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Table of Contents



1	Pavol BARAN , Radovan BAČÍK , Róbert ŠTEFKO and Jaroslava GBUROVÁ <i>Price Influence Possibilities and Selected Factors on Buying Behaviour of a Slovak Consumer</i>	...341
2	Hyung-Suk CHOI <i>Seasonality in Style Returns</i>	...348
3	Jarmila HORVÁTHOVÁ , Gabriela IŽARÍKOVÁ , Martina MOKRIŠOVÁ and Alžbeta SUHÁNYIOVÁ <i>Applying Correlation Matrix to Identify the Main Factors Influencing Enterprise Performance and Their Utilization To Create Creditworthy Model</i>	...359
4	Sukyoon JUNG and Ping WANG <i>How Do Investors Perceive High Synchronous Earnings? Evidence from Unexplained Volume on Earnings Announcement Days</i>	...373
5	Haryo KUNCORO <i>Does the Credible Fiscal Policy Reduce Its Volatility? The Case of Indonesia</i>	...382
6	Pornpitchaya KUWALAIRAT and Anirut PISEDTASALASAI <i>What Drives Stock Market Development? Evidence from Investor Type</i>	...394
7	Olivia Ramona MIHĂILĂ-ȘTEFĂNESCU <i>Publicity, Advertising and Spirituality</i>	...415

8	Andrey S. MIKHAYLOV and Anna A. MIKHAYLOVA <i>The Public Transportation of Russia and Sweden. A Comparative Analysis of Service Quality From Customer Perspective</i>	...422
9	Rajmund MIRDALA and Aneta SVRČEKOVÁ <i>Financial Integration, Volatility of Financial Flows and Macroeconomic Volatility</i>	...433
10	Mahito OKURA and David CARFI <i>Coopetition and Game Theory</i>	...457
11	Patrycja PUDŁO and Stanislav SZABO <i>Logistic Costs of Quality and Their Impact on Degree of Operation Level</i>	...469
12	Vincent ŠOLTĚS and Beáta GAVUROVÁ <i>Analysis of Selected Demographic Aspects of Day Surgery in Slovak Health Policy</i>	...476
13	Wadim STRIELKOWSKI , Denisa HEJLOVÁ and Liudmila KISILEVA <i>Economic Factors Influencing Wellbeing and the Quality of Life</i>	...487
14	Pavel TURČÍNEK , Jaromír LANDA and Tomáš KOUBEK <i>The Architecture of Management Cockpit for Support of Decision-Making</i>	...494
15	Roman VAVREK , Rastislav KOTULIC and Peter ADAMISIN <i>Topsis Method and Its Application to the Local Self-Government of the Slovak Republic</i>	...505
16	Martin VEJAČKA <i>Customer Acceptance of Electronic Banking: Evidence from Slovakia</i>	...514
17	Dominika WOJTOWICZ <i>The Role of European Union Funds in Local Investment Policy: Evidence from Łódzkie Region</i>	...523

PRICE INFLUENCE POSSIBILITIES AND SELECTED FACTORS ON BUYING BEHAVIOUR OF A SLOVAK CONSUMER

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Abstract:

The present time is a period of great and constant economic and politician changes that have a major impact on consumers and their buying behavior. Price and pricing policy play irreplaceable role not only on home-market but also on unified European market. Customers in Slovakia in shops usually decide in accordance to price. A price is commonly used and effective marketing tool. Despite the increased role of non-price factors in modern marketing, price remains a critical element of the marketing mix. This article is focused on price as one of the most dominant factors that affect Slovak consumer buying behavior. The aim of this article is also to show the impact of selected economic indicators that influence Slovak consumer buying behavior and buying decisions in relation to a price of offered products and services.

Keywords: consumer, marketing, retail trade, pricing policy, buying behaviour.

JEL Classification: M30, M31

1. Introduction

For the marketing to be successfully applied it also has to be uniquely customer oriented, regardless of at what market it is applied. Customer behavior is still in a permanent process of changes. It is not stable, changes over time under the influence of many factors. Therefore, there is a need of continual monitoring of trends' progress in a particular field (Gburova and Bacik, 2012; Gavurová, 2012). Consumers realize a big number of buying decisions every day. Their buying decisions are the subject of companies' researches with the aim to find out how consumers make decisions and what, how much, how often, when and why they do shopping (Bartakova *et al.*, 2007). Everyone who buys any products and services is considered a consumer. The consumer is a unique person with his own opinion and this should be respected by each retail trade that wants to attract consumers, retain them and adapt to them (Hes *et al.*, 2008).

It is also necessary to realize that consumer behavior varies depending on the characteristics of the buying product. A consumer will behave differently when he buys everyday consumer products from the way he buys a car (Koudelka, 1997).

Several authors Kotler *et al.* (2007), Kita *et al.* (2010), Kotler and Keller (2007), Hes *et al.* (2008) point out that a consumer and consumer behavior is considered as a very accented issue that every retail trade has to deal with, because satisfying the needs and desires of present and future consumers is the source of lasting success and profit. Consumers are not the only element of value chain, they are not one of the things that marketing specialists have to think about. What individual organizations know about consumers is never enough (Zyman, 2005).

Consumer buying behavior takes place in the consumer market that includes all individuals and households that buy products and services for final consumptions. From a marketing perspective, it is therefore important to know the factors that influence buying behavior and purchasing decision-making process, at the same time to understand them in order to prepare an engaging offer that ensures the consumer satisfaction (Kita *et al.*, 2010; Matušiková, 2013). Consumer behavior is closely related to other components of human behavior. The subject of research of consumer behavior is the research of making decisions of individuals when they want to meet their needs. Their decisions about what

they buy, why, how they buy it, where and how often as well as they spend their sources for consumption. (Cibakova and Bartakova, 2007; Šoltés and Gavurová, 2013).

Highly satisfied customer usually stays loyal for a long time, also he buys more other products. He talks about the products in a positive way to other people; he buys new products immediately when they appear on the market. This customer is less receptive to competition offers and less price sensitive. He provides his own ideas to a company. New products, services are cheaper than service of new customers, because the transactions become routine for them (Kotler and Keller, 2013; Gavurová *et al.* 2014).

According to Nagyova and Madarova (2004) globalization process in a business field will deepen more, the number of retail trades and medium business units will fall. Hypermarkets and supermarkets network will continue in expansion and general buying habits of Slovak customers will also change. The present consumer does not buy depending on whether it is a domestic or foreign products, but he rather buys according to price and quality, that affects a number of other economic and political factors (Gavurová, 2011; Szabo *et al.* 2013; Užík and Šoltés, 2009; Pudlo and Gavurová, 2012).

2. Aim, methods and materials

The aim of our research was to identify the price as one of the most dominant factors that affect buying behavior of Slovak consumer, as well as research of specific economic and political coherences that affect buying behavior of Slovak consumer. The objects of research were consumers living in Eastern Slovakia. The selected file was gained on the basis of selection of easy accessibility. To achieve this research aim we have set the following hypotheses:

H1: We assume that there are statistically significant differences in the perception of price and political situation in the Slovak Republic among the surveyed consumers depending on their place of residence (city, country).

H2: We assume that there are statistically significant differences in the perception of prices and pricing policy, depending on the education of consumers.

H3: We assume that there are differences in the perception of prices and pricing policy based on age consumers.

Respondents (consumers) responded to closed questions. The obtained primary data were then processed in a statistical program. Statistical methods as the t-test for independent selections, Kendall correlation coefficient tau ad Pearson's correlation coefficient were selected.

3. Results and discussions

In first examination of differences we focused on a comparison of answers from city and countryside respondents. We expected significant differences among these two groups. Their existence was verified by t-test for two independent selections and the results are shown in Table 1.

