals frequently "fail to maximize their expected utility," and identifying behavioral factors that may complicate the cost-benefit analysis by individuals on which much of rational choice theory depends. [12]

Recently evidenced policy responses to the recession and financial crisis may build an implicit belief among investors that the government will limit investment losses in the event of negative shocks in the future. Several economies maintain deposit insurance schemes to protect depositors against losses when a bank fails to meet its debt obligations. In addition, selected banks (e.g. systemically important banks) may receive capital from regulatory authorities or governments in the form of so-called "bailouts". It is stated that financial safety nets for individual banks aim to reduce the social cost of bank failures and promote financial stability. [6] For example, deposit insurance can help prevent bank runs and mitigate the potential spillover effects of bankruptcies. Yet such safety nets also can create moral hazard in the form of excessive risk-taking behavior. [7] Dam and Koetter (2012) tested if bailout expectations increase moral hazard in the banking industry in terms of excessive risk-taking behavior. They used sample of 3,517 German banks within the period from 1995 until 2006. Their results reveal that an increase in the expected bailout probability by 1% increases the probability of being in distress by 7.2 basis points. They results show that the marginal effect of moral hazard on risk taking is large compared to other bank-specific risk determinants. [4] Moreover some authors indicate that regulatory restrictions increase banks' risk-taking incentives and he presents empirical evidence for negative relation between regulatory restrictions and the stability of a banking system. [1]

The recent global financial crisis has ignited a debate on whether easy monetary conditions can lead to greater bank risk-taking. [13] Dell'Ariccia et al. (2011) studied this issue in a model of leveraged financial intermediaries that endogenously choose the riskiness of their portfolios. [5] They conclude that in situation when banks can adjust their capital structures, monetary easing unequivocally leads to greater leverage and higher risk.

In this paper we focus on long term investment decisions inspired by Benartzi and Thaler who were trying to answer the question: Why is the equity premium so large or why is anyone willing to hold bonds? [2] To simulate long term decision making in the design of an experiment we use repeated gambles. Klos points out that while everyone agrees that risk reduction is a desirable goal, not all definitions of risk are consistent with the observation that risk is reduced by repeated plays [11]. Equating risk with the probability of a loss is only one possibility. Most people would agree that the magnitude of potential losses needs to be considered as well. They investigate the effect of time horizon on investment behavior, and report the results of an experiment in which business graduate students provided certainty equivalents and judged various dimensions of the outcome distribution of simple gambles that were played either once or repeatedly for 5 or 50 times. Despite correctly realizing that outcome standard deviation increases with the number of plays, respondents showed evidence of Samuelson's fallacy of large numbers. Perceived risk judgments showed only low correlations with standard deviation estimates, but were instead related to the anticipated probability of a loss (which was overestimated), mean excess loss, and the coefficient of variation.

3 Data and Methodology

We conducted computerized laboratory experiment at ESI of Chapman University in using group of 126 subjects (students of the Chapman University). 67 males and 59 females were randomly chosen from the database. 10 to 14 subjects participated in each experimental session. One session lasted for approximately 50 minutes and the average earning for participant was approximately $20 (show up fee of $7 included). Experiment consisted of three parts.

We designed an experiment with two different lotteries (representing two treatments: unregulated and regulated market). Each treatment consists of three rounds of three consecutive lotteries. Subjects were about to decide about the wager for three of lotteries in one round. Subject can decide about the wager from initial endowment of 200 cents within the interval of 0 to 200 for one round of three lotteries. A remarkable series of laboratory experiments has found that subjects are more willing to invest in risky assets with positive expected returns if only aggregated returns are reported to them, rather than the individual component returns. We informed subjects about monetary result for one lottery as a whole. In "Unregulated treatment" we defined lottery with 2/3 chance of losing the wager and 1/3 chance of chance of winning 2.5 times the wager. In second treatment ("Regulated treatment") we limited the possible loss in the case of negative outcome from the lottery to the half of the wager. The third part of experiment was risk elicitation. For risk elicitation we used standard Holt - Laury test. After fulfilling all three parts of experiment, subjects were asked to fill the questionnaire.

Table 1 Overview of experimental subjects' structure

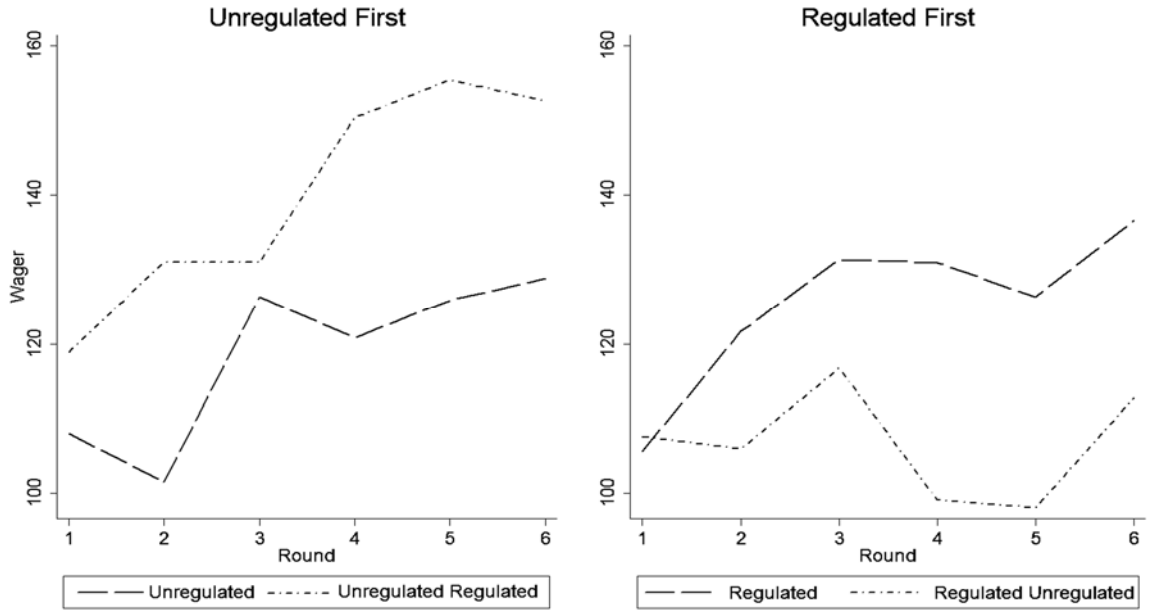
		Gender	
Treatment	**Total**	**Female**	**Male**
Unregulated	30	15	15
Unregulated / Regulated	32	12	20
Regulated	30	16	14
Regulated / Unregulated	34	16	18
Total	126	59	67

Source: Experimental data

4 Results and Discussion

For the evaluation and statistical analysis of results we used the Stata program. In Figure 1 we present different patterns in average wagers caused by the change of market environment. Left part of the figure present comparison of average wagers in treatments starting with lotteries without any loss limitation and it is clear from graphical analysis that wagers are higher in forth to sixth round. Right hand part of Figure 1 is summing up average wagers in treatments starting with lotteries with loss limitation. Graphical demonstration of decision on wagers suggest that change in environment setting is reflected by subjects, however statistical analysis does not give significant results.

Figure 1 Average wager according to treatment

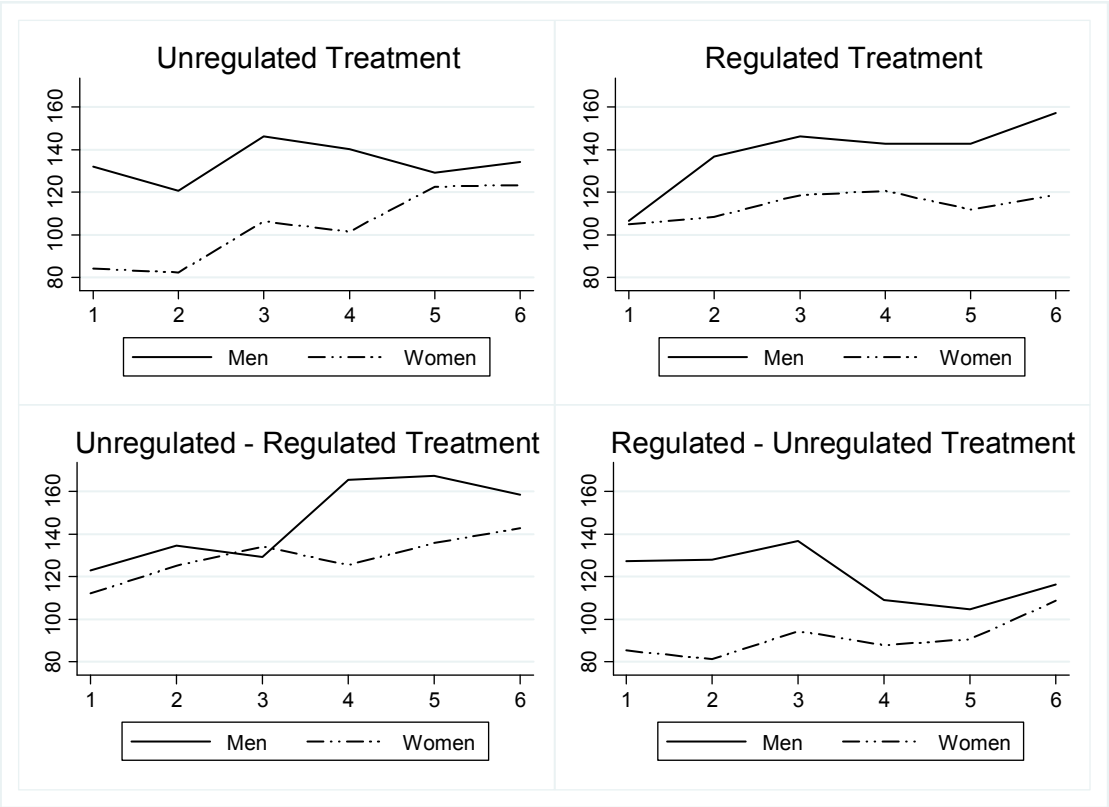


Source: Experimental data

According to previously reported large scale analysis results[1] males are significantly more risk positive than females. In our sample males were biding higher wagers, with the exception of wager number three, but the difference is not statistically significant. In regulated setting losses were limited to the half of the wager in the case of negative outcome from three lotteries in one round. The amount of wager increased significantly if this treatment was following the "Unregulated treatment" among male subjects. It rose from 128,95 cents for the wager in "Unregulated treatment" to 163,73 cents for the wager in "Regulated treatment". In contrary, females had consistent amount of wagers for both treatment, in "Regulated lottery" they reported slightly lower wagers (134,63 vs. 123,80).

[1] Fehr-Duda and de Gennaro used for analysis abstract and contextual environment [8]. Harris and Jenkins [10] observed 657 participants and assessed their likelihood of engaging in various risky activities relating to four different domains (gambling, health, recreation, and social domain). Market specific survey on insurance market done by Pastorakova et al supports previous findings on data from central Europe [14].

Figure 2 Average wager according to treatment



Source: Experimental data

5 Conclusions

Attempts of government to paternalistic prevent investors from the loss of their investments through limitation of potential losses by deposit protection funds or guaranteed pensions etc. are increasing in the time of financial crisis. Our results support general results from empirical surveys.

Apart from the validation of the general finding that women bid less in lotteries than men do we study the effect of change in environment on the amount of bids. In case of loss reduction, male decision makers tent to increase their wagers. When the loss limitation is absent, then men react and lower their bids significantly. We prove within-subject effects for male subjects, which mean that men do react on change in lottery conditions.

When women facing the same environmental changes, they do not react and keep their bids stable regardless the presence of loss limitation. This may at first seem surprising given all the evidence on women being more risk averse. An explanation for presented results may be that the loss limitation, by underlining the possibility of the net investment loss, increases salience of this negative outcome. This then might affect preferences over different wagers in the direction of investing less. As a result, in case the loss reduction effect makes a decision-maker to increase her wager, the salience effect works in the opposite direction, potentially cancelling out the former effect.

However, more research is necessary to disentangle payoff effects of various lottery distribution manipulations.

Acknowledgments

This paper/publication is the result of the project *The impact of market regulation on risk decisions of economic subjects* co-financed by Research Grant Agency of the Ministry of Education of the Slovak Republic.

References

[1] Alexy, M. & Kacer, M. (2014). Ratingové agentúry a regulačný rámec Európskej únie. *Nová ekonomika*, Faculty of National Economy, University of Economics in Bratislava, Vol. VII., No.2, pp.

[2] Benartzi. S. & Thaler. R. (1995). Myopic Loss Aversion and the Equity Premium Puzzle. *Quarterly Journal of Economics*. 110 (1) pp. 73–92.

[3] Camerer, C. et al. (2003). Regulation for Conservatives: Behavioral Economics and the Case for 'Asymmetric Paternalism'. *University of Pennsylvania Law Review*, Vol. 151, pp. 1211

[4] Dam, L. & Koetter, M. (2012). Bank Bailouts and Moral Hazard: Evidence from Germany. *Review of Financial Studies.* 25 (8): 2343-2380.

[5] Dell'Ariccia, G., Laeven, L. & R. Marquez (2011). Monetary Policy, Leverage, and Bank Risk-Taking. *CEPR Discussion Paper* No. DP8199.

[6] Demirgüç-Kunt, A. & E. Detragiache (2002). Does deposit insurance increase banking system stability? An empirical investigation. *Journal of Monetary Economics* 49, pp. 1373–1406.

[7] Diamond, D. W. & P. H. Dybvig (1983). Bank runs, deposit insurance, and liquidity. *Journal of Political Economy* 91, 401–419.

[8] Fehr-Duda. H, de Gennaro. M. et al. (2006). *Gender, Financial Risk, and Probability Weights. Theory and Decision* 60(2) pp. 283-313.

[9] Gneezy, U. & Potters, J. (1997). An experiment on risk taking and evaluation periods. *Quarterly Journal of Economics*. 112, pp. 631-645.

[10] Harris, C. R., Jenkins. M., & Glaser. D. (2006). *Gender differences in risk assessment: Why do women take fewer risks than men? Judgment and Decision Making*. 1. pp. 48–63.

[11] Klos et al. Risk Perception and Risk Behavior in Repeated Gambles. *Management Science* 51(12). pp. 1777–1790

[12] Korobkin, R. & Ulen T. (2000). *Law and Behavioral Science: Removing the Rationality Assumption from Law and Economics*, 88 CAL. L. REV. pp. 1051-1059 .

[13] Novak, M. & Lenner, M. (2012). Vývojové tendencie globálnej krízy v Európe, *Nová ekonomika*, Faculty of National Economy, University of Economics in Bratislava, Vol. 5, No. 4, pp. 119-131.

[14] Pastorakova, E. et al. (2013). Rodové rozdiely vo finančnom rozhodovaní v oblasti životného poistenia na Slovensku, *Ekonomický časopis*, Vol. 61(1), pp. 82-100.

BLOCK EXEMPTED AID AS AN INSTRUMENT OF STATE AID POLICY IN THE EUROPEAN UNION

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ABSTRACT

The subject of the article is an analysis of the rules of state aid admissibility on the basis of the implementing regulations, adopted by the European Commission in 2008 and 2014 on state aid provided under the General Block Exemption Regulation (GBER), which releases Member States from the obligation to notify to the Commission a number of state aid measures. The implementation of the regulation was one of the major components of the reform of the state aid system undertaken by the Commission in the recent years. The thesis taken in the article is based on the statement that in Poland during the financial and economic crisis block exempted aid showed a growing tendency, thereby forming, in addition to provisional measures addressed to enterprises in difficulty, one of the most important factors ensuring financing from the perspective of equity gap occurring in relation to small and medium-sized enterprises.

Keywords: state aid, crisis, competition policy, European Union, block exemption regulations

JEL codes: E62, K20, K33

1 Introduction

The lesson that comes from the experience of financial and economic crisis should be recognition of aid measures introduced in the context of the crisis for the ad-hoc and one-off operation, which was justified only with the size of the crisis effects for companies in various sectors. This aid should be subject to the rules of sectoral aid, which in the European Union undergoes strict supervision and regulation, in particular, the rule "one time last time", or "the first time, while the last time." Currently, most of the crisis effects have been mitigated and therefore the Member States should return to the state aid reform program and while granting it they should follow primarily the Commission's conclusion contained in the program that says "in some cases there is a small probability, that all categories of aid, contributing to achieve the objectives of common interest, had a negative impact on competition at Union level" [27]. Therefore so-called “block exemptions” were included in the wider use, thus the measures meeting the criteria specified in such special instruments could be granted without prior notification to the European Commission. This is essential to facilitate the procedure for granting aid and considerably accelerates the process. Member State after notification and approval of the aid program can basically provide individual aid without further notification to the Commission. Individual notification is required only in the event of substantial individual applications within the aid programs exceeding certain thresholds, and in the case of aid granted outside the program (*ad hoc* aid). It should be also highlighted that block exemptions are also an essential instrument for achieving medium and long term objectives specified in the anti-crisis aid programs, among which it was pointed to encourage companies to continually invest in the future, especially in economy based on sustainable growth. Promoting the future

objectives, such as, for example investment in innovative and ecological technologies, perfectly blends into the categories of aid granted under block exemption.

The purpose of the article is to demonstrate the acceptability of state aid in the EU Member States, with particular regard to implementation regulations adopted by the European Commission in 2008 and 2014 on state aid provided on the basis of block exemptions. Applying this principle enables to release the Member States from the obligation to notify the Commission of numerous state aid measures. Adopted thesis in the article is based on the statement that in Poland during the financial and economic crisis block exempted aid showed an increasing trend, thus providing, in addition to provisional measures addressed to enterprises in difficulties, one of the most essential factors to guarantee the financing from the point of view of equity gap occurring in relation to small and medium-sized enterprises.

2 Literature Review

Basic regulations of competition law on state aid can be found in art. 107, 108 and 109 of the Treaty on the Functioning of the European Union (TFEU) [15]. Art. 107 establishes the EU regulations regarding state aid admissibility. The provisions of art. 107 par. 1 TFEU establish a principle of general prohibition of granting state aid and the provisions of par. 2 and 3 allow for granting state aid by way of exemption from the general prohibition. These exceptions are respectively the categories of aid which are admissible as compatible with the internal market (art. 107, par. 2) and the categories of aid which may be permitted, or may be considered compatible with the internal market principles (art. 107, par. 3). Art. 108 defines the powers of the Council and the European Commission with regard to the aid granted by the Member States and compliance with the provisions of art. 107. In turn art. 109 gives the Council the power to issue regulations establishing rules for the application of art. 107 and 108.

Detailed criteria which are taken into account by the Commission while evaluating the admissibility of aid were however defined in a number of normative acts and so-called community soft law acts (*soft law*), which have no binding legal value on the addressees [11]. In the catalogue of normative acts it should be indicated above all on the regulations defining the rules of procedure in relation to public aid subject to notification to the European Commission, i.e. the Council Procedural Regulation No 659/99 [17] and the European Commission Implementing Regulation No 794/2004 [12; 13]. The first of these regulations defines the detailed rules for the application of the substantive rules of state aid, the other contains detailed regulations concerning the form, content and other elements of aid notification as well as annual reports, calculating the procedural terms and vindication rate of unlawful aid. In contrast, the first EU block exemption regulation within state aid was a regulation of the European Council of 1998 (so-called competence regulation) [16], which authorized the Commission to issue the regulations exempting (i.e. BERs regulations) stating that certain groups of aid are compatible with the internal market and do not require the filing of the notification which is mentioned in art. 108 par. 3 of the Treaty. This regulation contained an exhaustive list of horizontal aid groups subject to exclusion and determined to the Commission the mandatory and optional elements of each exemption. Block exemptions have been established to aid concerning small and medium-sized enterprises, research and development, environmental protection, employment and training, as well as to aid compatible with the map approved by the Commission for each Member State in relation to the provision of regional aid [26]. The Commission used the possibility given by the above mentioned regulation in all indicated cases, with the exception of environmental protection aid. In addition, the aid for research and development has been approved only in a situation where it was addressed to the sector of small and medium-sized enterprises (SMEs).

Issued block exemptions pursuant to Regulation No 994/98 were consolidated by the Commission in the new General Block Exemption Regulation - *General Block Exemption Regulation* (GBER) [14]. This normative act has become a special measure unifying and simplifying existing rules on block exemptions and applied cross-sectionally to all instruments and sectors [24]. "The introduction of this regulation, under which the Member States are exempted from the obligation to notify the Commission with numerous state aid measures - both those that were subject to bond exemptions previously in force, as well as those that have been regulated only with the guidelines of the European Commission and thereby were subject to the notification - this is one of the main elements of state aid system reform" [25]. This reform was an essential step towards reducing bureaucracy and a manifestation of the modern approach to state aid control, contributing to the Lisbon Strategy completed in 2010, which served achieving goals such as sustainable development, increasing the competitiveness of EU industry, increasing employment as well as social and regional cohesion.

The unquestionable advantage of Regulation 800/2008 on block exemptions is no obligation of report (notification) to the European Commission of proposed aid measure and no need to obtain a positive decision of the Commission in this case (authorization) before a Member State undertakes granting the state aid. GBER Regulation, which was in force until 30 June 2014, consisted of nine types of state aid: 1) regional investment and employment aid; 2) investment and employment aid for small and medium-sized enterprises; 3) aid for the creation of small enterprises by women; 4) aid to protect the environment; 5) aid for consultancy and participation of the small and medium-sized enterprises in fairs; 6) aid in the form of high risk capital; 7) aid for research and development activities; 8) training aid; 9) aid for disadvantaged or disabled workers. For these types of state aid, the European Commission set out the conditions that must be fulfilled in order for the aid measure to be exempted from the obligation to notify, pointed out the most essential concepts and terms, general categories of qualification costs and admissible intensity of support for a particular kind of aid [19].

On July 22 2013 Regulation (EC) No 994/98 has been amended by Council Regulation (EU) No 733/2013 of 22 July 2013 [18], to authorize the Commission to extend block exemption of new categories of state aid, for which it is possible to set clear conditions for compliance. These new categories of aid subject to block exemption include: aid to repair the damage caused by some natural disasters, social aid for transport for citizens of the far-off regions, aid for broadband infrastructure, innovation aid, aid to promote culture and preserve cultural heritage, aid for sport infrastructure and multifunctional recreational infrastructure.

3 Data and Methodology

The foundation of the European Union policy in the field of state aid is provision specified in art. 107 par. 1 TFEU, which constitutes that state aid is incompatible with the internal market. It is thus not the definition of the aid incompatible or compatible with the internal market, but determining state aid as prohibited, unless it is excluded from this prohibition under art. 107 par. 2 and 3, or art. 106 par. 2 TFEU, hence, basing on the Treaty provisions that speak directly of aid compatible with the internal market. Such treaty provision allows the adoption of a broad and flexible interpretation of the term "state aid" [20; 29]. Thus, in the case of the concept of "state aid", within the meaning of art. 107 par. 1 TFEU, which is of broad and general nature, the open texture of law is clearly evidenced [22]. The result is that there is no way to determine the semantic scope of that concept and legal norm defining the prohibition of state aid solely by reference to its semantic dictionary meaning and formal inference rules. Determining the semantic concept of state aid and the meaning of a legal norm defining the prohibition of state aid is specified during legal discourse, which in this case is proceeding before the Court of

Justice of the European Union. The Court of Justice of the EU may be referred to as "precedent court" because the general rules formulated in its case law determine the interpretation and application of both treaties, as well as all EU secondary law [28]. Therefore, in this article the analysis of state aid granted on the basis of the regulations excluding BER and GBER is conducted basing on the concept of state aid with the meaning given and constantly being given by the case law of the EU Courts.

Establishment of block exemptions within state aid resulted on the one hand from a gradual reduction of individual aid directed to individual enterprises (*ad hoc* aid) and increase in the size of state aid granted under the aid programs that in the rank of normative acts defined the potential group of beneficiaries, which meant that any company fulfilling the conditions determined in them could benefit from state aid. On the other hand, it resulted from the evolution of the EU guidelines defining the rules of admissibility of particular types of aid from acts of explanatory-interpretative nature towards *quasi*-normative. In Table 1 it was shown the intensity of state aid granted by the Member States under block exemption in the years 2005-2012.

Table 1 State aid granted under block exemption in the years 2005-2012 (EUR million)

	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**Total**
Austria	130.9	139.3	187.7	338.2	453.6	314.5	782.9	771.5	**3,118.6**
Belgium	141.5	132.7	154.8	235.2	732.1	744.1	561.7	434.9	**3,137**
Bulgaria	-	0	0.7	1.2	15.8	5.7	6.4	17.7	**47,5**
Cyprus	0.3	5.8	7.8	17.5	15.3	27.1	29.1	28.9	**131.8**
Czech Republic	79.2	93.9	231.1	475.7	377.2	440.9	753.6	929.5	**3,381.1**
Denmark	0.8	1.2	8.3	9.7	43.5	176.6	288.4	394.3	**922.8**
Estonia	5.5	3.2	5	6.5	5.7	4.3	7.2	14.9	**52.3**
Finland	1.5	1.8	79.5	98	92	116.8	693.3	599	**1,681.9**
France	3.6	65.8	323.4	511.2	716.1	552.1	532.8	685.7	**3,390.7**
Germany	560.7	412.3	1,891.1	3,313.8	4,387.5	2,910.7	6,129.4	7,042.5	**26,648**
Greece	114.5	108.3	91.3	249.3	260.3	291.5	373.2	224.7	**1,713.1**
Hungary	29.1	120.4	290.9	958.9	593.3	450.2	376.6	333.5	**3,152.9**
Ireland	51.1	91	166.4	157.7	90	118.7	92.9	107.2	**875**
Italy	987.5	1,132.5	1,033.1	1,180.6	1,701.8	1,370.7	1,156.7	2,558.9	**11,121.8**
Latvia	5.1	7.5	319.1	11.3	10.4	14.9	22.7	32.7	**423.7**
Lithuania	2.3	9.6	26.2	28.8	42.9	57.8	78.5	86.1	**332.2**
Luxem-bourg	9.1	14.4	9.2	9	47.3	53.4	67.3	50.5	**260.2**
Malta	0	1.4	2.4	1.3	13.9	15.6	27.6	25.4	**87.6**
Nether-lands	5.5	58.9	107.7	138.7	70.4	70.6	128.1	88.9	**668.8**
Poland	477.9	623.5	765.2	920.8	1,114.1	1,228.4	1,036.4	1,230	**7,396.3**
Portugal	29.2	9.4	26	49.8	104.1	349.5	248	375.2	**1,191.2**
Romania	-	-	1	31.6	47.5	80.8	110.1	87.4	**358.4**

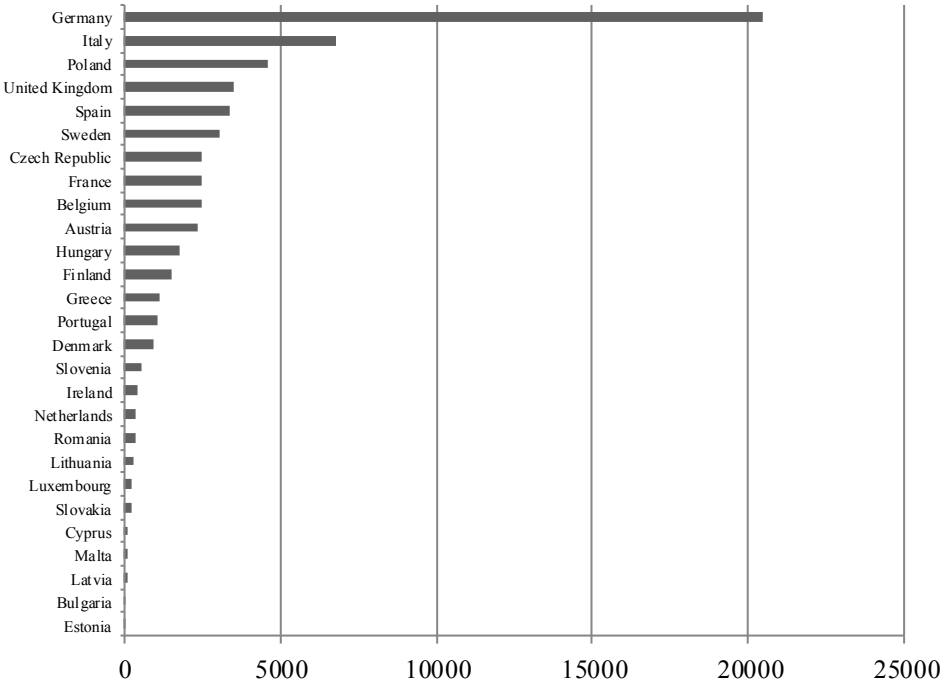
Slovakia	1.3	4.9	9.6	14.2	39.8	59	47.8	61.3	**237.9**
Slovenia	-	0.8	15.3	81	106.6	112.1	154.6	195.7	**666.1**
Spain	201.6	246.6	631.2	633.6	1,223.5	922.2	743	476.2	**5,077.9**
Sweden	5.6	5.8	79.1	63.3	68.7	85.6	669.6	2,243.8	**3,221.5**
United Kingdom	341.3	276.7	612.1	549.7	504.8	852.4	1,050.2	1,087	**5,274,2**
EU 27	**3,185.3**	**3,567.7**	**7,075.3**	**10,086.6**	**12,878.2**	**11,426.3**	**16,168.3**	**20,183.1**	**87,336.2**

Source: EUROSTAT

Analysing the data in Table 1 it can be concluded that public aid granted under block exemption shows a strong upward trend. In the period 2005-2012 the aid intensity for 27 Member States amounted to EUR 3.2 billion in 2005, 3.6 billion in 2006, 7.1 billion in 2007, 10.1 billion in 2008, 12.9 billion in 2009, 11.5 billion in 2010, 16.2 billion in 2011 and 20.2 billion euros in 2012. The biggest aid was granted by the countries such as Germany (26.6 billion euros in the whole analysed period), Italy (11.1 billion), Poland (7.4 billion), United Kingdom (5.3 billion) and Spain (5.1 billion euros). Whereas the countries that have granted the least aid of this kind are Bulgaria and Estonia, which in 2005-2009 allocated approx. 50 million euros, Malta (88 million), Cyprus (132 million), Slovakia (238 million) and Luxembourg (260 million euros).

Bearing in mind that GBER Regulation (800/2008) became fully effective in 2009 it seems reasonable to accurately analyse the aid granted by particular Member States in 2009-2012. The data in this area is shown in Figure 1.

Figure 1 The total amount of state aid granted by the EU Member States on the basis of Regulation 800/2008 GBER in 2009-2012



Source: EUROSTAT

In the years covering granting of block exemption aid under Regulation 800/2008, i.e. 2009-2012 (as of writing this article the latest *State Aid Scoreboard* concerned the aid granted in 2012), the chronological order of the Member States which have granted the most of this kind of aid, does not change. They are: Germany (20.5 billion euros), Italy (6.8 billion), Poland (4.7

billion), United Kingdom (3.5 billion) and Spain (3.4 billion euros). Referring these above mentioned amounts to years 2005-2012, it can be concluded that with the acquisition by the European Commission of Regulation 800/2008 the size of block exemption aid provided by the EU Member States definitely increased.

4 Results and Discussion

GBER Regulation (800/2008) introduced uniform rules for the application of the block exemptions and for each category of measures it defined the individual aid ceilings below which it would be applicable. The significant issue was the need to ensure transparency, equal treatment and effective monitoring of granted aid, which means that the GBER regulation related only to state aid, the amount of which can be defined as the gross grant equivalent at the time of grant, without the need for risk assessment (e.g. grant, preference loan). The GBER regulation also introduced an obligation of excluding in the aid programs the possibility of granting aid and granting individual aid (outside the program) to the enterprises, which are obliged to reimburse the aid as a result of a previous decision of the Commission declaring the aid incompatible with the law and the internal market. This provision results from the Daggendorf principle applied by the Commission, according to which the Commission may request the Member State to suspend the payment to the beneficiary of the new, compatible with the internal market aid until the reimbursement by the enterprise of the previous unlawful and incompatible with the internal market aid, which is the subject of a recovery decision [2]. The aid for these enterprises as well as for enterprises in difficulty, could not be granted under block exemption and continue to be subject to the notification requirement.

In addition, state aid granted under all aid groups mentioned in GBER regulation, had to be based on the incentive effect, which means that the aid must be necessary and leads to changes in behaviour of its customers, which consist in the development of a specific activity, such as investment, research, development and innovation. State aid is to encourage beneficiaries to take action that without this aid would not be taken at all or would be implemented to a limited extent. From an economic point of view, state aid, which does not lead to change in the behaviour of the enterprise (in the direction desired from the viewpoint of the economic policies of the Member State) leads to a waste of public funds [23].

On June 17 2014 the European Commission has adopted a new regulation on block exemption - Regulation 651/2014. According to the Commission, the new GBER is the basis for ¾ aid measures applied today. Their total value may in turn account for up to 2/3 of the value of public aid currently used by Member States [21]. New GBER is therefore to constitute the primary instrument by which the Member States are to provide state aid. Such a broad application of the GBER Regulation will allow on the one hand to relieve the Commission of routine matters and focus on the most serious from the point of view of the internal market, on the other hand will enable Member States effective and fast implementation of aid measures. The condition however *sine qua non* of the effective application of the regulation is the full compatibility of the planned aid measures with the guidelines set out in the regulation.

One of the basic conditions for the compatibility of the aid measure with the provisions of the regulation 651/2014 is the fulfilment of incentive effect. According to recital 18 of the objective regulation *in order to ensure that the aid is necessary and functions as an incentive to the development of activities or projects, the regulation should not apply to aid for activities in which the beneficiary would still be involved, even in the absence of aid. Aid should be exempted from notification under this regulation if the work on the aided project started after the submission by the beneficiary of the aid application.* According to the content of normative regulation, it applies only to aid which has incentive effect (art. 6, par.1), whereas, in

accordance with the regulation, there are two main mechanisms to verify the incentive effect. Firstly, the aid will be considered as producing incentive effect if the beneficiary has submitted to a Member State a written request for granting aid, before the start of work on the project or activity. Such a request should include at least such information as the name of the enterprise and its classification; description of the project, including the date of commencement and termination; location of the project; eligible costs schedule; type of aid (grant, loan, guarantee, capital contribution) and the amount of necessary public support (art. 6, par. 2). Regarding individual aid granted to large enterprises the aid has an incentive effect if, in addition to the conditions set out in par. 2 (i.e. an application for aid before the work starts on the project or activity), the Member State has verified, before granting the aid, basing on the documentation prepared by the beneficiary, that the result of the granted aid will be the economic existence of incentive effect. According to the art. 6 par. 3 of the Regulation 651/2014 GBER it will be done when the project, in the absence of aid would not have been carried out in the region or that its implementation would not be sufficiently profitable for the beneficiary without the aid (the case of regional investment aid), as well as in the situation that with the aid: the scope of the project/activity has increased; the total amount spent by the beneficiary for the project has increased; the project was completed in a shorter period of time.

Taking everything into account it is clear that adopted legal solutions under Regulation 651/2014 GBER in the field of verification of compliance of the project with incentive effect cause some doubts about their compliance with the case law of the Court of Justice, according to which the assessment of fulfilling the condition of aid, in the framework of verification of compliance of the project with incentive effect, may not be limited only to formal analysis, but it should be based on the merit (economic) verification of the validity of the project support [1; 5; 6; 7; 8; 9; 10]. In this regard the defined requirement in art. 6 par. 2 of the regulation is not sufficient. Submission of an application for aid before starting work on the project does not provide for the need of aid but at most a desire to benefit from the aid scheme. Incentive effect, in such a form, limited merely to the assessment of a formal nature does not allow for an assessment of the condition of aid necessity – it only leads to the exclusion of the possibility of obtaining the state support for the projects, whose implementation has already begun. In practice, this means that the body applying GBER Regulation 651/2014 will not be able to reject the project, which however fulfils the formal requirement for submitting an application for aid before the start of the project, however from the objective point of view it may (or even must) be accomplished by the applicant alone, without the participation of the state aid. Nothing in this field changes the wording of recital 18 of the regulation, which refers to the need to ensure that to be certain that the aid is necessary and encourages to develop further activity or projects, this regulation should not apply to aid for the activity that would be led by the beneficiary anyway, even in the absence of aid. The preamble to the Act of Union law is generally useful only in the process of interpretation [3]. In no case, however, the preamble to the regulation can serve as a basis for decisions of the authority. According to the case law of the Court of Justice, it is not legally binding and cannot be appointed by either to justify derogations from the provisions of the act, or to the interpretation of these provisions in a manner clearly contrary to their wording [4]. Interpretation of art. 6 par. 2 of the 651/2014 GBER Regulation in no way leads to the conclusion that it is possible to reject projects that are contrary to the principle of aid necessity.

5 Conclusions

The issue of block exemptions within state aid bases on the assumption that the Commission has extensive experience in the application of art. 107 and 108 of the Treaty, sufficient to define general criteria of compatibility of the horizontal state aid with the internal market, and thus

they are excluded from the notification procedure determined in art. 108 par. 3 of the Treaty. The validity of this assumption results from the fact that block exemption for aid schemes that meet the conditions set out in advance in a detailed way by the Commission was the action of strictly procedural manner, allowing to increase transparency and legal certainty in the application of competition rules on state aid. The introduction of block exemptions allowed focusing on other types of aid that could really threaten the functioning of the single European market.

Verifying the thesis set at the beginning it must be stated that it is true, because in the last few years, the amount of state aid granted in Poland under block exemptions has increased. Compared to other EU Member States Poland takes 3rd position among the countries that provide the most aid based on the principle of block exemptions. In recent years, the amount of the provided aid under GBER Regulation showed an upward trend, which can be explained by the emergence of new sources of financing the aid (especially programs co-financed by the European Union) and the partial replacement of state aid granted previously under the aid programs with the block exemption aid. Accumulation of spending from sources financed from EU funds under the financial perspective for 2007-2013 took place in 2010 – block exemption aid reached then 1.2 billion euros. In 2011, the decline was reported in the amount of the aid provided under the GBER Regulation (similarly as the total value of state aid) to a level comparable to the year 2009 - approx. 1.1 billion euros. However in 2012 its level returned to comparable to the year 2010, i.e. 1.2 billion euros.

One of the basic conditions for the compatibility of the block exemption aid with the internal market is the requirement that it is necessary for the beneficiary to implement the project. In other words, state aid should enable the implementation of activities that without the state support would not be taken. Aid, which does not meet this condition brings only improve of the financial situation of the enterprise and as such cannot be considered as compatible with the internal market. Verification of compliance with the incentive effect is designed to prevent the granting of aid for projects that could be implemented by the beneficiaries themselves. In this way, the internal market is protected from interference that is caused by granting aid not imposing an obligation on the beneficiary concerning its use. Hence, adopted solutions in the 651/2014 Regulation seem to be imperfect and cannot guarantee that support will be given only to those projects that actually, on the one hand, serve the public well-identified targets, on the other hand, need the public support for their implementation.

References

[1] Case 730/79: Judgment of the Court of 17 September 1980. - Philip Morris Holland BV v Commission of the European Communities, ECR 1980, p. 2671.

[2] Case C-188/92: Judgment of the Court of 9 March 1994. - TWD Textilwerke Deggendorf GmbH v Bundesrepublik Deutschland, ECR 1994, p. I-833.

[3] Case C-110/03: Opinion of Mr Advocate General Ruiz-Jarabo Colomer delivered on 16 December 2004. - Kingdom of Belgium v Commission of the European Communities, ECR 2005, p. I-2801.

[4] Case C-136/04: Judgment of the Court of 24 November 2005. - Deutsches Milch-Kontor GmbH v Hauptzollamt Hamburg-Jonas, ECR 2005, p. I-10095.

[5] Case C-390/06: Judgment of the Court of 15 April 2008. - Nuova Agricast Srl v Ministero delle Attività Produttive, ECR 2008, p. I-2577.

[6] Joined cases C-630/11 P to C-633/11 P: Judgment of the Court of 13 June 2013. - HGA Srl and Others (C-630/11 P), Regione autonoma della Sardegna (C-631/11 P), Timsas srl (C-632/11 P) and Grand Hotel Abi d'Oru SpA (C-633/11 P) v European Commission, ECLI:EU:C:2013:387.

[7] Case T-126/99: Judgment of the Court of First Instance of 14 May 2002. - Graphischer Maschinenbau GmbH v Commission of the European Communities, ECR 2002, p. II-2427.

[8] Case T-162/06: Judgment of the Court of First Instance of 14 January 2009. - Kronoply GmbH & Co. KG v Commission of the European Communities, ECR 2009, p. II-1.

[9] Cases T-394/08, T-408/08, T-453/08 and T-454/08: Judgment of the General Court of 20 September 2011. - Regione autonoma della Sardegna (T-394/08), SF Turistico Immobiliare Srl (T-408/08), Timsas Srl (T-453/08) and Grand Hotel Abi d'Oru SpA (T-454/08) v European Commission, ECR 2011, p. II-6255.

[10] Case T-551/10: Judgment of the General Court of 13 September 2013. - Fri-El Acerra Srl v European Commission, ECLI:EU:T:2013:430.

[11] Chalmers D., Hadjiemmanuil C., Monti G., Tomkins A. (2006), *European Union Law: Text and Materials*, Cambridge-New York: Cambridge University Press.

[12] Commission Regulation (EC) No 794/2004 of 21 April 2004 implementing Council Regulation (EC)No 659/1999 laying down detailed rules for the application of Article 93 of the EC Treaty, OJ L 140, 30.4.2004, p. 1.

[13] Commission Regulation (EC) No 271/2008 of 30 January 2008 amending Regulation (EC) No 794/2004 implementing Council Regulation (EC) No 659/1999 laying down detailed rules for the application of Article 93 of the EC Treaty, OJ L 82, 25.3.2008, p. 1.

[14] Commission Regulation (EC) No 800/2008 of 6 August 2008 declaring certain categories of aid compatible with the common market in application of Articles 87 and 88 of the Treaty (General block exemption Regulation), OJ L 214, 9.8.2008, p. 3.

[15] Consolidated versions of the Treaty on European Union and the Treaty on the Functioning of the European Union, OJ C 83, 30.3.2010, p. 1.

[16] Council Regulation (EC) No 994/98 of 7 May 1998 on the application of Articles 92 and 93 of the Treaty establishing the European Community to certain categories of horizontal State aid, OJ L 142, 14.5.1998, p. 1.

[17] Council Regulation (EC) No 659/1999 of 22 March 1999 laying down detailed rules for the application of Article 93 of the EC Treaty, OJ L 83, 27.3.1999, p. 1.

[18] Council Regulation (EU) No 733/2013 of 22 July 2013 amending Regulation (EC) No 994/98 on the application of Articles 92 and 93 of the Treaty establishing the European Community to certain categories of horizontal State aid, OJ L 204, 31.7.2013, p. 11.

[19] Deiberova K., Nyssens H. (2009), The new General Block Exemption Regulation (GBER): What changed?. *European State Aid Law Quarterly*, vol. 1, pp. 27-38.

[20] D'Sa R.M. (1998), *European Community Law on State Aid*, London: Sweet&Maxwell.

[21] European Commission, Memo - State aid: Commission adopts new General Block Exemption Regulation (GBER), Brussels 21.5.2014.

[22] Hart H.L.A. (1997), *The Concept of Law*, Second Edition, Oxford: Oxford University Press.

[23] Haucap J., Schwalbe U. (2011), Economic Principles of State Aid Control, *Düsseldorf Institute for Competition Economics Discussion Paper*, No. 17, pp. 1-50.

[24] Heidenhain M. (ed.) (2010), *European State Aid Law. Handbook*, München-Oxford: Verlag C.H. BECK, Hart Publishing.

[25] Nyssens H. (2008), The General Block Exemption Regulation (GBER): bigger, simpler and more economic. *Competition Policy Newsletter*, no. 3, pp. 12-18.

[26] Quigley C. (2009), *European State Aid Law and Policy*, Second Edition, Oxford-Portland Oregon: Hart Publishing.

[27] *Report from the Commission: State Aid Scoreboard Report on State aid granted by the EU Member States – Autumn 2010 Update*, Brussels 01.12.2010, COM/2010/701 final.

[28] Scheuring K. (2010), *Precedens w orzecznictwie Trybunału Sprawiedliwości Unii Europejskiej*, Warszawa: Oficyna a Wolters Kluwer business.

[29] Schina D. (1987), *State Aids under the EEC Treaty. Articles 92 to 94*, Oxford: ESC Publishing Ltd.

APPLICATION OF VAT RATES IN THE EU

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ABSTRACT

The aim of this paper is to point out that despite the high degree of harmonization of VAT, there remain significant differences in the application of VAT rates in the EU single market. These rates are not uniform, framework for the application of rates, their composition and amount includes the currently valid EU VAT Directive. Even if the rates and exemptions are not fully harmonized, common system of VAT should result in neutrality in competition in the sense that similar goods and services in the territory of each Member State should have the same tax burden, regardless of the length of the production and distribution chains.

Keywords: harmonization, standard VAT rate, reduced VAT rates, specific VAT rates

JEL codes: H25

1 Introduction

The VAT rates in the EU single market are not uniform and their implementation is the responsibility of individual Member States. The VAT Directive 2006/112/EC provides in Articles 93 to 130 and Annex III a legal framework for the application of VAT rates in Member States. Under the VAT Directive, Member States must apply a standard VAT rate of at least 15 %. They also have the option to apply one or two reduced VAT rates, with a minimum of 5 %, to goods and services which are included on a list annexed to the Directive. [3].

But these simple rules are complicated by a number of exceptions which are included in the VAT Directive or were granted to certain Member States. During the transition period (until the entry into force of the definitive VAT system), Member States may charge various special rates including the application of super - reduced rates (lower than 5 %) and zero rates, that were in place on 1 January 1991 or the application of additional reduced rate (known as the "parking rate"), no lower than 12 %.

In December 2011, the European Commission introduced the EU VAT Strategy setting out the priority actions needed to create simpler and more efficient VAT system in the EU. One of the priorities was the review of reduced VAT rates, which should be set at three principles: the abolition of reduced rates which constitute a distortion to competition and an obstacle to the proper functioning of the internal market; the removal of reduced rates on goods and services, the consumption of which is discouraged by other EU policies and the taxation of similar goods and services by the same VAT rate.

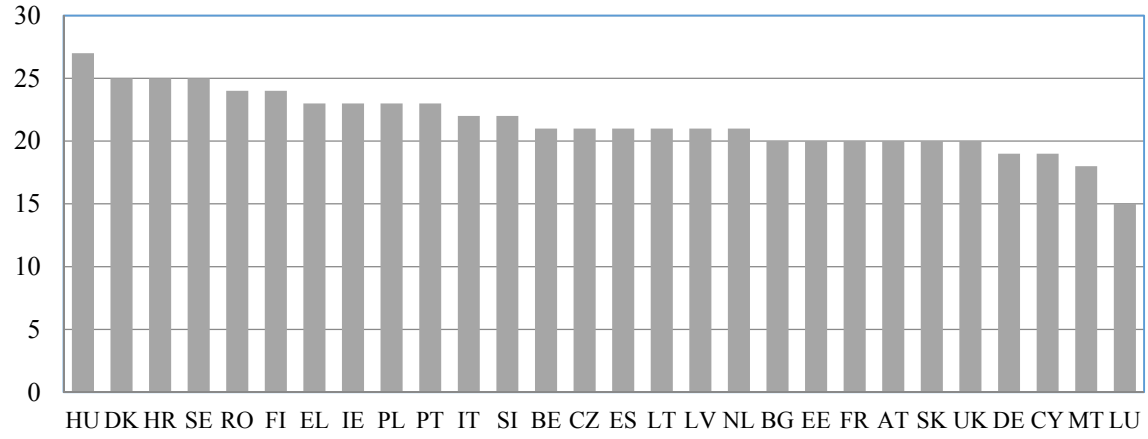
Current VAT rate structure in Member States is very different. To ensure the quality and stability of VAT revenue, which currently accounts for over 20 % of Member States' income, the Commission proposes limiting the use of reduced VAT rates and exemptions. A recent study indicates that a 50 % reduction in the dissimilarity in VAT rates structures between Member States could result in a rise of 9.8 % in intra-community trade and an increase in real GDP of 1.1 % [9].

2 The application of the standard VAT rate in the EU

Approximately two thirds of total final consumption in the EU is subject to the standard rate. Denmark has a specific position, because it is the only Member State, where all final consumption is subject to standard VAT rate. In individual Member States the percentage ranges from 40 % to 90 %. [1].

The standard VAT rate in EU varies between 15 and 27 %. The highest VAT standard rate is in Hungary (27 %), followed by Croatia, Denmark and Sweden (all 25 %), Finland and Romania (24 %), Poland, Portugal and Greece (all 23 %). The lowest rates are in Luxembourg (15 %) and Malta (18 %).

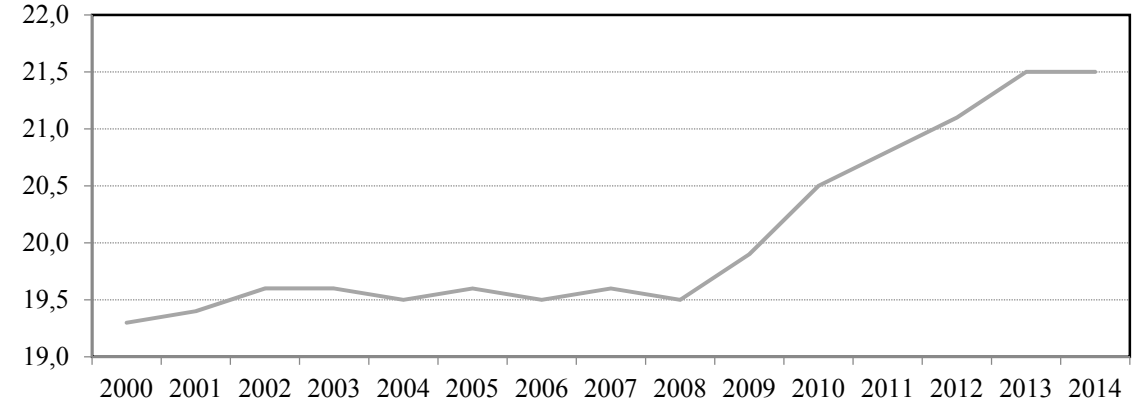
Figure 1 Standard rate of VAT in the EU (2014)



Source: VAT rates applied in the Member States of EU, 2014 [5].

Since 2009, the most Member States introduced reforms in the area of VAT, with the aim to gain additional revenues to public budgets [7]. Majority of them realized increases in statutory rates rather than broadening of the VAT base. The average standard VAT rate in the EU-28 increased from a level of 19.5% in 2008 to 21.5% in 2014.

Figure 2 Development of the average standard rate of VAT in the EU-28



Source: Taxation Trends, 2014 [6].

3 The application of reduced VAT rates in the EU

The use of reduced VAT rates is frequently discussed topic particularly within the EU [8]. On the one hand, there is growing pressure to unify VAT rates to increase the efficiency and competitiveness of the EU internal market. On the other hand, there may be specific economic benefits from operating a reduced VAT rate in specific sectors. It has been argued that the use

of reduced rates achieves social and distributional aims (vertical equity, positive externalities). Policymakers may attempt to correct the regressive nature of VAT by applying reduced rates to goods and services that are expected to be consumed by lower-income households.

However, the results of many economic studies show that from an economic perspective a single uniform VAT rate is the best policy choice. It would slightly improve consumer welfare, reduce distortions in the functioning of the internal market and reduce compliance costs for traders [2].

Only one Member State does not apply any reduced VAT rate (Denmark), fifteen Member States apply two reduced VAT rates and twelve Member States apply one reduced VAT rate.

Table 1 Reduced rates of VAT in the EU (%, 2014)

Member State	Reduced VAT rate	Member State	Reduced VAT rate
BE	6 / 12	**LV**	12
BG	9	**LU**	6 / 12
CZ	15	**HU**	5 / 18
DK	-	**MT**	5 / 7
DE	7	**NL**	6
EE	9	**AT**	10
EL	6,5 / 13	**PL**	5 / 8
ES	10	**PT**	6 / 13
FR	5,5 / 10	**RO**	5 / 9
HR	5 / 13	**SI**	9,5
IE	9 / 13,5	**SK**	10
IT	10	**FI**	10 / 14
CY	5 / 9	**SE**	6 / 12
LT	5 / 9	**UK**	5

Source: VAT rates applied in the Member States of EU, 2014 [5].

4 Application of specific VAT rates

The VAT Directive enables Member States to apply super-reduced rates, parking rates and zero rates (derogations from VAT Directive). All Member States, with the exception of Denmark, apply at least one reduced VAT rate and five Member States apply a super-reduced VAT rate. Zero rates are applied in the United Kingdom, Ireland, Cyprus and Malta. Several Member States apply a variety of parking rates.

A survey of prices in the Community shows that zero or super-reduced VAT rates do not automatically mean a better price to the consumer. They could cause distortions of competition or they allow entrepreneurs to charge higher profit margins because of the advantage of lower VAT rates.

Parking rates of VAT represent a transitional stage between the reduced rate and standard rate. They apply to goods and services on which some Member States were applying reduced, super-reduced or zero rates on 1 January 1991. The Member States are allowed to continue applying reduced rates instead of the standard rate until the launching of final VAT system. The lowest tax rate is 12 %. Actually, the parking rate applies only five Member States, mainly to energy resources, wine, agricultural equipment and specific types of services. In Luxembourg, the parking rate base accounts for 26 % of the whole taxable VAT base.

Table 2 Parking rates of VAT in the EU (%, 2014)

Belgium	12 %	Energy products (coal, solid fuel), tyres
Ireland	13.5 %	Energy for heating, specific services
Luxembourg	12 %	Certain wines, solid mineral fuels, washing and cleaning products, tourism publication, air conditioning
Austria	12 %	Wine from farm production
Portugal	13 %	Wine, diesel for agriculture, agriculture tools

Source: VAT rates applied in the Member States of EU, 2014 [5].

Member States may apply super-reduced rates of VAT (lower than 5 %), which were in force on 1st January 1991. Currently, only five Member States apply the super-reduced rate, mainly to food, books, pharmaceutical products and specific types of services.

Table 3 Super-reduced rates of VAT in the EU (%, 2014)

France	2.1 %	Pharmaceuticals, books, periodicals, TV licence fees, supply and reconstruction of new buildings
Ireland	4.8 %	Food
Luxembourg	3 %	Food, beverages, clothing for children, pharmaceuticals, books, periodicals, TV licence fees, restaurants, hotels, admission to cultural cervices, passenger transport, supply of new buildings etc.
Italy	4 %	Food, books, periodicals, TV licence fees, supply of new buildings, social services, medical equipment for disabled persons
Spain	4 %	Food, books, periodicals, supply of new buildings

Source: VAT rates applied in the Member States of EU, 2014 [5].

Only a small number of Member States may apply the zero VAT rate (United Kingdom, Ireland, Denmark, Sweden, Finland, Belgium, Italy, Malta). The goods and services subject to the zero VAT rate are quite different among Member States. While some Member States apply the zero VAT rate only to one or two commodities, the United Kingdom applies zero rate to 20 categories of products and Ireland to 12 categories. In the United Kingdom, the zero rate base accounts for 20 % of the whole taxable VAT base. It means that a fifth of the whole taxable base is actually not taxed. The application of zero VAT rate is often criticized for complexity and the lack of transparency [4].

5 Conclusions

Although the system of VAT rates is not fully harmonized, the common system of VAT should lead to neutral competition in the sense that similar goods and services should have the same tax burden in the territory of each Member State. For increasing the efficiency of VAT system in the EU, it will be necessary to unify VAT rates and to abolish the exceptions which are applied in individual Member States. It could help to minimize VAT revenue losses and increase the performance of VAT.

Acknowledgments

The paper is the result of the VEGA project 1/0008/11 entitled “Effectiveness of tax revenues and public expenditure in relation to long-term sustainability of public finances and new unconventional budget revenue options”.

References

[1] Borselli F., Chiri S. and Romagnano E., 2012. Patterns of Reduced VAT Rates in the European Union. *International VAT Monitor*, 23(1), pp. 13-21.

[2] Copenhagen Economics, 2007. *Study on reduced VAT applied to goods and services in the Member States of the European Union*. Available at: <http://ec.europa.eu/taxation_customs/resources/documents/taxation/vat/how_vat_works/rates/study_reduced_vat.pdf>.

[3] Council Directive 2006/112/EC of 28 November 2006 on the common system of value added tax

[4] European Commission, 2004. VAT indicators. Working paper, No 2. Available at: <http://ec.europa.eu/taxation_customs/resources/documents/vat_indicators.pdf>.

[5] European Commission, 2014. VAT rates applied in the Member States of the European Union. Available at: <http://ec.europa.eu/taxation_customs/resources/documents/taxation/vat/how_vat_works/rates/vat_rates_en.pdf >.

[6] Eurostat, 2014. Taxation trends in the European Union. Available at: <http://ec.europa.eu/taxation_customs/resources/documents/taxation/gen_info/economic_ analysis/tax_structures/2014/report.pdf>.

[7] Garnier, G. [et al.], 2013. Recent Reforms of Tax Systems in the EU: Good and Bad News. *Taxation Papers – Working paper,* No.39. Available at: <http://ec.europa.eu/taxation_customs/resources/documents/taxation/gen_info/economic_analysis/tax_papers/taxation_paper_39.pdf>.

[8] Charlet, A. and Owens, J., 2010. An International Perspective on VAT. Tax Notes International, 59 (12), pp. 943-954. Available at: <http://www.oecd.org/ctp/consumption/46073502.pdf>.

[9] IFS, 2011. A Retrospective Evaluation of Elements of the EU VAT System – Final Report, TAXUD/2010/DE/328. Available at: <http://ec.europa.eu/taxation_customs/resources/documents/common/publications/studies/report_evaluation_vat.pdf>.

RISK FUEL PRICES WITH REFERENCE TO VAT EVASION

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ABSTRACT

VAT fuel fraud, despite all the efforts of public administration, is still an enormous problem. The nature of this tax implies that there is no practically applicable tool that could stop tax evasion. The aim of the authors is to define a simple, administratively undemanding tool which can help identify the selling prices of fuel, which can be affected by tax evasion. In this text by using the data available to the tax authorities, considering the principles of pricing on the fuel market and on the basis of the results of their own research they identified a risk area of fuel prices. Prices which are in this risk area have a high likelihood of being affected by tax evasion and businesses trading at such prices should be carefully scrutinized by the tax authorities.

Keywords: fuel, tax evasion, usual price, value added tax

JEL codes: H20, H26

1 Introduction

Despite new methods of tax fraud detection that have recently appeared [18], [29], controlling still remains the only effective tool for disclosure of tax evasion. The inspection issue is rather disputable with two opposing groups always present. The first group includes taxpayers, who keep due accounting and tax records, calculate their tax liabilities, file tax returns and pay taxes. This group has generally a negative attitude to inspections. On the other hand there are tax administrators who supervise tax collection and tax management. Their scope of action is limited to an extent, due to the large number of tax returns and the resulting impossibility to inspect each and every taxpayer. This provides leeway for speculation concerning tax bases and tax liabilities. Taxpayers can risk distorting their results, which may lead to illegal decrease in taxes. The decision-making is between profit – risk of detection – severities of sanction. Tax administrators apply random tax inspections, which according to [17] are in the public interest, contribute to proper tax levy and state budget revenue. The Constitutional Court of the Czech Republic issued the decision [17], in which it challenged this basic role of tax administrators. In its reasoning it mentioned that random inspections cause restriction of rights of individual privacy.

The Czech Chamber of Commerce [4] maintains that the judgment should apply only to natural persons, not to legal persons, where interference with rights of privacy is not applicable. Because the judgment does not distinguish between natural and legal persons, it may be interpreted for the benefit of legal persons, which is absurd.

It is clear that financial inspections should burden the taxpayers as little as possible. The Supreme Administrative Court in its decision [26] mentions that it is essential that the tax

administrator, in accordance with the principle of adequacy, respect that while enforcing duties in the tax proceedings, only the least burdensome measures should be applied.

However, the Supreme Administrative Court did not accept the decision of the Constitutional Court absolutely and admitted a possibility of diversion under justified and consistently explained reasons [27], [28], thereby permitting the entitlement of the tax administrator to random inspections. The Constitutional Court addressed the issue again in its communication [21]. In its view, the procedure of the tax administrator who commences the tax inspection without a suspicion of the taxpayer's failure to fulfil tax liabilities that would be substantiated with concrete facts shall not be considered as contravening with rights of privacy.

Although this opinion of the Constitutional Court approximates the decision of the Supreme Administrative Court, there is a real danger that the opinion might change with the next cause brought to the court. We are convinced that tax administrators should seek mechanisms and red flags in order to firmly substantiate random inspections and ensure the inspections are justified, appropriate and adequate. Tax inspections are in fact recognized as one of the most important determinants of realization of tax evasions [20].

The aim of the authors is to define a simple, administratively undemanding tool which could help identify the selling prices in the Czech Republic that can be affected by value added tax evasion. Many authors [9], [19], [25] consider VAT evasion to be very serious. We will focus specifically on fuel whose nature and characteristics make it suitable for easy fraud [23].

2 Literature Review

VAT is a tax that is susceptible to increasing the size of the tax gap. If we use the definition of Slemrod [24], we will deal here only with part of the tax gap – intentional tax evasion.

VAT susceptibility to evasion is a logical consequence of interpretation of the factors determining the tendency to commit this type of evasion, which were already defined [1] and which are tax burden, penalties, probability of inspection and probability of detection. Another determinant in the form of time delay of possible detection and punishment compared to immediate profit from the committed evasion was added later [2].

The need to reduce VAT evasion is currently a burning issue. This is also confirmed by Gomez-Plana and Arzoz [12] who examined the impact of potential elimination of tax evasion in this area. Hashimdaze [14] or Keen and Smith [15] confirm that this is not a local but a global problem. Nevertheless, the value added tax is a good tax, which is confirmed by Gordon and Nielsen [13], or Keen and Smith [15] and it should not be condemned but it is recommended to seek solutions to the existing problems.

Specific evaluation of models to stop a certain type of VAT evasion is proposed by Gebauer et al. [10]. This is carousel fraud in the EU countries. The authors point out huge administrative costs of the proposed measures and also their limited effectiveness or rather susceptibility to other types of tax fraud. The evaluated measures are a reverse charge model with input tax settlement and a reverse charge model with jointly and severally liable debtors.

Problematic is the introduction of new measures because general implementation of the model requires consent of all Member States. If the consent is not obtained, it is complicated from the long-term perspective and unstable change in VAT collection. Despite the shortcomings of these measures the authors quantify significant benefit of reducing tax evasion after the application of these tools.

From what was mentioned above it is obvious that VAT evasion in fuel can certainly be reduced. General principles are not real tools to achieve these goals. It is necessary to formulate

measures tailored to the specific problem and to regard guidelines as criteria of the correctness of the direction of market regulation.

3 Data and Methodology

In the text a number of standard scientific methods and specific original methods are used. In this part we will focus on the description of specific original methods. At first, we will briefly outline basic lawful methods of quantification of tax burden. To identify the tax burden of fuel as the important factor of tax evasion, the following equation is used:

$$TB = VAT_{coef} \times P_S + E \text{ , where} \quad (1)$$

TB is the rate of tax burden,

VATcoef is coefficient for calculation of value added tax from a price (incl. VAT),

PS is selling price,

E is excise duties on mineral oils.

$$VAT_{coef} = \frac{VAT_R}{100} + VAT_R \text{ , where} \quad (2)$$

VATR is nominal value added tax rate.

Further, we will clarify specific non-original and original procedures used to achieve the goal. To specify a convenient instrument for reduction of tax evasion on value added tax on fuels, we use the decomposition of selling price:

$$P_S = P_P + E + M + C_{TR} + VAT \text{ , where} \quad (3)$$

PS is selling price,

PP is purchase price in refinery,

E is excise duties on mineral oils,

M is margin for fuel traders,

CTR is transportation cost,

VAT is value added tax.

The purchase price in refineries *PP* is the price at which the goods are delivered. This price is added the excise tax *E* and the value added tax *VAT* in accordance with the specific rate applied in the Czech Republic. The sense and nature of business operation is achievement of profit, and therefore the margin M is included in the calculation. However, this component of the selling price is difficult to quantify precisely. Nevertheless, it must be taken into account, being an important factor that determines the final selling price. The last but not least significant part of the calculation is transportation costs *CTR*, related to the transport of fuel from refineries to service stations. In practice, transportation costs are calculated individually according to distance bands in kilometres and volume of fuel transported. Transportation costs are likely to affect the final price; however, they cannot be determined without knowing the specific distances and volumes.

Used basic weekly prices *BP* are available from the company upon request [6].

In the process of identification of the fair market value, the possibility of storage of fuels in the ČEPRO, a.s. storage tanks must be taken into account [22]. The price *CP* compares the current price with previous prices which are added the storage fee for the refinery or the tax warehouse

operator. As rationally thinking entities, we subsequently select the lower of the given prices. For example, ČEPRO, a.s. charges the storage fee on the basis of the following formula [8]:

$$SF = D + T + S + P + R + FH + FB, \text{ where} \quad (4)$$

D is depositing,

T is transport,

S is storage,

P is protection,

R is release,

FH is fee for handling biofuel,

FB is fee for biofuel.

Average prices of fuels *APGFD* in the respective periods were obtained from the General Financial Directorate upon a written request.

Our research is also based on results of the questionnaire survey. The questionnaire was sent to 700 potential respondents, and the rate of return was 22%, i.e. 154 entities responded. Adjusted average aggregate prices of distributors *APGFDM* are obtained by adjusting of *APGFD*.

The minimal price *MPGFD* was again obtained from the General Financial Directorate upon a written request.

4 Results and Discussion

Now we will describe the situation on the fuel market in the Czech Republic and we will use available data to achieve the objective of this text. Data concerning fuel prices were obtained from ČEPRO, a.s., whose sole shareholder is the Ministry of Finance of the Czech Republic. Thus we may assume that such prices BP are not distorted by tax evasion. In 2011, 1,781 thousand tons of petrol and 4,013 thousand tons of diesel oil [7] was sold in the Czech Republic, whereas ČEPRO, a.s., accounts for a 15% market share in the long-term run [5], [16], in the context of wholesale. The authors of this article had to consider whether to use prices of a more dominant entity in the fuel market, such as ČESKÁ RAFINERSKÁ, a.s. The Annual Reports of the company do not contain information about wholesale business. According to the statement of the company, the whole UNIPETROL group, including BENZINA petrol stations, sold 827 thousand tons of petrol and 1,789 thousand tons of diesel oil. Thus we may assume that the market share of ČESKÁ RAFINÉRSKÁ, a.s. is approximately 30-35%.

One of the selection criteria has to be the location of fuel storage tanks. ČESKÁ RAFINERSKÁ, a.s. has its refineries only in Kralupy nad Vltavou and Litvínov, which means that prices differ according to the transportation distances to various parts of the Czech Republic. ČEPRO, a.s. on the other hand, has its storage facilities evenly distributed throughout the country, using also the services of ČESKÁ RAFINÉRSKÁ, a.s. By selecting ČEPRO, a.s., we minimized the additional effect of transportation costs, which is a price component that is difficult to identify.

The weekly prices *BP* in the first six months of 2012 were used for practical comparison of market prices [6]. These prices should be attained by each entity interested in business transactions with ČEPRO, a.s. regardless of other circumstances. The minimum required volume (typically the deliveries exceed 5,000 litres) and payment terms must be maintained.

The suggested solutions also used information from monthly reports submitted to the General Financial Directorate which provided a detailed explanation of procedures and requirements concerning fuel distributors.

Average prices of fuels *APGFD* in the respective periods are aggregated items, sent by the individual distributors. With respect to the product homogeneity, the prices had to be chosen mainly according to the Combined Nomenclature Codes. The code 27101141 for petrol Natural 95 was selected for our purposes. The lowest price for the period concerned was always chosen. The "period" is a time interval from Tuesday to Monday, corresponding to weekly prices of ČEPRO, a.s.

It was necessary to determine the price interval based on the usual deviation from average distributor prices, comprising also the distributors' margin. Our research is based on results of the questionnaire survey taken in July and August 2013, whose participants were distributors and service station operators. Adjusted average aggregate prices of distributors *APGFDM* are obtained by subtracting the highest value not yet referred to by the respondents as a price potentially affected by tax fraud from the average aggregate price of distributors *APGFD*.

The minimal price *MPGFD* was always the lowest one in the monitored period and could be attained by any distributor. Apparent errors were found in certain items, and therefore such erroneous prices had to be eliminated. An erroneous price is considered such value, which deviated from the average of minimal prices by more than CZK 1 in the week monitored. The incorrect price was then replaced with the next lowest price.

It must be noted that it was not possible to establish whether the (average and minimal) prices obtained from the General Financial Directorate [11] included the price of transport or not, as the GFD does not require such specification from the entities concerned. The choice of the price is up to the distributor. Thus, the minimal price could get to an even lower value and therefore we did not take into account the transport component in the case of the other prices (*BP* and *CP*).

Table 1 Wholesale price composition of petrol

Item	Price per litre [natural 95]
Purchase price in refinery (CZK)	16.97
Margin of fuel traders (CZK)	0
Excise duty (CZK)	12.84
Value added tax (CZK)	6.26
Total (CZK)	36.07

Source: Authors, [6].

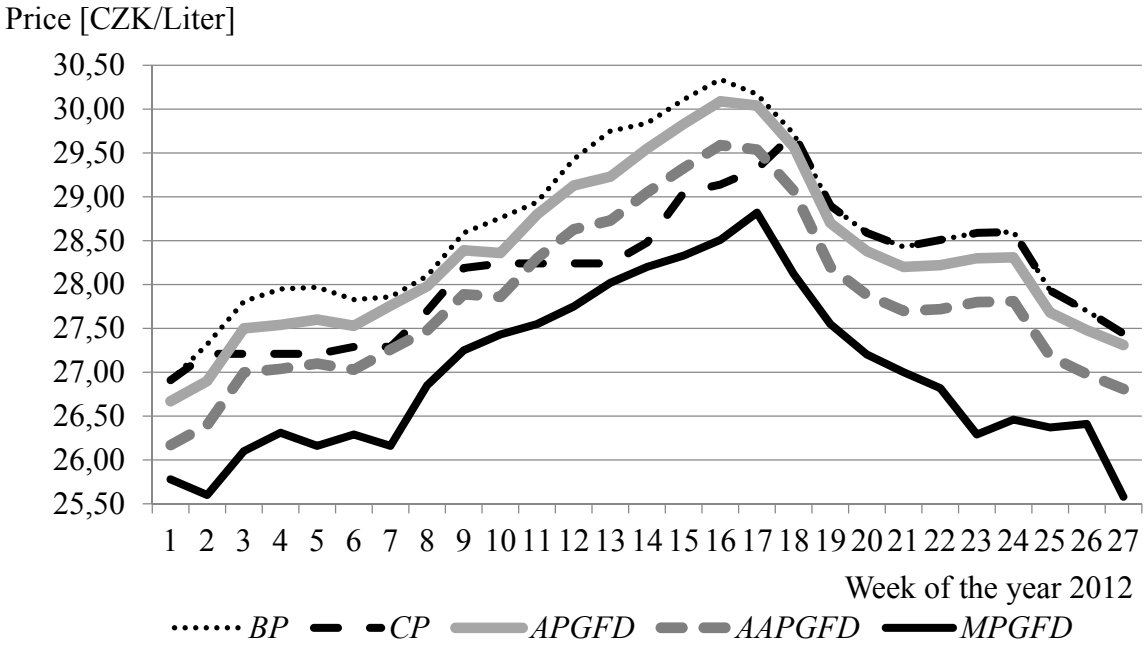
The seller participating in or profiting from a tax fraud can sell for lower selling prices than its competitors. We should add that such seller often realizes the transactions with profit and higher margin than its competitors. Let us use Table 1 for the sake of theoretical explanation. If the margin equalled the entire amount of VAT, the seller would get more than CZK 5 from one litre of fuel. However, a standard distributor's margin is CZK 0.01-0.25 per litre. 71% of respondents to the survey answered that a standard distributor's margin with seven-day maximum maturity lies within such range. We may assume that if the maturity is shorter, the margin shall be lower, whereas with longer maturity, it may be even higher.

Basic weekly prices of ČEPRO, a.s. for the week 18th – 24th September 2012, 34.88 CZK/litre for diesel and 36.07 CZK/litre for petrol, were used (incl. VAT). By using the relationships (1) and (2) identified individual parts of the selling price of fuel in Table 1 make suitable input

values for determination a borderline between usual prices determined according to equation (3) and unusually low price. On a competitive market it is unlikely to identify big differences between prices of individual sellers. We see the biggest problem is in intra-community trades. The first subject which possesses fuel on the ground of the Czech Republic and which goes bankrupt according to the predefined schedule causes the biggest market distortion with highest tax evasion. As it is clear that the tax is evaded or there is at least an attempt to evade, the selling price is lower than the one of other distributors. With lower price the sales increase.

On the basis of data consisting of basic weekly prices *BP*, prices reflecting the method including storage *CP*, average aggregate distributor prices *APGFD*, adjusted average aggregate distributor prices *AAPGFD* and minimal distributor prices *MPGFD*, we designed a chart for petrol Natural 95, covering the period from 1 January 2012 to 30 June 2012. A more detailed description of the respective prices is outlined in the Methodology.

Figure 1 Development of monitored prices of petrol Natural 95 in the first half of 2012



Source: Authors; [6];[11].

The calculation of *CP* is based on the comparison of six previous weeks' prices with the current price. All the items depend on the storage limit in cubic metres during the first calendar month. The lowest possible storage fee is approximately CZK 0.30 per litre during the first calendar month in the case of the highest storage limit [8]. With lower volumes, the fee increases. If the goods continue to be stored in the next calendar month, the company requires another payment of the fee on storage and protection. Thus, the distributor's costs increase and the storage become less profitable.

The next step was choosing the lowest price in the monitored period and if profitable, the fee related to storage was added to the previous weeks' price. The prices for the previous period had to be organized in the chronological order. Subsequently we made a comparison between the current price and the set of prices which had been added the fee charged by ČEPRO, a.s. (4): If the price was still more profitable after the end of the calendar month, another CZK 0.08 per litre was added for storage in the next calendar month. The interval of six-week prices corresponds to the monthly value added tax period. 49 calendar days were included in this manner.

It is apparent from the chart that the storage ceases to be profitable in a certain week and therefore the values correspond to the basic weekly price.

The adjusted average aggregate prices of distributors *AAPGFD* are obtained by reducing the average aggregate price of distributors *APGFD* by 0.50 CZK/l, because 82% of respondents said the value of the difference between the prices of alternative suppliers potentially affected by tax fraud and their usual suppliers' prices was 0.51 CZK/l or more.

There is a rather significant gap between the minimal price *MPGFD* during the period and the combination of either the average price after subtracting the CZK 0.50 *AAPGFD* or the method taking into account the storage fee *CP*. In our opinion, business entities selling fuels below this level should be subject to inspection and must reason the manner in which such prices were set. Such prices need not necessarily be the result of tax evasion, but the risk of and tendency toward tax fraud are significantly higher here. Also prices below *MPGFD* are in the risk zone and there is an objective reason for the inspection of their origin.

The proposed solution corresponds to the situation in the fuel market, where problems arise mainly in the process of collection of the value added tax from short-term companies. The tax administrator could use the proposed solution and respond to potential threats and unusually low prices that may be the suitable primary identifier.

5 Conclusions

The inspection of taxpayers by the tax administrator is essential for detecting tax evasion. However, this measure was challenged by the decision of the Constitutional Court of the Czech Republic, which ruled out the arbitrariness of inspection as interference with rights of individual privacy. The decision did not specify whether it applied only to natural or also to legal persons. On the other hand, the Ministry of Finance and the Supreme Administrative Court of the Czech Republic supported the tax administrator in its action, and therefore the Constitutional Court had to reopen the case and this time decided in favour of inspections. Another change of opinion may occur over the time and therefore the authors of this contribution tried to ascertain prices in the fuel market and to use them as red flags suggesting occurrence in the risk zone.

It was found out that a risk zone price existed in each monitored moment. Such prices were lower than the reference price CP which considered storage possibilities, and lower than average aggregate prices of the General Financial Directorate AAPGFD which considered the qualified estimate of the survey respondents.

Our research shows that selling prices that are located in our defined risk zones are considered a real threat in relation to tax evasion. It is necessary to consider that selling prices between distributors and their customers are in real time. Our research as well as data provided by tax authorities is ex post, which means that we have a relatively large amount of information that the common trader does not have. A question then arises about how to provide taxpayers with enough information in real time. This is a question concerning Directive 2006/112/ES, according to which it should be possible to transfer the liability for unpaid tax from the provider to the recipient of the taxable supply [3]. In the Czech Republic it is one of the conditions of sale for unusual prices, more precisely for prices lower than the usual price without any economic justification.

Although the authors try to eliminate taxpayers' burden to the maximum possible extent, there is a risk that some of them shall be asked to present a proof of purchase. The main questions should be where the goods were purchased and whether the provider of taxable supply paid the value added tax. If the price occurred within the risk zone that we defined, the seller may be

subject to sanction and the buyer to the liability for unpaid taxes (Section 109 Act on Value Added Tax [30]). In case they submit a relevant proof of purchase, sanction shall not be imposed.

Acknowledgments

The paper was funded by an Internal Grant Agency IGA, Grant Project No. 13/2014 at the Faculty of Business and Economics, Mendel University in Brno.

References

[1] Allingham, M.G. – Sandmo, A. (1972) Income tax evasion: A theoretical analysis. *Journal of Public Economics* [online]. Elsevier. November 1972, vol. 1(3-4), 323-338 [Accessed 1st February 2014]. Retrieved from: doi: 10.1016/0047-2727(72)90010-2

[2] Andreoni, J. (1998). Tax Compliance. *Journal of Economic Literature*. 36 (2). pp. 818–860.

[3] Council Directive 2006/112/EC of 28 November 2006 on the common system of value added tax.

[4] Czech Chamber of Commerce. (2009). *K rozhodnutí ústavního soudu o namátkových finančních kontrolách.* Retrieved from: http://www.komora.cz/aktualni-zpravodajstvi/aktuality-1/k-rozhodnuti-ustavniho-soudu-o-namatkovych-financnich-kontrolach-.aspx

[5] ČEPRO. (2012a). *Annual report 2012*. Retrieved from: https://www.ceproas.cz/public/data/media/vyrocni_zpravy/CEP_vz12.pdf

[6] ČEPRO. (2012b). *Information about the basic weekly prices*. Retrieved from: https://www.ceproas.cz/kontakty

[7] ČEPRO. (2013a). *Produktovodní síť a střediska*. Retrieved from: <https://www.ceproas.cz/produktovodni-sit-a-strediska>

[8] ČEPRO. (2013b). *Smlouva o poskytování služeb při nakládání s minerálními oleji*. p. 28. Retrieved from: https://www.ceproas.cz/kontakty

[9] Fedeli, S. – Forte, F. (2011). International VAT Fraud: The Carousel Game. *Journal of Modern Accounting and Auditing.* 7 (3). pp. 211-226.

[10] Gebauer, A., et al. (2007). Can reform models of value added taxation stop the VAT evasion and revenue shortfalls in the EU?. *Journal of Economic Policy Reform*. 10 (1). pp. 1–13.

[11] General Financial Directorate of the Czech Republic (GFD). (2012). Internal data available from GFD according to the Act No. 106/1999 Coll., on free access to information (Czech Republic).

[12] Gomez-Plana, A.G. – Arzoz, P.P. (2011). Tax Fraud and value-added tax in Spain: Incidence in a general equilibrium model. *Hacienda Publica Espanola – Review of Public Economics.* 199 (4). pp. 9–52.

[13] Gordon, R.H. – Nielsen, S.B. (1997). Tax evasion in an open economy: Value-added vs. income taxation. *Journal of Public Economics.* 66(2). pp. 173–197.

[14] Hashimzade, N., et al. (2010). Tax fraud by firms and optimal auditing. *International Review of Law and Economics*. 30 (1) pp. 10–17.

[15] Keen, M. – Smith, S. (2006). VAT fraud and evasion: What do we know and what can be done?. *National Tax Journal*. 59 (4). pp. 861–887.

[16] Loula, V. (2012). Přednáška ropa, paliva, svět, trh ČR. In *PETROLSummit* 12. 2012. Prague: PETROLmedia.

[17] Nález Ústavního soudu České republiky. I. ÚS 1835/07 ze dne 18. listopadu 2008. *Důvody pro zahájení daňové kontroly - vyloučení svévole*.

[18] Nigrini, M. (2011). *Forensic Analytics: Methods and Techniques for Forensic Accounting Investigations*. Hoboken, NJ: John Wiley & Sons Inc.

[19] Podlipnik, J. (2012). *Missing Trader Intra-Community and Carousel VAT Frauds – ECJ and ECtHR Case Law*. Croatian Yearbook of European Law & Policy. 8, pp. 457-472.

[20] Sandmo, A. (2005). The Theory of Tax Evasion: A Retrospective View. *National Tax Journal.* 58 (4). pp. 643– 663.

[21] Sdělení Ústavního soudu České republiky. sp. zn. Pl. ÚS-st. 33/11 ze dne 8. listopadu 2011.

[22] Semerád, P. (2013). Stanovení ceny obvyklé u pohonných hmot v podmínkách České republiky. *Odhadce a oceňování majetku*. 19 (3-4). pp. 46-57.

[23] Semerád, P., et al. (2013) Karuselové podvody u daně z přidané hodnoty se zaměřením na trh s pohonnými hmotami. In *Trendy v podnikání 2013*. Plzeň: Západočeská univerzita v Plzni, pp. 1-5.

[24] Slemrod, J. (2007). Cheating Ourselves: The Economics of Tax Evasion. *Journal of Economic Perspectives*. 21 (1). pp. 25-48.

[25] Šemeta, A. (2011) *Editorial – The Future of VAT*. EC Tax Review [online]. 1, pp. 2-3.

[26] Usnesení Nejvyššího správního soudu č. 2 Afs 144/2004-110 ze dne 31. srpna 2005.

[27] Usnesení Nejvyššího správního soudu č. 2 Aps 2/2008 ze dne 3. prosince 2009

[28] Usnesení Nejvyššího správního soudu č. 2 Afs 79/2008 ze dne 24. září 2008

[29] Wu, R.S., et al. (2012). Using data mining technique to enhance tax evasion detection performance. *Expert Systems with Applications*. 39 (10). pp. 8769–8777.

[30] Zákon č. 235/2004 Sb., o dani z přidané hodnoty, v platném znění (Czech Republic).

ENVIRONMENTAL TAXES IN NEW 12 EU MEMBER STATES: A SUITABLE TOOL FOR ACHIEVING THE KYOTO PROTOCOL COMMITMENT?

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ABSTRACT

The aim of the paper is to research, whether new EU member states use environmental taxes as a tool for declining the greenhouse gas emissions based on the Kyoto Protocol commitment or whether environmental taxes are used as a tool for raising budget revenues. The environmental taxes are analysed from the different points of view, mainly through the implicit tax rate on energy, and through carbon taxation. The paper provides facts that the environmental tax revenue of new EU member states constitutes 8.20% of total EU28 environmental tax revenue in 2012 and its tendency is increasing compared to 2004 as well as the implicit tax rate on energy at most of new EU member states. However, according to the overall results only Slovenia and Malta can be considered as states using environmental taxes as a tool for declining the greenhouse gas emissions.

Keywords: greenhouse gas emissions, new EU member states, environmental tax revenue, carbon taxation

JEL codes: Q54, H23, F64

1 Introduction

Many international organizations and institutions are dealing in detail with the issue of climate change/global warming, and try to eliminate its adverse effects, for example increasing global average temperatures [14], sea level rise [20], a higher frequency of extreme weather events [22] and others. Based on the Kyoto Protocol and its Doha Amendment for the second period of commitment from 2013 to 2020 was made a new commitment to reduce greenhouse gas emissions at least 20% in 2020 compared to 1990 levels [5]. Furthermore, the EU committed to decrease greenhouse gas emissions at least 40% in 2030 compared to 1990 levels [13].

Currently in the EU, the most commonly used environmental policy instruments are environmental taxes and EU Emissions Trading Systems. The approach to environmental taxes in the EU has concentrated on the discouraging behaviour that is potentially harmful to the environment [15]. However, currently effective environmental taxes in EU do not reflect the energy content or the CO_2 emissions of the taxed energy products. Due to this fact, the European Commission proposed revision of the ETD on 13 April 2011, which introduces CO_2-related taxation, which has been applied after the proposal by several EU member states [6].

It can be considered that the environmental policy of 28 member states is not consistent, mainly due to the fact that there are different levels of CO_2 pollution, energy or carbon intensities, and other aspects related to greenhouse gas emissions and to the Kyoto reduction target. Moreover

the EU has been still enlarging and it makes the situation more complicated as the new EU member states are situated in the Eastern Europe where usually agriculture or/and heavy industries prevail over other sectors than it is usual in the West Europe, where is the shift to the low-carbon industries.

The aim of the paper is to research, whether new EU member states use environmental taxes as a tool for declining the greenhouse gas emissions based on the Kyoto Protocol commitment or whether environmental taxes are used as a tool for raising budget revenues. To accomplish this aim, it is firstly necessary to evaluate the fulfilment of the commitment to the Kyoto Protocol, then to analyse each kind of environmental tax in the respect of absolute value, as a percentage of GDP and taxes and social contributions. Secondly, it is necessary to analyse the largest part of environmental taxes by economic activity and in the respect of implicit tax rate. Finally, the analysis of introduced carbon taxation has to be made.

2 Literature Review

In literature can be identified four basic types of environmental policy instruments, namely charges and taxes, tradable emissions permits, subsidies, and deposit-refund systems [17]. Currently the EU environmental policy used mainly environmental taxes and EU Emissions Trading Systems.

The rationale for environmental taxes was developed by economist Arthur Pigou that levies a tax on the activities giving rise to the externalities, which are harmful to the environment or which cause CO_2 emissions, as a solution for properly valuation of product [21]. Environmental taxes are considered as a cost-effective instrument which influences consumers and producers behaviour to the way to use natural resources responsively, and which limits or avoids environmental pollution [8]. Further based on the double dividend theory, environment taxes increase environment protection and reduce distortionary taxes on the economy [19], [3], [16].

The EU Emissions Trading System (hereinafter EU ETS) established in 2005 works on the cap-trade principle and covers major energy and industrial installations as a major polluters with aim to achieve both significant investments in low-carbon technologies and reduction of greenhouse gas emissions. However, based on the low average emissions allowance prices during the III. phase (the weighted average clearing price was EUR 5.53 per emissions allowances, June 2014) [12], the EU ETS does not create a desirable result in the form of consistent CO_2 price signal for strategic environmental investment decisions [23], [2].