Table 1 - Comparison of the average score of the answers from city and countryside consumers

Question	Place of living	x	SD	t	p
In your opinion – Has global financial crisis affected prices and price policies of goods and services in the Slovak Republic?	city	4.33	0.81	3.016	0.003
	countryside	3.86	0.78		
In your opinion – Are prices and pricing policy developing more favorable in Slovakia aftermath of the main symptoms of the crisis?	city	2.18	0.84	-1.135	0.259
	countryside	2.38	0.96		
Were prices of goods and services during the government of Iveta Radicova for you more acceptable than during the government of Robert Fico?	city	3.15	1.00	0.805	0.423
	countryside	3.00	0.88		

Question	Place of living	x	SD	t	p
Have you experienced any change in the reduction of prices of goods and services after the early parliamentary elections in March 2012?	city	2.12	0.95	1.213	0.228
	countryside	1.90	0.82		
Do you think prices of primary food will rise next year?	city	4.06	0.99	-0.466	0.642
	countryside	4.14	0.72		
If the bread price rised 10%, would you continue in buying it?	city	4.42	0.75	-1.081	0.282
	countryside	4.57	0.59		
Do you prefer the price over quality?	city	2.88	1.16	0.098	0.922
	countryside	2.86	1.05		
Do you think that you receive reasonable quality for an adequate price?	city	2.30	0.91	1.455	0.149
	countryside	2.05	0.85		
Would you prefer to buy a more expensive Slovak product than cheaper product from abroad?	city	3.30	1.46	1.307	0.194
	countryside	2.95	1.19		
Do you think that you would pay less for the same goods and services outside Slovakia?	city	3.94	1.08	0.862	0.391
	countryside	3.76	0.98		
Do you think the government of Robert Fico will bring the reduction of primary food next year (2015)?	city	1.70	0.72	0.199	0.843

Source: own elaboration

The year of 2012 was full of economic and political changes for Slovakia. Every change is linked with expectation of something new and positive. As we can see in Table 1, assumed differences among respondents from the city and countryside were only statistically significant in responses to one question – „Has global financial crisis affected prices and price policies of goods and services in the Slovak Republic?” where consumers from the city expressed a greater degree of consent.

Because of the fact that in one question there was value $p < 0.05$ and different diameters in other compared items were not large enough to be considered as statistically significant differences, in this case we can reject first hypothesis. In the conclusion of the finding, we can state that there are no statistically significant differences in the perception of price and political situation in Slovakia between consumers living in a city and countryside.

In the second hypothesis we tried to realize of there are significant differences in the perception of price and consumer price policy depending on education. In relation to a type of variable “education” (ordinal variable), we used Kendall correlation coefficient tau. Its values with its statistical significance are shown in Table 2.

Table 2 - Education of respondents versus perceived price

Question	τ	p
In your opinion – Has global financial crisis affected prices and price policies of goods and services in the Slovak Republic?	-0.07	0.40
In your opinion – Are prices and pricing policy developing more favorable in Slovakia aftermath of the main symptoms of the crisis?	-0.13	0.12
Were prices of goods and services during the government of Iveta Radicova for you more acceptable than during the government of Robert Fico?	-0.01	0.94
Have you experienced any change in the reduction of prices of goods and services after the early parliamentary elections in March 2012?	-0.12	0.16
Do you think prices of primary food will rise next year?	-0.07	0.39
If the bread price rised 10%, would you continue in buying it?	0.16	0.06
Do you prefer the price over quality?	-0.27	0.01
Do you think that you receive reasonable quality for an adequate price?	-0.09	0.30
Would you prefer to buy a more expensive Slovak product than cheaper product from abroad?	0.05	0.53
Do you think that you would pay less for the same goods and services outside Slovakia?	0.03	0.70
Do you think the government of Robert Fico will bring the reduction of primary food next year (2015)?	-0.13	0.13

Source: own elaboration

Results in Table 2 point out that a relationship of demographic variable with price perception was not noted again. The values of correlation coefficients ranged very low in absolute terms (less than 0.16) with only one exception. Since value $p > 0.05$, in this case we also reject our second hypothesis. The only statistically significant relationship was observed between education of respondents and favoring price over quality when purchased. Relationship was negative, therefore respondents with higher education prefer price over quality less than respondents with lower education.

Last examined circuit was to watch the relationship between age and the price perception and individual questions focuses on the perception of prices themselves. In this case we used Pearson correlation coefficient. The results are shown in Table 3.

Table 3 - Structure of the sample by region range offers of retailers affiliates

Question	Age	1	2	3	4	5	6	7	8	9	10
1. In your opinion – Has global financial crisis affected prices and price policies of goods and services in the Slovak Republic?	r	-0.09									
	p	0.37									
2. In your opinion – Are prices and pricing policy developing more favorable in Slovakia aftermath of the main symptoms of the crisis?	r	-0.30	-0.28								
	p	0.00	0.00								

3. Were prices of goods and services during the government of Iveta Radicova for you more acceptable than during the government of Robert Fico?	r	-0.12	0.20	-0.07								
	p	0.20	0.04	0.45								
4. Have you experienced any change in the reduction of prices of goods and services after the early parliamentary elections in March 2012?	r	-0.25	-0.03	0.36	-0.24							
	p	0.01	0.74	0.00	0.01							
5. Do you think prices of primary food will rise next year?	r	0.03	0.01	-0.01	0.06	-0.03						
	p	0.79	0.95	0.94	0.57	0.78						
6. If the bread price rised 10%, would you continue in buying it?	r	0.04	-0.06	0.01	0.10	0.15	-0.01					
	p	0.68	0.53	0.94	0.32	0.12	0.90					
7. Do you prefer the price over quality?	r	-0.10	0.18	-0.10	0.17	-0.03	-0.04	-0.11				
	p	0.30	0.06	0.31	0.08	0.74	0.65	0.25				
8. Do you think that you receive reasonable quality for an adequate price?	r	0.10	-0.09	0.24	-0.24	0.08	0.02	-0.13	0.05			
	p	0.31	0.35	0.01	0.01	0.39	0.81	0.18	0.64			
9. Would you prefer to buy a more expensive Slovak product than cheaper product from abroad?	r	-0.12	-0.09	-0.01	0.00	0.30	0.06	0.11	-0.27	0.11		
	p	0.21	0.36	0.96	0.98	0.00	0.51	0.25	0.00	0.26		
10. Do you think that you would pay less for the same goods and services outside Slovakia?	r	0.05	-0.02	-0.06	-0.10	0.04	-0.05	0.32	0.07	-0.07	0.04	
	p	0.60	0.83	0.51	0.30	0.65	0.63	0.00	0.50	0.46	0.67	
11. Do you think the government of Robert Fico will bring the reduction of primary food next year (2015)?	r	-0.22	-0.10	0.26	-0.55	0.42	-0.09	0.01	-0.14	0.18	0.18	0.16
	p	0.02	0.29	0.01	0.00	0.00	0.34	0.95	0.16	0.07	0.07	0.10

Source: own elaboration

Table 3 shows us three statistically significant relationships between age and questions related to price perception. Older respondents agreed less with more positive price developments in the aftermath of the crisis ($r=-0.30$), they have an experience with price reduction only to a lesser extent ($r=-0.25$) and they less often have the feeling that the government of Robert Fico will bring price reduction of primary food next year ($r=-0.22$).

Answers to a question „In your opinion – Has global financial crisis affected prices and price policies of goods and services in the Slovak Republic?“ were statistically significantly related to two other questions. Respondents with a positive attitude increasingly expressed their agreement with the

statement of more reasonable prices during Iveta Radicova government ($r = 0.20$), while they less positive perceived price developments in the aftermath of the crisis ($r = -0.28$).

Price perception in the aftermath main crisis symptoms was related statistically significantly with three other questions. Respondents with more positive perception of development in the aftermath of main crises symptoms experienced more changes in price reduction after the early elections in March 2012 ($r = 0.36$), they expect more adequate quality for the cost and increasingly expect that the government of Robert Fico bring price reduction of primary food prices in 2013.

Opposite relationships can be found in the following question (Were prices of goods and services during the government of Iveta Radicova for you more acceptable than during the government of Robert Fico?), with the higher rates of agreement, while respondents agreed less with the questions: "Have you experienced any change in the reduction of prices of goods and services after the early parliamentary elections in March 2012?" ($r = -0.24$), "Do you think that you receive reasonable quality for an adequate price?" ($r = -0.24$), and "Do you think the government of Robert Fico will bring the reduction of primary food next year (2015)?" ($r = -0.55$).

Price reduction after early elections in 2012 except two already mentioned was associated significantly with two questions. Higher level of acceptance of this entry was associated with a higher willingness to pay higher prices for Slovak product ($r = 0.30$), as well as higher expected price reduction of primary food in 2015 ($r = 0.42$).

In other statistically significant relationships there was increased willingness to buy bread even with price increase 10% associated with intense feeling of better purchase outside Slovakia ($r = 0.32$) and a higher preference for price over quality with less willingness to pay more for Slovak product ($r = -0.27$).

Conclusion

The current situation in the retail sector in the Slovak Republic is influenced by European and worldwide globalization processes that bring a lot of problems and situations whose solutions require a responsible attitude, as well as solutions in the interests of both consumers and companies. Therefore, it is necessary to constantly examine Slovak consumer buying behavior and on this basis to try to adapt to their needs and wishes. Slovakia produces enough quality products, i.e. increasingly promote Slovak products before foreign products and fix them such prices, which would be more attractive and more acceptable for Slovak consumers and thus encourage them to purchase them and to prioritize Slovak products against foreign products. When establishing pricing policy in retail trade it is necessary to take into account the geographical location of branches of retail chains, this mainly applies to retail chains operating in towns that are located near the border with another country (i.e. Poland, Ukraine, Hungary and the Czech Republic). At the present time increasingly more attention is paid to keep customers that in the highly competitive environment mean strengthening security and stability for each retail. Slovak consumer behavior is developing more and more by the impact of globalization. The evidence is above processed results that show the factors affecting buying behavior and buying decision of Slovak consumers. Growth in living standards of citizens, moving residents to cities, fall of natural consumption, the global financial crisis, various political changes in the Slovak republic and better mobility of citizens, these and many other factors have resulted in a change in buying behavior of a Slovak consumer.

Aknoledgment

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SEASONALITY IN STYLE RETURNS

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Abstract:

In this paper, I examine seasonality in returns to style portfolios, which serve as important benchmarks for asset allocation, and investigate its implications for investment. In doing so, I consider monthly returns on the style portfolios classified by the six size/book-to-market sorting and the six size/prior-return sorting over the sample period 1927 - 2006. The key findings are: first, as is well known, small-cap oriented portfolios are subject to the January effect, but also to the (negative) September and October effects. Second, cross-style return dispersion exhibits a seasonal pattern of its own (it is largest in January and smallest in August), suggesting possibly profitable trading strategies. Indeed, my seasonal strategies yield significant profits, as high as about 18.7 % per annum. Finally, this profit can be mostly explained by the seasonal autocorrelation in style returns.

Keywords: style portfolio, seasonal trading strategies, size effect, value effect, momentum effect.

JEL Classification: G02, G11, G15

1. Introduction

Investors group assets into different classes based on some similarity among them. For example, stocks can be categorized into broad classes such as small versus large stocks, value versus growth stocks, prior winners versus losers, or categorized by different industry sectors. The asset classes are called “styles” and the process allocating money among styles is called “style investing” (See, Barberis and Shleifer (2003)). Sometimes investors must consider styles because portfolio allocation among different styles is required by law. For instance, a pension sponsor must follow systematic rules of asset allocation imposed by the Employee Retirement Income Security Act. Even when it is not required, as Barberis and Shleifer (2003) argue, it would be human nature to classify objects with the benefit of simplifying problems of choice. Recently, Peng and Xiong (2006) show that investors tend to process more market and sector-wide information than firm-specific information, because attention is a scarce resource and an enormous amount of new information comes into the market at lightning speeds.

Much of academic literature has shown that certain styles outperform other styles in the long run.¹ In particular, small-cap (value) stocks outperformed large-cap (growth) stocks historically. However, the relative performance between these styles is not stable over time. Chan, Karceski, and Lakonishok (2000), for example, show that large-cap (growth) stocks outperform small-cap (value) stocks in 13 years (8 years) out of their 29 year sample period from 1970 to 1998. Style based strategy can produce long periods of poor performance. Thus, style rotation strategy, switching from one style to another, could generate additional returns when I can forecast the relative performance between styles.

In this study, I examine seasonal patterns in the cross-section of expected returns on twelve style portfolios. Instead of focusing on the returns on style index or mutual funds, I focus on the returns on the style portfolios classified by six size/book-to-market sorting and six size/prior-return sorting. I do so for three reasons. First, I need a substantially long sample period to test the seasonal pattern. While the style indexes used in the previous studies, such as Wilshire Style Index, are available only from the mid of 1970’s, I investigate the style returns over 80 years. Mutual fund style classification also has the same problem of the short available sample period. Second, my seasonal strategy requires monthly portfolio rebalancing so it is critical to make the style of the portfolio to be persistent while mutual funds could deviate from their stated style objects. Third, the characteristics of those twelve style portfolios are comparable to the commonly used Morningstar style classification and those portfolios are likely to have seasonal patterns as suggested by previous studies.

¹ See, for example, Banz (1981), Fama and French (1992), Jegadeesh and Titman (1993), La Porta (1996), Daniel and Titman (1997), Barber and Lyon (1997), and Carhart (1997).

I find that style returns exhibit substantial variations across calendar months. For example, over the sample period of January 1927 to December 2006, in January the mean return of the Small/Down portfolio is 6.2 percent and that of the Big/Up portfolio is only 1.3 percent. However, in March the mean return of the Small/Down portfolio is 0.03 percent and that of the Big/Up portfolio is 1.26 percent. My finding is consistent with previous literature on seasonality in stock returns which suggests the outperformance of some style against another in a specific calendar month. For example, Keim (1983), Reinganum (1983), and Roll (1983) find that small-cap stocks outperform large-cap stocks in January. Branch (1977) and Dyl (1977) suggest that tax-loss selling creates a downward price pressure on loser stocks in December and a price rebound in January. Lakonishok, Shleifer, Thaler, and Vishny (1991) find that pension funds dump prior loser stocks at the end of every quarter. However, these studies explored only the turn-of-the-year period or the end of each quarter.² My finding shows that the seasonal pattern of the style returns is not limited to January or the end of each quarter. Small stocks perform poorly in October and the Big/Value portfolios beat the market in April and July. Surprisingly, my seasonality test of style portfolio returns shows that all twelve style portfolios perform poorly in September. This is the most prevalent seasonal regularity in the stock market.

I also propose a style rotation strategy using the seasonal pattern among style returns. I take the long positions of styles with good performance in a specific calendar month and the short positions of styles that have done poorly in the same calendar month. For example, I rank the twelve style portfolios according to their average returns during the previous five Januaries to construct a zero investment portfolio for the next January. I repeat this for each of twelve calendar months. My strategy is different from the style rotation strategies that have been employed by the previous literature.³ The focus of this study is not to explain or predict the relative style performance but to utilize the seasonal patterns in the style returns that I observe. The strategy yields profits across all calendar months. Specifically, the mean profit in January alone is 4.5 percent. Overall, my seasonal strategy yields economically and statistically significant profits of 18.7 percent per year.

The possible source of the profit from my strategy is seasonal autocorrelation in style returns (predictability component) or cross-sectional variation (dispersion component) in mean style returns (see, Lo and MacKinlay (1990) and Conrad and Kaul (1998)). The decomposition of the profit shows that the main source of the profit is the predictability component. The predictability component explains more than 90 percent of the profit in every calendar month. Therefore, the seasonal patterns among style returns have significant power to forecast future relative style performance, which would be inconsistent with the efficient market hypothesis.

The rest of this paper proceeds as follows. Section 2 describes the style portfolio construction and seasonal patterns in their returns. Section 3 reports the seasonality test results of style portfolio returns, while section 4 describes the style rotation strategy to exploit this seasonality. Finally, section 5 concludes.

2. Style portfolio

To study the seasonality in style returns, I use monthly returns on six size/book-to-market sorted portfolios and six size/prior-return sorted portfolios⁴ over the sample period of January 1927 – December 2006. At the end of each June, firms are sorted independently along size and book-to-market ratios to construct Small, Big, Value, Neutral, and Growth portfolios. The median NYSE market equity is the size breakpoint and the 30th and 70th NYSE book-to-market percentiles are the book-to-market breakpoints. Thus the first six style portfolios used in this study are Small/Value, Small/Neutral, Small/Growth, Big/Value, Big/Neutral, and Big/Growth.

² To my knowledge, the only academic literature to explore the general seasonal variation across stock returns is Heston and Sadka (2008). They find that stocks tend to have relatively high (or low) returns every year in the same calendar month.

³ Barberis and Shleifer (2003) proposed the style-level momentum and value strategies. Levis and Liodakis (1999), Asness, Friedman, Krail, and Liew (2000), Lucas, Dijk, and Kloek (2002), and Wang (2005) proposed models to predict relative style performance using macro-economic variables.

⁴ I thank Kenneth French for making the data available. The data on the style portfolios are obtained from http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

In addition, at the end of each month t , firms are sorted independently along size at month $t-1$, and prior returns over month $t-12$ through $t-2$ to construct Small, Big, Up, Lateral, and Down portfolios. The monthly size breakpoint is the median NYSE market equity and the monthly prior return breakpoints are 30th and 70th NYSE percentiles. Thus, the next six style portfolios used in this study are Small/Up, Small/Lateral, Small/Down, Big/Up, Big/Lateral, and Big/Down.

I compute the mean return by calendar month for each of the twelve style portfolios during my sample period January 1927 – December 2006. The results are presented in Table 1 with the t-statistics from the paired t-test between each style portfolio return and the CRSP value weighted market return in parenthesis. Table 1 shows how the relative returns among contrasting style portfolios (i.e., Small vs. Big, Value vs. Growth, and Up vs. Down) vary across calendar months. Controlling for the size, the Value portfolios have a higher return than the Growth portfolios in the first half of the year but the situation is reversed with the latter having a higher return than the former. In the case of Up vs. Down portfolios, the Small/Up portfolio has a higher return than the Small/Down portfolio in each month except January and the Big/Up portfolio has a higher return than the Big/Down portfolio in eight out of twelve months.