Therefore is recommended to implement a carbon taxation to achieve higher effectivity of environmental taxes, as carbon taxes are both statically and dynamically efficient in the short run as well as in the longer run. Furthermore, it can serve as revenue raising instrument [4]. In addition, this kind of taxation can be considered as an alternative approach for setting up an energy efficiency that have the effect of reducing end-use energy consumption with result of declining greenhouse gas emissions. This approach was also supported by the Energy Efficiency Directive 2012/27/EU.

3 Data and Methodology

An analysis of the environmental taxes as a tool for achieving the Kyoto Protocol commitment or as a tool for raising budget revenues was performed on the new EU member states, namely Bulgaria, the Czech Republic, Estonia, Croatia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Romania, Slovenia and Slovakia, which have enlarged the EU since 2004. Further,

there are mentioned EU28 or EU27 as a comparable unit. Eurostat and European Environment Agency (hereinafter EEA) were used as a source of data set.

An environmental tax is defined as a tax whose tax base is a physical unit of something that has a proven, specific negative impact on the environment, and which is identified in ESA95 as a tax. For analytical purposes, the environmental taxes are divided into four categories: energy taxes including carbon dioxide (CO_2) taxes, transport taxes, pollution and resource taxes. Two last categories are analysed together because of their small share in total tax revenue.

Environmental tax revenues from all four categories were analysed from the different points of view i.e. as an absolute amount in Million EUR (from 1.1.1999), as a percentage of taxes and social contributions (hereinafter TSC) and as a percentage of GDP. Data of all new EU member states was gained from Eurostat, online data code *env_ac_tax*. Data from the last available year (2012) was compared with 2004. Furthermore, the energy taxes as the largest category of the environmental tax revenue were analysed based on economic activity (tax payers) using NACE[1] codes for production activities plus households. The analysed NACE (activity units) were selected as sectors with the highest greenhouse gas emissions, specifically NACE A, B, C, D, F, G, H and households. The primary data was gained from Eurostat, online data code *env_ac_taxind2* for 10 new EU member states, for Poland and Cyprus no data available, and in case Croatia only total amount available. The reference year was 2011 and measured unit Million EUR (from 1.1.1999). In the end, the development of the implicit tax rate (hereinafter IETR) on energy was considered. Data was gained from Eurostat, online data code *tsdcc360* for all new EU member states. This indicator is defined as the ratio between energy tax revenues and final energy consumption calculated for a calendar year, and represents a Sustainable Development Indicator of the EU Sustainable Development Strategy:

$$IETR = \frac{Energy\ tax\ reveues}{Final\ energy\ consumption} \quad \text{[EUR per TOE] (1)}$$

Where, energy tax revenues are measured in 1000 EUR (deflated with the final demand deflator) and the final energy consumption in 1000 TOE (tonnes of oil equivalent), therefore the IETR on energy is measured in EUR per TOE. The final energy consumption covers energy consumed in the transport, industrial, commercial, agricultural, public and households sectors but exclude deliveries to the energy transformation sector and to the energy industries themselves. The indicator IETR on energy measures the development of the burden of taxes on energy consumption. It treats equally all kinds of energy consumption, regardless of their environmental impact. Many countries have set up energy taxes as an economic instrument aimed at achieving the Kyoto Protocol commitment.

4 Results and Discussion

Regarding the Kyoto targets, all the new EU member states, except of Slovenia, are deeply below the 8% reduction's target. However in the respect of the newly set target (20% reduction of greenhouse gas emissions) for the second commitment period from 2013 until 2020, five countries (Croatia, Poland, Slovenia, Malta and Cyprus) have to decrease their level of greenhouse gas emissions to achieve the Kyoto target. The biggest decreases have to be achieved by Malta (71%) and Cyprus (67%), mainly due to the fact, that they had no legal targets for the first commitment period until 2012.

[1] NACE is the Statistical Classification of Economic Activities in the European Community.

The analysis of the environmental taxes as a tool for achieving the Kyoto Protocol commitment or as a tool for raising budget revenue gave interesting results. Environmental tax revenue of the new EU member states amounted to EUR 25,576 million in 2012 or 8.20% of total EU28 environmental tax revenue. It represents more than 2% increase of the share on the EU level compared to 2004. Energy taxes amounted to almost 84% of this amount (compared to 79% in 2004), followed by transport taxes (10.36% compared to 15.84% in 2004) and taxes on pollutions/resources (5.9% compared to 5.33% in 2004). In 2012, among the new EU member states, the share of energy taxes in the total environmental taxes ranged between 53.05% for the Malta and 94.12% for the Lithuania; the average share was around 80%. In the case of transport taxes, their share in the total ranged between 2.2% for Estonia and 42.68% for Malta, however it varies across all new EU member states (the average share was around 15%). Taxes on pollutions/resources represent lower shares in most new EU member states, it ranged between 1.05% for the Czech Republic and 20.33% for Croatia. However, Croatia and other countries (Estonia, Hungary, Romania, Slovenia and Poland) are exemptions where taxes on pollutions/resources represent higher share. For more details see Table 1 in Annex.

Furthermore, the highest amount of energy tax revenue was reached by Poland (EUR 8,215 million or 1.94% of GDP), followed by the Czech Republic (EUR 3,349 million or 2.19 of GDP) and Romania (EUR 2,261 million or 1.7% of GDP). In case of transport taxes, the highest amount of revenue was also reached by Poland (EUR 735.54 million or 0.19% of GDP) and followed by Hungary (EUR 410.33 million or 0.42% of GDP). All the new EU member states reported an increase of the total environmental tax revenue in 2012 compared to 2004. For more details see Table 1 in Annex.

In 2012, the environmental tax revenue as a percentage of GDP exceeded the average of the EU28 (2.4% of GDP) in the most new EU member states and have converged to a level between 1.66% and 3.82% of GDP. There were only three states with revenues less than 2% of GDP (Romania with 1.94% of GDP, Slovakia with 1.75% of GDP and Lithuania with 1.66% of GDP) and two states with revenues over 3% of GDP (Croatia with 3.18% of GDP and Slovenia with 3.82% of GDP). For more details see Table 1 in Annex.

Further, in the respect of shares of the environmental tax revenue in taxes and social contributions (TSC) as well as energy taxes, all new EU member states also exceeded the average of EU28 (6.05% of TSC and 4.53% of TSC respectively), in 2012. Their share of total environmental tax revenue in TSC ranged between 6.12% for the Lithuania and 10.15% for Slovenia, the average was 7.91% of TSC. Further the share of energy taxes in TSC ranged between 2.82% for Bulgaria and 8.25% for Slovenia, the average was 5.42% of TSC. Regarding transport taxes and taxes on pollutions/resources the results varies across all new EU member states. More than half of the new EU member states presents shares of pollutions/resources taxes as a percentage of TSC above the EU28 average (0.26%). The lowest share was reported by the Czech Republic (0.07% of TSC). Further, in case of transport taxes as a percentage of TSC, the only four new EU member states exceeded the EU28 average (1.25% of TSC). The lowest share was reached by Lithuania (0.17% of TSC). For more details see Table 1 in Annex.

Regarding the development of environmental tax revenues in relation to TSC and GDP, almost all new EU member states recorded a decrease since 2004, for example the largest decreases in the environmental tax share of TSC since 2004 was observed at Cyprus and Lithuania (by 4.58% and 2.15% respectively). Further, the only Estonia, Slovenia, Bulgaria and Malta reported increase in individual categories, for more details see Table 1 in Annex.

As regard to the largest share of energy tax revenue in total environmental tax revenue in the new EU member states, is interesting to analyse a breakdown by economic activity. The largest share of energy tax revenue is paid by households; totally they paid EUR 4,280 million

(33.07%). Other NACE sectors with larger share on it are NACE sector C - Manufacturing (EUR 2,565 million, 19.82%) and followed by H – Transportation and storage (EUR 1,895 million, 14.64%). For more details see tab. 2 below.

Table 2 Energy tax revenue by economic activity, 2011 (million EUR)

NACE** /GEO*	A	B	C	D	F	G	H	Households	Other NACE	Total
BG	54.43	22.86	117.43	12.77	54.68	45.68	242.61	356.92	75.37	**982.75**
CZ	130.01	26.19	744.9	192.48	131.03	477.39	590.16	727.98	384.13	**3 404.27**
EE	13.59	4.78	21.91	8.97	13.78	24.16	115.46	136.16	52.04	**390.85**
HR	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	**806.83**
LV	30.1	3.58	21.86	12.42	20.88	23.98	70.76	177.92	29.41	**390.91**
LT	36.92	1.39	64.21	26.2	6.97	11.83	73.42	253.03	23.14	**497.11**
HU	107.42	5.5	39.97	99.69	10.44	156.75	281.22	1 070.54	177.92	**1 949.45**
MT	1.55	0.26	2.42	28.47	2.3	1.66	10.86	17.39	42.44	**107.35**
RO	37.59	54.18	692.95	93.85	41.11	0	457.21	864.7	6.1	**2 247.69**
SI	0.01	0	172.52	30.9	0.01	9.22	47.26	675.5	83.23	**1 018.65**
SK	0.35	0.18	687.53	44.44	0.04	404.77	6.87	0	2.19	**1 146.37**
Total	**411.97**	**118.92**	**2,565,70**	**550.19**	**281.24**	**1,155.44**	**1,895.83**	**4,280.14**	**1,682.80**	**12,942.23**
%	**3.18**	**0.91**	**19.82**	**4.25**	**2.19**	**8.92**	**14.64**	**33.07**	**13.0**	**100%**

*Poland, Cyprus – data not available. Croatia – only total amount available.
**NACE code: A – Agriculture, forestry and fishing; B- Mining and quarrying; C - Manufacturing; D – Electricity, gas, steam and air conditioning supply; F - Construction; G – Wholesale and retail trade, repair of motor vehicles and motorcycles; H – Transportation and storage.
Source: primary source [10], own processing.

However, the situation varies across the new EU member states, from the individual perspective. The relative largest contributions of households to total energy tax revenue were reported by Slovenia (66.31%), followed by Hungary (54.91%) and Lithuania (50.90%). On the other hand Malta and the Czech Republic observed the relative lowest contributions, 16.19% and 21.38% respectively. Even that the Czech Republic accounted for the third largest energy tax revenue in absolute terms. Further, in NACE sector C, the relative largest contributions were reported by Slovakia (59.97%), followed by Romania (30.83%) and the Czech Republic (21.88%), contrary with the lowest contribution of Hungary (2.05%). The sector H contributed from 0.60% of total energy tax revenue in Slovakia to 29.54% in Estonia; while the largest energy tax revenue in absolute terms were reported by the Czech Republic (EUR 590.16 million) and Romania (EUR 457.21 million). The relative highest contribution to energy tax revenue from the sector D was reported by Malta (28.47%), although in absolute terms it was by the Czech Republic (EUR 192.48 million). In case of sectors A, B, F and G the relative largest contributions were observed in Latvia (7.70%), Romania (2.41%), Bulgaria (5.56%) and Slovakia (35.31%) respectively. For more details see tab. 2 above.

Given to the implicit tax rate on energy as a Sustainable Development Indicator, the average EU28 (172.78 EUR per TOE, in 2012) was reached only by Malta with 200.37 EUR per TOE and followed by Slovenia (172.24 EUR per TOE). Due to the fact that IETR measures energy tax revenues and final energy consumption calculated for a calendar year i.e. the taxes levied on the use of energy, it represents whether states use taxes for the decrease of the use of energy, which in the final point of view contributes to foster energy efficiency and to decline of the greenhouse gas emissions. Otherwise, there is assumption that the environmental taxes are used as a tool or raising budget revenues. Among the new EU member states, in 2012 IETR varied between 47.52 EUR per TOE for Slovakia and 200.37 EUR per TOE for Malta. Other high rates were observed by Slovenia and Cyprus (141.29 EUR per TOE), in contrast to the lowest

rates reported by Slovakia and Bulgaria (65.51 EUR per TOE), which are at least three time less than EU28 average. Further based on the development of IETR during 1995 to 2012, the real burden of taxation on energy increased in all new EU member states, except Cyprus, where the IETR decreased from 295.21 to 141.29 EUR per TOE (or by 52%). In case of the shorter period, 2004 to 2012, the real burden of taxation on energy decreased in Croatia, Lithuania and Slovakia. For more details see tab. 3 below.

Table 3 Implicit tax rate on energy (EUR per TOE)

GEO/Year	1995	2000	2004	2007	2008	2009	2010	2011	2012
EU28	n.a.	n.a.	167.6	164.25	159.94	172.44	165.61	173.99	172.78
BG	19.53	38.29	51.1	65.39	72.74	73.28	69.04	66.81	65.51
CZ	49.2	53.29	66.7	77.28	76.76	80.14	76.84	83.09	79.08
EE	9.49	31.3	53.5	68.63	70.56	87.28	85.86	87.64	91.12
HR	17.32	48.08	113.7	106.12	92.12	67.5	107.11	90.91	87.43
CY	295.21	245.27	132.2	121.48	110.71	211.3	130.45	140.28	141.29
LV	30.61	43.03	62.9	70.93	67.96	112.77	61.84	70.43	70.43
LT	23.06	57.6	70.6	73.37	72.9	79.34	72.53	70.98	69.65
HU	71.9	76.89	68.7	79.42	77.61	77.12	77.19	74.83	75.41
MT	65.01	132.12	126.1	233.19	157.44	170.32	173.8	201.21	200.37
PL	28.91	58.57	75.9	92.67	91.42	92.12	89.3	95.03	96.38
RO	19.78	57.57	50.6	58.93	53.61	64.24	68.6	66.03	68.13
SI	133.55	110.18	127.9	136.73	131.61	174.87	170.05	159.07	172.24
SK	36.49	39.71	52.1	51.88	51.53	49.72	45.5	48.58	47.52

Source: primary source [18].

As regard to carbon taxation as another tool for achieving the Kyoto Protocol commitment and energy efficiency. Several new EU member states have already introduced taxation based on CO_2. Currently 4 countries (Latvia, Malta, Romania and Slovenia) apply some form of CO_2 tax in the transport area. In the category of air pollution, 4 countries (Estonia, Poland, Romania and Slovenia) apply CO_2 taxation in the energy area. However, only 2 countries, namely Romania and Slovenia, implemented CO_2 taxation in both areas (for details see table 4 below).

Table 4 Overview of CO_2 taxation in the new EU Member States

CO_2 taxation based on the registration and/or ownership of passenger car – in the transport area	Latvia, Malta, Romania, Slovenia
CO_2 taxation based on the pollution of air – in the energy area	Estonia, Poland, Romania, Slovenia
CO_2 taxation covered in both area	Romania, Slovenia

Source: primary source [1], [18], own processing.

5 Conclusions

The paper examined, whether the new EU member states use environmental taxes as a tool for declining the greenhouse gas emissions accordingly the Kyoto Protocol commitment or whether environmental taxes are used as a tool for raising budget revenues.

Regarding the new Kyoto targets five countries (Croatia, Poland, Slovenia, Malta and Cyprus) have to decrease their level of greenhouse gas emissions to achieve the Kyoto Protocol commitment. The biggest decreases have to be achieved by Malta (71%) and Cyprus (67%), mainly due to the fact, that they had no legal targets for the first commitment period until 2012 (for details see table 5 below).

As regard as the environmental tax revenue, the new EU member states amounted to EUR 25,576 million or 8.20% of total EU28 environmental tax revenue in 2012. All of them reported

an increase of the total environmental tax revenue compared to 2004. Moreover, the majority of the new EU member states also exceeded the average of the EU28 as a percentage of GDP. Furthermore, in the respect of energy tax revenue breakdown by economic activity, the largest share of energy tax revenue is paid by households (totally EUR 4,280 million, or 33%), followed by sector C - manufacturing (EUR 2,565 million, or almost 20%) and sector H – transportation and storage (EUR 1,895 million or almost 15%), although the situation varies across the new EU member states. In addition, based on the implicit tax rate, the only Malta and Slovenia reached or exceeded the average of the EU28 (172 EUR per TOE). The rest of the new EU member states were deeply below the EU28 average (172.78 EUR per TOE), e.g. Slovakia (47 EUR per TOE) and Bulgaria (65 EUR per TOE).

To summarise the overall picture of the environmental taxes in new EU member states, in case of Slovenia and Malta can be concluded that both States use the environmental taxes together with carbon taxes as a tool for achieving the Kyoto Protocol commitment. As can be seen in table 5 below, its implicit tax rates and environmental taxes as a percentage of GDP reach the highest values and furthermore, both states have applied the carbon taxation. Its actions are inevitable and reasonable since Malta and Slovenia have to decrease its greenhouse gas emissions by 71% and 25% respectively based on the Kyoto target. As regard to other new EU member states it has been still questionable whether States use the environmental taxes as a tool for achieving the Kyoto Protocol commitment, it seems that they use environmental taxes mainly as a source for raising the budget revenues. According to the development of IETR during 2004 to 2012, its values are still deeply below the EU28 average in the amount of 172.78 EUR per TOE, and moreover, the real burden of taxation on energy decreased in Croatia, Lithuania and Slovakia.

Table 5 Overall evaluation of environmental taxes in new EU member states*

Country	Kyoto target (2011)[1]	Environmental tax revenue % of GDP (2012)	Implicit tax rate (2012)	Carbon taxation
EU28/27	83	2.4	172.78	-
BG	60 (4)	2.82 (4)	65 (12)	No (3)
CZ	68 (7)	2.35 (10)	79 (7)	No (3)
EE	51 (3)	2.78 (5)	91 (5)	Yes (2)
HR	89 (9)	3.18 (2)	87 (6)	No (3)
CY	147 (11)	2.67 (6)	141 (3)	No (3)
LV	44 (1)	2.42 (9)	70 (9)	Yes (2)
LT	44 (1)	1.66 (13)	69 (10)	No (3)
HU	67 (6)	2.55 (7)	75 (8)	No (3)
MT	151 (12)	2.98 (3)	200 (1)	Yes (2)
PL	87 (8)	2.52 (8)	96 (4)	Yes (2)
RO	50 (2)	1.94 (11)	68 (11)	Yes (1)
SI	105 (10)	3.82 (1)	172 (2)	Yes (1)
SK	63 (5)	1.75 (12)	47 (13)	No (3)

*in bracket is mentioned position between new EU member states
(1) Indexed to 1990
Source: primary source [1], [7], [9], [11], [18], own processing.

To bring the paper to a close, there can be made one recommendation how can be achieved the Kyoto Protocol commitment and decreased greenhouse gas emissions, specifically to impose carbon taxes with aim to change a customer's behaviour.

Acknowledgments

The paper is the result of the project "Postdoc contracts at MENDELU technical and economic research" No. CZ.1.07/2.3.00/30.0031 as Investments in Education Development at Mendel University in Brno.

References

[1] ACEA, European Automobile Manufacturers Associations. (2014). *CO2 based motor vehicle taxes in the EU.* Retrieved from: http://www.acea.be/uploads/publications/CO_2_Tax_overview_2014.pdf

[2] Borenstein, S. – Bushnell, J. – Frank A. Wolek – M. Zaragoza-Watkins (2014). Expecting the unexpected: Emissions uncertainty and Environmental Market Design. Retrieved from: http://web.stanford.edu/group/fwolak/cgi-bin/sites/default/files/NBERpaperV12.pdf

[3] Bovenberg, L. – R. A de Mooij. (1997). Environmental tax reform and endogenous growth. Journal of Public Economics, 63, pp. 369-391.

[4] Cuervo, J. - Ved P. Gandhi. (1999). Carbon taxes: Their macroeconomic effects and prospects for global adoption, *EconPapers*, Revista Desarrollo Y Sociedad.

[5] Doha Amendment. (2012). Retrieved from: https://treaties.un.org/doc/Treaties/2012/12/20121217%2011-40%20AM/CN.718.2012.pdf.

[6] Ekins, P. - Speck, S. (2011). Environmental Tax Reform - A Policy for Green Growth. Oxford University Press, Oxford, New York.

[7] EEA, Eurostat. *Indicators for greenhouse gas emissions and air pollution*. Online data code: env_air_ind. Retrieved from: http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database.

[8] Eurostat (2010). Environmental statistics and accounts in Europe. Luxembourg: Publications Office of the European Union.

[9] Eurostat. *Environmental tax revenues*. Online data code: env_ac_tax. Retrieved from: http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database.

[10] Eurostat. *Environmental taxes by economic activity (NACE Rev. 2).* Online data code: env_ac_taxind2. Retrieved from: http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database.

[11] Eurostat. *Implicit tax rate on energy*. Online data code: tsdcc360. Retrieved from: http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database.

[12] European Energy Exchange. (2014). Auctions by the transitional common Auction platform. *Report June 2014.* European Commissions. Retrieved from: http://ec.europa.eu/clima/policies/ets/cap/auctioning/docs/cap_report_201406_en.pdf.

[13] European Commission. (2014). Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the regions. A policy framework for climate and energy in the period from 2020 to 2030. COM(2014) 15 final. Retrieved from: http://eur-lex.europa.eu/legal-content/en/TXT/?uri=celex:52014DC0015.

[14] Hegerl, G.C. - F.W. Zwiers - P. Braconnot - N.P. Gillet - Y. Luo - J.A. M. Orsini - N. Nicholls - J. E. Penner - P.A. Stott. (2007). Understanding and Attributing Climate Change. In Climate Change 2007: Impacts, Adaptation and Vulnerability, Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, ed. S. Solomon, D. Qin, M. Manning, Z. Chen, M. Marquis, K. B. Averyt, M. Tignor, H. L. Miller. Retrieved from: http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-chapter9.pdf.

[15] Kubátová, K. (2010). Daňová teorie a politika. Praha: Wolters Kluwer, Praha.
[16] Nerudová, D. – Dobranschi, M. (2014). Double dividend hypothesis: Can it occur when tackling carbon emissions? Procedia Economics and Finance, vol. 12, pp. 472-479.
[17] OECD (1997). Evaluating Economic Instruments for Environmental Policy, Paris: OECD.
[18] OECD/EEA. (2013). *OECD/EEA database on instruments used for environmental policy and natural resources management*. Retrieved from: http://www.eea.europa.eu/themes/policy/economic-instruments.
[19] Pearce, D. (1991). The role of carbon taxes in adjusting to global warming. Economic Journal, 101, pp 938-948.
[20] Pethica, J. - F. Fox - B. Hoskins - M. Kelly - J. Mitchell - S. Owens - T. Palmer, et al. (2010). Climate change: a summary of the science. Retrieved from: http://royalsociety.org/policy/publications/2010/climate-change-summary-science/.
[21] Pigou, A. C. (1920). The Economics of Welfare. London: Macmillan. Retrieved from: http://www.econlib.org/library/NPDBooks/Pigou/pgEW0.html.
[22] Smith - S. H. Schneider - M. Oppenheimer - G. W. Yohe - W. Hare - M. D. Mastrandrea - A. Patwardhan, et al. (2009). Assessing dangerous climate change through an update of the Intergovernmental Panel on Climate Change (IPCC) 'reasons for concern'. Proceedings of the National Academy of Sciences of the United States of America 106 (11) (March 17): 4133-7. doi:10.1073/pnas.0812355106. Retrieved from: http://www.pubmedcentral.nih. gov/articlerender.fcgi?artid=2648893&tool=pmcentrez&rendertype=abstract.
[23] Solilová, S. – Nerudová, D. (2014). Overall approach of the EU in the question of emissions: EU emissions trading system and CO2 taxation, Procedia Economics and Finance, vol. 12, pp. 616-625.

ANNEX

Table 1 Environmental tax revenue by type, 2004 – 2012

GEO/TIME		2004				2012			
		Million EUR	% total	% TSC	% GDP	Million EUR	% total	% TSC	% GDP
EU28	*Total environmental taxes*	276 557.18	100	6.66	2.59	311 682.78	100	6.05	2.4
	Energy taxes	211 400.18	76	5.09	1.98	233 762.16	75	4.53	1.8
	Transport taxes	56 149.05	20	1.35	0.53	64 582.72	21	1.25	0.5
	Taxes on pollutions/resources	9 007.95	3	0.22	0.08	13 337.89	4	0.26	0.1
BG	*Total environmental taxes*	647.49	100	9.76	3.18	1 119.49	100	10.11	2.82
	Energy taxes	567.8	88	3.3	1.48	995.15	89	2.82	1.28
	Transport taxes	42.4	7	0.64	0.21	104.13	9	0.94	0.26
	Taxes on pollutions/resources	37.3	6	0.56	0.18	20.21	2	0.18	0.05
CZ	*Total environmental taxes*	2 332.7	100	7.07	2.54	3 595.61	100	6.72	2.35
	Energy taxes	2 131.45	91	6.46	2.32	3 349	93	6.26	2.19
	Transport taxes	172.12	7	0.52	0.19	208.56	6	0.39	0.14
	Taxes on pollutions/resources	29.13	1	0.09	0.03	38.05	1	0.07	0.02
EE	*Total environmental taxes*	203.5	100	6.88	2.1	484.2	100	8.56	2.78
	Energy taxes	173.8	85	5.13	2.52	426.5	88	4.56	2.2
	Transport taxes	6.7	3	0.23	0.07	10.8	2	0.19	0.06
	Taxes on pollutions/resources	23	11	0.78	0.24	46.9	10	0.83	0.27
HR	*Total environmental taxes*	1 334.38	100	11.01	4.04	1 389.73	100	8.86	3.18

	Energy taxes	801.31	60	4.45	1.34	757.66	55	4.62	1.32
	Transport taxes	350.38	26	2.89	1.06	349.48	25	2.23	0.8
	Taxes on pollutions/resources	182.68	14	1.51	0.55	282.59	20	1.8	0.65
CY	*Total environmental taxes*	506.97	100	12.21	4.02	477.1	100	7.63	2.67
	Energy taxes	264.35	52	5.48	2.21	337.9	71	5.31	2.34
	Transport taxes	242.62	48	5.84	1.93	139.2	29	2.23	0.78
	Taxes on pollutions/resources				n.a.				
LV	*Total environmental taxes*	291	100	9.13	2.61	537.61	100	8.65	2.42
	Energy taxes	238.44	82	7.48	2.14	425	79	6.84	1.91
	Transport taxes	39.52	14	1.24	0.35	94.2	18	1.52	0.42
	Taxes on pollutions/resources	13.04	4	0.41	0.12	18.4	3	0.3	0.08
LT	*Total environmental taxes*	491.98	100	9.33	2.7	548.13	100	6.12	1.66
	Energy taxes	332.9	68	6.31	1.82	515.93	94	5.76	1.57
	Transport taxes	142.76	29	2.71	0.78	15.39	3	0.17	0.05
	Taxes on pollutions/resources	16.31	3	0.31	0.09	16.82	3	0.19	0.05
HU	*Total environmental taxes*	2 375.25	100	7.68	2.89	2 470.93	100	6.5	2.55
	Energy taxes	1 587.61	67	7.88	2.94	1 834.23	74	5.75	2.26
	Transport taxes	641.97	27	2.08	0.78	410.33	17	1.08	0.42
	Taxes on pollutions/resources	145.68	6	0.47	0.18	226.37	9	0.6	0.23
MT	*Total environmental taxes*	138.21	100	9.45	2.96	204.22	100	8.86	2.98
	Energy taxes	56.47	41	3.86	1.21	108.35	53	4.7	1.58
	Transport taxes	80.55	58	5.51	1.72	87.18	43	3.78	1.27
	Taxes on pollutions/resources	1.18	1	0.08	0.03	8.69	4	0.38	0.13
PL	*Total environmental taxes*	5 258.24	100	8.18	2.57	9 605.47	100	7.75	2.52
	Energy taxes	4 327.56	82	5.12	1.92	8 215.88	86	4.97	1.94
	Transport taxes	695.63	13	1.08	0.34	735.54	8	0.59	0.19
	Taxes on pollutions/resources	235.04	4	0.37	0.12	654.05	7	0.53	0.17
RO	*Total environmental taxes*	1 447.82	100	8.71	2.37	2 550.56	100	6.84	1.94
	Energy taxes	1 312.61	91	6.88	2.1	2 261.09	89	5.24	1.7
	Transport taxes	38.88	3	0.23	0.06	215.03	8	0.58	0.16
	Taxes on pollutions/resources	96.32	7	0.58	0.16	74.43	3	0.2	0.06
SI	*Total environmental taxes*	899.9	100	8.67	3.31	1 348.04	100	10.15	3.82
	Energy taxes	667.19	74	6.43	2.45	1 095.16	81	8.25	3.1
	Transport taxes	139.72	16	1.35	0.51	143.83	11	1.08	0.41
	Taxes on pollutions/resources	93	10	0.9	0.34	109.05	8	0.82	0.31
SK	*Total environmental taxes*	849.81	100	7.94	2.5	1 244.81	100	6.18	1.75
	Energy taxes	762.36	90	7.13	2.24	1 082.75	87	5.38	1.52
	Transport taxes	64.66	8	0.6	0.19	138.31	11	0.69	0.19
	Taxes on pollutions/resources	22.79	3	0.21	0.07	23.75	2	0.12	0.03

Source: primary source [9], own processing.

FRAUDS IN THE ECONOMIC PRACTICE AND POSSIBILITIES OF THEIR DETECTION

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ABSTRACT

Economic crime causes financial situation deterioration of organizations and loss of mutual business confidence. Management of many organizations in an effort to report and present better results illegally acquires the purposeful improvement of achieved results. Another reason of handling the output of accounting data is that under this fraudulently improved results management wants to attract more investors and seeks to reduce the tax base by cost overestimating or by revenues undervaluation. Forensic audit as a good corporate diagnostic tool can be used in determination of such a questionable areas and specifying their diagnosis, even in the proposal of an appropriate measures for their elimination and further prevention.

Keywords: forensic audit, forensic technology, forensic investigations

JEL codes: K42, M41, M42

Introduction

It is obvious that violations of laws and another regulations can have serious consequences for companies and may also represent a significant costs. Companies are nowadays subject of numerous local, national and international controls. Companies must avoid similar violations of laws and other regulations. Such economical, complex and independent investigations may focus on the misuse of personal data, the bribery of foreign public officers, the laundering of money from illegal activities, operations that may be considered a violation of business competition and the creation of cartels. That also applies to targeted distortion of accounting documents, which means that it is a manipulation with accounting information. The various manipulation techniques distinguish depending on whether a particular technique of distortion is more or less clear or whether its detection requires high professional qualification of Auditors. At first it must be examined a non-standard action to clarify the facts of the suspected fraudulent acts committed within the entity or against it.

1 The characteristics of fraudsters in Central and Easter Europe

Continuous development of international trade at the turn of the twentieth and twenty-first century requested the harmonization of accounting systems for the reason of the comparability of information that uses a wide range of users. If financial statements have to bring to users some benefits, they must have some essential characteristics. In analyze of financial statements we come from individual financial statements that have been prepared in accordance with international accounting standards due to existing differences between national legislation and

IFRS. It must be stated that not a form of presentation of information is important for the user, but their content. The preparation of financial statements is very difficult. In order to handle the matter in question, it is necessary to know in detail the related legislation. A conceptual framework for the preparation and presentation of financial statements, related international standards, as well as financial statements that are used for the calculation of financial indicators largely contribute to the adoption of decisions in the process of managing entities.

International Financial Reporting Standards are currently the most important means of harmonization of financial reporting in the European context and worldwide. The transition to IFRS is currently the most important step in the world of financial reporting. Effect of transition to IFRS goes far beyond of accounting itself. It applies to every business decision and not only in the way that is posted. Access to current knowledge and information is a key element. The more countries adopt IFRS as their "language of financial reporting," the more important role will play their consistent interpretation and application.

The basic assumption for the preparation of financial statements in accordance with IFRS is conceptual framework, which aims to create a single reporting system for the purpose of providing such information that is useful to a wide range of users. The objective of IAS 1 is to settle basic rules that must be followed in preparation of financial statements so that specific information needs of users of financial statements are satisfied. It must be also observed a going concern in the company and the accrual principle. Individual items of statements must be presented and classified consistently, i.e. equally in the two consecutive accounting periods. If, on the basis of exception (e.g. change of particular standard, a more appropriate presentation) are reclassified certain items, they must also be reclassified in compared accounting period. [5]

Another principle of the presentation of financial statements lies in the significance of homogeneous items. These must be presented separately. Insignificant items are aggregated with other items, even in the case of Notes to the financial statements. The balance sheet or profit and loss account shall not be compensated. The standard, however, allows exceptions to authorize compensation. The complete IFRS financial statements consist of:

- Statement of financial position.
- Statement of profit or loss / other comprehensive income.
- Statement of changes in equity.
- Statement of cash flows.
- Notes.

The difference between Slovak legislation and conceptual framework lies in the fact that in the conceptual framework directly warn that the individual financial statements are prepared for users who have sufficient knowledge and understanding of business and economic activities and who assess this information and make an analysis of this information. The information to individual users that they get from financial reporting must be reliable, relevant and comprehensive, so each user can make a qualified idea of a business unit financial situation.

To what extent, can we consider this information reliable? Even at present there are companies that take into account all the rules, purposely distorting accounting information for a variety of reasons. They follow the motto "creative accounting" - what is not forbidden is allowed. Such an approach eventually affects all users of this information - both internal and external. Business management through accounting and financial statements receives information as a basis for decisions of future activities and is acquainting with areas of activity that are for owners profitable and which not, whether the business unit keeps stable financial position and whether is achieving the objectives that have been set.

Presentation of the subject of accounting is authentic and fair, when accounting methods are used in a manner that leads to the achievement of authenticity, while the content of items in the financial statement is corresponding to the actual status, which is displayed in accordance with the accounting methods, the use of which is to the entity prescribed by law no. 431/2002 Collection of Accounting [4], where an entity can choose between several options of the accounting method and the chosen option would not corresponds an actual condition, the entity shall choose another option that corresponds to the actual condition. The specific form and content of accounting information depends on the person to whom such information is presented, what is required from that person and what decision-making tasks is addressed. If there is a suspicion of fraud, manipulation of accounting documents and information, bribery and corruption of the unfair financial operations, or bad financial management, it is necessary to carry out an independent investigation in the business unit, which will ensure a fast and efficient solution to these issues.

It is necessary to detect and investigate the non-standard activities with the aim of clarifying the facts related to suspected fraudulent acts committed within of a business unit or against it. A careful examination helps to the company management to clarify what happened, to get the greatest possible damage compensation at a minimum cost and to provide evidence for the needs of future proceedings. These activities include, for example, investigation of the theft of intellectual property and other intangible property, investigation and monitoring transactions, other activities associated with the search, detention and regaining the stolen money and property, or handling of economic result.

The KMPG Company in the study "Global profiles of the fraudster" presents the detailed characteristics of the fraudsters [1]. These frauds were detected on the basis of research of hundreds frauds investigated by KPMG member firms´ worldwide forensic specialists. The KPMG Company was dealing with at about 80 frauds in countries of Central and Eastern Europe. In this post we will select some of the main features that characterize the basic profile of the fraudster in Central and Eastern Europe and we will compare them with the differences to the global profile. It can be seen that in 44 percent of cases, the Director or Board of Directors is involved in a fraud. Frauds, which were investigated in Central and Eastern Europe, is more likely to occur at the level of the Executive management or the Board of Directors. Exactly these people commit frauds often involving their subordinates. The lack of surveillance and unlimited power creates an opportunity for manipulation. Therefore it can be concluded that, if the foreign parent companies gives to the management of their daughter companies the possibility of “free hands”, than it should be not be surprising if at some point occurs a misuse of their trust. Correctly set the principles and mechanisms for reporting unethical behaviour (known as the whistleblowing) within an organization can be provided by a communication channel and to use this channel of communication as an effective control in the fight against fraud and corruption.

If we compare obtained results of frauds investigation in Central and Eastern Europe with global results, it is obvious that the greatest contribution has the weak internal control system. Frauds in Central and Eastern Europe, however, in comparison with the overall results were in much greater measure the result of ruthless dishonesty despite the implemented control system. This is associated with higher hierarchic status of persons who are often involved in frauds, that were investigated in Central and Eastern Europe. Among them there are just those higher executives, who are ultimately responsible for the control environment in the company. As long as there is no independent oversight, it is possible to ignore that controls without any punishment. Executives are looking for ways to defraud the system. But there is a hidden danger that what we do not know, we cannot verify. It is therefore necessary to know the people with whom we come into contact.

Not only the fraudsters in Central and Eastern Europe, but also fraudsters in other countries, often cooperate with other people. Such jointly realized frauds were often committed with the participation of former colleagues or family members. However many fraudsters in the past never committed any fraud, often we find fraudsters that by reason of committed fraud or abuse of power were fired by their previous employers.

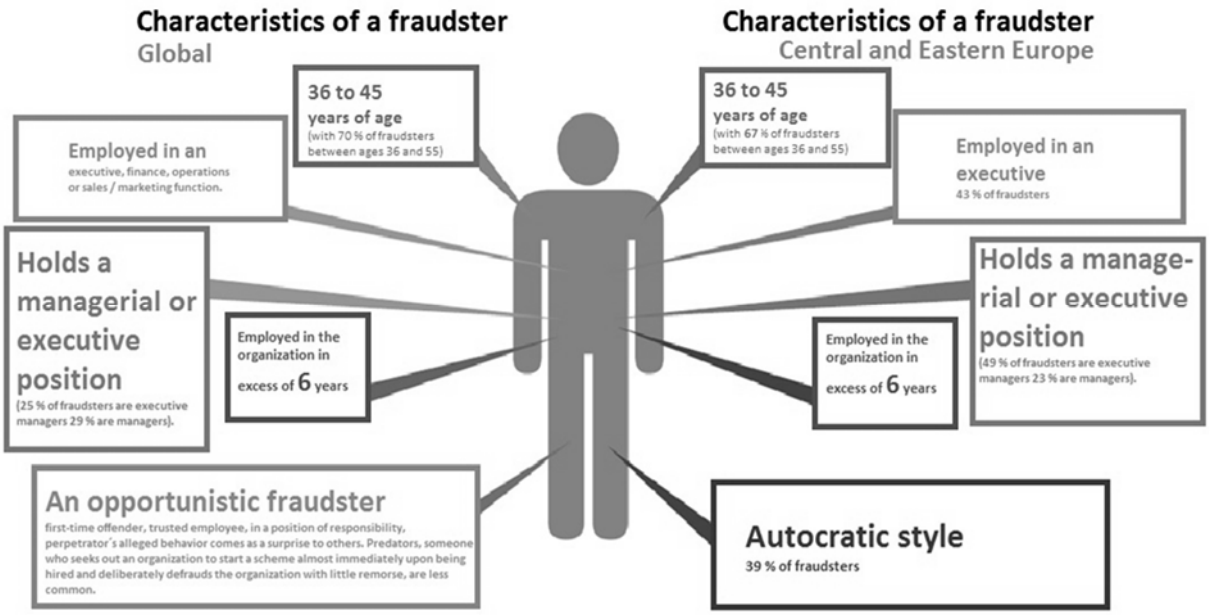
Careful verification of new workers and other periodic verifications of workers that occupy key positions, helps detect possible problems with the integrity of such persons. Also verification of major trading partners, in terms of their links to the employees, helps in the detection of potential conflicts of interest directly at an early stage of their formation.

A number of investigated cases of fraud have occurred not only in large multinational or national companies, but a significant part of the fraud was committed also in a small organizations. It is important that even smaller companies pay attention to the fraud risk management. Large companies increasingly attract the fraudsters, in particular due to their size. It is the size of the companies that makes them easier to deal with the losses that were caused by fraud. For a small companies this fact of occurrence of fraud often represents a threat to their existence.

2 The business unit management audit and forensic accounting

Difficult financial and tax issues allows fraudsters to take in the advantage in the accounting and financial frauds the imperfection of the legislation, the complexity and inefficiency of management control processes. An example is the manipulation of accounting records, the distortion and improving the business unit management, the falsification of financial statements, and also covering up incorrect management decisions. For the detection of such fraudulent practices are necessary in the context of forensic accounting an extensive experience with collecting, checking and analysis of the financial and accounting operations. A careful interpretation of the accounting records and knowledge of non-standard procedures allows early detection of very complicated accounting manipulations and financial transactions.

In the case of suspicion of a fraud, manipulation of accounting documents and information, bribery and corruption or the unfair financial operations and bad financial management, it is necessary to take the independent investigation. First of all, it should be examined non-standard activity to clarify the facts related to suspected fraudulent acts committed in the context of a business unit or against it. These activities include, for example, investigation of thefts of intellectual property objects and other intangible assets, the investigation and monitoring of transactions and other activities associated with the search, detention and regaining stolen money and property. The results of these activities are an important background not only for the control authorities of the company's Supervisory Board, i.e. the Board of directors or the members of the audit Commission, but also for the owners and top management of the company.



Source: [1]

The basic procedures for the detection of committing accounting fraud include [2]:

- obtaining evidence of unfair activity;
- an in-depth analysis of complex financial transactions;
- interviews with the responsible employees of the business unit;
- a thorough review and examination of individual accounting cases;
- reconstruction of distorted or missing accounting records;
- creation of a summary report with the results of the investigation.

The expected result of the forensic accounting and review of the business unit management is:

- detection of the history of the case and the length of the detection summary of non-standard activities;
- detection of the reason of the case, i.e. the determination of whether there has been an accidental error or deliberate tampering with the records;
- the identification and clarification of the structure of the fraudulent scheme;
- evaluation of the impact and the size of the potential losses.

Where appropriate, it is necessary to apply the knowledge and experience of experts on forensic technologies, an expert estimation of the damages and the legal services related to the recovery of damages.

3 Forensic technologies

It can be stated that in the current practice in almost all business transactions are carried out through electronic systems. Communication systems or computer networks, payment systems, accounting programs, and smart cards, are just part of a large number of systems that process and store important information into the data storage databases. The use of forensic technology has become a normal part of any investigation of detected frauds. The fraudsters, who falsify or change the paper documentation or accounting information, generally cannot modify the

relevant electronic records. This leaves behind visible tracks. But they often forget how much data, documents and sensitive information are stored on their computers and company's servers.

Analysis of the data, as one of the possible forensic technology in today's world of electronic media, is often the only option to identify fraudulent behaviour and to obtain evidence of his sentencing. In doing so, it is necessary to investigate, prove, find and view information in a hidden storage of electronic databases. Each business unit regularly records and stores a number of significant key data. Nevertheless, these data is the company often not able to analyse and convert them into a form in order to identify the potential risks of non-standard transactions and frauds, and at the same time to prevent from such frauds. To identify fraud it is necessary [3]:

- Search and effectively index documents in a fairly large databases of electronic documents, data, and e-mail;
- responsibly use the selected documents from databases especially in the activities of the legal offices and legal proceedings;
- to correctly identify non-standard transactions, i.e., to verify and test a database of business cases, payments, and accounting records for the presence of symptoms pointing to the existence of potential risk activities and transactions;
- to extract data and data from the selected data carriers and databases;
- examining and analysing extracted data and the data;
- summarize and complete the results of data analyses in the form of transparent presentations.

We believe that the scope of the present use of database systems in all areas of life has significantly increased the need for the existence of an efficient collection, analysis and subsequent presentation of the information obtained.

Analysis of digital data, information and documents, it is possible to:

- prevent fraud transaction by regular verification of databases and accounting banking transactions;
- check the suspicious activities of employees or external entities (clients, suppliers, and business partners);
- reveal the companies and persons involved in non-standard and illegal transactions;
- get electronic evidence of committed fraud;
- examine the control system to detect its weaknesses.

4 Fraud investigation and forensic audit

It is obvious that the deception is not always easy to detect. Even more difficult is to investigate them and also to prove them is very challenging. Fraudsters often become intelligent people, with perfect knowledge of the area and of the environment, and that possess sensitive information and have years of experience on the level of management. This is a common reason that detection of deception remains an issue of long time, often months, or years. In case of suspicion of fraudulent behaviour in the company should be as soon as possible, preferably already in the initial start-up phase in collecting the necessary information, whether in the evaluation of the existing suspicions, selected the most appropriate instruments and procedures

of investigation. In addition, it is necessary to establish the corresponding expert investigation team.