It is noteworthy that the substantial value premium and momentum premium and these style premiums are much stronger between Small portfolios than Big portfolios. The value premium between Small portfolios (Small/Value – Small/Growth) is 6.05% per year but the value premium between Big portfolios (Big/Value – Big/Growth) is only 3.93% per year. The difference of the momentum premium between the Small and the Big portfolios is much bigger than that of the value premium. The momentum premium between Small portfolios (Small/Up – Small/Down) is 11.04% per year but the momentum premium between Big portfolios (Big/Up – Big/Down) is only 6.92% per year.

The size premium is also prevalent across all book-to-market style portfolios and momentum style portfolios. The cumulative size premium between Up portfolios (Small/Up – Big/Up) is 5.63% per year and the Small/Up portfolio has a higher return than Big/Up portfolio in each month, except June and October. The Small/Down portfolio outperforms the Big/Down portfolio in only four months but the cumulative size premium between Down portfolios (Small/Down – Big/Down) is still positive, 1.50%. The cumulative size premiums between Value portfolios and between Growth portfolios are also positive.

3. Seasonality test of style portfolio returns

I now set a framework to test seasonality in style returns. To formally test the null hypothesis that the style returns in each calendar month are not different from the unconditional mean monthly return, I use the following time series regression model for the return () on the i th style portfolio in month t :

$$R_{it} = \alpha_i + \beta_{i1}M_{1t} + \beta_{i2}M_{2t} + \dots + \beta_{i12}M_{12t} + e_{it} \quad (1)$$

where α_i is the unconditional monthly mean return, M_{jt} is the calendar month dummy variable that is to equal one if the month t is the j th month of the year and zero otherwise, and e_{it} is the error term. I impose the restriction that the sum of the coefficients of the calendar month dummy variable is to be zero for each style portfolio i (i.e. $\sum_{j=1}^{12} \beta_{ij} = 0$). Under this restriction, the OLS estimate of the regression intercept, $\hat{\alpha}_i$, now becomes the cross-month average return whereas the estimated coefficient for each month dummy, $\hat{\beta}_{ij}$, indicates how the mean return for the month differs from the cross-month average return. Note that this paper is concerned with establishing overall seasonal patterns in each style portfolio, rather than narrowly focusing on the January effect.

Table 1 - Style portfolio returns by month

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Small/Growth	3,630 *** (4.88)	0,879 (0.59)	0,279 (-0.71)	0,669 (-1.25)	1,056 (0.80)	0,874 (-0.51)	0,916 (-1.33)	1,347 (-0.03)	-0,486 (0.96)	-0,485 ** (-2.04)	1,965 (0.80)	1,752 (-0.05)
Small/Neutral	4,163 *** (6.14)	1,412 *** (2.77)	0,811 (0.87)	1,471 (1.01)	0,826 (0.51)	1,311 (0.74)	1,425 (-0.14)	1,544 (0.52)	-0,317 (1.51)	-0,195 * (-1.81)	1,832 (0.68)	1,696 (-0.24)
Small/Value	5,955 *** (7.51)	1,760 *** (3.15)	1,063 (1.26)	1,587 (1.10)	1,152 (0.89)	1,091 (-0.01)	2,255 (1.54)	1,870 (0.74)	-0,696 (0.28)	-0,628 *** (-2.69)	1,682 (0.11)	1,356 (-0.97)
Big/Growth	1,047 *** (-5.07)	0,480 (-1.15)	0,666 (0.84)	1,051 (-0.58)	0,683 (1.61)	1,135 (0.33)	1,376 (-0.59)	1,260 (-0.80)	-0,831 (0.26)	0,506 (1.24)	1,853 * (1.83)	1,731 (-0.30)
Big/Neutral	1,863 (0.49)	0,677 (0.29)	0,596 (0.17)	1,381 (1.06)	0,363 (-0.97)	1,090 (-0.03)	1,708 (0.97)	1,554 (0.85)	-0,806 (0.34)	0,529 (1.01)	1,393 (-1.21)	1,777 (0.04)
Big/Value	3,452 *** (4.35)	0,736 (0.33)	0,518 (-0.16)	1,758 * (1.84)	0,607 (0.25)	1,341 (0.70)	2,409 * (1.69)	1,721 (0.91)	-0,938 (-0.19)	0,133 (-0.60)	1,410 (-0.65)	1,739 (-0.10)
Small/Down	6,212 *** (6.51)	0,655 (0.10)	-0,031 (-1.64)	0,673 (-0.96)	0,602 (0.11)	0,196 * (-1.94)	1,347 (-0.21)	1,509 (0.19)	-1,442 (-0.83)	-0,987 *** (-3.02)	1,135 (-1.08)	-0,149 *** (-3.93)
Small/Lateral	4,632 *** (6.48)	1,345 *** (2.91)	0,574 (0.03)	1,049 (-0.30)	1,035 (0.73)	1,148 (0.17)	1,589 (0.36)	1,596 (0.51)	-0,423 (1.16)	-0,191 * (-1.98)	1,756 (0.41)	1,532 (-0.68)
Small/Up	4,241 *** (5.61)	1,888 *** (3.13)	1,371 ** (2.14)	1,726 (1.58)	1,346 (1.29)	1,613 (1.27)	1,509 (0.11)	1,781 (1.25)	0,024 *** (2.77)	0,076 (-0.70)	2,241 * (1.68)	2,948 *** (3.46)
Big/Down	2,501 * (1.88)	-0,020 * (-1.89)	0,059 (-1.63)	1,118 (-0.05)	0,252 (-0.72)	0,865 (-0.56)	1,678 (0.37)	1,832 (0.86)	-1,432 (-1.45)	-0,009 (-0.98)	1,127 (-1.62)	0,250 *** (-5.09)
Big/Lateral	1,550 * (-1.90)	0,498 (-0.68)	0,234 ** (-2.17)	1,029 (-0.75)	0,504 (-0.11)	0,876 (-1.08)	1,734 * (1.68)	1,518 (1.02)	-0,690 (1.09)	0,452 (0.70)	1,596 (-0.28)	1,413 * (-1.86)
Big/Up	1,328 * (-1.95)	1,039 ** (2.27)	1,258 *** (4.10)	1,485 (1.42)	0,771 (1.59)	1,618 ** (2.55)	1,466 (-0.01)	1,302 (-0.23)	-0,605 (1.20)	0,682 (1.64)	2,148 * (1.87)	2,647 *** (4.22)
VWMkt	1,783	0,617	0,565	1,136	0,518	1,095	1,469	1,362	-0,863	0,341	1,638	1,770

Note: This table reports the mean returns of the six size/book-to-market portfolios and the six size/prior-return portfolios by month. At the end of each June, firms are sorted independently along size and book-to-market ratio to construct Small, Big, Value, Neutral, and Growth portfolios. At the end of each month, firms are sorted independently along size and prior (2-12) return to construct Small, Big, Up, Lateral, and Down portfolios. The median NYSE market equity is the size breakpoint; the 30th and 70th NYSE book-to-market percentiles are the book-to-market breakpoints; and the monthly prior (2-12) return breakpoints are 30th and 70th NYSE percentiles. Portfolio percentage returns are calculated by month. The last row (VWMkt) reports the mean CRSP value weighted return by month. The t-statistics from the paired t-test between each style portfolio return and the CRSP value weighted return are reported in the parenthesis. The analysis uses NYSE, AMEX, and NASDAQ-listed stocks for the period January 1927 through December 2006. ***, **, and * denote the significance level at 1%, 5%, and 10%, respectively.

Table 2 provides the seasonality test results. First, the intercept shows that the Small/Up is the best performing style fund and the Big/Down is the worst performing style fund in general. Also, the size premium, value premium, and the momentum premium are clearly presented. The mean monthly Small/Growth (Small/Value, Small/Down, Small/Up) portfolio return is 0.12% (0.30%, 0.13%, 0.47%) greater than the mean monthly Big/Growth (Big/Value, Big/Down, Big/Up) portfolio return. The mean monthly Small/Value (Big/Value) portfolio return is 0.50% (0.33%) greater than the mean monthly Small/Growth (Big/Growth) portfolio return. The mean monthly Small/Up (Big/Up) portfolio return is 0.92% (0.58%) greater than the mean monthly Small/Down (Big/Down) portfolio return.

As can be seen from the table, the January dummy variable is significantly positive for most of the twelve style portfolios at the 5-percent level or better except Big/Growth, Big/Neutral, Big/Lateral, and Big/Up portfolios. Specifically, the January dummy is significant for all Small portfolios (Small/Growth, Small/Neutral, Small/Value, Small/Down, Small/Lateral, and Small/Up) at the 1-percent level confirming that the January effect is driven by the small firms. However, the January dummies for the Big/Value and Big/Down portfolio are also significantly positive suggesting that the January effect is also related with investor sentiment and tax-loss selling.

Overall, the test results presented in Table 2 indicate that small-cap oriented portfolios are significantly subject to the January, September, and October effects, whereas large-cap oriented portfolios are mostly subject to the September effect. Clearly, the September effect is the most pervasive, affecting every category of style portfolios. Although practitioners are aware of this September effect, it has received little attention from academic researchers. This is in sharp contrast to the January effect that spawned a long strand of papers offering alternative documentations and explanations.

4. Seasonality based style rotation strategies

The seasonality of style portfolios presented in Table 1 and 2 motivates me to try new style rotation strategies based on historical returns. I form the following relative strength strategy to exploit the effect of lagged returns at distinct annual intervals. Unlike other style momentum strategies that use the contiguous past performance information to form portfolio weights, my portfolio weights depend on the relative performance of the style portfolio during the same calendar month in previous years. More specifically, consider buying or selling style portfolios at the beginning of each month t based on their performance in the same calendar month j over the previous k year(s). For example, at the beginning of January 2005, the portfolios are constructed based on the performance in five Januaries from year 2000 to 2004 considering k of 5. The performance of a style portfolio is determined relative to the average performance of the twelve style portfolios in this study. Finally, let $w_{ijt}(k)$ denote the fraction of the trading strategy portfolio devoted to a style portfolio i over a calendar month j , that is

$$w_{ijt}(k) = (\mu_{ijt}(k) - \bar{\mu}_{jt}(k)) / 12 \tag{2}$$

where $\mu_{ijt}(k)$ is the average calendar month j return of the style portfolio i over the past k years and $\bar{\mu}_{jt}(k)$ is the mean of $\mu_{ijt}(k)$'s of the twelve style portfolios. The holding period is one month while I use four different portfolio formation periods k years, i.e., 1, 5, 10, and 20 to see whether relying on more years in ranking would generate additional returns.

Table 2 – Seasonality test of style portfolio returns

	Small/Growth	Small/Neutral	Small/Value	Big/Growth	Big/Neutral	Big/Value	Small/Down	Small/Lateral	Small/Up	Big/Down	Big/Lateral	Big/Up
Intercept	1.033 *** (4.09)	1.332 *** (5.82)	1.537 *** (5.77)	0.913 *** (5.24)	1.01 *** (5.39)	1.24 *** (5.30)	0.81 *** (2.75)	1.304 *** (5.51)	1.73 *** (7.30)	0.685 *** (2.80)	0.893 *** (4.90)	1.261 *** (7.01)
Jan	2.597 *** (3.10)	2.831 *** (3.73)	4.418 *** (5.00)	0.134 (0.23)	0.853 (1.37)	2.212 *** (2.85)	5.402 *** (5.53)	3.329 *** (4.24)	2.511 *** (3.19)	1.816 ** (2.24)	0.657 (1.09)	0.067 (0.11)
Feb	-0.154 (-0.18)	0.08 (0.11)	0.223 (0.25)	-0.433 (-0.75)	-0.334 (-0.54)	-0.505 (-0.65)	-0.155 (-0.16)	0.042 (0.05)	0.158 (0.20)	-0.705 (-0.87)	-0.395 (-0.65)	-0.223 (-0.37)
Mar	-0.754 (-0.90)	-0.52 (-0.69)	-0.475 (-0.54)	-0.247 (-0.43)	-0.414 (-0.67)	-0.723 (-0.93)	-0.84 (-0.86)	-0.73 (-0.93)	-0.36 (-0.46)	-0.626 (-0.77)	-0.659 (-1.09)	-0.003 (-0.01)
Apr	-0.364 (-0.43)	0.14 (0.18)	0.05 (0.06)	0.138 (0.24)	0.371 (0.60)	0.517 (0.67)	-0.137 (-0.14)	-0.255 (-0.32)	-0.004 (-0.01)	0.433 (0.53)	0.136 (0.23)	0.223 (0.37)
May	0.023 (0.03)	-0.505 (-0.67)	-0.385 (-0.44)	-0.23 (-0.40)	-0.648 (-1.04)	-0.634 (-0.82)	-0.208 (-0.21)	-0.268 (-0.34)	-0.385 (-0.49)	-0.433 (-0.53)	-0.389 (-0.64)	-0.491 (-0.82)
Jun	-0.159 (-0.19)	-0.021 (-0.03)	-0.446 (-0.50)	0.222 (0.38)	0.079 (0.13)	0.101 (0.13)	-0.614 (-0.63)	-0.155 (-0.20)	-0.118 (-0.15)	0.18 (0.22)	-0.017 (-0.03)	0.356 (0.60)
Jul	-0.117 (-0.14)	0.093 (0.12)	0.718 (0.81)	0.463 (0.80)	0.698 (1.12)	1.169 (1.51)	0.537 (0.55)	0.285 (0.36)	-0.221 (-0.28)	0.993 (1.22)	0.841 (1.39)	0.205 (0.34)
Aug	0.314 (0.37)	0.212 (0.28)	0.333 (0.38)	0.347 (0.60)	0.543 (0.87)	0.48 (0.62)	0.699 (0.72)	0.292 (0.37)	0.051 (0.06)	1.147 (1.41)	0.625 (1.03)	0.04 (0.07)
Sep	-1.519 * (-1.81)	-1.648 ** (-2.17)	-2.233 ** (-2.53)	-1.744 *** (-3.02)	-1.816 *** (-2.92)	-2.179 *** (-2.81)	-2.252 ** (-2.31)	-1.726 ** (-2.20)	-1.707 ** (-2.17)	-2.117 *** (-2.61)	-1.583 *** (-2.62)	-1.867 *** (-3.13)
Oct	-1.518 * (-1.81)	-1.527 ** (-2.01)	-2.165 ** (-2.45)	-0.407 (-0.70)	-0.482 (-0.78)	-1.108 (-1.43)	-1.797 * (-1.84)	-1.494 * (-1.90)	-1.655 ** (-2.10)	-0.694 (-0.85)	-0.441 (-0.73)	-0.58 (-0.97)
Nov	0.932 (1.11)	0.501 (0.66)	0.145 (0.16)	0.94 (1.63)	0.383 (0.62)	0.169 (0.22)	0.325 (0.33)	0.452 (0.58)	0.511 (0.65)	0.442 (0.54)	0.703 (1.16)	0.887 (1.49)
Dec	0.719 (0.86)	0.365 (0.48)	-0.181 (-0.21)	0.817 (1.41)	0.767 (1.23)	0.499 (0.64)	-0.959 (-0.98)	0.228 (0.29)	1.217 (1.55)	-0.435 (-0.54)	0.52 (0.86)	1.385 ** (2.32)
N	960	960	960	960	960	960	960	960	960	960	960	960
adj-R ²	0.007	0.0117	0.0252	0.0042	0.0049	0.0109	0.0283	0.0153	0.0102	0.0062	0.0036	0.0073
F value	1.61 *	2.03 **	3.25 ***	1.37	1.43	1.96 **	3.53 ***	2.35 ***	1.9 **	1.55	1.31	1.65 *

Note: This table reports the OLS regression results of the six size/book-to-market portfolios and the six size/prior-return portfolios. At the end of each June, firms are sorted independently along size and book-to-market ratio to construct Small, Big, Value, Neutral, and Growth portfolios. At the end of each month, firms are sorted independently along size and prior (2-12) return to construct Small, Big, Up, Lateral, and Down portfolios. The median NYSE market equity is the size breakpoint; the 30th and 70th NYSE book-to-market percentiles are the book-to-market breakpoints; and the monthly prior (2-12) return breakpoints are 30th and 70th NYSE percentiles. I impose the restrictions that for each model with a different portfolio the sum of coefficients of the independent variables must be zero so that the intercept becomes the overall mean return over the entire sample period. The t-statistics are reported in the parenthesis. The analysis uses NYSE, AMEX, and NASDAQ-listed stocks for the period January 1927 through December 2006. ***, **, and * denote the significance level at 1%, 5%, and 10%, respectively.