In forensic audit, i.e. in the investigation of fraud, when examining business and financial documents, obtained business information, manipulation of accounting information and accounting records are in the business unit using investigative, audit and accounting knowledge of members of created expert investigation team. Common areas include a review, for example, the regular review [3]:

- of recruitment procedures;
- of transactions, projects and activities of employees not only within individual functions, but also individual departments;
- of employees and third parties on the presence of a conflict of interest;
- of staff selected for the presence of corrupted behaviour;
- of employee expenses;
- of administration and inventory management;
- non-standard financial and commercial transactions.

Within the investigation must be carried out a survey of the valid legislation, internal guidelines of the organization, the existing processes and procedures. The part of investigation is a review of documentation and electronic accounting and financial records. During the audit it is inevitable to continuously evaluate public and non-public information concerning selected entities. On the basis of the evaluation of the collected evidence and the findings should be presented recommendations to correct the identified weaknesses and vulnerabilities of control system. The outcome of the investigation is the development of a written forensic report. The primary goal is to detect and find the hidden information fragmented in many sources, and thereby to create an overall picture of what happened and is happening in the company.

5 Conclusion

Manipulation and deception reveals very tediously and difficulty. It is not a simple process. But, to investigate and to prove fraud is much more complex and demanding process, because frequent fraudsters are mainly intelligent people, with excellent knowledge of the subject area and the environment that possess sensitive information and also have many years of experience in the management environment. Also for this reason, revealing the deception often tends to be a matter of a long time. In case of suspicion of fraudulent behaviour in the company should be as soon as possible, preferably already in the initial start-up phase in collecting the necessary information, whether in the evaluation of the existing suspicions, selected the most appropriate instruments and procedures of investigation. In addition, it is necessary to establish the corresponding expert investigation team composed of experts at detecting deception.

The recognition of various types of fraud is subject to a thorough knowledge of their characteristics, which is a key condition for their detection. In this paper, we introduced the possibilities of identification, verification and investigation of fraud or unfair proceedings and also the possibility of obtaining evidence for the further procedure.

References

[1] Study of KMPG "Global profiles of fraudsters". profile offender fraud in Central and Eastern Europe. Available online at http:/www.kpmg.com/SK/skIssuesAndInsigfhts/ArticlesPublications/Documents/CEE profile of a Fraudster_SVK.PDF

[2] PWC. 2011. Global Economic Crime Survey 2011 [online]. 2011. p. 3. [cit. 2.4.2012]. Available at: <http://www.pwc.com/sk/sk/forenzne-services / assets / 2011-survey-hospodarskej_kriminality_SK.pdf>.

[3] PWC. 2012. Investigation and Forensic Services [online].2012. [cit. 10.4.2012]. Available at: <http://www.pwc.com/sk/sk/forenzne-sluzby/index.jhtml>.

[4] Act. 431/2002 Coll. on Accounting as amended

[5] STARÍČKOVÁ, Z. 2013. International financial reporting standards in accordance with IAS/IFRS. 4th section. [online] [cit. 11. 12. 2013]. Available at: http://www.derivat.sk/files/2013%20casopis/2013_Nov_Starickova_IV.Medzinstandardy.pdf

DO BRATISLAVA AND WARSAW STOCK EXCHANGES GO HIGH FREQUENCY TRADING?

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ABSTRACT

This paper addresses the microstructure of the Slovak and Polish public financial markets. The aim of the paper is to justify the development and potential of high frequency trading on regulated markets. The research follows H. Hau's discussion on the location of traders against the exchange. The study advances former research through the application of different proxy for the traders, mainly the physical distance between the stock mainframe and the traders' notified location. Through the application of geocoding on 3920 notified companies in Slovakia and Poland, differences were examined in HFT's structure on both markets and their interconnectivity. The evidence shows the potential market service concentration, weak interconnectivity and substantial geographical concentration of notified entities. It opens the way for markets' mutual cooperation.

Keywords: algorithmic trading, geocoding, notification, investment companies

JEL codes: G10, G14, G24

1 Introduction

The use of High Frequency Trading (HFT) on developed markets is significant. As of 2009, high-frequency trading firms, which represented approximately 2% of about 20,000 trading firms operating in the U.S. markets, accounted for 73% of all U.S. equity trading volume [1]–[3]. As of 15 April, 2013 the Warsaw Stock Exchange (WSE) put into operation a new transaction system, UTP (Universal Trading Platform), which accelerated the transaction execution [4]. Those processes raise the question if the HFT ability is conditioned on the distance to the stock exchange.

HFT applies sophisticated technological tools and computer algorithms to rapidly trade securities. Algorithmic trading may be used in any investment strategy, including market making, inter-market spreading, arbitrage or pure speculation.

The purpose of this paper is to examine the interconnectivity of the Bratislava and Warsaw Stock Exchanges in respect of their potential high frequency trading abilities. Both markets are different in term of the liquidity thus it is expected that the broker-dealer structure should be adjusted thereon.

It applies both literature research analysis and statistics relating to the distances as the HFT's proxy on all notified entities on both markets as of 2014 to conclude this research. The paper follows prior research of H. Hau on the German market and of the Staszkiewicz' on the Polish market [5], [6]. The findings demonstrate that HFT's development is constrained by the entities' origin. According to the author's knowledge, this is the only paper that addresses HFT's microstructure in the Polish and Slovak registered entities markets.

This paper contributes to the prior research by:

- Addressing substantial population of 3920 notified entities on both markets (Section 3.1 and 4).
- Applying combined methodology for geocoding and the Herfindahl–Hirschman Index for market structure decomposition (Section 3).
- Proposing a different proxy for the HFTs (Section 2).
- Developing evidence for the concentration of the services for a minority of market participants (Section 5).

2 Literature Review

Research on the professional traders' geographical distribution shows that traders located outside the market's home country and in foreign cities show lower proprietary trading profit. Evidence was found for an information advantage for high-frequency trading due to the proximity of corporate headquarters [5]. This research broadly follows H. Hau's concept.

The discussion on HFT is spread over different areas. General discussion focuses on HFT's impact on the market. T. Hendershott et al. confirmed that HFT improves liquidity and enhances access to information on quotes [7]. The improvements resulting from HFT to overall market quality, including bid-ask spreads, liquidity, and transitory price impacts were observed by R. Litzenberger and others [8]. The relation between HFT and LFT (Low frequency trading) is contrasted against each other. In terms of trading, Easley et al. state that HFT will evolve to continue exploiting the structural weaknesses of low-frequency trading [9]. In terms of risk assessment, measurement of the risk structure opens the new issues [10].

HFT's impacts the econometrics in a number of fields like variance/covariance estimations. F. Bandi et al. indicate that the profits yielded by optimal sampling are economically large, statistically significant and robust to realistic transaction costs [11]. This issue resulted in discussion on the autoregressive conditional duration (ACD) models [12], [13]. There was also research conducted on return variance structure [14], stochastic variability for return and time [15] or interpolation of the inequity in the non-synchronized time series [16].

The above discussion shows the variety of issues linked to HFT. Nevertheless it should be concluded that the HFT is not directly observed market data. There were different approaches in different studies like textual analysis, order imbalance, revenues structure and stock exchanges' external data to capture HFTs feasibility. Those examples indicate that there is not a widely accepted proxy for HFT performance or ability. Thus it is proposed in this research to measure the HFT ability of an entity by application of the physical distance from the main office of the entity to the seat of the stock exchange. Hence the research was conducted based on the following hypothesis:

H_0: WSE and BSE are mutually interconnected for HFTs.

3 Data and Methodology

3.1 Methodology

The addresses of the entities available from the public register were geocoded, then the distances to exchanges were computed. A similar approach was applied as in the author's earlier paper [6]. The approximation of distance between any two different locations A (Long1,Lat1)

and B (Long2,Lat2) where Long1 and Long2 are longitudes, Lat1 and Lat2 - latitudes was calculated based on the following formula:

$$d = 2 * \pi * q * R / 360 \quad (1)$$

Where:

$\pi = 3.1415...$,

R = 6371km (average radius of the Earth).

q is the solid angle between the points A i B.

Because:

$$\cos(q) = \sin(Lat1) * \sin(Lat2) + \cos(Lat1) * \cos(Lat2) * \cos(Long1 - Long2) \quad (2)$$

Thus:

$$d = 2 * \pi * \arccos(\sin(Lat1) * \sin(Lat2) + \cos(Lat1) * \cos(Lat2) * \cos(Long1 - Long2)) *R/ 360 \quad (3)$$

A uniformed Earth radius was used due to its changeability within 0–90 degrees, while the latitude changes with the sample from around 40–60 degrees, thus potential corrections are insignificant to conclusions. The Earth is a rotation geoid, thus there is no universal method for distance measurement, however, the different matrix has a minor impact on the final conclusions. The geocoding was extracted mainly automatically and partly manually.

For concentration estimation the Herfindahl index (also known as Herfindahl–Hirschman Index, or HHI). It is defined as the sum of the squares (Herfindahl notation) [17] of the market shares of the 50 largest firms (or summed over all firms if there are fewer than 50) within the industry, where the market shares are expressed as fractions. Thus:

$$H = \sum_{i=0}^{n} s_i^2 \quad (4)$$

where s_i is the market share of firm i in the market, and N is the number of firms. The Herfindahl Index (H) ranges from $1/N$ to one, where N is the number of firms in the market. A HHI index above 0.25 (above 2,500) indicates high concentration. The index was re-applied to the distribution of number of market participant by countries to account for the notification impact towards local capital market.

3.2 Data set

The entities' data were collected from the official websites of the Polish Financial Supervision Authority (PFSA) and the National Bank of Slovakia during the period March to October 2014. Membership of the WSE was extracted from the *Giełda Papierów Wartościowych w Warszawie* (Warsaw Stock Exchange) official website, and the membership of *Burza cenných papierov v Bratislave, a.s.* (Slovak Stock Exchange) from its website. All geocoding data, if necessary, were retranslated from the degree, minutes and seconds into a decimal degree. The geocoding of the addresses was done using the application of the batch transferring at www.findlatitudeandlongitude.com. The output data were reviewed for consistency and manual corrections were made for the missing coding. The calculation was performed using the application of the R environment and Statistica [18], [19].

4 Results and Discussion

Composition of market participants by the types of the entities is shown in Table 1.

Table 1 Types of participants and their frequency

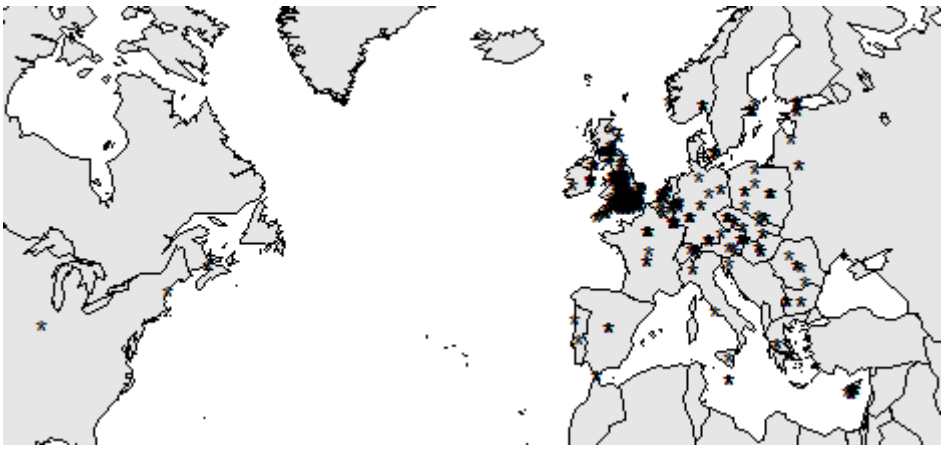
Type	Poland		Slovakia	
	Numbers	Share	Numbers	Share
Without branch notifications	1776	93.08%	1976	97.58%
Broker-dealers houses domiciled locally	55	2.88%	14	0.69%
Local entities notified abroad without branches	34	1.78%	12	0.59%
Banks licensed for investment activities	14	0.73%	9	0.44%
Local entities notified aboard with branches	10	0.52%	2	0.10%
Notifications with branches	9	0.47%	12	0.59%
Parent companies of branches notified	9	0.47%	na	na
Commodity houses domiciled locally	1	0.05%	0	0.00%
All entities (investment companies)	1908	100%	2025	100.00%

*Not disclosed separately in the register, only as reference note.

Source: own calculation and presentation based on PFSA and NBS registers.

For both markets, the majority of the market participants constitute foreign entities (domiciled in Europe) which operate from their countries of origin without building a trading infrastructure in the host country's territory. The overrepresentation of European entities is attributable to general EU financial passport rules. The notified without branches companies are rather unlikely to perform HFT on local exchanges. The distribution demonstrates the geographical impact on the Polish and Slovak markets. The majority of offshore market participants for both counties are located in the UK, Cyprus and the Netherlands, as shown in Figures 1 and 2 and in Table 2. Locations in Cyprus and the Netherlands are rather linked to tax management while the UK locations relate to capital management projects. There are instances of notification of an entity located in the USA (Polish market only).

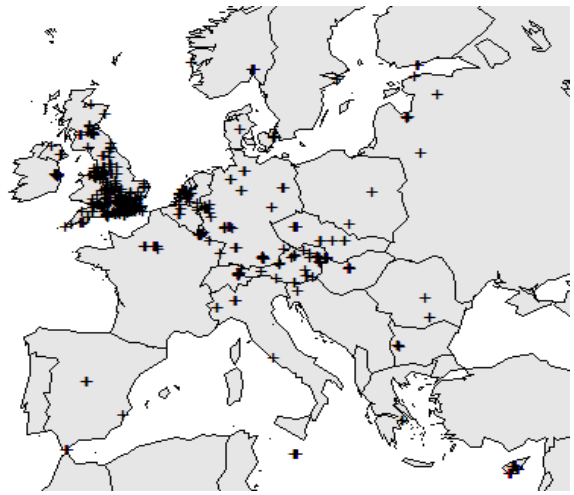
Figure 1 Geographical allocation of the entities notified on Polish territory (*)



Source: resized form: [6].

Figure 2 Geographical allocation of entities notified on the Slovak territory

Slovak territory notifications (+)



Slovak (+) and Polish (*) notifications rescaled to Slovak range

Source: own study.

In both territories there are no participants from Russia, Asia, Africa, South America or Australia. However, the analysis takes into account only the direct place of operation. There are no provisions taken for any capital commitments and/or control.

For both markets there is substantial concentration, however, Polish markets (HHI=58%) are more concentrated in terms of geographic distribution in comparison to Slovak markets (HHI=49%). There are no substantial differences in the average distances for notified companies to the relevant home stock exchanges, unless there are not the south-central European countries, which is reasonably attributable to the geographical location of the WSE and BSE.

Table 3 Distribution of distances to the stock exchanges (only significant results)

Country	Average	Average	t	df	p	Stand dev.	Stand dev.	F	p
Malta	2057.8	1993.2	4.202	3920	0.000	523.5	437.6	1.431	0.0000
Slovenia	1261.4	1201.7	3.607	3920	0.000	568.4	464.5	1.498	0.0000
Austria	1246.8	1191.6	3.188	3920	0.001	589.7	493.7	1.427	0.0000
Italy	1090.8	1035.4	3.136	3920	0.002	609.3	494.3	1.520	0.0000
Slovakia	1286.7	1233.2	3.104	3920	0.002	588.0	489.5	1.443	0.0000
Hungary	1415.2	1367.6	2.822	3920	0.005	583.1	470.3	1.537	0.0000
Greece	2237.8	2188.0	2.558	3920	0.011	661.6	555.9	1.417	0.0000
Buglaria	1891.4	1847.7	2.473	3920	0.013	615.2	486.4	1.600	0.0000
Czech Rebulic	1094.4	1051.3	2.408	3920	0.016	614.9	504.4	1.486	0.0000
Romania	1950.6	1915.0	1.984	3920	0.047	630.0	490.9	1.647	0.0000

For: Germany, Luxemburg, Spain, Cyprus, Portugal, France, Ireland, Belgian Poland, Irish, UK_LIFFE, UK_LME, UK_ICE, Nederland, Denmark, Norway, Lichtenstein, Sweden, Finland, Latvia, Estonia and HOME there were no significant differences in averages noted.

Source: own calculation and presentation.

The above table displays the average distance of entities to the major stock exchanges by country. The t statistics (applied only in order to predict the changes in the portfolio of notified companies) becomes significant only for the neighbourhood countries. The variable HOME

indicates the distance of the notified entity to its home major stock exchange. The substantial concentration of the notified companies against their home financial markets should be noted.

The majority of companies are within a distance of five thousand kilometers from the stock exchanges. HFT ability increases with the decrease of the distance to the capital market mainframe. The number of entities, with distance given in range from 50 meters to five kilometers, is shown in Table 4.

Table 4 Number of entities with selected distances to exchange notified on Polish and Slovak territory

	Poland WSE	Slovakia BSE
Up to 50m	0	0
Up to 300m	1	2
Up to 500m	3	9
Up to 1 km	9	18
Up to 3 km	49	23
Up to 5 km	55	32

Source: own study.

HFT ability is strongly related to distance to the mainframe. The cut-off point was set as one kilometer to the capital mainframe, where the distance may be assumed to create a competition advantage over the other entities. This assumption follows R. Garvey and F. Wu's observation that "*traders located in the NYC area execute their market orders at a price, on average, 1.8 cents worse than the quoted price they observe at order submission time [...]. Traders located outside of the NYC area execute their market orders at a price 4.1 cents worse. The price differentials result in financial center traders experiencing a total latency cost of $2,288,716 on 504 million executed shares, whereas more distant traders experience a total latency cost of $3,017,089 on 220 million executed shares."* [20, p. 370]

The specific list of companies within one kilometer of the stock is shown in Table 5 and Table 6 for WSE and BSE respectively.

Table 5 Entities within 1 km of WSE (in km)

Entity name	Country	Member	Execution	Type*	WSE distance
PGE Dom Maklerski SA	PL	Yes	Yes	BD	0.254
BGŻ SA Biuro Maklerskie BGŻ SA	PL	Yes	Yes	BPDM	0.342
IFM Global Asset Management SP. Z O.O.	PL	No	No	BD	0.436
Raiffeisen Bank Polska SA Dom Maklerski	PL	Yes	Yes	BPDM	0.755
NWAI Dom Maklerski SA	PL	Yes	Yes	BD	0.790
Dom Maklerski Banku Ochrony Środowiska SA	PL	Yes	Yes	BD	0.841
Dom Maklerski MBANKU SA	PL	Yes	Yes	BD	0.871

Tullet Prebon (Polska) SA	PL	No	No	BD	0.871
ING Investment Management (Polska) SA	PL	No	No	BD	0.975

*BD - Broker-dealer, BPDM - bank office broker-dealer.
Source: own modified table based on: [6].

It was applied both "membership" criteria for WSE and BSE due their participants' structure [21].

Table 6 Entities within 1 km of BSE (in km)

Company registered name	Country of origin	Type	Member License BSE trading		Distance to BSE
Tatra banka, a.s.	SK	Bank	Yes	Yes	0.160
X-TRADE BROKERS DOM MAKLERSKI S.A., ozganizačná zložka	PL	Branch	No	na	0.270
Československá obchodná banka, a.s.	SK	Bank	Yes	Yes	0.441
OTP Banka Slovensko, a.s.	SK	Bank	Yes	Yes	0.441
Sberbank Slovensko, a.s.	SK	Bank	Yes	Yes	0.441
Všeobecná úverová banka, a.s.	SK	Bank	No	na	0.441
SALVE INVESTMENTS, o.c.p., a.s.	SK	Broker	No	na	0.441
M Securities o.c.p., a.s.	SK	Broker	No	na	0.443
RM - S Market, o.c.p., a.s.	SK	Broker	No	na	0.451
COMMERZBANK Aktiengesellschaft pobočka zahraničnej banky	DE	Bank	No	na	0.520
Fio o.c.p., a.s.	SK	Broker	No	na	0.530
WOOD & Company Financial Services, a.s.	CZ	Broker	No	na	0.580
CALYON S. A.pobočka zahraničnej banky	SK	Branch	No	na	0.713
ING Bank N.V.pobočka zahraničnej banky	NL	Branch	No	na	0.760
ABN AMRO Bank N. V.pobočka zahraničnej banky	NL	Branch	No	na	0.765
UniCredit Bank Czech Republic and Slovakia, a.s.pobočka zahraničnej banky	CZ	Branch	No	na	0.799
SLÁVIA CAPITAL, a.s., obchodník s cennými papiermi	SK	Broker	No	na	0.862
CAPITAL MARKETS, o.c.p., a. s.	SK	Broker	No	na	0.998

Source: http://www.bsse.sk/%C4%8Clenovia/Zoznam%C4%8Dlenov.aspx (membership) access 22 October 2014, NBS register for scope of activities and own calculations.

Not all of these entities have a license for orders execution. Consequently, in Poland, 3 out of 9 are unable to operate HFT due to their lack of license and stock membership, while in Slovakia only 4 out of 18 are direct members of the BSE. There are no foreign notified entities on the list for the Polish market. In contrast, there are foreigners close to the BSE, but they are not recognized as members, thus the competitive advantage both in Polish and Slovak territory lies with local entities. Among the entities listed as close to WSE are only broker-dealer houses (4 eligible) and two bank branches licensed for capital market operations. All of those entities are likely to have substantial capital coverage, but contagion exposed [22]–[24].

Consequently, 0.3% in the WSE and 0.1% in the BSE of all locally registered market participants have an HFT competitive advantage in Poland and Slovakia respectively. In

contrast, in Slovakia, only banks are fully equipped for HFT and there are no broker-dealers on the horizon. This constitutes a substantial difference in the microstructures of these two markets. Thus, taking into account the increase of trading volume and geographic structure of entities, the market is likely to be strongly concentrated. It will probably be concentrated in future around a small fraction of the locally domiciled companies. This observation is in line with H. Hau's results [5].

Due to the potential number of entities with HFT competitive advantage, we rejected the null hypothesis that:

H_0: WSE and BSE are mutually interconnected for HFTs.

This is rejected in favor of the statement that WSE and BSE are not mutually interconnected for HFT purposes.

The relatively small impact of HFT on Polish and Slovak territory is explained both with development of the infrastructure and investor perceptions. HFT algorithms do not explicitly take into account the intrinsic value of an investment. Those algorithms are only concerned with what happens to the price in the next few seconds. This short-term approach limits the social benefits of HFT. Low frequency investors are cautious about the possibility of having their trades detected and headed off by high frequency traders. This is the reason why traditional investors allocate their orders in 'dark pools'[25].

In this study we did not consider the related parties of financial groups and conglomerates such as subordinate entities (parent, subsidiaries, associated).

5 Conclusions

There are different investments strategies across markets, some of them are based on research wisdom whereas others are based on the speed of data processing. This research examines speed in the context of the interconnectivity drivers of HFT on Polish and Slovak territory.

The research provides empirical findings for potential concentration of HFT in a small number of entities domiciled solely in Poland and Slovakia. There are only six companies in Poland and four in Slovakia with substantial HFT competitive advantage, which represents 0.3% and 0.1% of the total companies notified respectively. The broker-dealer structure is independent from the level of the market liquidity.

Those findings are one step towards a better understanding of the underlying principles of HFT and its implications for market structure and performance, although given the complexity and importance of this area, much more research is needed. There are several interesting research directions to explore, mainly the profitability of the market participants against the distance to markets.

References

[1] R. Iati "The real story of trading software espionage," *Wallstreet and Technology*, 2010. [Online]. Available: http://www.wallstreetandtech.com/trading-technology/the-real-story-of-trading-software-espionage/a/d-id/1262125? [Accessed: 03-Jun-2014].

[2] A. Motylska-Kuźma (2012), "High frequency trading na rynkach finansowych w Polsce," *Zesz. Nauk. Uniw. szczecińskiego*, vol. 689, no. 50, pp. 447–457.

[3] T. Zieliński "Technologia informacyjna a kryzys finansów," in *Finanse w niestabilnym otoczeniu - dylematy i wyzwania. Rynki finansowe*, 2012, pp. 23–33.

[4] M. Kobza "GPW: Handel algorytmiczny coraz bardziej popularny na warszawskiej giełdzie - - Forsal.pl - Giełda, Waluty, Finanse – forex, notowania NBP, surowce," *Forsal.pl*, 2013. [Online]. Available: http://forsal.pl/artykuly/764346,gpw-handel-algorytmiczny-coraz-bardziej-popularny-na-warszawskiej-gieldzie.html. [Accessed: 02-Jun-2014].

[5] H. Hau (2001), "Location Matters: An Examination of Trading Profits," *J. Finance*, vol. 56, no. 5, pp. 1959–1983.

[6] L. Staszkiewicz and P. Staszkiewicz "HFT's potential of investment companies," *Pr. Nauk. Uniw. Ekon. we Wrocławiu* (in evaluation).

[7] T. Hendershott, C. M. Jones, and A. J. Menkveld (2011), "Does Algorithmic Trading Improve Liquidity?," *J. Finance*, vol. 66, no. 1, pp. 1–33.

[8] R. Litzenberger, J. Castura, and R. Gorelick (2012), "The Impacts of Automation and High Frequency Trading on Market Quality," *Annu. Rev. Financ. Econ.*, vol. 4, no. 1, pp. 59–98.

[9] D. Easley, M. M. L. de Prado, and M. O'Hara (2012), "The Volume Clock: Insights into the High-Frequency Paradigm," *J. Portf. Manag.*, vol. 39, no. 1, pp. 19–29.

[10] P. Staszkiewicz (2011), "Ryzyko struktury. Szkic koncepcyjny.," *Inwestycje Finans. i ubezpieczenia - tendencje światowe a rynek Pol.*, vol. 183, pp. 378–384.

[11] F. M. Bandi and J. R. Russell (2008), "Microstructure Noise, Realized Variance, and Optimal Sampling," *Rev. Econ. Stud.*, vol. 75, no. 2, pp. 339–369.

[12] R. Engle and J. Russell (1998), "Autoregressive conditional duration: a new model for irregularly spaced transaction data," *Econometrica*, vol. 66, no. 5, pp. 1127–1162.

[13] R. F. Engle (2000), "The Econometrics of Ultra-high-frequency Data," *Econometrica*, vol. 68, no. 1, pp. 1–22.

[14] F. M. Bandi and J. R. Russell (2006), "Separating microstructure noise from volatility," *J. financ. econ.*, vol. 79, no. 3, pp. 655–692.

[15] E. Scalas, R. Gorenflo, H. Luckock, F. Mainardi, M. Mantelli, and M. Raberto (2004), "Anomalous waiting times in high-frequency financial data," *Quant. Financ.*, vol. 4, no. 6, pp. 695–702.

[16] O. V. Precup and G. Iori (2007), "Cross-correlation Measures in the High-frequency Domain," *Eur. J. Financ.*, vol. 13, no. 4, pp. 319–331.

[17] A. O. Hirschman (1964), "American Economic Association The Paternity of an Index The Paternity of an Index," *Am. Econ. Rev.*, vol. 54, no. 5, p. 761.

[18] R. C. Team "R: A language and environment for statistical computing." Foundation for Statistical Computing, Vienna, 2013.

[19] StatSoft "Statisitca." 2011.

[20] R. Garvey and F. Wu (2010), "Speed, distance, and electronic trading: New evidence on why location matters," *J. Financ. Mark.*, vol. 13, no. 4, pp. 367–396.

[21] M. Sásik (1995), "Kapitálovy trh SR so zretefom na poslanie a cinnosf BCP v Bratislave," *Financ. A Uver*, vol. 5, no.45, pp. 269-274.

[22] T. Výrost, E. Baumöhl, and Š. Lyócsa (2013), "What Drives the Stock Market Integration in the CEE-3?," *Ekon. časopis*, no. 01, pp. 67–81.

[23] T. Barnhill, R. Sivák, and Ľ. Gertler (2006), "Analýza integrovaného trhového a kreditného rizika na príklade bankového sektora na Slovensku," *Ekon. časopis*, no. 06, pp. 539–554.

[24] P. Staszkiewicz (2013), "Factors influencing broker dealers equity level," *World J. Soc. Sci.*, vol. 3, no. 5, pp. 1–12.

[25] V. Manahov, R. Hudson, and B. Gebka (2014), "Does high frequency trading affect technical analysis and market efficiency? And if so, how?," *J. Int. Financ. Mark. Institutions Money*, vol. 28, pp. 131–157.

CHALLENGES IN SLOVAK PAYG AND DC SCHEMES

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ABSTRACT

Article deals with the challenges in Slovak unfunded quasi DB PAYG and funded DC pension schemes under the uncertainty and non-existence of automatic balance mechanism (ABM). By uncovering theoretical knowledge on ABM for PAYG schemes, we focus on its ability to overcome political risks and costs of stabilization the PAYG system in short and long run. Further, we present developed ABM model into specific conditions of Slovak PAYG scheme and test its ability to balance PAYG system on cash and accrual basis. At the same time, we present the level of uncertainty tied to the passive saving strategy for savers contribution into the 1bis funded DC scheme.

Key words*:* PAYG, automatic balance mechanism, funded DC scheme, uncertainty.

JEL Codes: H30, E27, J32.

1 Introduction

Pension schemes are relatively complex systems, and their individual set-up varies significantly between individual countries as well as within a country. This implies relatively complex requirements on savers to understand every aspect of the respective pension set-up and its consequences on its final outcome in a future from the perspective of consumer ([17] Oxera, 2013). This is in a direct contrast with the known low level of financial literacy of most savers participating in such complex systems. At the same time, complexity of pension schemes questions the knowledge and understanding of such systems by regulators.

There is a long path down the road from the designing the complex pension scheme to the achieving its objective. This path includes many misunderstandings, unknown and often complex factors and risks influencing the ultimate goal of the pension scheme - adequacy of the retirement income. Even if the pension scheme is well designed, there are still remaining risks that is becoming more visible especially in the CEE countries - political risk and the uncertainty transferred onto savers even within public quasi DB PAYG scheme.

2 Literature Review

One of the main problems faced by the DB PAYG pension systems is the political risk to which it is subjected, a risk which should be understood along the lines of that defined by Diamond (1994), basically referring to the decisions taken by politicians tied to their traditional planning horizon (often only four years), which is clearly far less than that of the pay-as-you-go pension system. [27] Valdés-Prieto (2006) points out that DB PAYG system tend to require periodic adjustments due to demographic and economic uncertainty. Relying on discretionary legislation for these social security modifications creates political risk for both contributors and beneficiaries.

However, Besley and Prat (2005) explain that another big problem for public (and private) pension systems is their inability to develop a credible institutional framework for contributors and pensioners in the sense that promises of payment may be reasonably respected. Boeri et al. (2001) note that the European pay-as-you-go pension model suffers from serious credibility problems and the public system in Slovakia is no exception. [11] Holzmann (2007) claims, that constant tinkering with parametric reforms (changes in retirement age, changes in contribution periods leading to entitlement, increases in contribution rates, etc.) lowers the credibility of pension systems. Political risk is ameliorated to the extent that governments act as the guarantors of the pension systems. In the event that for any reason pension funds prove to be inadequate, pension fund regulations or political pressure is likely to compel governments to provide some form of protection to pensioners ([12] Kay, Kritzer, 2001).

In public DB (or even DC) PAYG schemes, the automatic balance mechanism (ABM) is often discussed as a remedy to political risk. ABM is a set of predetermined measures established by law to be applied immediately as required according to the solvency or sustainability indicator. Its purpose, through successive application, is to re-establish the financial equilibrium of pay-as-you-go pension systems with the aim of making those systems viable without the repeated intervention of the legislators ([29] Vidal-Meliá et al., 2009).

For individuals to make good decisions about the future pensions, they need access to the right information and sound advice, while their needs should be considered by those designing, regulating and controlling the pension system ([8] EIOPA, 2013). There is much evidence ([1] Ball, Mankiw, 2007; [28] Walker, Iglesias, 2007; [5] Dahlquist et al., 2011) that suggests that individuals are often not well placed to make good decisions about long-term financial products, understanding the risk they take and especially the return (reward) they obtain by participating in pension scheme. Many authors (for example [9] Feldstein et al., 1999; [3] Blake, 2006; [7] Dušek, Kopecsni, 2008; [11] Holzmann, 2009; [25] Virdzek, Šebo, 2013) conclude that the pension fund performance is key information of savers decision making as well as key determinant of achieving the pension savings objective - securing the adequate income in retirement.

When designing pension scheme, any DB and/or DC pension model should be built using plausible assumptions about the stochastic processes driving key variables (such as asset prices, interest rates and mortality rates for DC schemes; labor market development for DB schemes) and these processes should have empirically plausible calibrations. These calibrations would cover, inter alia, the risk premia on growth assets such as equities, the interest-rate process and the mortality process, over the whole time horizon relevant for the plan member ([6] Dowd, Blake, 2013).

There are many international as well as specific national simulation models ([24] TARKI Social Research Institute, 2008), based on the overlapping generation models ([3] Blake, 2006) or micro-simulation (cohort or agent based) model ([10] Gilbert, Troitzsch, 2005; [4] Blommestein et al., 2009). The appropriate vehicle for designing and stress testing any pension

scheme is stochastic (or Monte Carlo) simulation ([2] Blake, Cairns, Dowd, 2003). This approach generates a large range of outcomes (a probability distribution function) for the value of the pension fund at any given future date, conditional on various assumptions about pension fund contributions, asset returns, mortality and other relevant factors. On the other hand, using simulations during the pension scheme designing, the simulations should be re-run periodically to achieve acceptable level of predictability. Downward revision of expected market returns should lead to the re-calculation of simulations and pension schemes set-up and re-estimation of other relevant variables, for example increasing the level of contributions, investment strategy and quantitative limits regulations redesign, etc.

Simulation models for designing (and constant evaluation) private DC pension schemes should aim to produce (and re-produce) reliable projections of likely outcomes and should also take account of the probabilities associated with projected outcomes. In short, the models should deal with quantifiable uncertainty. This implies that purely deterministic projections are highly problematic and, indeed, wrong in principle ([6] Dowd, Blake, 2013).

[25] Virdzek and Šebo (2013) provide a basis for analyzing the political risk under the standard principal-agent theory, where political risk should be viewed in the context of pension system players: government – PAMCs – savers. Government acts as a principal and PAMCs as agents. On the other hand, government acts as an agent and savers as principals in this particular relation. The triangle is closed by the relation between savers (principal) and PAMCs (agents). [25] Virdzek and Šebo (2013) recognize that government (managing public PAYG scheme) and PAMCs (managing semi-private DC funded scheme) follow their own goals, which are not always in favor of savers.

Several authors ([18] Power, 2004; [19] Renn and Graham, 2006; [13] Ma, 2008; [16] Micocci, Gregoriou and Masala, 2010) argue that the regulator is therefore forced into "trade-off" between the short term performance, long-term adequacy and safety of pension savings and thus influencing the pension scheme outcomes during the continuous life-cycle of the pension system and discrete time of individual savers. However, only few studies provide a comprehensive proof, that interventions into the complex pension scheme influence the individual outcomes differently and thus have significant redistribution effects on different savers ([23] Šebo, Virdzek, 2012).

3 Data and Methodology

The aim of the paper is to provide methodological approach toward evaluating the ability of the automatic balance mechanism to bring the public PAYG scheme back to the financial stability and at the same time to show, whether the semi-private funded DC pension scheme (1 bis pillar) is able to deliver expected replacement ratio under the growing longevity risk, which influences both systems.

We use the methodological recommendations provided by [29] Vidal-Meliá (2009), [3] Blake (2006) and [26] Virdzek (2012) supplemented with dynamic stochastic programming approach ([20] Samuelson, 1969; [14] Malliaris, Brock, 1988; [10] Gilbert, Troitzsch, 2005; [13] Ma, 2008; [15] Melicherčík, Ševčovič, 2012) to show, whether the PAYG together with DC scheme is able to sustain financial pressures connected with longevity risk in Slovakia.

The formula for calculating the revenue side of the PAYG balance sheet based on the cash basis (annually) is as follows:

$$RC_i = wf_i \times 12w_i \times c_{I;i} + (wf_i - sa_i) \times 12w_i \times c_{II;i} \quad (1)$$

where:

$R_{C;I}$ - total PAYG scheme revenues (in Eur)
wf_i - number of working citizens
w_i - average monthly wage (in Eur)
$c_{I;i}$ - contributions for the PAYG scheme (in %)
sa_i - number of participants in the 1 bis pillar
$c_{II;i}$ - contributions for the 1 bis DC scheme

The formula for the revenue side ($R_{A;i}$) of the PAYG balance sheet is based on the accrual basis by taking into account future contributions of economically active citizens and future benefits paid to the retired individuals using unisex life tables for a period of average turnover in the system (AT_i),

$$RA_i = \sum_{i}^{AT_i} wf_i \times 12w_i \times c_{I;i} + \left(wf_i - sa_i\right) \times 12w_i \times c_{II;i} \tag{2}$$

where $AT_i = ra_i - a_i$
ra_i - average life expectancy of retirees/beneficiaries
a_i - average age of economically active citizens

For the modeling purposes, we created a model that calculates the PAYG balance sheet up to the 2050 using assumptions for wage growth at the level of 2% p.a. Even with this simplified approach, which differs from [22] Settergren (2001), we are able to estimate the influence of changes in life expectancy, mortality and labor market on expected long term stability of PAYG scheme from its revenue side.

Formula for calculating PAYG expenditures on cash basis (annually) is as follows:

$$CC_i = r_i \times 12p_i - s_i \times 12p_i \times \frac{c_{II;i}}{c_{I;i} + c_{II;i}} \tag{3}$$

Formula for calculating PAYG expenditures on an accrual basis is as follows:

$$CA_i = \sum_{i}^{AT_i} r_i \times 12p_i - s_i \times 12p_i \times \frac{c_{II;i}}{c_{I;i} + c_{II;i}} \tag{4}$$

where:
$C_{C;i}$ - total PAYG scheme expenditures (cash basis)
$C_{A;i}$ - future PAYG scheme expenditures (accrual basis)
r_i - number of retirees/beneficiaries
p_i - average pension from the PAYG scheme
s_i - number of retirees from the 1 bis DC scheme

Expected average indexation using the Swiss indexation formula was originally set at 2% p.a. Average life expectancy of retirees was taken from the Statistical Office of Slovak republic for the year 2008 (74.78 years) and for the year 2050 the data from Eurostat were used, where the expected average age of retirees is 83.25 years.

Designing the DC funded pension scheme from the point of regulator (designer) as well from the individual member (saver) is basically a utility maximization optimization problem ([15] Melicherčík, Ševčovič, 2012). In order to satisfy the utility maximizing function known from the conventional economics, financial economics and econometrics, we have to solve the optimization problem. Considering there is no constraint, the maximization function should find the critical point, where the first-order condition $F'(x^*) = 0$ and the second-order condition $F''(x^{**}) < 0$ are sufficient conditions for the value of (x) that (at least locally) maximizes $F(x)$. When $F(x)$ is concave, the first-order condition is both necessary and sufficient for the value of (x) that maximizes $F(x)$.

Considering the optimization function for DC pension scheme, we inevitably end up searching for the optimal combination of many variables (N) and thus trying to satisfy the function $\max_{N;j} E\,(U(d_t))$. If these variables change over time, accommodate certain level of occurrence probability (risk) and specifically influence each saver (j) during his/hers life-cycle, than we might end up with trillions of calculations each day. This situation is often called „curse of complexity".

Despite these problems, DC pension schemes can be designed to target a particular socio-economic objectives (for example certain level of benchmark replacement ratio) with a specified degree of probability (risk). In order to perform this task, we are able to quantify the degree of pension risk, as a potential difference between the empirical replacement ratio and the benchmark (designed) replacement ratio. At the same time, we will be able to analyze further, what types of risks and under what circumstances move the empirical replacement ratio towards to or away from the benchmark replacement ratio.

The appropriate vehicle for designing and stress testing any pension scheme is stochastic (or Monte Carlo) simulation. This approach generates a large range of outcomes (probability distribution function) for the value of the pension scheme replacement ratio at any given future date, conditional on various assumptions about pension fund contributions, asset returns, mortality and other relevant variables ([3] Blake, 2006). Stochastic simulations produce an empirical distribution of possible individual replacement ratios compared to the expected benchmark replacement ratio (socio-economic objective) for particular pension scheme. The values of the probability distribution function (PDF) histogram will typically vary from substantially less than unity at the lower end to well above unity at the upper end.

To make the comparison and potentially recommendations for individuals as well as regulator, it is needed to specify one or more percentiles from the histogram and then compare the values with our target pension replacement ratio of unity. We take the i-th percentile, which is the VaR at the $100 - \text{ith}$ % confidence level. If this percentile is greater than or equal to unity, we would conclude that the pension scheme successfully replicates the designed benchmark scheme; if the percentile is less than unity, we conclude that the pension scheme does not successfully replicate the benchmark of designed pension scheme.

This simulation methodology has some attractive features ([3] Blake, 2006; [26] Virdzek, 2012):

- The model is extremely flexible and can accommodate almost any set of assumptions or features relating to existing types of pension arrangements.
- The methodology allows the pension scheme designer to carry out "what if?" experiments and stress tests by changing key assumptions and observing how these changes affect the results. These exercises are very useful because they enable the designer to identify the driving forces behind the results and gauge the sensitivity of the results to particular assumptions.

Stochastic simulation involves the following steps and set of variables (N):

- Setting the variable parameters defining both the DC pension scheme and the stochastic processes driving asset returns, earnings growth, unemployment, sickness, maternity leave, mortality, etc.
- Defining the investment strategy, e.g. contribution rates and an asset-allocation strategy for the relevant investment horizon.
- Using empirical data from various databases, the programme (using the EasyFitXL software) generates an empirical distribution of PDF for variables as well as PDF for income

replacement ratio (IRR) at any specified future date. This distribution in turn gives us VaR estimates for any chosen confidence level.

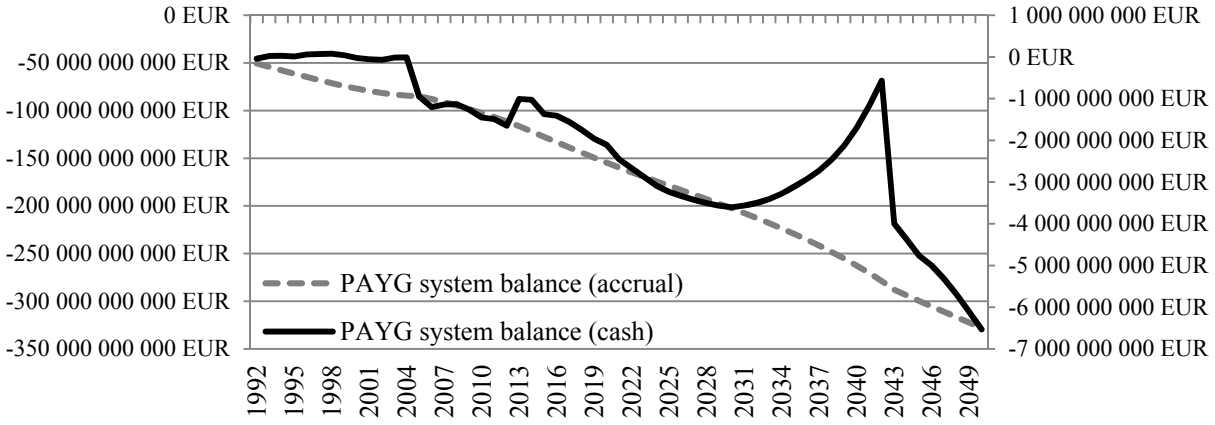
On contrary to the seminal paper of [21] Sivák, Ochotnický, Čambalová, 2011, where the deterministic approach was used, we applied stochastic approach to the variables such as wages, inflation and longevity, which led us to the re-estimation of key assumptions used in the PROST model. When the 1 bis pension scheme matures, most of the individuals retiring from funded DC scheme will experience the PAYG scheme pension reductions due to the contributing part of their social insurance contributions into the 1 bis scheme. In case of full working career contributions into the 1 bis scheme, the PAYG pension benefits will be cut by 1/3. As the PAYG scheme was initially set to provide 50% replacement ratio, the person retiring from the 1 bis scheme would seek for 16.7% income replacement ratio.

For the simplification sake, we illustrate the stochastic simulation using the simple case of a typical Slovak male employee who starts a DC pension scheme on his 25th birthday, lives at least until his 65th birthday when he retires, and makes contributions to his pension scheme throughout his working life. He faces asset-return risk, interest-rate risk but no unemployment risk. Asset-return risk affects the value of his pension fund, given his contributions; interest-rate risk affects the value of his pension when he retires, through its impact on the value of the annuity from which his pension is paid; and unemployment risk affects his income and, hence, his ability to make contributions to his pension fund. We made assumptions about the risk factors and the various control variables and assign values to the parameters of the model using normal distribution for all risk factors except the asset-return risk, where the Johnson Su distribution was used as it fit the distribution of empirical data on DJIA30, interest rates, bond yields daily log returns as well as inflation for last 95 years.

4 Results and Discussion

Initial balance of Slovak public PAYG pension scheme based on the above presented calculations is presented in the figure below.

Figure 1 Initial PAYG scheme balance – cash (r ight axis) and accrual (left axis) basis



Source: Own calculations, 2014

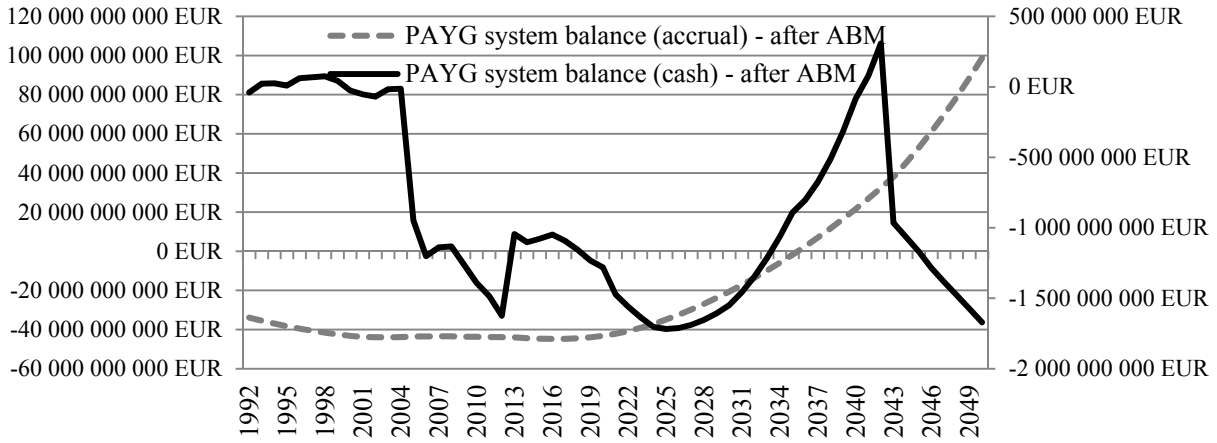
When constructing the ABM model to balance PAYG scheme, we assumed that the PAYG scheme should reach the financial stability expressed latest by the accrual basis during the estimated AT period (38 years). Until the accrual balance is reached, ABM model adjusts by same percentage each year three variables:

1. level of contributions to the PAYG system,

2. retirement age[1],
3. level of pensions´ indexation.

Initial PAYG financial stability ratio determines required "level" of PAYG scheme balancing and thus reveals the level of uncertainty hidden within the PAYG scheme the individuals contributing into the scheme will face. Introducing the ABM mechanism in 2015, the required annual adjustments should balance the PAYG system out by the year 2037.

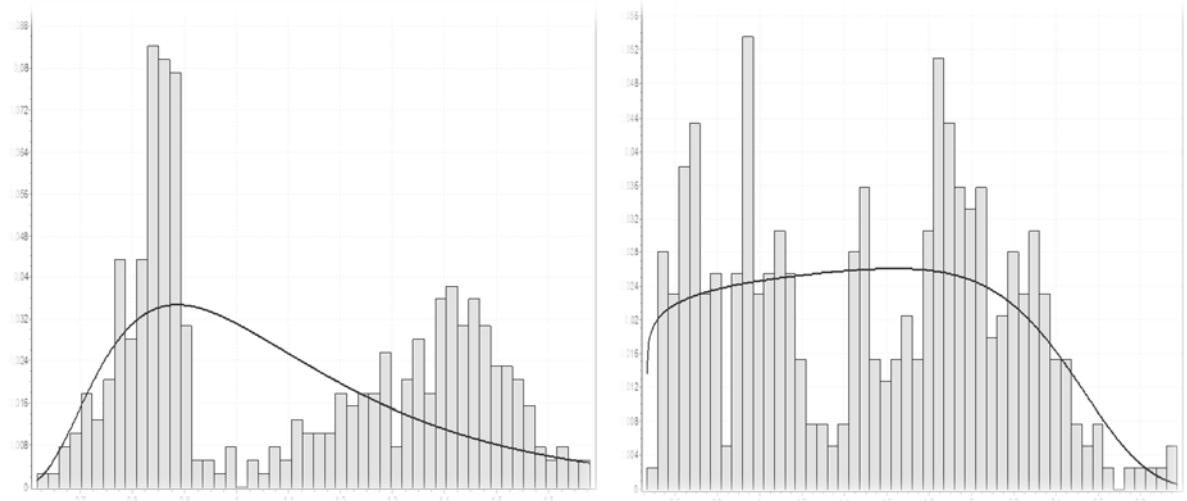
Figure 2 PAYG scheme balance after ABM introduction – cash and accrual basis



Source: Own calculations, 2014

Normalizing the expected (desired) replacement ratio to 1, than we can simulate on historical data, what is the probability of achieving this saving goal by saving the whole career in bond or equity pension funds. Our simplified stochastic model generated the probability distribution function of our respective saver´s replacement ratio after the 40-year savings horizon (Figure 3) even when low risk bond pension funds are used as an investment vehicle. PDF for 540 simulation results testing the ability of Slovak 1 bis scheme to achieve the targeted (required) income replacement ratio for a full career saving period into bond and equity pension funds are shown below.

Figure 3 Probability distribution function for achieving replacement ratio in 1 bis scheme



Source: Own simulations and calculations using MikroSIM and EasyFitXL, 2014

[1] It should be noted, that provisions within the Act on Social Insurance define the automatic retirement age adjustment. However, the first year, when the mechanism will become effective, is 2017.

Saving the whole career into bond (equity) pension fund would result only in 51.5% (70.4% respectively) probability of achieving the saving goal (targeted replacement ratio). However, the important knowledge is the dispersion of probabilities as the fitted distribution patterns suggest close to uniform distributions, which can be usually interpreted as a lottery.

5 Conclusions

We tried to bring more light into the debate on the methodological process of analyzing pension schemes by using ABM model and simulation model for the DC funded scheme, where the saver carries the investment and longevity risk under significant level of uncertainty. Based on critical analysis approach with creation of simplified model we point at the inconsistencies among the discrete time stochastic modeling of the pension scheme using isolated saver and the continuous time stochastic risk based model of pension scheme. At the same time, we showed how financially unsustainable Slovak PAYG scheme is.

Many areas of pension scheme complexities have remained uncovered, which deserve further investigation. Typical individual bio-metric and socio-economic parameters can be track and simulated on relatively high quality. However, relatively new risks, such as political and regulatory risks, still deserve more understanding in order to better track the pension scheme life-cycle and more precisely model the expected utility functions and pension scheme outcomes. It should be mentioned, that changes in FDC contributions or investment strategies regulations are not able to deliver systemic solution for PAYG scheme unsustainability. Parametric changes in the level of contributions between PAYG and FDC schemes are able to shift the PAYG scheme stability issues in time, but are not the ultimate solution as the FDC scheme can´t deliver other distribution of results.

Further research should therefore focus on creating an early-warning dynamic regulation model that is able to track the individual life-cycle savings paths, identify potential and occurring risks of PAYG as well as DC funded pension schemes and thus identify endangered cohorts for which the targeted recommendations can be formulated by the regulator.

Acknowledgments

This work was supported by the Slovak Research and Development Agency under the contract No. APVV-0465-12.

This work was supported by the Scientific Grant Agency of the Ministry of Education, science, research and sport of the Slovak Republic and the Slovak Academy of Sciences under the grant No. VEGA-1/0669/14.

This work was supported by the KEGA under the grant No. 007UMB-4/2014.

References

[1] BALL, L. - MANKIW, N. G. 2007. Intergenerational Risk Sharing in the Spirit of Arrow, Debreu, and Rawls, with Applications to Social Security Design. In *Journal of Political Economy*, Vol. 115, No. 4. ISSN 0022-3808.

[2] BLAKE, D. - CAIRNS, A. - DOWD, K. 2003. PensionMetrics 2: Stochastic Pension Plan Design During the Distribution Phase. In *Insurance: Mathematics and Economics*, 33, pp. 29-47. ISSN 0167-6687.

[3] BLAKE, D. 2006. *Pension Finance*. Oxford : Oxford University Press, 2006. ISBN 978-0-470-05843-5.

[4] BLOMMESTEIN, H. J. et al. 2009. Evaluating the Design of Private Pension Plans: Costs and Benefits of Risk-Sharing. *OECD Working Papers on Insurance and Private Pensions*, No. 34, OECD Publishing. 2009.

[5] DAHLQUIST, M. - MARTINEZ, J. V. - SÖDERLIND, P. 2011. Individual Investor Activity and Performance. In *Netspar Discussion Paper*, No. 10/2011-091. 2011.

[6] DOWD, K. - BLAKE, D. 2013. *Good Practice Principles in Modelling Defined Contribution Pension Plans*. Discussion Paper 1302. The Pension Institute. Available at internet: <http://pensions-institute.org/workingpapers/wp1302.pdf>.

[7] DUŠEK, L. - KOPECSNI, J. 2008. Policy Risk in Action: Pension Reforms and Social Security Wealth in Hungary, Czech Republic, and Slovakia. In *Czech Journal of Economics and Finance*, 58 (7-8). p. 329-358.

[8] EIOPA. 2013. Good practices on information provision for DC schemes - Enabling occupational DC scheme members to plan for retirement". EIOPA-BoS-13/010. 24 January 2013. Retrieved from: <https://eiopa.europa.eu/fileadmin/tx_dam/files/publications/reports/Report_Good_Practices_Info_for_DC_schemes.pdf>.

[9] FELDSTEIN, M. - RANGUELOVA, E. - SAMWICK, A. 1999. The Transition to Investment−based Social Security When Portfolio Returns and Capital Profitability Are Uncertain. *National Bureau of Economic Research Working Paper No.7016*. 1999.

[10] GILBERT, N. - TROITZSCH, K. G. 2005. *Simulation for Social Scientist*. Second Edition. Berkshire : Open University Press, 2005. ISBN 0-335-21600-5.

[11] HOLZMANN, R. 2009. *Adequacy of Retirement Income After Pension Reforms in Central, Eastern and Southern Europe*. Washington : World Bank Publications, 2009. ISBN 978-0-821-37781-9.

[12] KAY, S. J. - KRITZER, B. E. 2001. Social Security in Latin America: Recent Reforms and Challenges. In *Economic Review* (Federal Reserve Bank of Atlanta), 2001. Retrieved from: <http://www.frbatlanta.org/filelegacydocs/ACF10AD.pdf>.

[13] MA, Q. 2008. *Optimal Pension Asset Allocation Strategy when Terminal Utility is a Function of Replacement Ratio*. Discussion Paper No. 0820, London : The Pension Institute, 2008. ISSN 1367-580X .

[14] MALLIARIS, A. G. - BROCK, W. A. 1988. *Stochastic Methods in Economics and Finance (Advanced Textbooks in Economics)*. Amsterdam : North Holland, 1988. ISBN 0-444-86201-3.

[15] MELICHERČÍK, I. - ŠEVČOVIČ, D. 2012. Dynamic Model of Pension Savings Management with Stochastic Interest Rates and Stock Returns. In *Mathematical and Statistical Methods for Actuarial Sciences and Finance*. Proceedings of the international conference MAF 2010, Springer, 2012. ISBN 978-3-540-71296-1.

[16] MICOCCI, M. – GREGORIOU, G. N. – MASALA, G. B. (ed.). 2010. *Pension Fund Risk Management: Financial and Actuarial Modeling*. Boca Raton : CRC Press, 2010. ISBN 978-1-4398-1752-0.

[17] OXERA. 2013. Position of Savers in Private Pension Products. Research study prepared for behalf of FSUG and EC, 2013. Retrieved from:

<http://ec.europa.eu/internal_market/finservices-retail/docs/fsug/papers/oxera-private-pensions-study_en.pdf>.

[18] POWER, M. 2004. *The Risk Management of Everything: Rethinking the Politics of Uncertainty*. London : Dernos, 2004. ISBN 1-84180-127-5.

[19] RENN, O. - GRAHAM, P. 2006. *Risk Governance – Towards an Integrative Approach*. Geneva: International Risk Governance Council (IRGC), 2006. Retrieved from: <http://www.irgc.org/IMG/pdf/IRGC_WP_No_1_Risk_Governance__reprinted_version_.pdf>.

[20] SAMUELSON, P. 1969. Lifetime portfolio selection by dynamic stochastic programming. In *Review of Economics and Statistics*. Vol. 51(3), pp. 239–246. ISSN 1530-9142.

[21] SIVÁK, R., OCHOTNICKÝ, P., ČAMBALOVÁ, A. 2011. Fiškálna udržateľnosť penzijných systémov. In *Politická ekonomie*, 6/2011. ISSN 0032-3233.

[22] SETTERGREN, O. 2001. The Automatic Balance Mechanism of the Swedish Pension System - a non-technical introduction. *Working Papers in Social Insurance 2001/2*. 2001.

[23] ŠEBO, J. - VIRDZEK, T. 2012. Uplatnenie automatického vyrovnávacieho mechanizmu v priebežnom pilieri dôchodkového systému v SR. In: *Ekonomický časopis*. 5/2012. ISSN 0013-3035

[24] TARKI Social Research Institute. 2008. *PENMICRO Monitoring pension developments through micro socioeconomic instruments based on individual data sources: feasibility study*. Final Report for The European Commission - Employment, Social Affairs and Equal Opportunities, DG EMPL E4 Unit, 2008. Retrieved from: <http://ec.europa.eu/social/BlobServlet?docId=4300&langId=en>.

[25] VIRDZEK, T. - ŠEBO, J. 2013. Political risk and pension funds' performance – the case of Slovakia. In: Hughes, G. - Stewart, J. (ed.): *Old-Age Crisis and Pension Reform. Where do we stand?* Poznan : Publishing House of Poznan University of Technology, 2013. pp. 115-133. ISBN 978-83-7775-254-8.

[26] VIRDZEK, T. 2012. *Performance of Capitalization Pillars of Pension Systems*. PhD Thesis. Faculty of Economics, Matej Bel University in Banska Bystrica, 2012.

[27] VALDÉS-PRIETO, S. 2006. *"Market Innovations to Better Allocate Generational Risk"*, Ch. 12 in Restructuring Retirement Risks, Edited by David Blitzstein, D., O. Mitchell, and S. Utkus, Oxford University Press for the Pension Research Council, Wharton School, U. of Pennsylvania.

[28] WALKER, E. - IGLESIAS, A. 2007. *Financial Performance of Pension Fund Systems around the World: An Explanatory Study*. Report prepared for the OECD – World Bank project on Investment Performance of Privately Managed Pension Fund, 2007.

[29] VIDAL-MELIÁ, C. - del CARMEN BOADO-PENAS, M. – SETTERGREN, O. 2009. Automatic Balance Mechanisms in Pay-As-You-Go Pension Systems. 2009. (available at: http://ssrn.com/abstract=1132686)

SOCIAL SECURITY CONTRIBUTIONS AS "NEGLECTED" RESEARCH CATEGORY?

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ABSTRACT

Social security contributions represent a significant levy of a fiscal nature. This levy often represents a major difference between gross and net income of the employee and is also a major cost factor in value for employers and self-employed. Despite this fact, there are (compared to taxes) only few analytical-synthesis studies about insurance. The aim of this paper is to clarify some important facts in the field of social security contributions. This is fulfilled by using descriptive and comparative methods to specify this issue in selected EU countries.

Keywords: Social insurance, tax-related contributions, employees, employers, self-employed

JEL codes: H20, H22, H24

1 Introduction

While taxes and levies with more or less tax factors are there virtually since the creation of states, social insurance contributions date back to 1898, when Bismarck introduced them in the territory of modern Germany [2].

Contributions to social insurance do not fully meet the most famous definition of tax which defines it as a form of revenue for public budgets, from which are legally drained parts of the nominal income of a subject on the non-repayable principle according to predetermined rules and having a non-purpose character [eg. 9].

Given the above definition of the tax base, the views on how to look and where to include social insurance contributions (hereinafter "SSC") vary. While some of the economists regard them as a specific type of insurance contributions for which the taxpayer receives some consideration and also support it with a fact that in many countries SSC payments are directed to special funds, often outside the state budget, the prevailing view of tax theorists argue that SSC are levy having characteristics of a tax [3].

This statement is supported by the fact that a large part of the SSC structural elements is identical to the personal income tax and also that SSC and personal income tax have often identical incidence. By its very nature the social insurance contributions are levied on labour income, they apply only to personal income, including the self-employed, but are not levied on income flowing from capital assets.

The tax classification of the OECD classifies SSC listed under the item 2000. They are therefore included in tax payments and are included in the tax quota.

In the above mentioned context, there is an interesting fact regarding the frequency of scientific papers concerned to the taxes themselves and professional articles about contributions to social insurance, which is quite clearly positive for taxes[1].

The aim of the paper is to show some important attributes and incidental properties of SSC, suggest possible areas for further research in the field of social insurance contributions and demonstrate this issue on data and indicators for selected countries.

2 Literature Review

In the analysis of professional literary sources it is possible to begin with the first two major publications on public finances which were published in the former Czechoslovakia after 1989. While in the first of them, authors R. Musgrave and P. Musgrave dedicate the entire chapter of the book [14, chapter 26] to contributions to social insurance, the second book of authors Jackson and Brown mentions the SSC only in graphs that illustrate the total revenues of the United Kingdom [8, p.205].

This example illustrates the continuing dilemma of where to categorize social insurance, respectively whether to describe SSC as a part of an analytic description of the personal income tax or not. Williams makes demand for a clear separation between the description of the theory of taxes and SSC [20] because of differences in construction. While the personal income tax is progressive in all standard countries (even countries using a flat rate tax have in the tax incorporated tax reliefs in form of allowances, deductions or credits), SSC is mostly linear and often with the existence of a ceiling for payment of contributions. The impact of the SSC may therefore be regressive and may act against the principle of vertical equity applied in the personal income tax. The opposite approach is the requirement for integration of SSC into the personal income tax, whether in theoretical research [1 or 12] or in the tax-overflow practice [7].

From a macroeconomic point of view SSC is a significant component of public budgets revenue [17] and an appreciable positive aspect is the ease of their withdrawal (small administrative difficulties, low direct and induced costs of taxation) [21]. In addition to the income from employment, SSC is also collected from self-employed persons.

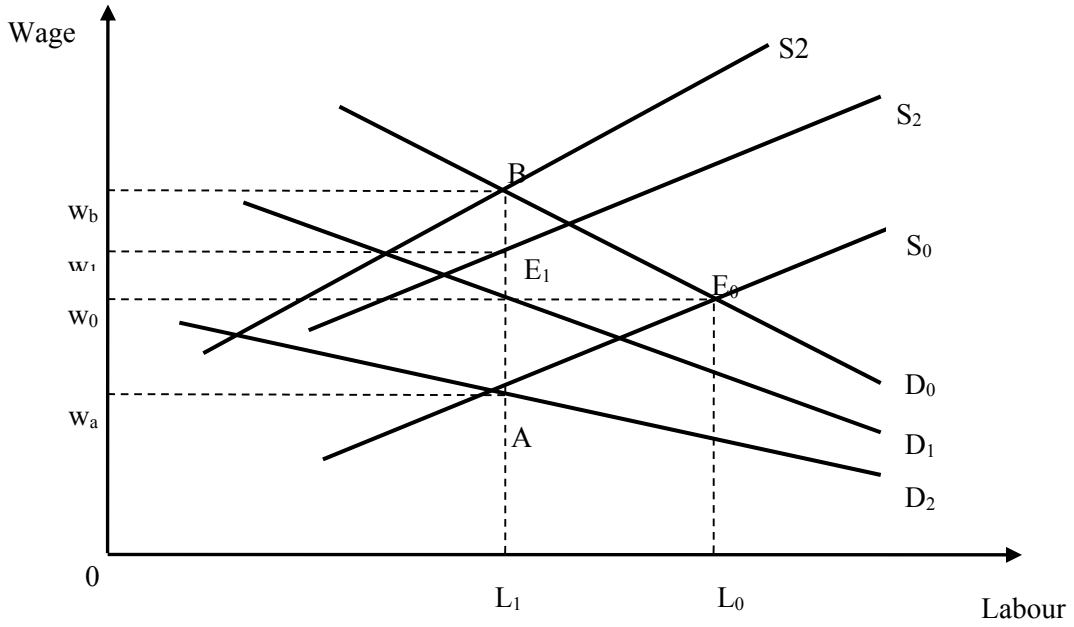
From a microeconomic point of view it is a tax paid on the labour market in the way that it is divided between the seller, i.e. worker who sells labour, and the buyer, i.e. firm that buys labour force [11].

On the labour market, social insurance contributions increase the distortion effects of the personal income tax [4]. If SSC are calculated from wage, they become part of the cost of labour and enter the implicit tax rate on labour. Labour-intensive productions are therefore disadvantaged. Higher costs for labour factor (production power) support the rationalization trend, i.e. larger capital-labour substitution, but deteriorate prospects of employment. Compared to the tax burden of capital, the tax burden on labour is disproportionately high.

Contributions to social insurance in employment are usually paid by both employees and employers, as a result their burden is transmitted mainly on labour force [13], basically it is the equivalent tax [19]. This is illustrated in Image 1.

[1] The authors studied three best-known impact journals in the Czech Republic and the Slovak Republic (Politická ekonomie, Journal of Economic and Czech Journal of Economics and Finance), and in the period 2010 to 2013 they found 46 articles related wholly to taxes, but only 17 papers dealing purely with the social insurance contributions.

Image 1 Possible distributions of social security contributions between employees and employers



Source: Široký et al. [19]

Let at time t = 0 a **D** curve represent a labour demand and curve **S** be a labour supply. The initial equilibrium is at point $\mathbf{E_0}$, where the labour supply is equal to $\mathbf{L_0}$ and the size of the wage $\mathbf{w_0}$. Let at time t = 1 a payment of social insurance contributions is introduced to which employees and employers contribute. Part of the SSC at the rate of $\mathbf{w_1w_n/w_10}$ which is paid by employees, shifts out the labour supply curve from position $\mathbf{S_0}$ to $\mathbf{S_1}$. The difference between $\mathbf{S_0}$ and $\mathbf{S_1}$ represents the amount of SSC paid by employees. Part of the SSC paid by employers has the rate $\mathbf{w_bw_1/w_10}$[2] and simultaneously shifts the demand curve for labour companies from position $\mathbf{D_0}$ to $\mathbf{D_1}$. After the introduction of both the components of social insurance contributions, the balance shifted to the point $\mathbf{E_1}$, where the gross wage increased to $\mathbf{w_b}$ and the net salary after paying both parts of SSC decreased to $\mathbf{w_n}$. The volume of offered work is now at $\mathbf{L_1}$ and the total tax revenue represents the area $\mathbf{w_bw_nAB}$, on which employees participate on the one hand in the amount of $\mathbf{w_1w_nAE_1}$ and employers on the other hand in the amount of $\mathbf{w_bw_1E_1B}$. Exactly the same result would have been reached if the SSC had been paid only by employees. Social insurance contribution would have in this case had the rate $\mathbf{w_bw_n/w_n0}$, which would change the supply curve $\mathbf{S_0}$ to $\mathbf{S_2}$. If, by contrast, SSC was paid only by employers at the same rate $\mathbf{w_bw_n/w_n0}$, the demand curve $\mathbf{D_0}$ would be shifted to $\mathbf{D_2}$. The gross cost of labour, the net wage and tax revenue are in all cases the same.

3 Data and Methodology

To illustrate the theoretical knowledge, in the application level, seven countries were chosen: the Czech Republic, France, Latvia, Poland, Austria, Slovakia and Sweden. The reason of choosing these countries was to include the countries with one of the highest tax quota (France and Sweden), and on the contrary the inclusion of countries with one of the lowest tax quota (Latvia and Slovakia). Selection of states also represents one founding member of the EEC, two states, which joined the EC in 1995 and three countries that joined the EU in the same year as the Czech Republic. Compared countries also include Eurozone countries and countries outside

[2] Due to the nature of social security contributions it is necessary that both have the same tax base, in this case, w_10.

the Eurozone. Another reason for the selection of these countries is the existence of countries with the "old" tax system (France, Sweden and Austria), countries with substantial amendments to the tax system (the Czech Republic, Poland and the Slovak Republic) and the country with completely "new" tax system because of the new state constitution (Latvia). And finally, the reason for choosing these countries is the possibility to acquire relevant information from publications [publication 16, publication 18, publication 15] and from personal interviews in the IBFD.

3.1 Macro-economic level

In the context of macroeconomic analysis[3] there were examined and compared indicators based on tax quota: The total tax quota, the share of direct taxes in gross domestic product (GDP), the share of personal income taxes in GDP, the share of social security contributions in GDP as a whole and also in selection of SSC paid by employers, employees and self-employed. The aim of the analyses was to answer the question of how significant is the SSC revenue for public budgets and what is the weight of their partial tax quota.

3.2 The microeconomic level

In the context of microeconomic analysis[4] there was made a description of systems of social insurance[5] in selected countries. The aim of the analyses was to answer the question of how significant levy is SSC for employees and how are the SSC systems designed in selected countries.

4 Results and Discussion

The results achieved by description and subsequent comparison confirm the high role of social security contributions and their significant research potential. The results are divided into macro- and microeconomic levels.

4.1 Results at the macroeconomic level

Table 1 illustrates the SSC as an important part of the overall tax quota at the level of all European Union member states (EU-28) both in the expression of weight average and the expression of the arithmetic average. Partial tax quota of social insurance contributions is (weighted average) only about 0.5 percentage point lower than the partial tax quota of direct taxes, respectively (arithmetic average) only of 0.2 percentage point. The sum of SSC of employees and SSC of self-employed persons also approaches the partial tax quota of personal income taxes.

[3] The macroeconomic data are analyzed as of the 31. 12. 2012.
[4] The macroeconomic data are analyzed as of the 30. 4. 2014.
[5] Regarding the required text extent it is possible to receive more detailed characteristics of both the SSC and personal income tax (tax basis, tax rates, tax reliefs etc.) upon request at email addresses of authors of this paper.

Table 1 The importance of social insurance contributions based on tax quota indicators (in %)

	Weight average EU-28	Arithmetic average EU-28
Total tax quota with SSC	39.4	36.3
Total tax quota without SSC	26.7	25.2
Partial tax quota:		
- direct taxes	13.2	11.3
- personal income taxes	9.4	7.8
- SSC total	12.7	11.1
- SSC of employers	7.3	6.4
- SSC of employees	3.9	3.5
- SSC of self-employed	1.5	1.2

Source: Denis – Hemellgarn – Sloan [6] and Own Calculations

In the seven selected countries there is recorded (with the exception of Sweden) higher partial tax quota of SSC than partial tax burden of direct taxes. The Table 2 also illustrates significant differences in the distribution of SSC between employers and employees, when in Sweden virtually all SSC are transferred by employers, in Poland the ratio of contributions of employers and employees is the same, in Austria it is similar (difference of one percentage point), in other countries the contributions of employers prevails over the contributions of employees. Social insurance contributions for the self-employed are the highest in the Slovak Republic, Poland and in the Czech Republic.

Table 2 Comparison of tax macroeconomic characteristics of selected countries (in %)[6]

	AT	CZ	FR	LV	PL	SK	SE
Total tax quota with SSC	43.1 (7)	35.0 (16)	45.0 (3)	27.9 (26)	32.5 (20)	28.3 24)	44.2 (4)
Total tax quota without SSC	28.2 (7)	19.4 (26)	28.0 (8)	19.5 (24)	20.2 (23)	15.8 (28)	37.0 (2)
Partial tax quota:							
- direct taxes	13.4 (9)	7.2 (22)	12.4 (11)	7.7 (19)	7.2 (21)	5.6 (26)	18.3 (2)
- personal income taxes	10.1 (6)	3.8 (23)	8.5 (11)	5.7 (18)	4.6 (21)	2.6 (28)	15.2 (2)
- SSC total	14.9 (6)	15.6 (3)	17.0 (1)	8.4 (22)	12.3 (12)	12.5 (11)	7.2 (24)
- SSC of employers	7.0 (11)	9.9 (3)	11.5 (1)	5.7 (17)	4.9 (21)	6.7 (12)	7.0 (10)
- SSC of employees	6.0 (4)	3.2 (13)	4.2 (11)	2.6 (18)	4.9 (8)	3.0 (14)	0.0 (28)
- SSC of self-employed	1.9 (6)	2.5 (3)	1.3 (14)	0.1 (27)	2.5 (3)	2.8 (2)	0.2 (24)

Source: Denis – Hemmelgarn – Sloan [6] and Own Calculations

4.2 Results at the microeconomic level

Table 3 shows characteristics of tax-payment liabilities of taxpayers having an income from employment and Table 4 shows characteristics of tax-payment liabilities of taxpayers having an income from self-employment.

[6] In brackets below each value there is specified order (from highest to lowest) including all 28 Member States of the European Union.

Table 3 Comparison of characteristics of the SSC in employment

	AT	CZ	FR	LV	PL	SK	SE
EMPLOYERS							
Number of SSC	7	4	8	1 (6)	3	8	7
Ceiling	YES	YES	YES	YES	YES	YES	NO
The differences according to the type of work	YES	NO	YES	NO	YES	NO	NO
EMPLOYEES							
Number of SSC	6	2	4	1	3	5	0
Ceiling	YES	YES	YES	YES	YES	YES	---
The differences according to the type of work	YES	NO	YES	NO	NO	NO	---
CHANGES IN THE RATES 2014/2013	YES	NO	YES	NO	YES	YES	NO

Source: Schellekens [16], Široký [18] and Own Calculations

Both tables show a high level of autonomy in determination of SSC in selected countries in areas of number of SSC, the existence of ceilings, different rates (at least a part) of the SSC in employment according to the type of work (manual workers pay higher SSC than administrative staff) and different assessment base for SSC of self-employed persons. The situation with self-employed persons is complicated by the fact that in some countries there are various professional groups with different rates of SSC (farmers, artisans and freelancers – each of them has different rate). The little-known fact is also annual changes in the level of SSC rates in some countries.

Table 4 Comparison of characteristics of SSC for self-employed persons

	AT	CZ	FR	LV	PL	SK	SE
DIFFERENT RATES FOR PROFFESIONAL GROUPS	NO	NO	YES	NO	NO	NO	NO
Craft activity							
Number of SSC	2	4	4	6	4	5	7
Base is the difference between revenues and expenditures	YES	YES*)	YES	YES	PL	YES	YES
Ceiling	YES	YES	YES	YES	YES	YES	NO
CHANGES IN THE RATES 2014/2013	NN	NO	YES	NO	YES	YES	NO

Source: Schelleckens [16], Široký [18] and Own Calculations. NN – not identified, *) modified, PL – assessment base is the amount declared by the taxpayer which shall not be lower than 60% of the average wage.

For further analyses and subsequent comparisons and synthesis there were used the average annual income of a taxpayer from employment and tax-payment obligations from those wages.

Table 5 Comparison of the importance of SSC in total levies from the average salary of the employee[7]

	AT	CZ	FR	LV	PL	SK	SE
The average annual wage (in thous. EUR)	36 821	11 127	33 775	10 512	10 724	10 284	39 748
TAX	5 965	1 334	4 931	1 377	740	967	7 155
(% of average wage)	**(16.2)**	**(12.0)**	**(14.6)**	**(13.1)**	**(6.9)**	**(9.4)**	**(18.0)**
SSC of employers	11 525	3 783	11 889	3 721	2 917	2 900	17 688
(% to average wage)	**(31.3)**	**(34.0)**	**(35.2)**	**(35.4)**	**(27.2)**	**(28.2)**	**(44.5)**
SSC of employees	6 665	1 224	4 695	421	1 909	1 378	278
(% of average wage)	**(18.1)**	**(11.0)**	**(13.9)**	**(4.0)**	**(17.8)**	**(13.4)**	**(0.7)**
SSC TOTAL	18 190	5 007	16 584	4 142	4 826	4 278	17 966
(% of costs of labour)	**(49.4)**	**(45.0)**	**(49.1)**	**(39.4)**	**(45.0)**	**(41.6)**	**(45.2)**

Source: OECD [15] and Own Calculations

The table 5 clearly shows the significant importance of SSC at the average wage, especially as a share of total costs of labour which in all countries are superior to the actual personal income tax. When comparing the amount of personal income tax and SSC paid by employees, their amount is similar in Austria, in the Czech Republic and in France, in Poland there are SSC of employees even higher than the tax, in Latvia, on the contrary, lower than the tax. In Sweden, all contributions for employees are, with a negligible exception, are paid by the employer.

4.3 Discussion

Social insurance contributions have in some theoretical works [5] different status/role than the theory of taxation in terms of their social function and the potential impact on social policy, which was not the subject of this article. It is also clear that the examined issues could be extended to the area of transfer payments, especially if payments on SSC (or their part) head directly to autonomous funds of public budgets [10] or even to private-legal funds.

The authors are also aware of the boundaries of their research. In macroeconomic calculations it can be based in possibilities of further voluntary contributions of SSC of self-employed persons and in the existence of private funds of levies on SSC, which are not reflected in macroeconomic indicators. In the microeconomic analysis the authors work only with average wages of the taxpayer applying only basic tax reliefs (credit at AT, CZ, FR, respectively allowance at LV, PL, SK and SE) in the absence of consideration other tax reliefs (e.g. children). Average wage indicator is the appropriate standard of eliminating different wage levels in selected states; however, when using multiples of the average wage, it is possible to achieve different results. In borderline cases of high wages ceilings of SSC in some countries will enter into the calculation, while in the calculations of very low wages there would also be appropriate to count against social benefits.

5 Conclusions

Contributions to social insurance are an inseparable part of the tax-payment system in the developed countries. While in practice, there is an obvious significance of the SSC for the public budgets and the economy as a whole, in theory, the SSC is not being paid such an attention that is being paid to taxes "de jure". The researched "macroeconomic" question of how far significant revenue for public budgets is the SSC and what is the weight of the partial tax

[7] The average annual wage is calculated from data for the first quarter of 2014. For countries outside the Eurozone is for the conversion of local currency to Euros used the exchange rate on 31. 3. 2014. It is a taxpayer from employment, who applies only basic tax deduction, respectively tax credit.

quota, offers the statement that the SSC bring public budgets more or less the same revenue as revenue from direct taxes. The researched "microeconomic" question of how significant levy is SSC for employees and how are SSC systems designed in selected countries, offers the statement that the amount of SSC from receivers of average wages are close to the tax.

The research also confirmed the substantial autonomy of the EU Member States in the construction and the amount of both personal income taxes and social security contributions. This fact could be the impulse for further research in the SSC in theoretical and application investigation level.

Acknowledgments

The contribution is processed as an output of a research project by the SGS under the registration number SP2014/95.

References

[1] Adam, S. – Loutzenhiser, G. (2007). Integrating Income Tax and National Insurance: An Interim Report. *Working Paper of Institute for Fiscal Studies*, No. 21.

[2] Atkinson, A. – Stieglitz, J. (1980). *Lectures of Economics.* London: McGraw-Hill.

[3] Atkinson, A. (2006). Income Maintenance and Social Insurance. In. *Auerbach, A. – Feldstein, M., Eds. Handbook of Public Economics. Volume II.* Amsterdam: Elsevier, chapter 13.

[4] Auerbach, A. (2007). The Theory of Excess Burden and Optimal Taxation. In. *Auerbach, A. – Feldstein, M, Eds. Handbook of Public Economics. Volume I.* Amsterdam: Elsevier, chapter 2.

[5] Boden, R. (2011). Taxation Research as Social Policy Research. In. *Lamb, M. – Lymer, A. – Freedman, J. – James, S, Eds. Taxation: An interdisciplinary Approach to Research.* Oxford: Oxford University Press.

[6] Denis, C. – Hemmelgarn, T. – Sloan, B., Eds. (2014). *Taxation Trends in the European Union. 2014 Edition*. Luxembourg: European Communities & EUROSTAT.

[7] Dilnot, A. – Webb, S. (1989). Reforming National Insurance Contributions: A Progress Report. *Fiscal Studies*, vol. 10, No. 2, pp. 86-101.

[8] Jackson, P. – Brown, C. (1990). *Public Sector Economics.* 4th Edition. London: Willey-Blackwell.

[9] James, S. – Nobes, Ch. (2010). *The Economics of Taxation. Principles, Policy and Practice.* 10th Edition. London: Fiscal Publications.

[10] Klazar, S. – Vančurová, A. – Slintáková, B. (2004). Redistributional Effects of Taxes and Transfers in the Czech Republic. In *Fiscal and Regulatory Competition. Proceedings of 60th Congress IIPF*. Milano: IIPF, pp. 438-451.

[11] Kubátová, K. (2010). *Daňová teorie a politika.* 5. vydání. Praha: Wolters Kluwer.

[12] Lindbeck, A. – Persson, M. (2013). A continuous Model of Income Insurance. *International Tax and Public Finance*, Vol. 20, No. 6, pp. 938-960.

[13] Medveď, J. – Nemec, J. et al. (2011). *Verejné financie.* Bratislava: Sprint dva.

[14] Musgrave, R. – Musgrave, P. (1989). *Public Finance in Theory and Practice.* 5th Edition. New York: Mc Graw-Hill.

[15] OECD (2014). *Taxing Wages 2014*. Paris: OECD Publishing.

[16] Schellekens, M., Ed. (2014). *European Tax Handbook 2014*. Amsterdam: IBDF.

[17] Schultzová, A. et al. (2011). *Daňovníctvo.* Bratislava: Iura Edition.

[18] Široký, J. (2013). *Daně v Evropské unii.* 6 vyd. Praha: Linde.Graw-Hill.

[19] Široký, J. et al. (2008). *Daňové teorie. S praktickou aplikací.* Praha: C. H. Beck.

[20] Williams, D. (1978). National Insurance Contributions – A Second Income tax. *British Tax Review*, No. 2, pp. 183-195.

[21] Zubaľová, A. et al. (2012). *Daňové teorie a ich využitie v praxi.* Bratislava: Iura Edition.

MORTGAGE LOANS AND CREDIT RISK IN THE CZECH REPUBLIC

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ABSTRACT

Indebtedness through mortgage loans is dominant in the amount of household indebtedness in the Czech Republic. Repeated growth of indebtedness results in the increase of the credit risk undertaken by banks in connection with their credit exposure. The research of the University of Finance and Administration has confirmed the existence of future risks arising from the potential increase of interest rates. The paper presents risks that are the output of a specific academic research. This research is a follow-up to surveys conducted as part of the research in the period of 2013-2014. It specifically refers to potential risk factors related to the development of mortgage lending that can be described as internal.

Keywords: Mortgage loan, credit risk, interest rate, commission

JEL codes: G21

1 Introduction

In terms of world economy experience and the development after 2007, the regulation and supervision of the subjects operating on the financial market have become more and more significant. At the present time, there is general agreement that we cannot do without financial regulation. With the exception of extreme opinions speaking for the regulation of all activities or the application of completely free development within the sector, we are currently presented with the general pragmatic opinion on reasonable regulation through respective institutions and supervision bodies [6].

Financial markets in the Czech Republic are subject to consistent regulation. The Czech National Bank, as the main institution in charge of the regulation and supervision, is generally considered a truly independent and responsible central bank.

Despite the favourable evaluation of the regulation and supervision in the Czech Republic, we can still examine potential risks on the financial market that may influence the future development of the financial sector. As part of the specific academic research of VŠFS[1], which was conducted in 2013, a large number of bank managers working for the banks in the Czech Republic were interviewed in the form of a research probe and directed interviews. The interviews also focused on identifying risks that are perceived by those managers in relation to the future risk in the banking sector. One of the frequently mentioned risks was the area of mortgage loans. The area of mortgage loans can also be considered significant in relation to the financial economic crisis after 2008. This crisis followed the so-called mortgage crisis in the USA which preceded the subsequent world economic problems. Another reason demonstrating the significance of mortgage loans for the banking sector risk is the fact that based on ČNB data

[1] Project of a specific academic research of the University of Finance and Administration, o.p.s. 2013 entitled: *Work with Credit Risk and Prospect for Future Conduct of Financial Institutions in the Czech Republic in the area of finance*.

as at 31. 3. 2014 mortgage loans totalling CZK 875.796,6 million[2] have been granted in the Czech Republic. At the same time, we can notice inter-annual increase of mortgage loans of +27%.

In addition to the verified risks, which are connected with the development of real estate prices and interest rates, additional potential risks arising from insufficient foresight of relevant financial institutions were mentioned. This area was pointed out in relation to increasing competitive pressure and the efforts to maintain existing profits of most banks. Long-term sustainability of existing situation of profits was also mentioned in the context of the forthcoming regulation in relation to BASEL III rules and to the application of measures of EU institutions. According to the respondents, as a result of the application of a more strict regulation and continuing pressure of the competition, there will be growing pressure to maintain the existing sources of long-term revenues. The primary sources of these long-term revenues include mortgage loans for citizens.[3] During the specific academic research, this risk was included in secondary verified outputs of the research.

In compliance with the information presented in the introduction, the main goal of the research was to elaborate the defined risks and to verify the statements of respondents. In order to determine a general hypothesis, it was assumed that the economic results of the biggest banks in the Czech Republic show decrease in revenues and provide identification of other parameters which can motivate bank managers to accept increased risks in the lending area.

2 Literature Review

As already mentioned, the previous research focused on verification of basic risks in relation to future development of interest rates and real estate prices in the area of mortgages. These risks may arise from potential decrease in the value of loan provision with regard to the development of real estate price in the Czech Republic and the potential development of bubbles [5]. The development of real estate prices is further related to LTV[4] indicator, in particular to the amount of provided funding of up to 100% of the mortgage value. The author has already analysed these areas in his previous papers. This paper is a follow-up to his previous work and elaborates the topic of selected internal risks related to mortgage loans that can be considered secondary.