Table 3 – Seasonality test of style portfolio returns

Strategy	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan - Dec
Year 1	3.88 (0.00)	0.66 (0.21)	1.47 (0.01)	1.30 (0.02)	0.88 (0.13)	0.68 (0.21)	0.64 (0.29)	0.82 (0.26)	-0.18 (0.76)	0.56 (0.46)	2.98 (0.00)	2.46 (0.00)	16.16 (0.00)
Year 1 - 5	4.15 (0.00)	0.74 (0.23)	1.65 (0.00)	1.51 (0.00)	0.75 (0.19)	0.74 (0.27)	0.97 (0.12)	0.80 (0.19)	-0.05 (0.94)	0.72 (0.27)	2.63 (0.00)	2.58 (0.00)	17.19 (0.00)
Year 1 - 10	4.43 (0.00)	0.93 (0.12)	1.48 (0.00)	1.48 (0.00)	0.81 (0.20)	0.66 (0.27)	1.13 (0.07)	0.84 (0.11)	-0.01 (0.98)	0.88 (0.07)	2.60 (0.00)	2.49 (0.00)	17.72 (0.00)
Year 1 - 20	4.52 (0.00)	1.35 (0.01)	1.74 (0.00)	1.45 (0.00)	0.79 (0.20)	0.81 (0.16)	1.09 (0.11)	0.77 (0.10)	0.11 (0.72)	0.90 (0.04)	2.47 (0.00)	2.69 (0.00)	18.68 (0.00)

Note: I calculate twelve style portfolio percentage returns by month and rank them according to various categories based on past performance of the calendar month indicated. For example, the trading strategy that is formed based on past January returns during year 1 through 5 ranks the twelve style portfolio returns according to their average returns during the previous five Januaries. The strategy has the weight of $(\mu_i - \bar{\mu}_i) / 12$, where μ_i is the average return during the five Januaries of the portfolio i and $\bar{\mu}_i$ is the mean of the average portfolio returns. The mean returns from the strategy are reported separately for every calendar month during the period January 1947 through December 2006. The last column reports the annual average cumulative return from the strategy. The corresponding Newey-West p -values are also reported in parenthesis.

Table 3 shows the average profit for trading strategies separately implemented for each calendar month during the period January 1947 through December 2006.⁵ The last column reports the annual average cumulative return from the strategy. The corresponding Newey-West p -values are also reported in parentheses. I note several interesting features of the profitability of the trading strategy. First, the strategy yields profits across all calendar months other than September. When I use the previous 20 years historical returns with annual lags to form the portfolio, the strategy yields profits in every calendar month and the returns are significantly positive at the 5-percent level in 7 out of 12 calendar months. This strategy yields the largest profit in January (4.52%), followed by December (2.69%), November (2.47%), and March (1.74%) and these are all statistically and economically significant. Therefore, my strategy is quite successful not only in the turn-of-year period as the previous literature on seasonality would suggest, but also in nearly every calendar month.

Second, unlike previous studies about the performance of the return-based strategies⁶, my strategy yields similar profits over short-, intermediate-, or long-term horizons. The cumulative profit of the strategy per year is 16.2 percent when I use only previous one year's calendar month return and is 18.7 percent when I use twenty years of historical returns with annual lags. The increase in the profit from using the longer historical returns to form the portfolio is marginal. In May and November, the strategy using previous one year's calendar month return yields the best performance. In April, the strategy using five years of historical returns with annual lags yields the best performance. In July and August, the strategy using ten years of historical returns yields the best performance.

The strategy using the weight in equation (2) enables me to decompose the expected profit into two distinct sources: time-series predictability in style portfolio returns and profits due to cross-sectional dispersion in mean returns of the portfolios.⁷ Suppose $\pi_{jt}(k)$ is the profit of the strategy over the month t using the previous k year's return with annual lags in calendar month j

⁵ To compare the returns of strategies based on previous one year's performance to those based on previous 20 year's performance, I use the sample starting from the year 1947 instead of 1928.

⁶ See, for example, DeBondt and Thaler (1985, 1987), Jegadeesh (1991), and Jegadeesh and Titman (1993, 2001). They show evidence of short-term reversal, intermediate-term momentum, and long-term reversal.

⁷ Lo and MacKinlay (1990) and Conrad and Kaul (1998) decomposed the momentum profits in a similar way.

with the weight $w_{ijt}(k)$ and R_{it} is the return on the style portfolio i over the month t , then the expectation of $\pi_{jt}(k)$ can be decomposed as follows:

$$\begin{aligned}
 E(\pi_{jt}(k)) &= \sum_{i=1}^{12} E(w_{ijt} R_{it}) \\
 &= \frac{1}{12} \sum_{i=1}^{12} E(\mu_{ijt} R_{it}) - E(\bar{\mu}_{jt}) \frac{1}{12} \sum_{i=1}^{12} R_{it} \\
 &= \frac{1}{12} \sum_{i=1}^{12} \{Cov(\mu_{ijt}, R_{it}) + \mu_{ij}^2\} - \frac{1}{12} \sum_{i=1}^{12} \{Cov(\bar{\mu}_{jt}, \frac{1}{12} \sum_{i=1}^{12} R_{it}) + \mu_{mj}^2\} \quad (3)
 \end{aligned}$$

assuming $E(\mu_{ijt}) = E(R_{it}) = \mu_{ij}$ and $E(\bar{\mu}_{jt}) = E(\frac{1}{12} \sum_{i=1}^{12} R_{it}) = \mu_{mj}$. Finally, the equation (3)

becomes

$$\begin{aligned}
 E(\pi_{jt}(k)) &= -Cov(\bar{\mu}_{jt}, \frac{1}{12} \sum_{i=1}^{12} R_{it}) + \frac{1}{12} \sum_{i=1}^{12} Cov(\mu_{ijt}, R_{it}) + (\frac{1}{12} \sum_{i=1}^{12} \mu_{ij}^2 - \mu_{mj}^2) \\
 &= P_j(k) + \sigma^2(\mu_j(k)) \quad (4)
 \end{aligned}$$

where $P_j(k)$ is the predictability index and $\sigma^2(\mu_j(k))$ is the dispersion index.

As I observed in Table 1, the dispersion among style portfolio returns varies substantially across the calendar month. For example, in January the difference between the best performing style portfolio return and the worst performing style portfolio return is 5.2% but the difference in August is merely 0.6%. Therefore, by decomposing the strategy profit as discussed above, I can clearly show whether the source of the profit is the information contained in past returns of the style portfolios or the cross-sectional dispersion that would arise even if the style portfolio returns are unpredictable.

Table 4 –The Decomposition of the seasonal strategy returns with the style portfolios

Strategy	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Year	Predictability	3.80	0.60	1.43	1.26	0.85	0.64	0.60	0.79	-0.22	0.51	2.93	2.41
1	(% of Profit)	(97.8%)	(90.8%)	(97.4%)	(96.8%)	(96.0%)	(94.0%)	(93.7%)	(96.5%)	(119.6%)	(90.5%)	(98.3%)	(98.2%)
	Dispersion	0.09	0.06	0.04	0.04	0.04	0.04	0.03	0.04	0.05	0.05	0.05	0.04
	(% of Profit)	(2.2%)	(9.2%)	(2.6%)	(3.2%)	(4.0%)	(6.0%)	(6.3%)	(3.5%)	(-19.6%)	(9.5%)	(1.7%)	(1.8%)
Year	Predictability	4.11	0.73	1.65	1.50	0.74	0.73	0.96	0.79	-0.06	0.70	2.62	2.57
1 - 5	(% of Profit)	(99.1%)	(98.3%)	(99.6%)	(99.3%)	(99.1%)	(98.2%)	(99.0%)	(99.2%)	(117.7%)	(98.2%)	(99.5%)	(99.5%)
	Dispersion	0.04	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
	(% of Profit)	(0.9%)	(1.7%)	(0.4%)	(0.7%)	(0.9%)	(1.8%)	(1.0%)	(0.8%)	(-17.7%)	(1.8%)	(0.5%)	(0.5%)
Year	Predictability	4.39	0.92	1.48	1.47	0.80	0.66	1.12	0.84	-0.02	0.87	2.60	2.49
1 - 10	(% of Profit)	(99.3%)	(99.4%)	(99.7%)	(99.6%)	(99.6%)	(99.0%)	(99.6%)	(99.6%)	(146.9%)	(99.1%)	(99.7%)	(99.7%)
	Dispersion	0.03	0.01	0.00	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.01	0.01
	(% of Profit)	(0.7%)	(0.6%)	(0.3%)	(0.4%)	(0.4%)	(1.0%)	(0.5%)	(0.4%)	(-46.9%)	(0.9%)	(0.3%)	(0.3%)
Year	Predictability	4.49	1.35	1.74	1.44	0.79	0.80	1.08	0.76	0.11	0.89	2.47	2.69
1 - 20	(% of Profit)	(99.2%)	(99.7%)	(99.9%)	(99.7%)	(99.7%)	(99.5%)	(99.6%)	(99.7%)	(97.5%)	(99.3%)	(99.8%)	(99.8%)
	Dispersion	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
	(% of Profit)	(0.8%)	(0.3%)	(0.1%)	(0.3%)	(0.3%)	(0.5%)	(0.4%)	(0.3%)	(2.5%)	(0.7%)	(0.2%)	(0.2%)

Note: This table reports the decomposition of the seasonal returns of weighted relative strength strategies with the style portfolios reported in Table 4. The decomposition is given by the equation (4). The proportion of each part relative to the mean return is reported in parenthesis.