3 Data and Methodology – Risks concerning mortgages

The applied method can be described as general-scientific of explanatory type. The applied forms of methods were empirical and general-theoretical. One of the basic outputs of the previous research was the observation that the bank managers admit the risk that can be described as internal for the purpose of VŠFS research. It involves risk related to the possibility of transferring increased risks related to maintaining business performance within the provision of mortgage loans. The follow-up research aims to identify relevant parts of the internal risk. In order to determine the classification and the possibility of a more exact description and verification of risks in the area of mortgage loans, several factors, which can be further analysed, were determined in the initial phase of other activities. The relevant verified internal risk factors are Revenue factor, Competition factor and Distribution factor.

The revenue factor is connected with the development of economic profitability in the banking sector and with the pressure to results. The competition factor is connected with the

[2] ČNB, Database of ARAD time series, Total household debt, Set-up No. 1538/3.
[3] Also described as the so-called residential mortgages.
[4] LTV (loan-to-value) indicator is the ratio of the drawn-down mortgage to the real estate estimated value.

development of the banking sector and with the increased performance of new as well as original banks in the area of housing financing. The distribution factor is related to the change in the method of distribution of bank products and to the commission system of intermediaries.

3.1 Revenue factor

As mentioned in the introduction, the author also aims to verify the related information which can put pressure on relevant bank managers to compensate the decrease in interest margins and revenues. This area has been described as the „Revenue factor" in this paper. The basic verification of the potential effect of the factor utilized data from internal verification of outputs of the biggest banks in the Czech Republic in 2013. Basic economic data are presented in Table No. 1. This table also shows decrease in revenues and profit with inter-annual increase in loans and deposits. This state remains even with the improvement of the indicators of risk costs and further decrease in operating cost.

Table 1 Inter-annual comparison of KB, ČS and ČSOB outputs, 2012/2013

	KB	ČS	ČSOB
Net operation yields	**-3,2%**	**-5%**	**-6,3%**
Operating costs	-2,5%	-4%	-3,5%
Gross operating profit	-4%	-6,1%	-7,9%
Risk Cost	**-7,1%**	**-10,1%**	**-8,6%**
Net profit belonging to Bank shareholders	**-5,6%**	**-6,2%**	**-11%**
Client loans (net)	4,8%	4%	5,7%
Client deposits	12,1%	4%	4,9%
Ratio of operating costs and yields	42,6%	42%	47,1%
Ratio of net loans and deposits	77,0%	72,4%	77,0%
Capital adequacy ratio (31.12.2013)	15,8%	17,7%	15,6%

Source: KB, ČS, ČSOB, annual reports

Although the presented results are not official, the parameters indicate that the opinion of the previous survey respondents in the context of potential „willingness" to accept increased risks is real. The achieved performance especially in the development of risk costs may lead to minor foresight in the area of credit risk (see substantial decrease with all of the three monitored banks). Another factor is the inter-annual decrease in revenue that puts increased pressure on business activity. However, we still need to ask a question how this area might be affected by the regulation in the banking sector in the future.

The validation of the presented information also included the validation of theoretical premise regarding the presented statement. Professional literature offers numerous responses to those issues. We can mention e.g. the quotation: In good times, financial institutions and clients may start to underestimate risks connected with their economic decisions, or they may even be exposed to strong inputs in the environment of increased competition and to expand the scope of assumed risk [2]. The risk may also be deduced from current prerequisites for continuous

GDP[5] growth. With GDP growth, we can expect the increase in credit activity, see e.g. the study by Quagliariello [7] or Čihák and Brooks [1]. Based on previous outputs of the specific academic research it cannot be foreseen that the expectation of the credit activity increase would be substantially limited by increased regulatory restrictions in relation to Basel III application etc.[3].

3.2 Competition factor

More and more financial institutions operate on the market of mortgage loans in the Czech Republic. Recently, the group of big banks has been complemented with small banks. Following banks was active in 2013 on the market: Česká spořitelna, Československá obchodní banka, Equa bank, GE Money Bank, Hypoteční banka, Komerční banka, LBBW Bank CZ, mBank, Oberbank AG, Raiffeisenbank, UniCredit Bank CR, Sberbank CZ and Wüstenrot mortgage banka.

It is necessary to pay attention to the impact of competition on the general system health. The financial crisis proved that it was not enough to have financial institutions that are only healthy and resistant to basic risks in order to provide financial stability. It is also necessary to study and evaluate reciprocal relations among them, for the effort to strengthen financial position of one institution may ironically result in undermining the stability of another institution or the system as a whole [2]. The author can confirm the fact that aggressive competitive environment puts increased pressure on the respective managers which in an attempt of maintaining or enhancing business results leads to taking enhanced credit risks, or to the decrease in internal yield margins of relevant businesses to the absolute minimum. Especially with mortgage loans, this condition is supported by existing minimal delinquency due to relatively high motivation of clients to repayment (mostly related to own housing or substantial portion of own sources when purchasing a real estate).

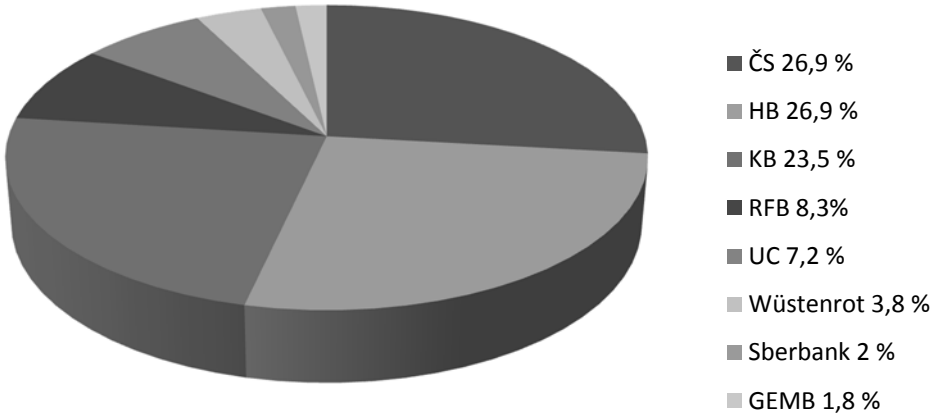
Based on available information from sources of relevant banks and the Ministry for Regional Development, big banks still have dominant position in the production of new mortgage loans. The largest volume and numbers of mortgage loans were closed in 2013 by Česká spořitelna, which returned to the imaginary first place after the drop in 2012[6]. Mortgage bank was second (by inclusion of the mortgages closed within ČSOB and Poštovní spořitelna). The third place was occupied by Commercial Bank. These big banks granted over 80% of all mortgage loans that were closed in the Czech Republic in 2013. The afore-mentioned situation demonstrates the dominant position of big banks. On the other hand, the confirmed growth of competition and the implementation of various marketing activities also enhance pressure on these big banks. The increase in competition is also confirmed by the result for 4Q 2013, which is shown in Figure No. 1.

As mentioned above and partially commented in Chapter 3.1, the logical step of managers is to compensate lower yields achieved in relation to the current state of interest margins and other revenues. For this reason we can confirm that this factor called „Competition factor“ is closely related to the presented „Revenue factor.“

[5] Estimates of GDP development in the Czech Republic for years predict inter-annual growth for 2014 of 2.6% and for 2015 inter-annual growth of 3.3% (ČNB forecast dated 7. 5. 2014).

[6] ČS statement dated 17.2.2014 with reference to information sources from the Ministry for Regional Development. The information reveals that in 2013 ČS granted over 25 thousand mortgages worth CZK 40 billion.

Figure 1 – Overview of market shares in the area of mortgage loans for 4Q 2013



Source: KB – internal evaluation of the comparison with competition[7]

3.3 Distribution factor

Another area, identified as part of the previous author´s work and yet not analysed, is the area of risks connected with the distribution of bank services. This area is described as „Distribution factor" in this paper. The original methods of distribution of retail bank products are gradually less and less applied. The area of mortgage loans is no exception either. The so-called primary production of mortgage loans, which is implemented through direct winning of new clients from the level of the employees of the financial institution subsidiaries, generates less volume from the total implemented production even with big banks. A number of smaller or specialized banks depend on the external distribution network from the very start. This mainly involves Mortgage Bank and most of the smaller and new banks. In recent years, the production has grown via external intermediaries in Commercial Bank as well. After earlier drops in the production, Česká spořitelna also focused more on external distribution. We can observe that the production via external partners exceeds more than 50% of total production of mortgage loans in the Czech Republic (on average for all banks). Česká spořitelna might still be the only one with its unique position considering the historical position in servicing clients – natural persons.

The best-known intermediaries are currently OVB, Swiss Life (most of the distribution network used to be part of the group AWD), Partners, ZPF, Fincentrum and Broker Consulting. In case of these companies, this refers to the so-called multi-product financial networks operating on the whole territory of the Czech Republic. Most of these companies are associated in the Union of Financial Intermediation and Consultancy companies (USF) and in the Association of Financial Intermediaries and Financial Advisers (AFIZ). Based on available information, these companies control more than 80% of the insurance market. The main task of individual consultants is the insurance and investment intermediation. The activity in the area of mortgage loans is a natural follow-up to financial consultancy which is provided by those subjects. The performance of these subjects only for the last quarter in 2013 in the area of mortgage loans is CZK 10,803,415,000. Another significant group of intermediaries of mortgage loans are subjects united in the Association of mortgage brokers. This association mostly unites subjects

[7] Comparison of market shares in the area of mortgage loans from publicly available data for 2013, KB background material.

which directly operate in the area of real estate trade. These include 1. EUROHYPOTÉKA, Bonnet.cz, FINEO Group, GEPARD FINANCE, HYPOASISTENT, M&M reality holding, OPEN FINANCE and BROKER TRUST. Declared production of these subjects for 2013 in the area of intermediation of mortgage loans is CZK 35,000,000. The association declares inter-annual increase in production by 40%. The presented list of intermediaries needs to be completed with Fincentrum a.s., which is one of the most significant consultancy groups. This company is currently no longer part of those associations. However, from the perspective of total mortgage production for the population of the Czech Republic, the production of this company is most significant. Based on their own statements, this company intermediated every 14th mortgage in the Czech Republic in 2013 and showed inter-annual increase in production by 23%. Declared production is CZK 10,300,000. The relevant verified factors are listed in the Table No. 2 for better orientation.

Table 2 Production of major companies financial advisory services

	Intermediated turnover	**Number of contracts**
USF and AFIZ (4Q 2013)	10,803,000,000	7,169
AHM (2013)	35,000,000,000	--
Fincentrum (2013)	10,300,000,000	8,000

Source: AFIZ, AHM, Fincentrum

It is unquestionable that the area of external distribution generates increased risks in the lending area. The risk of counter-party failure exists with every loan – even with mortgage loans where the arranged securing provides strong motivation for the client to meet its obligation. The involvement of an external experienced intermediary may enhance the credit risk of the bank. The reason might be the possibility of distorting a part of input information with regard to partial familiarity of the methodology and the evaluation model of client´s reliability from the relevant bank. This risk thus belongs to the area of standard credit risk. The fact that the involvement of external partner in the process of bank product sale enhances credit risk can be demonstrated on experience from the supervision of insurance and investment products sale. The area of insurance and investment products intermediation is currently regulated and controlled.[8]. Frequent cases of incorrect or fraudulent behaviour are presented by media. Specific cases can be found in presentations of ČNB[9] and relevant associations. From the perspective of bank risks verification we can observe that the enhanced risk is generated because of the absence of clearly stipulated regulation and supervision in the area of mortgage claims intermediation. Certain risks are also connected with the nature of the intermediary´s relation to the insurance company. The attempt to interconnect own products of the insurance company may affect the motivation of the intermediary for granting the loan „at all cost", i.e. even at the cost of distorting information submitted to the bank. Various life insurance companies became part of the banking process of credit expansion which damages production structure and causes economic cycles and recessions [4].

Another risk area in relation to external distribution is the economic impact of this cooperation. Intermediation of mortgage loans is provided as a reward. The reward granted by the bank is

[8] Supervision for ČNB is carried out by the Section of supervision of financial market within the control of insurance sector (based on current verification, 151.794 insurance intermediaries are registered in the Czech Republic) and capital market (7.771 investment intermediaries are registered); as part of the supervision observance of MiFID, UCITS, IMD directives is controlled.

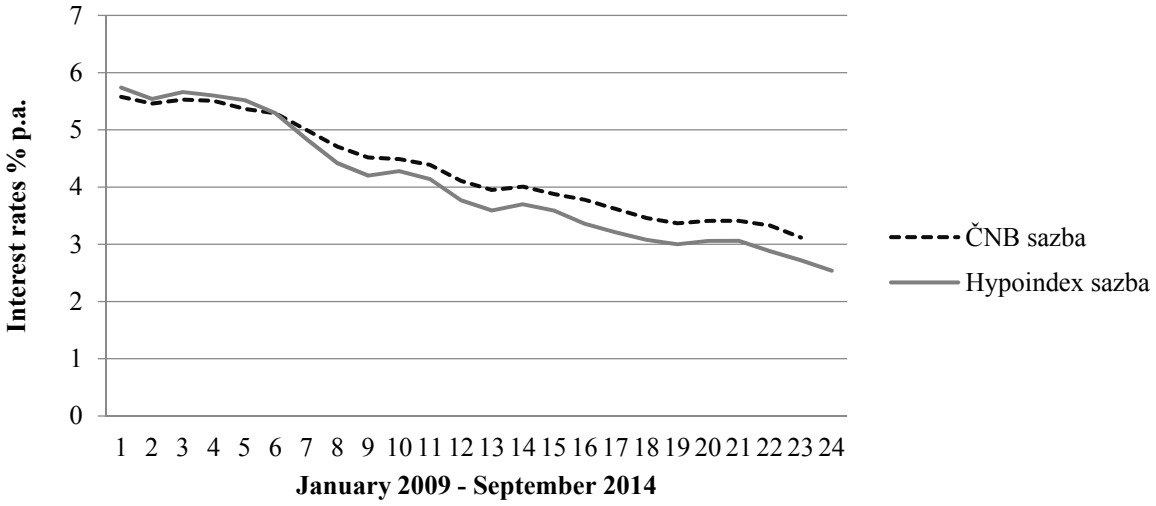
[9] E.g. ČNB report on the performance of supervision of financial market for 2012 claims: „In connection with the distribution of investment life insurance it was re-confirmed that the sector of insurance intermediaries in the Czech Republic fails to operate properly, which is also demonstrated by frequent cases of their unlawful action."

the so-called commission. The commission is usually individually stipulated with the relevant company that „runs“ the respective distribution network. Commissions are not made public, however, according to the author commissions with mortgage loans range from 0.6% to 1.8% of the scope of the closed deal. Also, the maximum amount of the provision is stipulated. The subject of the commission with most banks refers to standard mortgage loans, American mortgages and real estate loans, which fail to meet parameters of typical mortgages. Standard consumer or commercial credits usually are not the subject of the contract. The highest commissions are accomplished by the biggest intermediary networks.

Commission payment for the intermediation markedly influences business economics. External intermediaries have substantial impact on the level of interest rate to the loan. The fact is that external intermediary usually receives offers from more banks. Given the achieved production for a specific bank, this intermediary is also acquainted with inclusive rates at the lowest possible level. For the aforementioned reason, the loans implemented in cooperation with an external partner are mostly granted for below-average rate. Combination of this fact together with commission payment from the bank markedly influences economics of the specific business. The resulting internal margin considering the liquidity and risk surcharges often hardly achieves 1%. With commission payment, return on the deal is generated only in subsequent years of the business relationship with the client. This fact in the context of low interest rates may also be deduced from data that are released from ČNB or e.g. from Fincentrum[10].

The development of interest rates is shown in graph No. 2. The decrease in the rates affecting the loans profitability can be deduced by the development of the above-mentioned interest rates. This graph also declares the influence of competition (see comments in Chapter No. 3.1) that markedly affects the development of interest rates in the Czech Republic.

Figure 2 Development of mortgage loan interest rates in the Czech Republic



Source: Own charge based on the data of the CNB and Fincentrum Hypoindex

[10] Fincentrum, a.s. is one of the largest negotiators in the area of financial services and consulting in the Czech Republic. The company's activities also comprise the monitoring of the level of the provided mortgage loan interest rates. Data are published on the company's website www.hypoindex.cz.

4 Results and Discussion

The secondary goal of this article is to indicate the possibilities of risk restrictions that have been identified and described here. In the area of these risks, we may partially follow up with the existing regulation and rules applied in compliance with valid legislation and standards.

In the area of the presented Revenue Factor, the performed analyses conclude that the basic method consists in strict observance of valid BASEL II regulations. Further risk restrictions shall promote the application of BASEL III regulations. Another area that may diminish the impact of taking enhanced risks from banks is the potential regulation in the area of methodology of pricing the mortgages in relation to issuers of mortgage debenture bonds. A measure frequently applied abroad is also the regulation of relevant banks expositions towards the real estate market, restriction of the lending level in relation to the resulting LTV or LTC parameter. Factors in relation to competition shall be substantially affected by the price of relevant banks in the future. Certain regulation could be ensured as part of ČNB supervision. Business profitability in relation to the prices of bank products and applied interest rates directly affect the parameters that are reported to the central bank and are also the subject of direct control in the respective banks. In this area, it will be necessary to find tools to restrict possible risk behaviour of those banks, or their potential moral hazard under the pressure of their competitors. Especially the short-term marketing strategy of small banks to win new clients may be a risk factor with possible impact on the stability of the whole bank. The central bank may respond to possible risk behaviour by adopting respective measures, a decree or regulation of extra reserves etc. Thorough approach can be foreseen especially with system-significant banks.

The area of Distribution factor currently represents the least regulated area. The existing legislation primarily focuses on intermediation in the area of insurance and investment services. Self-regulation through relevant associations and unions is not sufficient and it is not possible to rely on the observance of existing ethical codes either. In this area, other changes may be recommended, in particular concerning ČNB activity and the search for tools of direct control of intermediaries and mortgage brokers. Given the growing importance of intermediaries, it might be worth considering the possibility to deal with the situation like in case of providing insurance or investment services and to require e.g. licences, certificates, expert exams etc. (supervised by the respective national authority etc.). There is also the area of commission payment. There is a certain regulation of other types of business activities; therefore it is possible to consider the possibility of regulation in this area feasible as well. Even though this sector might seem non-regulated, it is possible to introduce e.g. the new Civil Code in this area as well (see regulations for concluding and signing contracts, availability of information prior to closing deals, application of selected rules for the consumer protection etc.). Another inspiration may also be taken over from a set of regulations that are valid for granting consumer credits.

5 Conclusions

As part of a specific academic research of VŠFS, it was re-confirmed that the area of mortgage loans generates potential future risks even in the Czech Republic. Earlier researches and follow-up projects focused in detail on risks that may arise in relation to the development of the mortgage value (relation to the development of real estate prices for housing) and the development of interest rates (relation to historically lowest average interest rates of mortgage loans). Based on the outputs of the implemented research, these risks were considered essential for the future development of the mortgage financing sector in the Czech Republic. This article aims to develop and verify other risks that have been identified during previous activities. In

addition to the afore-mentioned risks, which might be described as external, the research and subsequent directed interviews identified risks that were described as internal for the purpose of the follow-up research. The article thus describes and verifies identified risk factors which are related to the potential behaviour of banks. First, it verified and examined risks with direct relation to the revenue development (Revenue factor). The next verified factor was the influence of competition on the financial market in relation to mortgage loans (Competition factor). A separate chapter focused on the verification of potential risk that is generally connected with the activity of external intermediaries of mortgage loans (Distribution factor). The final chapter, which deals with possible suggestions as to how to restrict the negative impact, presents a basic outline of measures that may diminish the identified risks in practice.

Following the performed activities we can observe that the article has basically fulfilled its task. We can also say that Chapter 3 and especially the figures presented in Table No. 3 confirm the hypothesis that the current decrease in yields and the development of risk costs may indeed motivate bank managers to accept enhanced risks in the lending area. Given the limited space, these issues have been tackled in general features only as a mere outline of possible measures to restrict the risks. The seriousness of the potential impact is so significant that it would be advisable to carry out more detailed research in this area. A more detailed analysis of the situation in relevant banks might certainly be worth attention. A special attention in terms of examining and verifying risks should be paid to smaller financial institutions which aim to break into the financial market with more aggressive business and marketing strategies. System failure in this area might markedly jeopardise especially smaller banks considering their limited bank balance.

Acknowledgements

The paper has come into existence under the research project SPECIFIC RESEARCH OF CREDIT RISK IN MORTGAGES IN THE CZECH REPUBLIC financed from the funds of specific university research at Vysoká škola finanční a správní o.p.s. (University of Finance and Administration) in 2014.

References

[1] Čihák, M. – Brooks, P. K. (2009). From Subprime Loans to Subprime Growth? Evidence for the Euro Area, *IMF Working Paper,* No. 09/69.

[2] Frait, J. – Komárková, Z. (2011). Finanční stabilita, systémové riziko a makroobezřetnostní politika, *Zpráva o finanční stabilitě 2010/2011*. Praha: Česká národní banka, pp. 98-109.

[3] Geršl, A. – Jakubík, P. (2010). Procykličnost finančního systému a simulace „FEEDBACK“ efektu, *Zpráva o finanční stabilitě 2009/2010.* Praha: Česká národní banka, pp. 105-113.

[4] Huerta De Soto, J. (2009). *Peníze, banky a hospodářské krize*. Praha: ASPI.

[5] Komárek, L. – Kubicová, I. (2011). Možnosti identifikace bublin cen aktiv v České ekonomice. *Politická ekonomie*, vol. 2, pp. 164-165.

[6] Pavlát, V. – Kubíček, A. (2010). *Regulace a dohled nad finančními trhy*. 2nd ed. Praha: VŠFS Eupress.

[7] Quagliariello, M. (2007). Banks´ Riskiness over the Business Cycle: a Panel Analysis on Italian Intermediaries, *Bank of Italy Economic Research Paper*. No. 599.

INVESTOR PROTECTION AND STOCK MARKET EFFICIENCY: EMPIRICAL EVIDENCES FROM AN INTERNATIONAL PANEL DATASET

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ABSTRACT

We investigate the relation between investor protection and weak-form informational efficiency of stock markets on a sample of 41 stock market indices over the period 1999 – 2012. Following [25], we employ a general measure for stock market efficiency in which we take into consideration the predictability of returns (short memory – linear and nonlinear dependences – and long memory). Unlike previous studies whose common denominator has been cross-section analysis, in this work we have adapted the methodology in order to consider the time-varying pattern of both efficiency and investor protection mechanism. The results, supported by robustness tests, show a direct and significant relation between stock markets informational efficiency and investor protection, even after we isolated the common shocks in time, such as the global crisis. In addition, as expected, turnover ratio and market volatility are two other determinants of efficiency.

Keywords: investor protection, stock market efficiency, short-memory, long-memory.

JEL codes: G14, G15, C33

1 Introduction

The legal mechanism of investor protection is thought to play a key role in the well-functioning of equity markets. Pioneering studies of [28]-[29] have shown that the architecture of these mechanisms has a significant impact on the development and performance of stock markets. The hypothesis of a direct relation between the informational efficiency of stock markets and investor protection was first highlighted empirically by [34] and attributed to the increased possibilities of investors to perform arbitrage in markets with high investor protection due to their transparency and better information. Arbitrage will lead to a better incorporation of firm specific information into prices, generating a reduction in their synchronism. Further empirical studies confirm ([11]; [13]) or reject ([19]) this hypothesis. An explanation for such contradictory results may reside in the possibility that stock return synchronicity (orR^2) is not a valid indirect measure of the degree of efficiency. Regarding this remark, [12] developed a theoretical model according to which a more informative stock price today means higher return synchronicity in the future, contrary to conventional wisdom.

The difficulty of testing the relation efficiency – investor protection is primarily given by the abstract nature of the definition of an informational efficient market. Of various definitions existing in literature we adopt the price reflectivity-based definition formulated by [18], in which an efficient stock market is one where the current stock prices reflect, through the actions

of rational investors, all information relevant to their fundamental value. In this case, the prices fluctuate only in response to the arrival of new information to the market. A quick incorporation of information in stock prices would determine a random movement given by the random nature of this information. On the contrary, a mis-reaction to information will lead to the emergence of linear and nonlinear dependencies in returns and, implicitly, to a potential predictability. Focusing on the weak form of informational efficiency, the martingale stochastic model provides an appropriate framework for testing whether stock prices are predictable.

The objective of this paper is to empirically investigate the relation between weak-form efficiency and investor protection using 41 equity indices from 1999 to 2012 and various measures of investor protection. In response to the limits of previous studies, our paper contributes to the literature in several ways. First, this study uses a general measure for efficiency proposed by [25] which takes into consideration the predictability of returns (short memory – linear and nonlinear dependencies – and long memory). The linear dependencies are detected by the Automatic Variance Ratio (AVR) test of [24], while the Generalized Spectral (GS) test of [17] is employed for the nonlinear dependencies. The long memory is investigated through the Generalized Hurst Exponent (GHE) test proposed by [2]. Second, the time-varying efficiency is considered by applying the test for short-memory in the rolling window approach. Third, the relation between efficiency and investor protection is investigated using different panel regressions in which we include various measures of investor protection and a set of control variables that captures the specific features of the investigated markets. Fourth, the robustness checks confirm the relation found between the weak-form efficiency and investor protection.

2 Literature Review

The motivation of our work arises from the fact that there are only few studies investigating the relation between the predictability of stock prices, as a weak-form informational market hypothesis test, and the investor protection. Moreover, these empirical results surprisingly indicate that investors' protection is generally insignificant. Thus, [30] employ the rolling bicorrelation statistic to measure the degree of stock price deviations from random walk. Using a sample of daily equity indices for 23 developed markets and 27 emerging markets, for the period 1995-2005, they find that the anti-director rights index of [29], the revised anti-director rights index of [16] and the investor protection index constructed by Doing Business – World Bank are not related to stock market efficiency. [37] use two nonparametric multiple-horizon variance ratio tests: one based on a wild bootstrap and the other on signs. Considering 50 equity markets for the time period 1998-2007, the authors fail to identify a significant relation between qualities of governance and efficiency. [20] use the investor protection index constructed by Doing Business to form two groups of markets with high and low investor protection. The return behaviour of each market is examined using serial correlation, Markov chain, duration dependence and variance ratio tests. The results show that there are no significant differences between the two groups of markets.

The lack of a significant relation in these studies may be attributed to several causes. First, the predictability tests employed do not have martingale behaviour as the null hypothesis. Thus, the tests used by [37] and [20] capture only the linear dependence, while the bicorrelation test used by [30] considers only the nonlinearity. Second, in the literature there are enough empirical arguments (see the survey article by [31]) according to which predictability has a dynamic nature. Therefore, one has to take into consideration this reality in order to obtain results that are not distorted. Third, most of the measures of investor protection have no time dimension,

limiting the econometric approach to cross-section analysis and, hence, not considering the time-varying efficiency and investor protection mechanism on the markets.

3 Data and Methodology

3.1 The Data

The data consists of daily closing values of market value-weighted equity indices for 19 developed and 22 emerging stock markets, using the market status defined by Standard & Poor's.

Table 1 The countries and their representative indices

Country	Index	Country	Index
Argentina	MERVAL	Korea R.	KOSPI
Australia	S&P/ASX200	Malaysia	KLCI
Austria	ATX	Mexico	IPC
Belgium	BEL20	Netherlands	AEX
Bulgaria	SOFIX	Norway	OSEBX
Canada	S&P/TSX	Oman	MSM30
Croatia	CROBEX	Peru	IGBVL
Czech Republic	PX50	Philippines	HSBC
Denmark	OMXC20	Poland	WIG
Egypt	EGX30	Portugal	PSI20
Estonia	OMXT	Romania	BET
Finland	OMXH25	Russia	RTS
France	CAC40	Spain	IBEX35
Germany	DAX	Switzerland	SMI
Greece	ATHEX20	Thailand	SET
Hungary	BUX	Tunisia	TUNINDEX
India	BSE100	Turkey	ISE100
Indonesia	IDX	U.K.	FTSE100
Ireland	ISEQ	U.S.	S&P500
Israel	TA100	Venezuela	IBC
Japan	NIKKEI225		

Source: Countries' Stock Exchange websites

The time series cover the sample period from January 1999 to December 2011, except Estonia, Australia, Bulgaria, Greece, Ireland, Israel and the Philippines, for which the time series begin in January 2000. All the values of these indices collected from *Datastream* are denominated in their respective local currency units. The data is transformed into a series of continuously compounded percentage returns.

As a proxy for investor protection we chose the risk indicators of Kaufmann because we need a variable with time-variability in order to investigate dynamically the relation investor protection – efficiency, fact that narrows significantly the area of choice. The most common

measures of investor protection have no time dimension which limits the econometric approach to cross-section analysis. We refer here to the anti-director rights index of [26], the shareholder protection index of [27], the anti-self-dealing index of [16] or the revisited anti-director rights index of [38]. In a program of the World Bank, [21]-[22] use an unobserved components methodology to create his own risk indicators, similar as coverage area and names to those of International Country Risk Guide (ICRG). They range between -2.5 and 2.5 and require a more complex methodology and a greater diversity of sources of information. Of the six dimensions of qualities of governance compiled by [21]-[22] we use:

- *Regulatory quality* (*RQ*) - reflects perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development;
- *Quality of institutions* (*QI*) - determined as the average of three sub-components: law and order, bureaucratic quality and corruption;
- *Rule of law* (*RL*) – [4] believe that it is likely to be closely associated with investor protection because it measures both the quality of the legal system and the extent to which laws are actually enforced. In fact, [4] use these three measures of ICRG as time-varying proxies for investor protection.

We include two control variables whose influence on efficiency has been empirically tested in the literature, namely liquidity and volatility. The proxy variable for liquidity is considered the *turnover ratio* (*TRN*), which is the total value of shares traded divided by the average market capitalization for the interval *t*. According to [33], [1], [9] or [10], a high liquidity stimulates the arbitrage activity and leads to an increase of the degree of efficiency. The second control variable, *volatility* (*MV*), is measured as the standard deviation of the daily returns of stock markets in the interval *t*. A direct relation between efficiency and volatility is supported by the positive feedback trading model of [36]. During volatile periods positive feedback traders exert a greater influence on price movements, resulting a higher degree of predictability.

3.2 Methodology

3.2.1 The test used

To test the existence of linear dependencies in the series of returns we use the Automatic Variance Ratio (AVR) test of [24]. The variance ratio tests have been widely used to test if the stock prices follow a Martingale Difference Sequence (MDS). A recent survey of [7] offers more details about the recent developments. The variance ratio is defined as the ratio of the variance of the *k*-period return to that of one-period return times *k*. Thus, the variance ratio test statistic can be estimated as:

$$\widehat{VR}(k) = 1 + 2\sum_{j=1}^{k-1}(1 - j/k)\widehat{\rho_j} \quad (1)$$

where $\widehat{\rho_j}$ is the estimator of the autocorrelation of the return of lag *j* and *k* is the holding period. To optimally choose *k*, [8] proposes a fully data-dependent procedure. To improve the sample properties of [8], [24] employs the wild bootstrap of [32] and determines the critical values of the test robust to conditional heteroskedasticity.

Because the AVR test is based on the sample autocorrelations only, we use the Generalized Spectral (GS) test of [17] which has the null of MDS but is capable of detecting both linear and nonlinear dependencies. The test is based on the fact that the normalized spectral density function of the stock returns which follow a MDS is equal to one at all frequencies. The *p*-value

of the test is estimated from a wild bootstrap procedure similar to the AVR test and is robust to higher order dependence, in particular to conditional heteroskedasticity.
Through Monte Carlo simulations, [6] showed that the AVR test has the best performances against its competitors in the presence of linear dependencies, while the GS test is more powerful under nonlinear dependencies.

To investigate the long-range dependencies we use the Generalized Hurst Exponent (GHE). [3] showed through Monte Carlo simulations that GHE is robust to fat tails in the underlying process and provides the lowest variance. This method, recently re-explored for the financial time series by [15] and [5], is based on the *q*-th order moments of the increments of the process *X(t):*

$$K_q(\tau) = \langle |X(t+\tau) - X(t)|^q \rangle / \langle |X(t)|^q \rangle \tag{2}$$

which scales as

$$K_q(\tau) \approx (\tau/\upsilon)^{qH(q)}. \tag{3}$$

To evaluate $K_q(\tau)$ we set $\tau = 19$ days and $q = 1$ according to [14]. *H(1)* characterizes the scaling of the absolute deviations of the process ([14]) and its value is expected to be closely to the classical Hurst exponent. $H = 0.5$ suggests a series serially uncorrelated or short-term correlated, $H \in (0; 0.5)$ suggests an antipersistent series and $H \in (0.5; 1)$ a persistent one.

3.2.2 Statistical indicator of the degree of market efficiency

We follow [25] and use an Efficiency Index that allows combining partial measures of efficiency:

$$IE = \sqrt{\sum_{i=1}^{n} \left(\frac{\widehat{M_i} - M_i^*}{R_i} \right)^2} \tag{4}$$

where M_i is the *i*th measure of efficiency, $\widehat{M_i}$ is an estimate of the *i*th measure, M_i^* is an expected value of the *i*th measure for the efficient market and R_i is a range of the *i*th measure. For the efficient market $IE = 0$ and for the least efficient market $IE = \sqrt{n}/2$, where *n* is the number of measures taken into consideration. In this study, we defined *IE* as:

$$IE = \left[\sum_{i=1}^{3} (Percent\ AVR/2)^2 + (Percent\ GS/2)^2 + (GHE - 0.5)^2 \right]^{1/2} \tag{5}$$

The expected value of the first two measures, *Percent AVR* and *Percent GS*, for the efficient market is zero, since *Percent* reflects the proportion of windows in which the hypothesis of efficiency is rejected. For the third measure, the long-memory, *GHE = 0.5* indicates a series serially uncorrelated or short-term correlated.

3.2.3 The panel models

To investigate the empirical relation between investor protection and the degree of informational efficiency, we estimate the following panel regressions:

$$IE_{i,t} = a_0 + a_1 IP_{i,t} + a_2 TRN_{i,t} + a_3 MV_{i,t} + c_i + \varepsilon_{i,t} \tag{6}$$

where $IE_{i,t}$ is an inverse measure of informational efficiency for market *i* in the interval *t*, $IP_{i,t}$ represents an investor protection measure, followed by the set of control variables, namely, turnover ratio ($TRN_{i,t}$) and market return volatility ($MV_{i,t}$). Note that c_i is the country effects and $\varepsilon_{i,t}$ is the error term.

We tested the random effects with the Breusch-Pagan Lagrange multiplier test and the fixed effects with the F test. If both effects exist (the null hypothesis of both tests is rejected), we choose between them using a robust test suggested by [40] (pp. 290). The test has the null hypothesis that the preferred model is random effects. To conduct the test we use the command *xtoverid* in Stata If the null hypothesis of both tests is not rejected, the pooled OLS regression is favored. We impose the option cluster to ensure that the test is robust to arbitrary heteroskedasticity and within-group correlation, which is consistent with the recommendations of [35].

The time fixed effects are intended to account for common shocks (the global financial crisis for example). It is important to mention that we initially estimated the models with time effects for all seven intervals and we observed that only the coefficient of the 2007-2008 interval was significant. Therefore, the models are estimated alternatively in the version with a dummy variable which is equal to 1 for the interval 2007-2008 and 0 for the other intervals. We considered the interval *t* equal to 2 years (approximately 500 sessions) because all three tests employed in this study have good performances only in large enough samples, of at least 300 observations for the AVR and GS tests (see [6]) and 500 for the GHE test (see[3]). The AVR and GS tests are applied in a rolling window of 300 observations because their *p*-values have a high temporal variability and sensitivity to the choice of the first day of the sample (see [39]). We choose the length of the window as a compromise between the length of the interval *t* and the need to maximise the power of the tests. Thus, for each index, we compute in *t* the percentage of time windows for which *p-value* is less than 0.05, denoted as *Percent*. For the GHE test we did not use the rolling window approach because the Hurst exponents are more stable in time and the test yields robust estimations only in windows of at least 500 observations. Therefore, the test is conducted on the whole interval *t* for each index.

4 Results and Discussion

4.1 Main results

Table 2 reports the coefficient estimates for panel regressions with and without 2007 – 2008 time effect. The applied tests reject the hypothesis of random and fixed effects therefore we estimated the parameters without effects by OLS for all six models. The negative effects of estimators' inefficiency is alleviated using the cluster-robust covariance estimator. Because the dependent variable is an inverse measure of informational efficiency for country *i* in the interval *t*, the negative sign of the estimated parameters indicates a direct relation between the informational efficiency and the exogenous variables. This relation is significant for all variables.

The direct association between efficiency and turnover is as expected and consistent with well-documented literature. As regards the sign of the link between volatility and efficiency there is no consensus in the literature. Our results, according to which the higher the volatility, the higher the degree of market efficiency, are consistent with [36] model prediction and inconsistent with the empirical results of [23]. Note that, in the model, the relation between volatility and market efficiency becomes less powerful when we isolate the common effects on efficiency over time, such as the significant increase in volatility in all markets during the interval 2007-2008 as a result of the global crisis.

Table 2 Investor protection and stock market efficiency – main results

Model/	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Investor protection	**RQ**		**QI**		**RL**	
Investor protection	-0.2461***	-0.2723***	-0.2708***	-0.2933***	-0.2354***	-0.2602***
	(-2.93)	(-3.88)	(-3.72)	(-4.54)	(-3.92)	(-4.45)
TRN	-0.0867**	-0.077**	-0.0702*	-0.0571*	-0.0693*	-0.0539*
	(-2.34)	(-2.20)	(-1.89)	(-1.74)	(-1.73)	(-1.68)
MV	-5.4336***	-3.0462	-5.8708***	-3.6704*	-5.7130***	-3.4431*
	(-3.34)	(-1.45)	(-3.53)	(-1.72)	(-3.45)	(-1.69)
Constant	0.6426***	0.6347***	0.6570***	0.6478***	0.6273***	0.6174***
	(9.68)	(10.14)	(10.75)	(10.47)	(11.80)	(10.51)
Dummy for 2007 -2008	-	-0.0995***	-	-0.0997***	-	-0.1022***
		(-4.03)		(-4.03)		(-4.09)
Prob. >*F*	0.0001	0.1420	0.0002	0.1688	0.0000	0.1254
Prob. > χ^2	0.0001	0.3224	0.0000	0.1773	0.0000	0.1634
xtoverid	0.1153	-	0.0743	-	0.0845	-
Cross-section effects	Random	None	Random	None	Random	None
R^2	0.1949	0.2405	0.2069	0.2525	0.1969	0.2451

Source: authors' calculations.

Note: The endogenous variables are an inverse measure of informational efficiency for country i in the interval t.; *, **, *** indicate statistical significance at 10%, 5% and 1% levels. Robust *t*-statistics in parentheses.

4.2 Robustness check

The robustness tests involve the use of other proxy variables for investor protection, namely different sub-components of International Country Risk Guide's (ICRG) political risk ratings. First, we consider the *investment profile* (noted *RQ2*) which is an assessment of factors, except political, economic and financial ones, affecting the risk to investment; *RQ2* is a sum of three sub-components: contract viability/expropriation, payments delays and profits repatriation, each with a maximum score of 4 points and a minimum score of 0 points. The second measure used, the *quality of institution* (*QI2*), is determined as the average of three sub-components: law and order, bureaucratic quality and corruption, each sub-component comprising 0 to 6 points. The third measure is the subindex *law and order* (*RL2*) of ICRG which is bounded between 0 and 6 points.

The direct relation between these proxy measures and efficiency, with and without 2007 – 2008 time effect, can be observed from the estimates of all six models in Table 3.

Table 3 Investor protection and stock market efficiency - robustness test

Model/	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Investor protection	**RQ2**		**QI2**		**RL2**	
Investor protection	-0.2900***	-0.2510***	-0.3789***	-0.3567***	-0.2288***	-0.2252***
	(-4.93)	(-4.78)	(-5.61)	(-5.90)	(-3.57)	(-3.68)
TRN	-0.0692*	-0.0598*	-0.0350	-0.0275	-0.0813*	-0.0600*
	(-1.81)	(-1.75)	(-0.99)	(-0.88)	(-1.92)	(-1.66)
MV	-6.4116***	-2.8388	-6.852***	-3.3339*	-5.5366***	-1.7137
	(-3.79)	(-1.47)	(-4.19)	(-1.73)	(-3.27)	(-0.86)
Constant	0.7211***	0.6475***	0.7688***	0.7119***	0.6511***	0.5989***
	(13.16)	(11.80)	(12.08)	(11.05)	(10.85)	(9.54)
Dummy for 2007 -2008	-	-0.0345**	-	-0.1038***	-	-0.0451***
		(-2.00)		(-4.93)		(-2.68)
Prob. >*F*	0.0000	0.0000	0.0037	0.0002	0.0000	0.0000
Prob. > χ^2	0.0000	0.0000	0.0020	0.0001	0.0000	0.0000
xtoverid	0.4899	0.3506	0.6642	0.2392	0.3888	0.5839
Cross-section effects	Random	Random	Random	Random	Random	Random
R^2	0.2232	0.2580	0.2591	0.2983	0.1874	0.2348

Source: authors' calculations.

Note: The endogenous variables are an inverse measure of informational efficiency for country i in the interval t.; *, **, *** indicate statistical significance at 10%, 5% and 1% levels. Robust *t*-statistics in parentheses.

5 Conclusions

There are only a few studies in the literature that have investigated the relation between stock markets efficiency in weak form and investor protection, and their results indicate that it is generally insignificant. The common denominator of these studies is the cross-section analysis whose main drawback is that it does not take into consideration the time-varying characteristics of both efficiency and investor protection mechanism. The dynamic nature of efficiency, highly revealed in the recent literature, and also the continuous change of the degree of investor protection as a result of the legislative amendments required the adaptation of the methodology of study to these realities.

This paper presents cross-country evidence using data for 41 stock markets indices over the period 1999-2012. Our panel regression results show a direct and significant relation between investor protection and efficiency, results that are supported by the robustness tests. At the same time, as expected, turnover ratio and market volatility are two other determinants of efficiency. The relation between volatility and market efficiency becomes less powerful when in the models we isolate the common effects over time on the efficiency, such as the global crisis.

Acknowledgments

This work was co-financed from the European Social Fund through Sectoral Operational Programme Human Resources Development 2007-2013, project number

POSDRU/159/1.5/S/142115 „Performance and Excellence in Doctoral and Postdoctoral Research in Romanian Economics Science Domain".

References

[1] Avramov, D – Chordia, T – Goyal, A. (2006). Liquidity and autocorrelations in individual stock returns. *Journal of Finance*, vol. 61, pp. 2365-2394.
[2] Barabasi, A.L. – Vicsek, T. (1991). Multifractality of self-affine fractals. *Physical Review A* vol. 44, pp. 2730-2733.
[3] Barunik, J – Kristoufek, L. (2010). On Hurst exponent estimation under heavy-tailed distributions. *Physica A*, vol. 389, pp. 3844-3855.
[4] Bekaert, G – Harvey, C.R – Lundbald, C – Siegal, S. (2011). What Segments Equity Markets? *Review of Financial Studies*, vol. 24 (12), pp. 3847-3890.
[5] Cajueiro, D.O – Gogas, P – Tabak, B.M. (2009). Does financial market liberalization increase the degree of market efficiency? The case of the Athens stock exchange. *International Review of Financial Analysis*, vol. 18, pp. 50-57.
[6] Charles, A – Darné, O – Kim, J.H. (2011). Small sample properties of alternative tests for martingale difference hypothesis. *Economics Letters*, vol. 110 (2), pp. 151-154.
[7] Charles, A – Darné, O. (2009). Variance-ratio tests of random walk: an overview. *Journal of Economic Surveys,* vol. 23, pp. 503-527.
[8] Choi, I. (1999). Testing the random walk hypothesis for real exchange rates. *Journal of Applied Econometrics*, no. 14, pp. 293-308.
[9] Chordia, T – Roll, R – Subrahmanyam, A. (2008). Liquidity and market efficiency. *Journal of Financial Economics*, vol. 87, pp. 249-268.
[10] Chung, D – Hrazdil, K. (2010). Liquidity and market efficiency: A large sample study. *Journal of Banking and Finance*, vol. 34, pp. 2346-2357.
[11] Daouk, H – Lee, C.M.C – Ng, D.T. (2006). Capital market governance: how do security laws affect market performance? *Journal of Corporate Finance*, vol. 12, pp. 560-593.
[12] Dasgupta, S – Gan, J – Gao, N. (2010). Transparency, Price Informativeness, and Stock Return Synchronicity: Theory and Evidence. *Journal of Financial and Quantitative Analysis,* vol. 45 (5), pp. 1189-1220.
[13] DeFond, M – Hung, M – Trezevant, R. (2007). Investor protection and the information content of annual earnings announcements: international evidence. *Journal of Accounting and Econonomics*, vol. 43 (1), pp. 37-67.
[14] Di Matteo, T. (2007). Multi-scaling in finance. *Quantitative Finance*, vol. 7(1), pp. 21-36.
[15] Di Matteo, T – Aste, T – Dacorogna, M. (2005). Long-term memories of developed and emerging markets: Using the scaling analysis to characterize their stage of development. *Journal of Banking and Finance*, vol. 29, pp. 827-851.
[16] Djankov, S – La Porta, R – Lopez-de-Silanes, F – Shleifer, A. (2008). The Law and Economics of Self-Dealing. *Journal of Financial Economics*, vol. 88, pp. 430-465.
[17] Escanciano, JC – Velasco, C. (2006). Generalized spectral tests for the martingale difference hypothesis. *Journal of Econometrics*, vol. 134, pp. 151-185.
[18] Fama, EF. (1970). Efficient capital markets: a review of theory and empirical work. *Journal of Finance*, vol. 25, pp. 383-417.
[19] Griffin, J – Kelly, P – Nardari, F. (2006). Measurement and Determinants of International Stock Market Efficiency. University of Texas at Austin. Retrieved from: http://www.mysmu.edu/faculty/rogerloh/database/Grffin_Nadari_Kelly_wk2006.pdf

[20] Jirasakuldech, B – Dudney, DM – Zorn, T – Geppert, J. (2011). Financial disclosure, investor protection and stock market behavior: an international comparison. *Review of Quantitative Finance and Accounting*, vol. 37, pp. 181-205.
[21] Kaufmann, D – Kraay, A – Mastruzzi, M. (2010). Governance Matters VIII: Governance Indicators for 1996-2008. World Bank Policy Research Unit
[22] Kaufmann, D – Kraay, A – Matruzzi, M. (2010). The worldwide governance indicators: a summary of methodology, data and analytical issues. World Bank policy research, *Working Paper* no. 5430.
[23] Kim, JH – Shamsuddin, A – Lim, KP. (2011). Stock return predictability and the Adaptive Markets Hypothesis: evidence from century-long U.S. data. *Journal of Empirical Finance*, vol. 18, pp. 868-879.
[24] Kim, JH. (2009). Automatic variance ratio test under conditional heterosckedasticity. *Finance Research Economics Letters*, no. 6, pp. 179-185.
[25] Kristoufek, L - Vosvrda, M. (2013). Measuring capital market efficiency: Global and local correlations structure. *Physica A*, vol. 392, pp. 184-193.
[26] La Porta, R – Lopez-de-Silanes, F – Shleifer, A. (1999). Corporate Ownership Around the World. *Journal of Finance*, vol. 54, pp. 471-517.
[27] La Porta, R – Lopez-de-Silanes, F – Shleifer, A. (2006). What Works in Securities Laws? *Journal of Finance*, vol. 61, pp. 1-32.
[28] La Porta, R – Lopez-de-Silanes, F – Shleifer, A – Vishny, RW. (1997). Legal determinants of external finance. *Journal of Finance*, vol. 52, pp. 1131-1150.
[29] La Porta, R – Lopez-de-Silanes, F – Shleifer, A – Vishny, RW. (1998). Law and finance. *Journal of Political Economy*, vol. 106, pp. 1113-1155.
[30] Lim, KP – Brooks, RD. (2010). Why do emerging stock markets experience more persistent price deviations from a random walk over time? A country-level analysis. *Macroeconomics Dynamics*, vol. 14, pp. 3-41.
[31] Lim, KP – Brooks, RD. (2011). The evolution of stock market efficiency over time: a survey of the empirical literature. Journal of Economic Survey, vol. 25, pp. 69-108.
[32] Mammen, E. (1993). Bootstrap and wild bootstrap for high dimensional linear models. *The Annals of Statistics*, no. 21, pp. 255-285.
[33] Mitchell, M – Pulvino, T – Stafford, E. (2002). Limited arbitrage in equity markets, *Journal of Finance*, vol. 57, pp. 551-584.
[34] Morck, R – Yeung, B – Yu, W. (2000). The information content of stock markets: why do emerging markets have synchronous stock price movement? *Journal of Financial Economics*, vol. 58, pp. 215-260.
[35] Petersen, M. (2009). Estimating standard errors in finance panel data sets: comparing approaches. *Review of Financial Studies*, vol. 22, pp. 435-480.
[36] Sentana, E – Wadhwani, S. (1992). Feedback traders and stock return autocorrelations: evidence from a century of daily data. *Economic Journal*, vol. 102, pp. 415-425.
[37] Shamsuddin, A – Kim, JH. (2010). Short-Horizon Predictability in International Equity Markets. *The Financial Review*, vol. 45, pp. 469-484.
[38] Spamann, H. (2010). The "Antidirector Rights Index" Revisited. *Review of Financial Studies*, vol. 23 (2), pp. 466-486.
[39] Todea, A – Zoicaş-Ienciu, A. (2008). Episodic dependencies in Central and Eastern Europe stock markets. *Applied Economics Letters*, vol. 15, pp. 1123-1126.
[40] Wooldridge, JM. (2002). Econometric Analysis of Cross Section and Panel Data. London: MIT Press, Cambridge, Massachusetts and London, England.

CAPITAL BUDGETING IN ENTERPRISES: MUTUAL RELATIONSHIPS AND DEPENDENCIES BETWEEN DISCOUNT METHODS USED IN PROJECT EVALUATION

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ABSTRACT

In practical capital budgeting enterprises may use a variety of financial methods to evaluate projects. Discount methods, due to their utilitarian benefits and advantages, play a particularly important role in this respect. In order for the methods to be used effectively in actual investment undertakings, investors should be familiar not only with their strengths but also their drawbacks, as projects are of different characters, are carried out in various sections of the economy and carry differing risks. Therefore the key aim of the paper has been to present the methodical aspects in the field of measuring financial effectiveness of commercial projects, with the focus on the pros and cons of discount methods, their mutual relationships and dependencies.

Keywords: corporate finance, capital budgeting, project evaluation, discount methods, investments

JEL codes: G11, G31, E22

1 Introduction

„[...] The studies on profitability of investments, conducted in the early 1900s by I. Fischer, may be regarded as the intellectual foundation and the outset of financial methodology used in analyses of a number of financial issues, including planned investment projects. [...] The concept of the Net Present Value (NPV), devised at that time, has still remained (having undergone numerous modifications) the key criterion of financial evaluation, supported by other financial methods, and is used in analysis of an array of phenomena in the world of finance"[14]. The dynamic development of knowledge in this area has brought about a very wide range of advanced methods which investors can currently deploy when making their investment decisions. Nowadays, apart from the traditional discount methods such as NPV, IRR (Internal Rate of Return) and DPP (Discounted Payback Period), also advanced techniques and tools, including computer simulations, are used all over the world for this purpose. No matter, however, which particular method is to be used to evaluate an investment project, one should always remember about the advantages and disadvantages of specific methods as every project is different and carries its own risk. That is why a key to successful investment is having a good understanding of mutual relationships and dependencies between methods used in capital budgeting in an enterprise. Whether or not the right decision is taken by an investor may depend on such understanding. Investors also need to be able to quantify risks posed by investment projects in the right way, applying specific methods, techniques and tools. These problems are addressed and discussed in the paper. In particular, it aims to present the issued related to capital budgeting in an enterprise, with the focus on discount methods used in financial evaluation of investment projects, outlining their advantages and disadvantages, as well as mutual

relationships and dependencies between the results obtained using these methods. Today they are commonly used in business and, unlike statistical methods, they show an important benefit, i.e. the fact that money value in time is taken into account. This was the starting point for the theoretical deliberations (theoretical cognitive dimension of knowledge) in this respect. The paper presents a new division of the methods used when making investment decisions in companies, i.e. the division into discount, dynamic and static methods. The paper offers just a synthetic presentation of the related issues. The paper does not cover statistical methods, due to their numerous weaknesses, neither does it present dynamic methods (simulation methods, real options), due to the difficulties in their practical application. As the background, the literature on the subject has been reviewed and the formulas given in the paper are derived from the literature: [1], [2], [3], [4], [5], [7], [8], [9], [10], [13], [15], [16], [18]. Deduction and induction are used here, as well as the author's personal experience gained when working in business and his theoretical knowledge acquired when lecturing at the University of Economics in Katowice.

2 A few remarks on the division of methods for financial evaluation of investment projects carried out by enterprises – at attempt at a synthetic presentation of the problem

Both in theory and in practice, the key criterion when dividing methods used in financial evaluation of investment projects is changing value of money (capital) in time. The evaluation of effectiveness as such, however, is based on present values (*PV)*, and a decreasing current value is typical for future values (*FV)* (of capital). Therefore, discounting is the basis for the application of discount methods (NPV, IRR and DPP) in financial evaluation of corporate investment projects, although the approaches to the discount rate calculation differ in the theory of corporate finance. Currently, however, the traditional division of methods used in financial evaluation of corporate undertakings, i.e. the division into static and discount methods, can no longer be applicable when looking at investment projects conducted in the economy. The traditional division into static and discount methods, previously used in practical investment processes and based on the sole criterion i.e. the changing time value of money, has changed and a new system has been proposed in the world of science in this respect, i.e. a new group of dynamic methods have appeared, in addition to static and discount methods. The scholarly literature points out that a drawback of discount methods, contrary to the dynamic ones, is a lack of flexibility. Therefore, the supremacy of dynamic methods over the discount ones is generally emphasized. As investment processes occur in the conditions of risk, it is currently believed that (for some projects) risk is not sufficiently addressed in the traditional evaluation of effectiveness [14]. This is mainly due to the fact that a financial analysis of investment projects deals with the future, which is uncertain, and the analysis is based, firstly – on estimated net cash flows (*CF)*, secondly – on an estimated discount rate (*r)*, and thirdly – on the use of specific algorithms of calculations (methods) in order to estimate expected financial results of an investment project, fourthly – on an estimated project risk, and fifthly – on the right investment decisions made on the basis of the results obtained. These stages present a short description of how the capital budgeting process runs in a company, although it should be kept in mind that the pay-off calculation of an investment project should not be based on a profit as an economic category but on cash flows (*CFs)*, and any mistakes made when calculating the *CFs,* or the discount rate *(r)*, will lead to incorrect final results of the investment project. This, in turn, may result in an incorrect investment decision. Besides, in the traditional approach to the evaluation of profitability of corporate investment, net cash flows are determined ex-ante for some projects, which means that traditional discount methods do not take into account any future changes in this respect and, thereby, do not allow for effective risk mitigation [14]. Despite this significant shortcoming, however, discount methods remain most popular, are

commonly used in business and believed by many practitioners to be the best ones [17]. This belief is mostly due to the difficulty in practical application of real options or the simulation methods and the fact that these methods require a lot of expertise in their application [17]. Furthermore, the use of real option methods for the needs of various investment projects may be quite time-consuming and challenging to perform, and results may not be reliable either [17]. Nevertheless, many authors are convinced that real options ensure the flexibility referred to above and, consequently, dynamism in the financial evaluation of investment projects carried out by enterprises.

„[...] The literature review shows that individual authors, although they differ in some details, agree on the nature and purpose of capital budgeting in an enterprise. [...] Without analysing the views expressed by selected researchers, it may be concluded that capital budgeting is a multi-step process, in which an investment risk belongs to the basic categories to be considered. [...] The methodical approach to such risk, however, changes from stage to stage, due to the subject of studies and the purpose of the specific stage [...]. For one thing, capital budgeting aims to make sure that capital resources available in an enterprise are allocated among value-adding projects in such a way as to best contribute to the achievement of the enterprise's goals, and for another, it aims to provide an assurance that good investment ideas are not going to be put on hold and, at the same time, poor or unclearly-defined ideas are going to be rejected or improved"[14]. It should also be added that „[...] in order to ensure high quality capital budgeting, attention should be paid to posing, and responding to, the right strategic questions, rather than improving measuring techniques. [...] That is why, when presenting the structure of the multi-step budgeting process, the majority of authors emphasize the importance of strategic types of research (strategic planning), including strategic risk assessment, at the initial stages. [...] This is done, for example, by R. Pike and B. Neale, for whom, however, strategic studies should follow budget analyses and who propose a four-step process of capital budgeting:

- establishment of the budget – a decision about an available amount to be allocated for the project funding;
- research and development – identification of suggested projects, their preliminary evaluation and initial description (outline);
- evaluation and authorisation of the project – detailed specification of the project, (including the evaluation of profitability and risk), a formal decision to go ahead with, reject, improve or temporarily suspend the project;
- monitoring and control – monitoring of the project execution and a follow-up audit (already at the project life stage) of the project"[14], [15].

Irrespective of the way in which the corporate capital budgeting process is broken down into specific stages, however, the most essential and critical moment is the time when the final investment decision is made. Because of ubiquitous risk factors in the economy, the final outcome of an investment project, as determined in a feasibility study, may not necessarily prove to be true in the business practice.

3 Basic relationships and dependencies between discount methods used in capital budgeting in an enterprise

One of the key and, at the same time, general rules of investment states that investors expect higher rates of return from more risky investment projects to compensate for the risk they have to face. Here a reference should be made to the investment decision theories outlined in the paper. Investment in a modern enterprise is based on the calculation of financial measures of

investment effectiveness, on one hand, and on the estimation of appropriate measures of investment risk, on the other hand. Only such a combination, i.e. the obtained results, may enable the investor to take the right decision. It should be noted, however, that currently „[...] investors pay attention not only to future gains from their investments but also to risks connected with them"[11]. Thus, there is a rate of return vs. risk relationship, which should provide the basis for final investment decisions. In case of a more risky project generating a higher rate of return, however, a positive capital investment decision does not necessarily have to be made. In reality, the decision-maker's personal preferences, which here can mean the behavioural aspects of investment, should always be taken into account. No matter, however, whether the decision-maker in a given enterprise is risk-averse or eager to take investment risk, he or she has to possess a lot of professional knowledge about the application of financial methods in a capital budgeting process. In particular, they should know the strengths and weaknesses of specific discount methods, which are summarised in Table 1.

Table 1 Selected advantages and disadvantages of discount methods used in capital budgeting

Feature / Method	*Takes into account entire project lifecycle*	*Takes into account change-able time value of money*	*Takes into account company's objectives*	*Takes into account project risk*	*Deter-mines net gains as net cash flows*	*Possibility of constructing an objective decision-making criterion*
NPV	Yes	Yes	Yes	Yes	Yes	Yes
MNPV (modified NPV)	Yes	Yes	Yes	Yes	Yes	Yes
IRR	Yes	Yes	No	Yes	Yes	Yes
MIRR (modified IRR)	Yes	Yes	No	Yes	Yes	Yes
PI	Yes	Yes	No	Yes	Yes	Yes
MPI (modified PI)	Yes	Yes	No	Yes	Yes	Yes
DPP (discounted)	No	Yes	No	Yes	Yes	No

Source: [16].

There are close relationships and dependencies between the discount methods shown in Table 1 (and their results). These dependencies stem directly from their mathematical formulas:

In general, the dependencies between the discount methods of NPV and IRR result from the very definition of IRR, which stands for such a discount rate for which the NPV result for an investment project equals 0, namely:

$$\sum_{t=0}^{n} \frac{CF_t}{(1+IRR)^t} - CE_0 = 0 = NPV \tag{1}$$

where: NPV – net present value; IRR – internal rate of return, CF_t – net cash flows in subsequent years analysed; CE_0 – investment expenditure, n – period analysed, t – subsequent years of the period analysed, r – discount rate.

The IRR result, expressed as a percentage return on the investment in question, may also be defined in a different way, i.e. stating that this is the discount rate for which the present value of cash inflows (revenues from investment) equals the present value of cash expenditure related

to the construction and operation of the investment project, which in turn can be illustrated using the following equation:

$$\sum_{t=0}^{n} \frac{\mathrm{CIF}_t}{(1+\mathrm{IRR})^t} = \sum_{t=0}^{n} \frac{\mathrm{COF}_t}{(1+\mathrm{IRR})^t} \tag{2}$$

where: CIF_t – income from the investment in year t (*Cash Inflows*), COF_t – expenditure on the investment in year t (*Cash Outflows*), which means the cost of the investment project.

Since the IRR is expressed as a percentage, it shows how soon the project will make it possible to recover the expenses incurred for it. And here we have another dependency, i.e. between the IRR result and the DPP result, which may be presented in the following way:

$$DPP = \frac{1}{IRR} \tag{3}$$

The dependency described by equation (3) may be interpreted in the following way – „[...] the higher rate of return of the project, the quicker pay back"[15], [17]. In order to eliminate the assumption that the rate of reinvestment should equal IRR, the internal rate of return is modified to the MIRR (Modified Internal Rate of Return), which in turn can be described mathematically as:

$$MIRR = \frac{\sqrt[n]{\sum_{t=0}^{n} CIF_t (1+rei)^{n-t}}}{\sqrt[n]{\sum_{t=0}^{n} COF_t (1+\mathrm{r})^t}} - 1 \tag{4}$$

where: *rei* – rate of capital reinvestment

Equation (4) shows that the MIRR, just like the IRR, is defined as a discount rate which makes the actualised final value of the project equal to the actualised value of the investment expenditure incurred for the project. Unlike in the NPV, a relative measure of return on investment in the financial analysis is the Profitability Index (PI), as shown in formula (5):

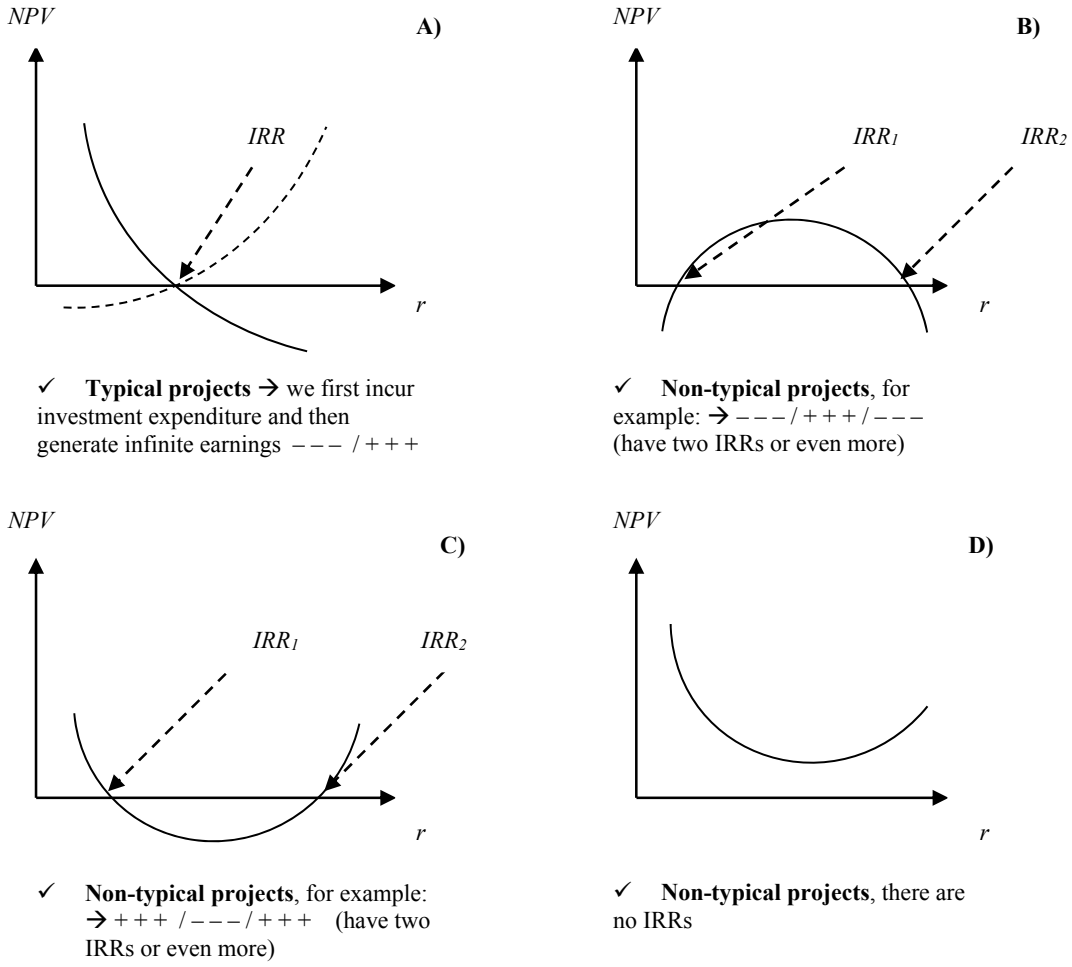
$$PI = \frac{PV}{CE_0} \tag{5}$$

Similarly to the IRR, the PI result is always calculated with the NPV for a given investment project and shows how many monetary units are going to be generated by the project by investing an expenditure unit. In formula (5) the present value of PV for the investment project means that:

$$\begin{aligned} PV - CE_0 &= NPV \\ NPV + CE_0 &= PV \end{aligned} \tag{6}$$

and, as a consequence, equations (6) may be referred to various NPV results, calculated for various projects with the given discount rate (*r)*, which is illustrated by graphs A, B, C, and D in Figure 1.

Figure 1 NPV profiles: relationship between NPV and IRR of different projects



Source: developed on the basis of: [2], [5], [15], [16], [17].

As shown in Fig. 1, various profiles of the NPV calculated for an investment project with a given value of a discount rate (*r)* are presented. In particular, graph A shows the NPV profile for a project which generates a conventional cash flow (*CF*) – these are so-called typical projects, i.e. the projects with a single rate of return (IRR) that are profitable from the financial point of view, which means that NPV > 0 (i.e. when the investment project remains profitable). Also the IRR is higher than the rate which reflects the cost of capital needed to finance the investment project, i.e. IRR > WACC (in this case, the investment activities of an enterprise are funded by using a number of sources at the same time). For a typical investment project the IRR may be estimated using the universal formula of linear interpolation, namely:

$$IRR = r_0 + \frac{NPV_0}{NPV_0 - NPV_1}(r_1 - r_0) \tag{7}$$

where: r_0 – a lower discount rate accepted for the calculation, r_1 – a higher discount rate accepted for the calculation, NPV_0 – the NPV result calculated at a lower discount rate, NPV_1 – the NPV result calculated at a higher discount rate.

Formula (7) is commonly applied in business practice and its essence is the calculation of NPV results for a given investment with a given value of two discount rates r_0 and r_1, until the mathematical function reflecting the NPV result changes from negative to positive (Graph A in Fig. 1), i.e. if the NPV changes its sign from the negative to the positive one or from the positive to the negative one (a dotted line in Graph A, Fig. 1). This means that the calculations are

repeated until the zero point of the function is found. However, when estimating the IRR using formula 7, one should keep in mind one important drawback of the IRR method, i.e. that the method is not reliable when it comes to prioritisation of investment projects which differ by scale or the life of project.

Graphs B, C and D in Fig. 1 present the NPV profile for so-called non-typical projects, which means the projects with unconventional cash flows. In case of Graph D the IRR result cannot be estimated at all for the investment project and the project is simply not feasible, which means that the investment expenditure incurred by the investor (e.g. a developer) is not going to pay off at all, so the DPP result cannot be determined either. Graphs B and C present the NPV profiles for the investment projects which have two IRRs at the same time (in theory there might be more than two as the life of project may continue $+\infty$), which means that in case of Graph B, if the cost of capital expressed as r is known, then $IRR_1 < r$, and $IRR_2 > r$. As a result, the IRR method has a fundamental flaw – it is unreliable in case of investment projects with unconventional net cash flows and, as such, should not be used in business in order to estimate investment projects of that kind. In case of investment projects from Graphs B and C, the NPV should be used as the main decision-making criterion, while in case of Graph D the investment project should be rejected altogether. In theory there might be various situations when it comes to types and kinds of investment projects carried out by enterprises. In practical terms, however, everything depends on the type of investment, the size of the project, the sources of funding, the life of project, the risk which a given project carries etc.

Due to the variety of investment undertakings, as well as the operating conditions in which the projects are conducted, it is necessary to introduce certain modifications to the discount methods. For example, the financial effectiveness is calculated differently for investment projects carried out on the housing market and differently for the typical industrial undertakings [2]. At the same time, a risk is estimated differently for a developer's business [6] and differently for industrial projects carried out e.g. in the mining sector. In particular, the mathematical formulas referred to above are modified, depending on the assumptions adopted in the project. In the event when there is one-off income from the investment project, the IRR calculation formula is changed to:

$$IRR = \sqrt[t]{\frac{CF_t}{CE_0}} - 1 \tag{8}$$

Whereas, in case when the discount rate (r) for the investment project is estimated using the weighted average cost of capital ($WACC$), as the investment project is to be funded using a number of sources at the same time, then the NPV formula looks as follows:

$$NPV = \sum_{t=0}^{n} \frac{CF_t}{(1+WACC)^t} - CE_0 \tag{9}$$

However, when the investment expenditure is incurred by the investor throughout the subsequent years analysed, i.e. in case of big-scale investment projects carried out for many years – so-called megaprojects, then the NPV formula is:

$$NPV = \sum_{t=0}^{n} \frac{CF_t}{(1+r)^t} - \sum_{t=0}^{n} \frac{CE_0}{(1+r)^t} \tag{10}$$

where: CE_0 means investment expenditure incurred in the subsequent years analysed.

According to the theory, a rational investor will expect a higher rate of return (IRR) from a more risky project, thus „[...] when calculating the financial effectiveness of the investment project using the NPV method, taking into account a risk, one should act just like in case of the

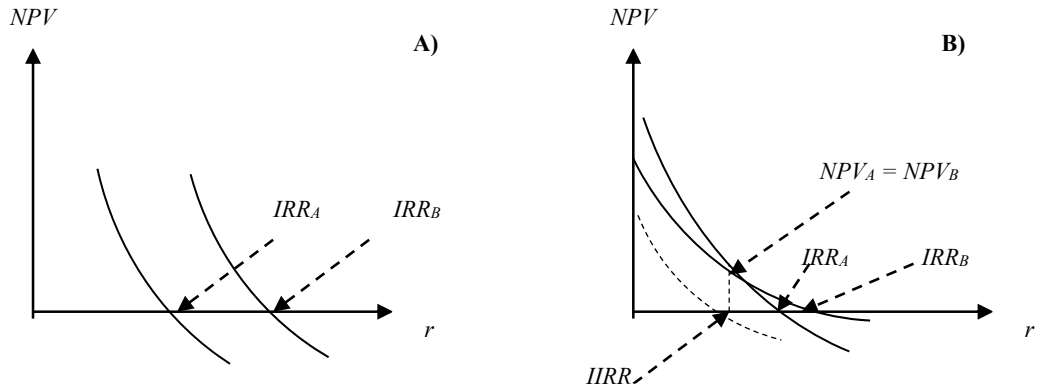
absence of risk, and the only difference is the replacement of a risk-free discount rate (showing the time value of money) with a discount rate which takes into account the value of money in time and the project risk, i.e. *RADR* [14]:

$$\text{NPV}_{RADR} = \sum_{t=0}^{n} \frac{CF_t}{(1+RADR)^t} \tag{11}$$

where: *RADR* – a discount rate including a project risk" [14].

Irrespective of the type and specificity of the investment project and the selection of risk measurement techniques, the discount methods should always be used in a comprehensive and complementary way. This is particularly important when the investor prepares a ranking of projects which differ in terms of the size of investment expenditure or a period over which return on investment is to be generated, and which demonstrate unconventional cash flows *CFs*, i.e. when we have a portfolio of non-typical projects. The decision-making situations for different types of investment projects are presented in Figure 2.

Figure 2 Conflict of projects to be chosen



✓ **NPV profile** for projects of the same size and lifespan

✓ **NPV profile** for mutually exclusive projects of a different size

Source: [12], [16].

In general, when it comes to typical projects, the NPV and IRR results tend to overlap, in terms of financial effectiveness. Similarly, when the investor has a portfolio of typical projects and needs to choose one of the many possible ones which do not differ much in terms of investment expenditure required or the life of project – Graph A (Fig. 2), the investment decision is obvious, i.e. the project with higher NPV and IRR is selected. However, in a situation when two investment projects are mutually exclusive and differ in terms of the size of investment expenditure, for one project the NPV may be higher and the IRR lower, while for the other one it may be the other way round – Graph B (Fig. 2). As can be seen in Graph B „[...] the NPV curves of the analysed projects of A and B cross when $r = IIRR$, where the IIRR stands for the Incremental Internal Rate of Return"[12], i.e. it is such a discount rate (cost of capital) for which the NPVs of competitive projects are equal [12]. In the event when the investor has to choose one of the projects shown in graph B (Fig. 2), then „[...] if the cost of capital is higher than the IIRR, then project A should be chosen as it has higher NPV and IRR. [...] If the cost of capital is lower than the IIRR, then project B should be selected as it has a lower IRR but a higher NPV (for this *r*)"[12], [17].

4 Conclusions

The theoretical background for the paper is very important from the practical point of view. It provides the basis for making rational investment decisions in enterprises of different business profiles as the contents of the paper can have universal applications. They can also indirectly help entities to avoid wrong investment decisions, as investment decisions should always be based on specific results, instead of e.g. the decision-maker's intuition. In particular, the theoretical aspects of investing activities, as outlined in the paper, can lead to a few basic conclusions. Firstly, looking from the corporate finance perspective, no matter which financial method is to be used in the capital budgeting process, it may be concluded that attention should be drawn to all possible results obtained, i.e. not only the results given by the discount methods but also the ones obtained from simple methods (Return on Investment –ROI, Accounting Rate of Return – ARR). All the methods illustrated in Fig. 1 should be used complementarily and only based on such combination appropriate investment decisions should be made. Secondly, a lack of flexibility (dynamism) shown by the discount methods is not a barrier to prevent them from being widely used in business. Thirdly, when investment decisions are made in an enterprise, an investment risk should always be estimated, in addition to the basic measures of financial effectiveness. Fourthly, in a capital budgeting process one should always pay attention to the advantages and disadvantages offered by the specific discount methods. Fifthly, the results of the evaluation conducted using the discount methods depend, to a large extent, on the acceptance of the right discount rate (*r)*, and on the other hand on the right cash flow (*CF*) forecast, thus the mistakes made at this stage will lead to incorrect results of final calculations and, consequently, wrong investment decisions. Sixthly, the financial analysis of an investment project should be based on cash flows, instead of profits, and a cash flow analysis should be incremental in its character. Seventhly, what also needs to be remembered is that the effects of the investment decisions may be seen after a number of years and the related decisions generally stimulate the growth of the company and add value. Therefore – eighthly – the implications of wrong investment decisions which, in the worst case scenario, may even bring the company to the edge of bankruptcy have to be kept in mind. All these factors are the best indicators of the significance of the issues referred to in the paper.

References

[1] Aggarwal, R., (1993). *Capital Budgeting under Uncertainty.* New Jersey: Prentice – Hall, Inc.

[2] Behrens, W. – Hawranek, M.P. (1993). *Poradnik Przygotowania Przemysłowych Studiów Feasiblity*. Warszawa: United Nations Industrial Development Organization (UNIDO).

[3] Brealey, A.R. – Myers, C.S. – Marcus, J.A. (2007). *Fundamentals of Corporate Finance.* 5th ed. New York: McGraw-Hill, Inc.

[4] Brigham, F.E. – Gapenski, C.L. (2000). *Zarządzanie Finansami.* Warszawa: Polskie Wydawnictwo Ekonomiczne.

[5] *Budżetowanie kapitałów*. (2000). Edited by Pluta, W., Warszawa: Polskie Wydawnictwo Ekonomiczne.

[6] Czernik, T. – Iskra, D. (2014). Modeling Financial Surplus of the Housing Projects Developer. In: *Proceedings of the 11th International Scientific Conference European Financial Systems 2014*. Brno – Lednice: Masaryk University, pp. 134-142.

[7] Gitman, J.L. (2006). *Principles of Managerial Finance.* 11th ed. Boston: Pearson Education Limited, Inc.

[8] Gitman, J.L. – Joehnk, D.M. – Smart B.S. (2011). *Fundamentals of Investing.* 11th ed. Boston: Pearson Education Limited, Inc.

[9] Hartman, C.J. (2007). *Engineering Economy and the Decision-Making Process.* New York: Pearson Education Limited, Inc.

[10] Hirschey, M. – Nofsinger, J. (2008). *Investments: Analysis and Behaviors*. *Fundamentals of Corporate Finance.* New York: McGraw-Hill Companies, Inc.

[11] Iskra, D. – Czernik, T. (2012). *Maximal Loss and Value at Risk. Portfolio analysis – a comparison*. In: Mathematical, Econometrical and Computer Methods in Finance and Insurance 2010. Edited by Barczak, S.A., Węgrzyn, T., Katowice: Publisher of the University of Economics in Katowice, p. 16.

[12] Jajuga, K. – Jajuga, T. (2007). *Inwestycje: instrumenty finansowe, aktywa niefinansowe, ryzyko finansowe, inżynieria finansowa.* Warszawa: PWN, p. 366.

[13] Loosemore, M. – Raftery, J. – Reilly, Ch. – Higgon, D. (2006). *Risk Management in Projects*. New York – London: Taylor & Francis.

[14] Marcinek, K. – Foltyn – Zarychta, M. – Pera, K. – Saługa, P. – Tworek, P. (2010). *Ryzyko w finansowej ocenie projektów inwestycyjnych: wybrane zagadnienia*. Katowice: Wydawnictwo Uniwersytetu Ekonomicznego, p. 9, 46, 47, 74.

[15] Pike, R. – Neale, B., (2003). *Corporate Finance and Investments.* Harlow: Pearson Education Limited Inc., p. 182.

[16] Rogowski, W. (2004). *Rachunek efektywności przedsięwzięć inwestycyjnych*. Kraków: Oficyna Ekonomiczna.

[17] Tworek, P. (2013). The investment decision-making process in entrepreneurship: advantages and disadvantages of selected financial methods used in projects evaluation. In: *Proceedings from 9th International Scientific Conference Financial Management of Firms and Financial Institutions (PART III).* Edited by M. Čulik. Ostrava: VŠB – Technická Univerzita Ostrava, pp. 995-996.

[18] Watson, D. – Head, A. (2007). *Corporate Finance. Principles & Practice.* 5th ed. Harlow: Pearson Education Limited, Inc.

WELFARE REGIMES OF THE LONG-TERM CARE FINANCING

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ABSTRACT

We compare the liberal, social-democratic, conservative and neoliberal regimes of LTC financing, separately mentioning the Austrian and Czech reforms as well. Any LTC model has to take the health care design used into account. England has been trying the combination of a social-democratic health care system with a liberal welfare LTC system, generating many inconveniences due to asset testing and persistence of low universal benefits. The US has been trying the combination of a neoliberal health care system with a not comprehensive LTC system. Sweden has a system of universal health care and LTC services system. Germany relies on a conservative social health and LTC insurance model with neoliberal design additions. The Czech universal LTC benefit and the central subsidizing of LTC institutions require a paradigmatic reform, to arrive at a reasonable welfare regime and to meet the increasing demand for the services.

Keywords: long-term care, health care, welfare regime, attendance allowance, social assistance

JEL codes: I18, I11, I38

1 Introduction

Long-term care (LTC) refers to care for persons with reduced self-support as a result of long-term adverse health or disability, e.g. in performing the so-called basic activities of daily living, such as bathing, dressing, eating, toileting, etc. This "personal" component of care is often provided in combination with basic health care, as well as with prevention, rehabilitation, and palliative care. LTC services also often comprise, for example, preparation of meals, shopping, transportation, etc.

The area of LTC financing is mainly addressed by the OECD [1]. For "illustrative purposes", the OECD classifies individual countries into three basic groups: universal schemes with a single program, mixed schemes, and means-tested safety-net schemes. The universal schemes are further divided into three "sub-models": tax-financed schemes, schemes within social insurance, and schemes within health care. However, we will not try to compete with this information source in describing LTC systems in individual countries. We will focus on how the basic welfare regimes are being implemented in selected countries.

The objective of this paper is to analyse the existing LTC financing systems in selected OECD countries and demonstrate the relation of LTC with, in particular, health care systems. In this regard, we will rely on the integration of LTC within general welfare regimes, namely as drafted by Esping-Andersen [2]. Therefore, we distinguish three basic welfare regimes: liberal, conservative, and social-democratic and we add the neoliberal regime. We will follow up on the characteristics of the LTC financing recently compiled by Daatland in analysing the Scandinavian (social-democratic) regime [3]. Using this analysis of mainly secondary sources, we will also try to contribute to the discussion on the reform of the Czech LTC system.

2 Literature Review

We rely also on our previous research of health care and pension models, knowing that no social system is ideal. The comparison of existing LTC financing systems, our material in this paper, is of practical importance. We will first examine, whether and how the individual LTC welfare regimes – or the particular LTC schemes of the specific countries, as appropriate – use the three social security methods: social insurance, public provision (of services and benefits) and social assistance.

2.1 Liberal Regime

The classical liberal regime minimizes government interventions in the economy, people should take care of themselves. There were certain exceptions to these rules, in principle proving the rule, during the period, when this applied to the maximum extent possible even in today's developed countries: institutional care in poorhouses, almshouses etc.

Private LTC insurance plays only a somewhat important role in a few countries in the world. In most countries, this insurance is of no significance at all, although it is available in the market in some form. For the vast majority of people, the costs of LTC are high – if not prohibitive – in case of low level of self-support. This is also partly affected by the insurance companies' overhead costs; there are four reasons for such high overhead cost: administrative costs, imperfect competition, asymmetric information, and overall risk of rising costs [4].

Social assistance as a social security method best corresponds to the modern liberal regime. Charity does not contradict the regime and the practice of the relevant countries is dominated by the provision of LTC by family, relatives, and friends.

The US and the UK (except Scotland) are two representatives of the liberal LTC financing model. The basic orientation of the two systems is identical: social assistance, i.e. means-tested benefits, represents the dominant method. The main difference in the implementation thereof is affected by absolutely different provision of health care. Health care in the US is of the neoliberal type, with LTC being an important part of such health care; in the UK, health care stems from a social-democratic regime and LTC represents a separate part of the social system, relying on a liberal concept.

The fundamental modification of the distinctively market-oriented health care system in the US comprises two largest public health care programs Medicare and Medicaid as well as tax support for the provision of health insurance (including health savings) or direct health care by employers. Medicaid is the largest federal and state expenditure program for low-income groups. In 2011, LTC expenses amounted to 28% of all health care expenses under Medicaid [5]. The basic LTC package is defined by a federal law as a minimum that must be provided by individual states. The provision of most LTC services falls within the competency of individual states. The means testing is very strict. States may require the LTC beneficiaries to pay some minor deductible [1]. Medicaid reform takes place in 2014, individual states have an option to increase the minimum means-testing federal poverty limit. This option will be exercised by about a half of all US states.

The UK LTC financing scheme is viewed as a liberal one. The most important method is the social assistance. The Attendance Allowance (AA) for people from the age of 65 years has existed in the UK since 1971. Currently, this allowance has two different low rates and falls within the UK system of universal benefits. In 2011, the higher AA rate amounted to 15% of average net monthly wage. In case an AA beneficiary also collects the higher amount of the Basic State Pension (BSP), he would have at his disposal additional 20.7% of average net wage. Even the sum of the two benefits amounts to less than a half of AA in Austria and a half of

similar allowance in Germany. The costs of intensive LTC represent a multiple of the rates in Germany and Austria – consequently, the purpose of AA in the UK is hard to explain.

In assessing the payments for the provided services, applicants' income and assets are tested, and adequacy of the basic services provided and their price are assessed (locally). The client's capital – which also comprises the selling price of a client's home – also is/may be an important source for the permanent institutional care settlement. Attention is given to the operation of institutions as a whole and to individualized contributions to individual clients. The provision of institutional care is dominated by the private sector [6].

A UK government Commission characterized the current LTC system as confusing, unfair and unsustainable. Its first two recommendations were major parametric changes of the existing social assistance scheme: to introduce a lifelong limit for contributions of adults for the costs of their social care and to increase of the upper limit for the testing of assets for the purpose of eligibility for social assistance in institutional care [7]. In case assets exceed the upper limit, a client is not eligible for the benefit. In case clients currently have assets of less than £ 14,250 in England, they do not pay anything for LTC and, moreover, they are entitled to retain £ 23.90 of their weekly income for their own needs. In case of assets amounting to £ 14,250 to 23,250, the benefit is determined by the local administration.

The UK Care Act 2014 implements aspects of the Dilnot Commissions' proposals. The Act overhauls the social care system in England, reforming and streamlining much of the legislation on access to, administration of, and responsibilities for care services. The lifelong limit for client's contributions to the social care costs should be capped at £ 72,000 from 2016. The act brings improvements for higher-income/asset groups of clients [6].

LTC financing under the modern liberal regime via an individualized social assistance allowance represents a systemic solution. This regime can take care of the poorest group of non-self-sufficient people. An advantage is the fact the UK health care system is constructed on a different social model – due to potential overlapping of health care and LTC. The problems are concentrated in respect of the middle class, where the liberal UK approaches require preferential use of clients' assets for the LTC funding.

2.2 Conservative Regime

The typical feature of the *conservative regime* is great diversity of security for individual social groups. On a model basis, each social group has "its own" social security scheme. The typical method of social security for employees, used most frequently under this regime, is social insurance.

LTC insurance was introduced in Germany as of 1995, as the fifth social insurance branch. An important argument for a pay-as-you-go social insurance was the possibility of immediate launch of the payment of benefits as well as the effort to shift the organization and funding of the relevant institutional care from municipalities to other institutions. After the 1995 reform, about 20% of the said institutions' residents had to rely on social assistance, today their number has increased to one-third as a result of insufficient adjustment of benefits.

The monthly AA under the LTC social insurance is differentiated for 3 * 3 basic groups, depending on the scope of care need as well as on the type of care – i.e. home care (provided by family, etc.), out-patient care, and institutional care. The significant differentiation of AA according to the provider type is remarkable, especially for the lowest level of non-self-support. The highest rate of the German LTC social insurance allowance of € 1,550 or € 1,918 (most severe cases), as appropriate, amounts to 70.6% or 87% of average net wage in 2011.

The level of compensation of the long-term institutional care costs may be illustrated using average data from the statistical inquiry that took place at the end of 2011. AA covers 68% of LTC costs and 53% of comprehensive institutional care costs. 54% of LTC institutions were operated by social welfare institutions such as deaconries or Caritas, 40% of the institutions were private Informal care is dominant in Germany [8].

From 2013 the LTC social insurance premium is collected using a "parity" rate of 1.025% of wages. An increased rate of 1.275% is applied to employees with no children.