Table 4 shows the decomposition of the seasonal returns of the strategy reported in Table 3, the proportion of each part relative to the mean return for all calendar months, and the portfolio formation periods. The surprising result is that the main source of the profit is the predictability component for each calendar month and portfolio formation period. There are only four cases with the dispersion component explaining more than 5 percent of the profit and they are all the cases when I use one year's previous calendar month return. From this I argue that the historical

performance of the style portfolio in each month has strong predictable power for the future style portfolio return and I can implement this for creating profits.

Conclusion

This paper examines seasonal patterns in style returns and develops a style rotation strategy to exploit such patterns. Style returns exhibit substantial variations across calendar months. Some of the variations could be explained by the previously examined hypotheses such as tax-loss selling, window dressing or turn-of-the-year effect. I find that the seasonal pattern of the style returns is not limited to January or December. Small stocks perform poorly in October and the Big/Value portfolios beat the market in April and July.

Based on the seasonality of style portfolios, I formed the relative strength strategy to exploit the effect of lagged returns at distinct annual intervals. This strategy yields the largest profit in January (4.52%), followed by December (2.69%), November (2.47%), and March (1.74%) and these are all statistically and economically significant. Therefore, my strategy is quite successful not only in the turn-of-the-year period as the previous literature on seasonality would suggest, but also in nearly every calendar month. In addition, by decomposing the seasonal returns of the strategy, I find that the main source of the profit is the predictability component for each calendar month and portfolio formation period.

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APPLYING CORRELATION MATRIX TO IDENTIFY THE MAIN FACTORS INFLUENCING ENTERPRISE PERFORMANCE AND THEIR UTILIZATION TO CREATE CREDITWORTHY MODEL

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Abstract:

Business performance measurement has become an important phenomenon of today. To measure the performance the variety of methods are used. In addition to the traditional methods, based on the calculation of the conventional indicators of ex-post and ex-ante financial analysis, the modern indicators are beginning to apply. These indicators include effects and risks of surroundings, sectoral indicators and also indicators focused on the future revenues and achievements resulting from the current decisions. The aim of this paper is to point out the performance of the selected industry in the Slovak Republic with the application of all abovementioned methods of the performance evaluation, principally the modern ones. Methods applied in this contribution include comparative analysis, method of scoring and correlation. When building a creditworthy model the method of comparison with mean values respectively the optimum values, as well as the method of scoring will be used. The research and measurements conducted will result in the proposal of the key performance indicators – financial and sectoral - for the given industry and the performance evaluation of the industry with regard to the EVA indicator.

Keywords: creditworthy model, economic value added, financial indicators, sectoral indicators, correlation matrix

JEL Classification: G32, C52, C51

1. Introduction

Business performance measurement has become an important phenomenon of today. To measure the performance the variety of methods are used. In addition to the traditional methods, based on the calculation of the conventional indicators of Ex Post and Ex Ante Financial Analysis, the modern indicators begin to apply. These indicators include effects and risks of surroundings, non-financial indicators and also indicators focused on the future revenues and achievements resulting from the current decisions.

2. Literature review

The beginning of the business performance measurement dates back to the second half of the 20th century. In this period specifically in the Western Europe and the American continent the emphasis was placed on providing the operative and tactical performance, while among the basic performance indicators were the economic output and indicators of capital/asset profitability. Over time, however, there have been many significant changes not only in the approach to measuring performance, but also in the methods and tools of performance evaluation. In this regard, *during the 70s and 80s of the 20th century the use of modern performance indicators has started. These indicators take into account the implications of current decisions and activities for the future development of corporate performance and economic profit* (represented by indicators such as

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MVA – Market Value Added, EVA – Economic Value Added, CVA – Cash Value Added). The fundamental change in the development of performance measures has occurred in the 90s of the 20th century, when the evaluation of the performance in relation to the transformation process has moved to the performance expressed by the modification of the market value of the company and Free Cash Flow. In terms of the development of measures and methods of performance measurement and management, the opinions on the performance have also developed from the requirement of maximizing profit to market value maximization and ensuring the future strategic growth (Fisher 1992). Among the representatives who understand the performance as the enterprise ability to capitalize its investments embedded into business in the best way are the authors Frost (2005) and Neumaierová, Neumaier, (2002). Proponents of the Value Based Management indicate *that the value of the company is determined* by its performance and according to this theory enterprise is a tool whose task is capitalization of shareholder investments (Neumaierová 2003). Several authors indicate the need for the comparison of performance with the target value (Nenadál 2004), (Brealey 2011).

European Foundation for Quality Management ((EFQM) defines performance as the level of results achieved *by individuals, groups, organizations and processes*. Enterprise performance can be evaluated differently. It depends on market participant, who makes the review (Stýblo, 2008). Valach (1998) approaches to the definition of the performance in the same way – *he points out that the participant for whom the evaluation is done is important, whether it's a customer or shareholder*. The enterprise is powerful when it satisfies customer product requirements. The business is powerful for the shareholder when it provides *adequate return related to risk* (Valach 1998).

Nowadays the attention in evaluating and measuring the performance is given to formation of such methods of performance measurement which in addition to *financial indicators include also sectoral ones supporting* the business strategy and enabling the measurement of performance for each level of management. Such methods include for instance Balanced Scorecard, EFQM Excellence Model, techniques of determining measures for organizational management – for example CMM (Capability Maturity Matrices), performance pyramid, EP²M (Effective Progress and Performance Measurement), Performance Management Process by authors Sink and Tuttle (1989), who claim that business performance is a complex relationship among seven measurement categories of organizational performance: effectiveness, efficiency, quality, productivity, quality of work life, innovation, cost and prices. These seven performance measurement categories in many ways remind the Balance Scorecard method of Kaplan and Norton (1996). The modern techniques of performance management and performance measurement also include the following methods: Total Quality Management, Six Sigma, Benchmarking, Kaizen, *Business Process Reengineering* and others.

3. Material and methods

The sample for the performance calculation and evaluation consists of companies running a business within the energy industry, namely three companies active in the field of electricity distribution in the Slovak Republic with the largest share on this market. As a source of information web pages and annual reports of these companies (Východoslovenská distribučná, a.s.), (Západoslovenská distribučná, a.s.), (Stredoslovenská energetika, a.s.) as well as web page of „Úrad pre reguláciu sieťových odvetví“ are used. Financial indicators are calculated for the years 2008, 2009, 2010, 2011. Whereas these companies require not to publish the data provided, they will be mentioned in this contribution only as DIS1, DIS2 and DIS3.

There are many studies dealing with the issue of business performance evaluation with the use of variety of methods. These studies are based on the fact, that there is a strong correlation between the performance of the enterprise and the quantitative variables and try to define the performance as the function of these quantitative variables. At the same time they are searching for the most appropriate independent variables influencing the classification of the enterprise in the performance-creditworthy band. In this paper we focus on determining the impact of the selected fundamental factors on the enterprise performance. We put emphasis on the selection and application of the financial indicators as well as sectoral ones specific for the analysed industry. In the light of above-mentioned, the following scientific problem is formulated: „Can the selection

of financial and sectoral indicators influence the final evaluation of enterprises performance". The choice of financial and sectoral indicators influencing performance evaluation of the enterprise can be realized with the use of Balanced Scorecard method (Kaplan, Norton, 1996), INFA model (Neumaierová, Neumaier, 2002), factor analysis (Grunwald, Holečková, 2009) and mathematical and statistical methods. Enterprise performance is measured and calculated with the use of the EVA indicator generally considered to be the top indicator of the enterprise performance evaluation. Established objectives and tasks are implemented with the use of mathematical and statistical methods and subsequently the creditworthy model is constructed. This model will be designed in three modifications - CM1, CM2, CM3.

Creditworthy model represents portfolio in which the X-axis is applied to the sum of scores of the future enterprise's success and the Y-axis is applied to the sum of scores of the financial performance. At the intercept point of these values *company's position in terms of performance evaluation is located*. Creditworthy model includes 12 fields which allow classification of the enterprise into the corresponding performance range (see Figure 1). The portfolio consists of performance fields marked as follows:

- inappropriate,
- doubtful,
- substandard,
- watch,
- excellent.

The best performance achieve companies located in the portfolio in performance field „excellent“. This position means the target value for all enterprises and is determined by scores over 64 points in the area of financial performance and scores of over 52 points in the area of success. Within this position it is necessary to focus on those characteristics which report fewer than 8 points, while it should be noted that the number of indicators intended to improve will be minimal. However in this position, there is scope for improvement of business performance too. Position in performance field „watch“ creates more room for further improvement. It is a position where financial performance is between 52 and 64 points and enterprise success less than 52 points but at least 26 points. The average value of performance is entitled as „substandard“. In this position financial performance reaches values between 32 and 52 points and success may not fall below 26 points. The worst performance fields represent positions „doubtful“ and „appropriate“ where the financial performance of the enterprise is less than 32 points. In the case of these companies there is large scope for improvement of performance results. But if these companies are no longer able to improve their results, they are threatened by bankruptcy.