The conservative model does not dominate the LTC financing within OECD countries and the same goes for the health care. The latest systemic changes of the German LTC insurance are included under the neoliberal regime.

2.3 Social-Democratic Regime

The social-democratic regime in its basic, initial concept is associated with exclusive provision of public services. The most typical social-democratic regime of the LTC provision basically copies the same system of health care provision. The official policy declares civil right to high-quality LTC (if necessary). The LTC management and planning in Sweden comprises a three-stage system: nationwide, regional, and municipal.

In the 1990s, some reforms of LTC took place in Sweden, following the great economic depression. Perhaps the most significant reform with political context was the approval of private business undertakings in the area of social services, including the use of outsourcing, under a right-wing government. In general, the reforms may be characterized as economization, de-formalization (in terms of greater utilization of informal care), and privatization [8]. However, the basis of the social-democratic model has not been significantly affected. Even after the implementation of the mentioned reforms, the public sector continues to dominate the provision of LTC in Scandinavian countries.

In principle, the social-democratic regime is applied in all Scandinavian countries. According to the OECD data, the share of direct payments by clients in Denmark, Norway, and Finland in the LTC financing amounted to around 10% in 2007, compared to around 1% in Sweden. However, the OECD itself warns about a number of inaccuracies in these and other similar statistics; LTC reporting is not sufficiently unified on an international level.

Overall, the social-democratic model of the LTC financing has no major problems that would handicap it, compared to other models. Its key model advantage is/should be the fact that there is a single dominant payer that covers most costs. This standardized approach should generate higher effectiveness compared to fragmented systems in Germany, UK, or US, where the LTC funding comes from several different sources [9].

2.4 Neoliberal Regime

The neoliberal regime declares the maximum liberalism with simultaneous substantial government interventions, which are to allow or even create extensive competitive environment, including the social security. The mandatory private health insurance may be seen as the basic version of the neoliberal regime. Flat insurance premiums, independent of the participant's income level, are a systemic solution. The scheme envisages the provision of subsidies to this premium for a predominant part of the insured persons. The system works in Switzerland and partly in the US; significant share of LTC is integrated within health care in both countries.

In Switzerland, LTC is from about 36% financed privately – the provision of such care is largely viewed as a personal/family problem. Cantons and municipalities play an important role within the Swiss system. The following sources are used to cover the institutional LTC costs:

- Contribution of an insurance company based on the care level (12 levels);
- Client's contribution – up to 20% of the previous amount;
- Contribution of a municipality – covers the remaining costs.

The costs of "hotel services" are borne by clients. The situation is similar for out-patient care at home. It is obvious that these funding schemes allow the individualized coverage of costs by individuals. Moreover, benefits from other social systems, particularly the subsidiary allowance (EL) from the solidary public pension pillar, are used to cover the clients' costs.

The LTC financing in Switzerland features neoliberal elements, mainly due to its connection to the mandatory private health insurance with substantial clients' deductibles and copayments as well as due to flat-rate insurance premiums. The data on costs (in relation to GDP) vary – from numbers below the OECD average to the highest number in this regard.

According to the coalition agreement of the German conservative-liberal government of 2009 the social LTC insurance cannot permanently fulfill its role in the form of a pay-as-you-go system – to guarantee reliable partial coverage of care costs to all citizens: "Therefore, we need – in addition to the existing pay-as-you-go system – a fully funded supplement, which must be mandatory, individualized, and generationally fair." Bräuninger [10] came to a conclusion that if private LTC insurance is mandatory, it must be associated with social compensation. Therefore, it is easier to introduce a state contribution, instead of a social compensation. The German LTC insurance reform was effective from 2013, the government introduced voluntary private LTC insurance with state contribution, based on the Riester pension model. The share of the state contribution in the total insurance premiums amounts to 33.3% for young people. Insurers must enroll any person that (currently) does not need LTC. Overhead costs are capped.

In contrast to health care, there are not enough analytical materials to assess the neoliberal regime of the LTC financing as for its efficiency. A typical feature of the neoliberal model are state subsidies – to insurance premiums. Social assistance, provided by the municipalities, is the final social security method.

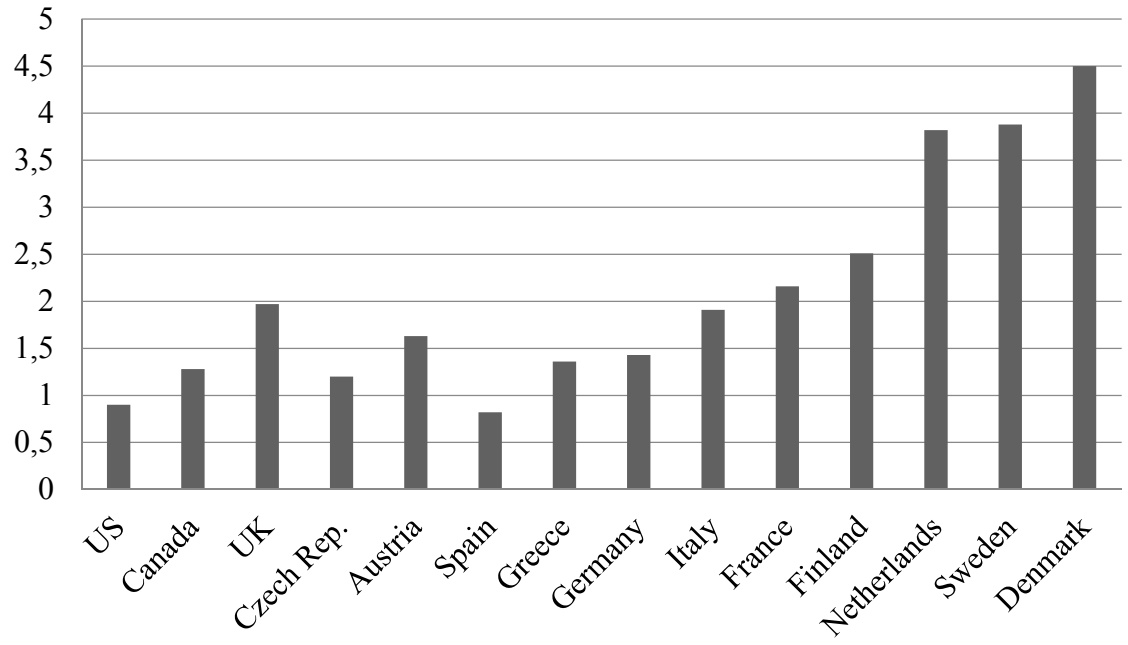
3 Universal long-term care allowance

LTC in the Czech Republic is partly provided by medical facilities according to public health care rules and its second, predominant part is regulated by the Social Services Act. In the 1990s, earlier detailed central regulation of social services was replaced by central detailed subsidy regulation on the part of the Ministry of Labor and Social Affairs. At the same time, the number of (subsidized) providers has increased significantly. The range of these providers is quite diverse – including private and nonprofit organizations. State institutions were transferred to regions and municipalities; new founders also routinely grant subsidies to them. The demand for social services in not fully covered, some liberalization may help here.

As of 2007, the Czech "care allowance" replaced two former allowances. Introduction of the AA was motivated by the effort to transfer public resources to clients and not to institutions. LTC financing has not been clearly defined. The Czech AA is a universal public benefit, with 4 levels now, according to dependence on another person's assistance. The public LTC expenditure in relation to GDP is comparable to other OECD countries, particularly to those with a conservative model. The highest rate of the Czech AA amounted to 64.4% of the average net wage in 2011. The Czech AA is (relatively) slightly lower than AA in Germany and Austria.

Figure 1 illustrates the relative public LTC expenditure in selected OECD countries; input data have been primarily arranged according to [11], with data for the US and Canada added thereto; the data for the Czech Republic have been revised. I do not use the OECD data, which are incomparable in many regards, as also noted by Colombo [1]. It is no surprise that the states with the social-democratic regime of the LTC provision in the figure show above-average costs; this could ensue directly from the "specification" of the model. However, the already mentioned problem of the input data quality is apparent here, largely determined by the nature of LTC and its very heterogeneous connection with other areas of social policy in individual countries. The data cannot be used to draw conclusions on the effectiveness of the LTC provision. In general, "the future public LTC expenditures will substantially increase: the two main changes expected to affect LTC in the near future are (i) the doubling in the number of dependent individuals in the next twenty years within the OECD, associated with the rapid increase of very old (75+) people in the population, and (ii) the decline in family solidarity due to increased participation of women in the labor market, increased mobility and changing family values" [13]. The demand for formal LTC services by the population is likely to grow substantially [14, 15].

Figure 1 Public LTC Expenditure in % of GDP



Source: [11, 12], own selection of data and processing

The AA in Austria, introduced as of 1993, could have served as a predecessor of the Czech AA. The Austrian AA is a universal state benefit for non-self-sufficient residents, with 7 levels. The highest rate of the Austrian AA corresponds to 76% of the average net wage for the same year. The objective of this allowance is the flat settlement of additional costs associated with LTC, i.e. a contribution for the settlement of costs incurred by people in need of such care. In case of a hospital stay, there is no entitlement to the AA. In case of institutional care at the public expense it is possible to transfer up to 80% of the AA to the provision costs. Moreover, clients are entitled to pocket money in the amount of 10% of the AA at the 3rd level of dependence. The remainder of the AA is not awarded.

In 2007, a special means-tested allowance for 24-hour home care was introduced in Austria, trying to regulate the most striking cases of illegal employment. The allowance is to cover about 80% of the costs, whereas its amount is differentiated based on the type of contractual relation

with caregivers. Different amounts between employment and other independent activities are explained by different costs of social insurance of providers.

The LTC financing concept in Austria prefers home care to institutional care. In about 80% of cases, such care is provided informally. The preference of family care and informal economy lead to the fact that the Austrian system is somewhat closer to the "Mediterranean-Catholic" model, with high level of family responsibility, than to the "Nordic-Protestant" model with high level of individual responsibility and more significant role of the government in the provision of such services [16].

The LTC in Austria is also financed from the social assistance system. In this regard, the most significant is the institutional care financing. Social assistance, as a financing method, is used by 80% of clients of such institutions. The nationwide averages for the institutional care financing sources were as follows in 2006: 48% from social assistance; 44% from pensions and AA; 7% from the clients' assets and recourse to relatives. At the same time, clients retain pocket money amounting to 20% of pensions and about 10% of the AA. Out-patient services at home are also significantly subsidized; clients cover "at least 27%" of the price [16].

The AA in Austria, Germany, and the Czech Republic is the crucial benefit for this care. At the same time, the Austrian and Czech allowances "only" differ in the technical/economic implementation at the first glance; the basic concept of the two benefits is identical and their overall significance is comparable. The German concept varies in the differentiation of the allowance amount, depending on who and how provides the care – this mainly takes into account the fact that informal provision of services is not subject to taxation. Compared to this, the Austrian and Czech concepts pretend this is not the case – or it could be reasoned that production or care within a family is usually not taxed. The allowance for 24-hour care, introduced additionally in Austria, interferes with the basic concept of the AA in a way.

The universal LTC allowance according to the Austrian/Czech model does not fall within any of the typical welfare regimes, although the universal benefit could fit within the social-democratic model. However, it would need to fit within the entire social system and comprehensively address the "problem" in its entirety. This is clearly not possible – both in terms of the nature of LTC and in terms of the need for coordination with health care, pensions, and other benefits and services. Last but not least, it also concerns taxation of any type as well as the status of LTC providers. If we wish to take into account the major fiscal differences between the formally and informally provided LTC, we must reject the universal AA using the Czech or Austrian construction for this reason alone. The AA is too global, disregarding both the specificities of the LTC financing and welfare regimes used (throughout the world), particularly in terms of health care. The problem is further accentuated by the fact that the Czech health care still lacks any clearly selected welfare regime that is always significantly reflected in the health care / LTC financing system.

4 Conclusions

Long-term care is a relatively new area of social security, which has not generally won recognition as a separate branch of the system but which relative importance will substantially grow in the future decades due to the population aging and due to the expected further decline in family solidarity. The long-term care is differently connected to related branches in different countries and under different regimes – particularly with health care as well as with social assistance. An absolutely clean welfare regime is not applied throughout the entire social system of any country.

The liberal design of the LTC financing preferentially uses the social assistance system, provided by the local public administration. Although low LTC financial benefits correspond with a modern liberal welfare regime, they do not significantly address the issue of the LTC financing. Furthermore, private LTC insurance has minor practical significance as well. Liberal policy distinctly accentuates the testing of income and assets of LTC clients.

The conservative design of the LTC financing addresses the issue of LTC analogically to health care – i.e. LTC "follows" health care in this case. The pay-as-you-go LTC insurance, providing financial benefits aimed at partial settlement of costs of such care, corresponds to the segmented social insurance scheme.

The social-democratic design may be applied by financing social and health care administration institutions, without any more or less universal financial allowances for clients. The modern social-democratic regime also respects the existence of private and nonprofit LTC providers, to whom it is possible to provide the settlement for services provided to individual clients, in connection with the system of funding the basic health care package.

The neoliberal design of the LTC financing follows up on the neoliberal solution in terms of the health care provision/funding. In this context, LTC may be included in the package of basic health care, mainly provided by the private sector, typically with higher deductible and copayment of clients (even for health insurance and health savings products) and with significant final role of the social assistance system. Moreover, significant fiscal support of those who purchase voluntary LTC insurance also represents a neoliberal solution.

The universal LTC allowance is a far too global form of social security for non-self-sufficient persons. The LTC financing should not only follow up on the health care funding, but it should also be comprehensibly combined with the entire system of public benefits, particularly with old-age/disability pensions. This is not the case in the Czech Republic. Europe prefers benefits in kind in LTC or financial benefits, customized to the level of dependence and method, in which the relevant services are provided, including the corresponding financial participation of clients. Further research ought to be aimed more at assessing the efficiency of different LTC schemes and designs. Our research aims also at the potential of opening this sector to more competition, to meet the increasing demands for the social services of all kinds; different governance arrangements are to be more analyzed and implemented as well.

Acknowledgment

This paper was supported from the internal grant agency of the University of Finance and Administration in 2014.

References

[1] Colombo, F. et al. (2011). Help Wanted? Providing and Paying for Long-Term Care. *OECD Health Policy Studies.* Paris: OECD Publishing.

[2] Esping-Andersen, G. (1990). The Three Worlds of Welfare Capitalism. Cambridge: Polity Press & Princeton: Princeton University Press.

[3] Daatland, S. O. (2012). Population Aging and Long-Term Care: The Scandinavian Case. In: Wolf, D. A., Folbre, N. (eds.) (2012). *Universal Coverage of Long-Term Care in the United States. Can We Get There from Here?* Russell Sage Foundation. Retrieved from: https://www.russellsage.org/publications/universal-coverage-long-term-care-united-states

[4] Cremer, H., Pestieau, P., Ponthiére, G. (2012). The economics of long-term care: a survey. *ECORE Discussion Paper 2012/30*. Louvain-la-Neuve: Center for Operations Research and Econometrics. Retrieved from: http://www.ecore.be/DPs/dp_1343209359.pdf

[5] Truffer, Ch. J., Klemm, J. D., Wolfe, Ch. J., Shuff, J. F. (2012). *2012 Actuarial Report on the Financial Outlook for Medicaid.* United States Department of Health & Human Services. Centers for Medicare & Medicaid Services. Retrieved from: http://medicaid.gov/Medicaid-CHIP-Program-Information/By-Topics/Financing-and-Reimbursement/Downloads/medicaid-actuarial-report-2012.pdf

[6] Humphries, R. (2013). Paying for social care: Beyond Dilnot. London: The King´s Fund. Retrieved from: http://www.kingsfund.org.uk/sites/files/kf/field/field_publication_summary/social-care-funding-paper-may13.pdf

[7] Dilnot, A., Warner, N., Williams, D. J. (2011). *Fairer Care Funding: The Report of the Commission on Funding of Care and Support*, vol. I. Retrieved from: http://www.ilis.co.uk/uploaded_files/dilnott_report_the_future_of_funding_social_care_july_2011.pdf

[8] Auth, D. (2013). Economization and (in-)formalization of long-term care in the UK, Sweden and Germany. *3rd European Conference on Politics and Gender (ECPG). Barcelona.* Retrieved from: http://www.ecpg-barcelona.com/sites/default/files/Paper%20Auth%20ECPG%20Barcelona%202013-final.pdf

[9] Karlsson, M., Iversen, T, Oien, H. (2010). Scandinavian Long-Term Care financing. *Working Paper 2010*, No. 2. University of Oslo. Retrieved from: http://www.med.uio.no/helsam/forskning/nettverk/hero/publikasjoner/skriftserie/2010/2010_2.pdf

[10] Bräuninger, D. (2011). Pflegeversicherung – Aufbau von Vorsorgekapital geboten. Deutsche Bank Research. *Aktuelle Themen 510.* Frankfurt am Main: Deutsche Bank. Retrieved from: http://www.dbresearch.de/PROD/DBR_INTERNET_DE-PROD/PROD0000000000270658/Pflegeversicherung+-+Aufbau+von+Vorsorgekapital+geboten.pdf

[11] Lipszyc, B., Sail, E., Xavier, A. (2012). Long-Term Care: Need, use and expenditure in the EU-27. *European Economy. Economic Papers 469*. European Commission. Directorate-General for Economic and Financial Affairs. Retrieved from: http://ec.€opa.eu/economy_finance/publications/economic_paper/2012/pdf/ecp469_en.pdf

[12] Rodrigues, R., Huber, M., Lamura, G. (eds.) (2012). *Facts and Figures on Healthy Ageing and Long-Term Care: Europe and North America.* Vienna: European Centre for Social Welfare Policy and Research. Retrieved from: http://www.Euro.centre.org/data/LTC_Final.pdf

[13] De Donder, P., Pestieau, P. (2013). Private, Social and Self-Insurance for Long-Term Care in the Presence of Family Help – A Political Economy Analysis. *CESifo Working Paper No. 4352.*

[14] Cremer, H., Roeder, K. (2013). Long-Term Care and Lazy Rotten Kids. *CESifo Working Paper No. 4372*.

[15] European Commission (2012). The 2012 Ageing Report. Economic and budgetary projections for the 27 EU Member States (2010 – 2060). *European Economy*, vol. 2.

Retrieved from: http://ec.europa.eu/economy_finance/publications/european_economy/2012/pdf/ee-2012-2_en.pdf

[16] Riedel, M., Kraus, M. (2010). The Long-Term Care System for the Elderly in Austria. *ENEPRI Research Report* No. 69. Retrieved from: http://www.ancien-longtermcare.eu/sites/default/files/ENEPRI%20RR%2069%20ANCIEN%20Austria%20Rev1.pdf

FINANCIAL SERVICES: LOW TAXATION AND HIGH SUBSIDIZATION

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ABSTRACT

The theory and policy of taxation of financial services has significantly changed in recent years, due primarily to the financial crisis. Theory requires the coordination of the financial sector taxation and regulation, and analyses the effectiveness of introducing special taxes. This newly opens up the issues of value added tax and the existing exemption of financial services from it. Markets are moreover distorted by government subsidies for different financial products. The authors´ primary aim is the critical review of the literature and derivation of the recommendations for the taxation of financial services in the Czech Republic. Financial services need to be temporarily subjected to the financial activities tax until these services are duly subject to the value added tax in the EU. A major reform of value added tax, such as the transition to income type of this tax, would ease the solution of the existing problems.

Keywords: financial services, value added tax, financial activities tax, income tax, tax credit

JEL codes: H21, G23, G21

1 Introduction

The issue of taxation and subsidization of financial services and financial sector is relatively extensive, it is significantly linked to the taxation and general regulation of the economy and of this sector in particular. Its solution has broad implications for public budgets. Global economic and financial crisis has changed in many approaches to this sector as a whole as well as to its individual segments, which have their essential specifics. While earlier efforts to motivate consumers to invest more prevailed, supported by the interests of financial services providers, in the latest years it is more about how the financial sector should be taxed additionally. EU document in this direction reviews the current policy objectives related to the taxation of the financial sector as follows: The main goals driving this debate are: the use of taxation as (1) a complement to regulation to correct for negative externalities stemming from the activities of the financial sector, which include the effects of excessive risk-taking; (2) to ensure that the financial sector pays a fair and substantial contribution to public finances, in particular with regard to the economic and financial crisis; (3) to raise funds in the context of the exit-strategy [7].

This paper concentrates on the redistributive problems of taxation and subsidization of financial services, which particularly in the Czech Republic appear in the form of clear-cut – thanks to extreme approaches applied in practice. In spite of EU's efforts to create a single market in financial services, these markets are largely segmented and monopolized in the Czech Republic and other new Member States of the EU, even with the contribution of those States, also because

of the high subsidies granted for selected financial products. A fundamental international problem is the exemption of the most important financial services from value added tax. Also, proposals for the implementation of a few types of selective taxes for the financial sector are being repeatedly presented.

2 Value Added Tax

Value added tax (VAT) was created to replace the general turnover tax, "temporarily" put in place after World War I until public finances reasonably stabilize. The general turnover tax survived the World War II, the originally low rates were being raised, and it soon became clear that the tax would require a substantial reform to eliminate its main problem: i.e. the cascade effect of the tax. Theory drew a conclusion that the simple but not 'competitively neutral' general turnover tax had to be replaced with VAT. Today, an alternative single-stage turnover tax basically exists in the United States only. The other countries have put in place VAT with multiple rates as a rule, differentiated by products.

Politicians embraced VAT not only as a fiscal instrument but also as a social and business one. Consistent with this is the existing VAT design in the EU: a zero tax rate on exports (even within the EU), the persistence of multiple rates despite the significant efforts to unify the rules applicable to this tax. The VAT system developed in Western Europe in the 1960's has become the basic model of taxing consumption in almost any part of the world. VAT is considered to be the most successful fiscal innovation of the last half-century.

One of the shortcomings of the existing VAT system is the treatment of financial services, when these services are in almost all cases exempt from VAT, and this also involves the inability to deduct the tax included in the prices of products purchased by relevant businesses. Under EU VAT, financial services supplied to customers outside the EU are effectively zero rated, because the exemption is accompanied by the right for the service provider to deduct input tax [11].

This distinct approach to financial services is being explained by the specificities of financial services. According to this approach, financial institutions may charge for their services in the following ways:

- Explicit fees and commissions and
- Implicit charges in the form of margin.

Taxation of "explicit" fees and commissions by the VAT itself is considered to be trouble-free, with the principal VAT design being applicable there. However, a problem reportedly exists with margin-based financial services. Around 2/3 of all financial services are margin based which makes the implementation of the invoice-credit VAT system very difficult in this respect. (EC 2010). A margin, for example an interest rate spread alone, even is a value added but the main problem is alleged to be the 'dividing' of the margin between the lender's transaction (deposit) and the borrower's transaction (loan). The basic problem with this approach is, however, that these financial services are treated in this way at all. The question is why this or that academician or politician pays attention to the margin at all – with the given construction of VAT in the EU. Very comprehensive study of the literature shows that the real reason for this approach is not the tendency to apply the existing structure of the EU VAT on the financial services, but the effort to modify this construction so that the savings are not taxed. From the point of view of political economy it is an entirely legitimate approach to replace the income tax with the consumption tax in a general form – i.e. not in the form of the current VAT in the EU. But this issue should not be combined with the problem of the exclusion of financial services from VAT today. Today's VAT taxes (or does not tax) individual transactions,

regardless of the destination of the products for the real final consumption or "just" for the provision of financial services.

VAT is a complex system of calculations and transfers. It can be assumed that the application of existing VAT construct for financial services will require detailed arrangements, regulation, due to the plenty of complicated financial products. But this is not a reason for refusing the application of VAT to simple, basic margin-based financial services, namely the deposit and credit services. Transaction costs associated with this system of taxation of financial services would be obviously much higher than the application of another VAT system, the income-type VAT. But this is again a problem of public choice: whether we want the credit-invoice VAT, as well as the above question, whether we prefer an income tax or a consumption tax. Many industries have a special VAT treatment; financial services in this respect would be no rarity.

One approach to charging VAT for financial services is the cash-flow approach [14]. This approach is based on the concept of taxing all cash flows, which means that even the sole loan transfer or deposit receipt is subject to VAT. In addition, however, these authors actually propose a fundamental change of VAT, exemption of certain components of value added (margin) from taxation ("pure" interest rate, risk premium). VAT calculation is carried out for a given period using a special tax calculation account (TCA system). It is very complex and that is why it has not been put in practice.

At the EU level, it has been recognized that the existing approach to imposing VAT on financial services is out-dated. In addition, even individual Member States apply different practices while the continuing formation of the single market provides room for undesirable tax optimization there. The only tendency promoted in the EU so far has been to enable more financial institutions to choose the principal VAT system in lieu of the existing exemption of financial services (the “option to tax”). This is what the draft new Directive of 2008 primarily contains. However, the impacts of those proposals have not been adequately analysed yet [8].

We believe that the EU’s approach to VAT on financial services lacks enough consideration and power. This may be due to the existence of various interests, including the effect of lobbyists. In any event, it would be useful to consider a fundamental VAT reform, notably the switch to the income-based type of VAT. In addition to fully complying with the financial sector in technical terms, such a VAT type is also much simpler. This reform would also eliminate the zero VAT rate applicable to exports, i.e. another significant simplification. But the theory has not reached this knowledge yet. The best practice that can be distilled from the literature strongly indicates that the consumption base of the VAT should be defined as broadly as possible and that all goods and services should be taxed at a uniform rate. [4].

The program to reform VAT on financial services should put at least all “explicit fee” services into the principal VAT system (design). This would also eliminate the problem of excessive taxation of financial services for businesses. For example, non-life insurance would become cheaper for them. This practice exists in several countries (South Africa is cited as an example), probably without problems, or problems have not been published at least. Even in some other respects, the practice outside Europe seems to be more flexible than the EU’s VAT policy.

As concerns margin-based financial services within the framework of the existing general VAT design, it is possible and also explicitly useful and practical to abandon the model approach, by which the relevant businesses “live” on margins, and to replace it with a more realistic model of providing individual services, when a bank separately provides loans and other individual services, including deposit ones. After all, this also happens in reality.

Credit services are remunerated by interests and fees – and today’s standard VAT can be charged on both of those prices. After all, interest can be seen as a fee for granting a loan. If

taxing today's standard banking fees is not a problem, then this must also be true of a fee calculated as interest. The fee calculation method is irrelevant, and the interest must be billed; the implementation of such practice can be considered useful.

For deposit services generally, banks pay out interests and collect fees. If a bank charges fees for providing deposit services, taxing these by VAT is not a problem. If a bank provides interest on deposits to a VAT non-payer, such a deposit owner cannot "charge" VAT to the bank. If the practice of taxing fees for deposit services leads to the suppression of fees and the reduction of interests, this cannot be seen as detrimental. After all: according to at least one of the generally theoretical approaches to consumption taxation, this represents deferred rather than current consumption – and hence there is no reason to tax deposit interest; we deal with the VAT here, not the income tax. (However, all banking services are subject to VAT in Morocco.) A separate question is the income tax rate to be applied to interest income from deposits. Thus the problem of taxing deposit services by VAT can be easily resolved in 'cooperation' with income tax.

The approach to insurance services can be analogical. The principle of equal conditions for all deposit services and other similar services makes it clear that any deposit service needs to be separated from life and non-life insurance because of VAT taxation alone. After all, this will also be necessary because of the further extension of insurance regulation within the Solvency program. The separation of deposit services is also desirable for the transparency of insurance services; in effect, this will uncover and, hopefully, also eliminate the instances of providing clearly disadvantageous savings products. VAT will apply to separate fees and to risk insurance premium, including fees, while deposit income will be subject to income tax.

3 Financial Activities Tax

As part of the financial sector regulation reforms, the IMF has recommended putting in place the financial activities tax (FAT), as a potential complement to the bank tax (levy). The IMF's report [10] considers three variant versions of FAT; we will only deal with its first form here – the taxation of the volume of company wages and profit (addition method of FAT), which is actually what is known as the income type of VAT. This FAT variant is used in numerous countries on account of the complete or significant exemption of financial services from value added tax. For example, Denmark's financial sector payroll tax is 10.5% and the overall revenue from the tax is 0.25-0.3% of GDP [3]. 19 Member States of the EU have an insurance premium tax or similar tax. Nearly all EU Member States have introduced other taxes on financial services, not all specifically compensating for the VAT exemption [5].

Under the current situation, when most financial services are not adequately taxed by VAT, it is absolutely right to introduce quickly a compensating tax for the VAT exemption, preferably the FAT. In the current Czech conditions, the FAT may be introduced as the payroll tax and profit (corporate income) tax – immediately at the rate of, say, 5% – with a possible rate increase to be analysed at a later stage. (Financial institutions in Israel pay the FAT on the sum of wages paid and the basis of assessment for corporate income tax and the rate is set at 16% – the same as the standard VAT rate.) It is simple if the will to do that exists; however, the powerful financial sector does not wish such taxes.

4 Income Tax and Direct Subsidies

Specific solutions to the VAT and FAT issues have direct or indirect impacts on providers of financial services and their clients, depending on the tax selected and its rate as well as on the market conditions. In the baseline scenario, these services are subject to the same tax as other products: general economic theory has no reason to favour this or that product. The practical

solutions in that area are based on the specificity of savings in its relation to income and consumption taxation. The question is what and how exactly should be taxed; in this case the accruals in the savings of households, employees and other residents, businesses and other institutions. As the savings invested typically generate yields, it is also necessary to consider and decide whether and when to tax such investment yields. The model solutions to these variants are based on the concept of the entire tax system, i.e. of two essential taxes; we may consider income tax and VAT to be such taxes. The choice of these two taxes as the essential ones is the matter of public choice, as mentioned above.

In the conventional concept of income tax, the generation of savings means the use of income, with savings being consequently generated from income after tax. If savings generate (capital) yield, the yield needs to be subject to income tax. In this concept, the pay-out of a single or recurred amount (benefit) from the relevant financial product should no longer be taxed as income. This variant of approach to savings tax is referred to as the TTE (Taxed, Taxed, Exempt) in pension literature. The TTE scenario can be viewed as a neutral or liberal approach to savings taxation. It is rarely used abroad.

The basic and most widely used variant at the international level is the reverse EET scenario, where the contributions (deposits) of a client or client's employer are not taxed and where the client pays income tax on a single or recurred amount, which also covers the capital yields at the time of savings (the contribution payments). Advocates of consumption/expenditure taxation see this as a system that achieves the fiscal neutrality between current and future consumption, as all savings are tax-exempt [2].

The EET is referred to as the deferred income tax system. In a typical scenario, which also envisages the existence of the progressive income tax, a client is likely to benefit from the deferred income tax – and thus it is an indirect government incentive for savings, actually used in pension products. In its basic variant, the system works in such a way that the pension product contributions paid by the participant are deductible from the participant's income tax base. If the contributions are paid by the employer, the employee does not pay income tax on those contributions while for the employer this item is recognized for tax purposes (in corporate income tax). Relevant laws normally set the upper thresholds on these deductible items recognized for tax purposes.

The system of participant's contributions to pension products, as items deductible from the income tax base (part of the EET), can be replaced with an income tax credit or, where appropriate, with a direct government contribution. In a progressive income tax system, the advantage of those variant solutions is the possible single amount of government incentive irrespective of taxpayer's income; however, liberals consider this to be a disadvantage.

The Czech system of government incentives for supplementary pension insurance and "private life insurance" is fairly non-standard. The government contribution for supplementary pension insurance was established with the creation of this product, which is exclusively provided by 'pension funds'. In addition, the pension lobby made legislators approve a tax incentive in 1999 – a deductible item from the taxable amount for participant's income tax. A year later, legislators enacted a parallel analogical tax incentive for the "private life insurance", provided by life insurers. In 2008, the government incentive for employer's contributions to supplementary pension insurance and private life insurance of employees, allowing for the recognition for tax purposes of up to CZK 24,000 (30,000 from 2013) a year in contributions for both types of products in total, was put in place in the Czech Republic; the contributions are also deducted from the basis of assessment for social insurance and health insurance.

The relative amount of the government contribution for supplementary pension insurance in the Czech Republic is the world's highest according to OECD's international comparison [16].

This is certainly not good because it indicates wastage. The government incentives, put in place later, for employer's contributions to supplementary pension insurance and private life insurance are even much greater, hitting some 95% of the notional equivalent of employee's contributions. The existing three forms of government incentives have moreover no logical interrelationships.

Direct government subsidies and tax reliefs have significant fiscal impacts. Viewed by general economic theory, a significantly different approach to the taxation of these or those activities or sectors fundamentally affects the relevant markets. The result is the assumption of the relative hypertrophy of financial services in the Czech financial sector, the overuse of those services, with this involving significant inefficiency in the national economy. Also, this is even gloomy if we are aware of the usual high profits in the financial sector, associated with the lack of competition not only in this country. The only fundamental solution is the elimination of any government incentives for supplementary pension savings and private life insurance. Slovakia chose this aggressive approach: since 2011, the government incentive for participant's contributions to pension savings has been repealed there; the Minister of Finance also proposed repealing the government incentive for employer's contributions to pension savings but failed to enforce such a move. Given the existing huge amount of government subsidies in the Czech Republic, it is advisable – in the first step – to cut significantly the government incentive for 'pension' products, for example to Austria's level (the tax credit of 4.25% of participant's contribution).

Contract savings for housing (Bauspar) is even a more serious issue than pension savings, notably in the Czech Republic. Naturally, it is useful to save money for housing purposes but it is not an activity worthy of government incentives, except for incentives to support socially vulnerable groups or birth rate, as appropriate. A paper for a World Bank seminar sees the Czech system of contract savings for housing (CSH) as the worst product of its sort. "The Czech Republic has allowed the Bauspar system to grow uncritically and pointlessly, due to political popularity." Poland, by contrast, is praised for having reversed its decision to adopt a Bauspar system [9]. A different situation existed in Germany after World War I, when Bauspar institutions were established as mutual institutions to concentrate funds from future builders in order to speed up construction.

The CSH market is a stand-alone financial market just because of the high subsidies for this product while the target solution is to combine this market with the mortgage market. As an immediate and simple solution, I recommend cutting the government contribution from today's 10% to Austria's level (1,5%) and unifying the design of this contribution with the contribution for supplementary pension insurance, as well as unifying the regulation of banks and Bauspar institutions. After a few years, the government contribution should be completely repealed.

5 Mortgage Interest Deduction

Mortgage interests are deductible from the taxable amount for personal income tax in a number of countries. Up to CZK 300,000 a year is deductible in the Czech Republic but the amount is to be cut to CZK 80,000 a year as part of the country's tax reform. In the Czech Republic, the deduction also applies to rival loans granted under Bauspar schemes.

Excited discussions on mortgage interest deduction (MID) from the income tax base are taking place in the United States. In the U.S., these are the largest deductions from taxable amount, and thus are highly relevant not only in terms of revenue from income tax but also for the taxpayers concerned. MID analyses consider this to be unjust support for the rich: it is a conventional "upside-down" subsidy because it provides ten times the tax savings for

households with income exceeding $250,000 compared to households earning between $40,000 and $75,000. It does not help 65% of taxpayers taking the standard deduction, or nearly half of all homeowners, nor 20% of mortgaged homeowners. Moreover, the MID provides no benefits to low-income households and only minimal benefits to middle-income households. And it gives little assistance to the elderly [15].

Today's personal income tax is historically based on the concept of household as an economic unit, with gross revenue as well as expenditure. This economic activity also includes cooking and food processing generally as well as the processing of other purchased products. It also includes housecleaning, including the purchase of appliances and their amortization. A fundamental and increasingly relevant item is housing. If I live in a rented home, I incur the costs of rent and other services. If I live in my own home, I provide the same services to myself; and even though I do not pay the rent, I have to consider that I do pay the rent to myself – and thus generate revenue (which is subject to tax) and expenditure on housing (which needs to be taken into account in taxation as costs). In theory, the fictitious revenue from rent is referred to as imputed rent. If I buy a home, including fittings and all equipment of the household, on credit, I can (must) also include the associated interest and insurance in my expenditure. This way, we can illustrate the approaches by the whole generations of tax theoreticians to income taxation.

Mortgage interest deductions, as viewed by tax theory, are mostly just part of the costs of buying a home. Here authors of textbooks present owner-occupied housing as an investment, commensurate with an investment in securities; both should be subject to equal (tax) conditions. The solution is based on the taxation of imputed rent with the deduction of the costs of buying a home. However, voters also have to be convinced of this; having a would-be great theory is not enough. "While the reasons to tax imputed rent may be essentially strong, such taxation is politically unacceptable and unenforceable." [13]. Given this, however, we also need to denounce clearly the existence of housing cost deductions, including the MID.

In the last decade, tax theory has tended to shift: some authors distinguish between two policy approaches to buying a home and other durable items:

- The investment-based approach requires taxing the net imputed rent, i.e. the gross imputed rent after the deduction of depreciation and mortgage interest;
- The consumption-based approach means failure to tax the imputed rent as well as failure to provide tax deductions of mortgage interest or other interests.

The practical tax policy allows for aligning the taxation of income with the taxation of buildings; the taxation of owner-occupied residential buildings can also be explained as the taxation of imputed rent; it would also depend on the rate of such a tax.

The investment-based approach to housing taxation and subsidization is only used in very few countries. According to a World Bank paper released in 2000, mortgage interest deductions are a traditionally dominant instrument of tax incentives for mortgage markets and home ownership. Tax credit has replaced MID in some countries in order to correct distributional inefficiencies. The condition for success of the mortgage subsidy reform is to integrate it with the general financial sector, housing sector and the fiscal reform [6].

The countries where MID does not exist include a group of more liberal Anglo-Saxon States: Australia, New Zeeland, Canada as well as the United Kingdom, which is praised for phasing out those deductions. A country without MID is also Slovakia; this also applies to loans granted under the Bauspar scheme. An overview of OECD countries with MID incentives, sorted by the level of those public subsidies, lists the Czech Republic as second, closely behind the Netherlands [1]. The Czech Republic is a world star in subsidizing financial products!

Universal mortgage interest deductions from income tax base, as in the Czech Republic, are not sustained by economic theory, and the number of steps by which these can be repealed is just the only question.

6 Conclusions

With the single exception of non-life insurance of businesses, the financial sector is subject to very low taxes and huge subsidies. The financial crisis has largely changed the attitudes by a number of States and other institutions to the financial sector; the reasons were the significant fiscal costs of that sector's recovery.

EU's approaches to the imposition of value added tax on financial services require greater flexibility and the alignment of this issue with the other internationally considered taxes, with the income tax concept, as well as with the taxation and subsidization of pension products, contract savings for housing, and mortgages. An immediate partial compensation for the missing tax on financial services within the scope of value added tax is the introduction of the financial activities tax on the providers of those services.

The subsidization of pension products, savings for housing, and mortgage loans is extremely high in the Czech Republic compared to the other countries. These subsidy systems require a fundamental reform, which might be carried out in two steps in order to enable people and financial institutions to adapt to the changes on a gradual basis, with other reform steps also taken into account. Without any undue delay, it is advisable to cut the subsidies for housing savings, supplementary pension insurance, and private life insurance to Austria's level while unifying the design of those subsidies. Likewise, the mortgage interest deductions and Bauspar loans deductions need to be substantially reduced and subsequently repealed.

Acknowledgment

This paper was prepared as part of the Specific University Research No. 7427.

References

[1] Andrews, D., Caldera Sánchez, Johansson Å. (2011): Housing Markets and Structural Policies in OECD Countries. *OECD Economics Department Working Papers*, No. 836, Paris: OECD Publishing. Retrieved from: http://www.melbourneinstitute.com/downloads/hilda/Bibliography/wp/Andrews_etal_OECD_WP836.pdf

[2] Blanc, J. Le (2011): The third pillar in Europe: institutional factors and individual decisions. *Discussion Paper, Series 1: Economic Studies*, No. 9. Frankfurt am Main: Deutsche Bundesbank. Retrieved from: http://www.bundesbank.de/download/volkswirtschaft/dkp/2011/201109dkp.pdf

[3] Claessens, S., Keen, M., Pazarbasioglu, C. (eds.) (2010): *Financial Sector Taxation: The IMF's Report to the G-20 and Background Material.* Washington, IMF, 2010. Retrieved from: http://www.imf.org/external/np/seminars/eng/2010/paris/pdf/090110.pdf

[4] Cnossen, S.: VAT Coordination Issues in the European Union: Commentary. In: [12].

[5] Delacroix, P. (2011): Taxation of the Financial Sector: State of the Play. Presentation to *The Brussels Tax Forum*, 28 March 2011. Retrieved from:

http://ec.europa.eu/taxation_customs/resources/documents/taxation/gen_info/conferences/taxforum2011/delacroix_ppt.pdf

[6] Duebel, H.-J. (2000): Separating Homeownership Subsidies from Finance: Traditional Mortgage Market Policies, *Recent Reform Experiences and Lessons for Subsidy Reform.* Washington: The World Bank. Retrieved from: http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2003/07/15/000112742_20030715100455/Rendered/PDF/261750urbanbackground14.pdf

[7] EC (2010): Taxation papers. Financial sector taxation. *Working Paper No. 25.* Luxembourg: Office for Official Publications of the European Communities. Retrieved from: http://ec.europa.eu/taxation_customs/resources/documents/taxation/gen_info/economic_analysis/tax_papers/taxation_paper_25_en.pdf

[8] Feria, R. de la, Lockwood, B. (2010): Opting for Opting In? An Evaluation of the European Commission's Proposals for Reforming VAT on Financial Services. *Warwick Economic Research Paper No. 927*. Warwick: University of Warwick. Retrieved from: http://wrap.warwick.ac.uk/3533/1/WRAP_Feria_twerp_927.pdf

[9] Hoek-Smit, M. C., Diamond, D. B. (2003): The Design and Implementation of Subsidies for Housing Finance. *The World Bank Seminar on Housing Finance*. Retrieved from: http://housingfinance.wharton.upenn.edu/Documents/design%20and%20implementation%20of%20subsidies%20for%20housing%20finance.pdf

[10] IMF (2010): A Fair and Substantial Contribution by the Financial Sector. *Final Report for the G-20.* Washington. Retrieved from: http://www.imf.org/external/np/g20/pdf/062710b.pdf

[11] Kerrigan (2010): The Elusiveness of Neutrality – Why is it so Difficult to Apply VAT to Financial Services? *MPRA Paper*, No. 22748, May. Retrieved from: http://mpra.ub.uni-muenchen.de/22748/1/MPRA_paper_22748.pdf

[12] Mirrlees, J. et al. (2010): *Dimensions of Tax Design: the Mirrlees Review.* Oxford: Oxford University Press

[13] Musgrave, R. A., Musgrave, P. B. (1994): *Public Finance in Theory and Practice.* 5th edition. New York: McGraw-Hill Book Co.

[14] Poddar, S., English, M. (1997): Taxation of Financial Services under a Value-Added Tax: Applying the Cash-Flow Approach. *National Tax Journal,* Vol. 50, No. 1, March, pp. 89-112.

[15] Ventry, D. J., jr. (2009). The Accidental Deduction: A History and Critique of the Tax Subsidy for Mortgage Interest. *UC Davis Legal Studies Research Paper Series*, Research Paper No. 196. Davis: School of Law, University of California. Retrieved from: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1498784

[16] Whitehouse, E. (2006). Comparing Retirement Saving Across Countries: An Economic Perspective. Presentation. Paris: *28th International Congress of Actuaries.* Retrieved from: http://www.actuaries.org/CTTEES_SOCSEC/Documents/36_Whitehouse.pdf

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ISBN 978-80-225-3991-3