Creditworthy model 1 (CM1)

To assess the financial performance with the use of creditworthy model no. 1 (CM1) we specify the group of conventional financial indicators, which evaluate financial performance of the enterprises running a business in the selected industry: Turn around Receivables (TAR), Turn around Liabilities (TAL), Grade Watered (GW), the Total Debt (TD), Routine Indebtedness (RI), Return on Sales (ROS), Total Liquidity (TL), Current Ratio (CR), Return on Equity (ROE), Assets Turnover (AT). To evaluate the performance in CM1, ex-ante models are used, especially selected four models of future enterprises success: Quick test, Z – score, Credit score, Taffler index.

Creditworthy model 2 (CM2)

The second group of measures for the construction of correlation matrix and creditworthy model no. 2 (CM2) represents modified financial indicators, which directly influence the EVA indicator or participate in calculation of the EVA indicator: Current Ratio (CR), Cash - to - Cash (CTC), Capital Turnover (CT), Average Collection Period (ACP), Return on Assets (ROA), Profit Margin (PM), Weighted Average Capital Cost (WACC). Equity Ratio (ER), Return on Equity (ROE), Interest Coverage (IC). To evaluate the performance in CM2, ex-ante models are used, namely Quick test, Z – score, Credit score, Taffler index.

Creditworthy model 3 (CM3)

To assess enterprise financial performance in the creditworthy model no. 3, the same group of financial indicators as in CM2 is applied. To measure the success of the company, sectoral characteristics of the energy industry are applied. On the basis of this selection we will, in terms of modern approaches to performance evaluation, try to complement traditional financial measures of performance by *sectoral indicators and measures, typical for the given industry*. The selected sectoral indicators include: Cost consumption (CC), Return on Investment (ROI), Point of Supply Profitability (PSP), Tariff for Electricity Distribution without Losses including Electricity Transmission (TED), Energy Efficiency of Electricity Distribution (EE), Share of Losses in the Electricity Distribution (SL), Average Interruption Duration of Electricity Distribution to Point of Supply (AID), Number of Failure to Comply with Standard of Quality Events to Recorded Events (NFRE), Number of Failure to Comply with Standard of Quality Events to Employee (NFE), Employee Labour Productivity (ELP).

To assess the impact of the selected financial and sectoral indicators on the EVA indicator the correlation matrix will be applied. Its results will be used to determine key financial and sectoral indicators involved in the financial performance development *of the selected companies*.

Individual correlation matrices are processed with the use of software Statistica. This software in each of correlation matrices marks the correlations, in which P values are less than significance level of 0.05. In these cases we reject the null hypothesis H_{0x} in favour of the alternative hypothesis H_{1x} . Therefore we conclude that the studied linear relationship between given variables is statistically significant.

In addition to above mentioned methods, when creating the creditworthy model the method of modelling will be used. For the transformation of the financial performance indicators, ex-ante models and sectoral indicators to the scores, the method of scoring will be used. The scores will be applied to create the creditworthy models. Each of the given set of indicators is assigned by corresponding number of points. The maximum score is 8 points. Indicators which fail to reach maximum number of points will be assigned the score with the use of formulas (1) and (2).

We calculate the scores of indicators, development of which should be growing, by putting the highest value of the indicator to the denominator of the equation (1).

$$b_{ij} = \frac{x_{ij}}{x_{imax}} \times 8 \quad (1)$$

We calculate the scores of indicators, development of which should be declining, by putting the lowest value of the indicator to the numerator of the equation (2):

$$b_{ij} = \frac{x_{imin}}{x_{ij}} \times 8 \quad (2)$$

Where

- x_{ij} is the value of the j-th explanatory variable associated with enterprise i
- x_{jmax} is the highest value of the j-th explanatory variable assessed by 8 points, it refers to the indicators, development of which should be growing
- x_{imin} is the lowest value of the j-th explanatory variable assessed by 8 points, it refers to the indicators, development of which should be declining
- b_{ij} is the score of the enterprise i for the j-th explanatory variable

In accordance with the stated objective and mentioned methods of solution, six scientific hypotheses were set up. These hypotheses were tested with the use of correlation matrix at the significance level of 0.05.

Hypothesis for conventional financial indicators:

H_{01} : There is no statistically significant linear relationship between conventional financial indicators and the EVA indicator.

H_{11} : There is statistically significant linear relationship between conventional financial indicators and the EVA indicator.

Hypothesis for modified financial indicators:

H₀₂: There is no statistically significant linear relationship between modified financial indicators and the EVA indicator.

H₁₂: There is statistically significant linear relationship between modified financial indicators and the EVA indicator.

Hypothesis for sectoral indicators:

H₀₃: There is no statistically significant linear relationship between selected sectoral indicators and the EVA indicator.

H₁₃: There is statistically significant linear relationship between selected sectoral indicators and the EVA indicator.

4. Results and discussion

In this part of the paper we evaluate the results obtained for CM1, CM2 and CM3 with a focus on the most important results in terms of the performance of the selected companies. In all three models the impact of selected indicators on the EVA indicator (Stewart, 2013) is analysed, therefore the values of the EVA indicator are listed in Table 1. Analysed companies achieve positive values of the EVA indicator, except company DIS2 in 2010 and company DIS3 in 2011. When calculating the EVA indicator we used *Build-up model processed with the application of economic, financial and legislative conditions in the Slovak Republic with the use of Three Factor Model* (Fama, French, 1992, 1993).

Table 1 - Values of the EVA indicator

Indicators	DIS1	DIS1	DIS2	DIS2	DIS3	DIS3	
	2010	2011	2010	2011	2010	2011	
EVA (€)	4	22	- 46	452.98	13	32	- 46
	519.12	828.12		740.76	093.28		545.98
Rate of Equity (%)	4.06	5.21	14.06	5.45	4.06	15.21	
Rate Free (%)	4.06	5.21	4.06	5.21	4.06	5.21	
Financial risk (%)	0	0	10	0.25	0	10	
Business risk (%)	0	0	0	0	0	0	
Risk of lower liquidity in the Stock market (%)	0	0	0	0	0	0	
Price of foreign capital (%)	0	0	0.053	0.011	0	0	
WACC (%)	4.063	5.21	14.17	5.43	4.063	15.21	

Source: authors

4.1. Results for the creditworthy model 1

According to the results of conventional financial indicators, it is obvious, that analysed companies exhibit low indebtedness. It regards enterprises with a high degree of self-financing. On this basis we can conclude that these enterprises are financially stable. In addition to the indicators of stability are for the performance of the enterprise important also indicators of liquidity and profitability. According to our evaluation for creditworthy model 1 (CM1), liquidity of each enterprise is below the required values. This fact was reflected in the performance of selected companies. Assumptions for performance improvement provides indicator of activity, namely Assets Turnover and in the case of company DIS2 indicator Return on Equity. Values of the financial indicators were for the purposes of the creditworthy model transformed into points. The largest number of points achieved company DIS1. In terms of financial performance, it is the best performing enterprise of the analysed companies. We assume that company DIS1 will be located in an „excellent” position in creditworthy model no. 1. Despite the good results in the field of performance, company DIS1 still has scope for performance improvement, especially in the area of Total Liquidity and Assets Turnover. Total scores of the creditworthy model no. 1 are presented in Table 2.

Table 2 - Total scores of the creditworthy model no. 1

Performance scores			
Selected indicators	Values	Selected indicators	Values
Mean value – points	67	Minimum score – points	56
Error of the mean value	1.70	Maximum score – points	76
Median – points	68	The total sum of points	804
Modus – points	68	Maximum integral indicator	7.4
Standard deviation	5.9	Minimum integral indicator	5.8
Sampling variance	34.5		

Source: authors

The sample mean value is 67 points, median accounts for 68 points. The maximum score of 76 points received the company DIS1 in the year 2009. The minimum score, concretely 56 points, obtained company DIS2 in the year 2009. Total score of the analysed companies is 804 points.

To assess the impact of the selected indicators on the EVA indicator we have chosen correlation matrix (see Table 3). Based on the correlation matrix we can conclude that indicators Current Ratio and Cash-to-Cash have the most significant impact on the EVA indicator. This influence can be explained by the fact that Current Ratio, one of the fundamental factors influencing the EVA indicator, enters into the calculation of this indicator in estimating financial risk. Since the Current Ratio does not reach optimum values, this measure shows the most important impact on the EVA indicator. This fact resulted in an increase in equity price, caused a decrease in the EVA indicator and consequent decrease of the company performance.

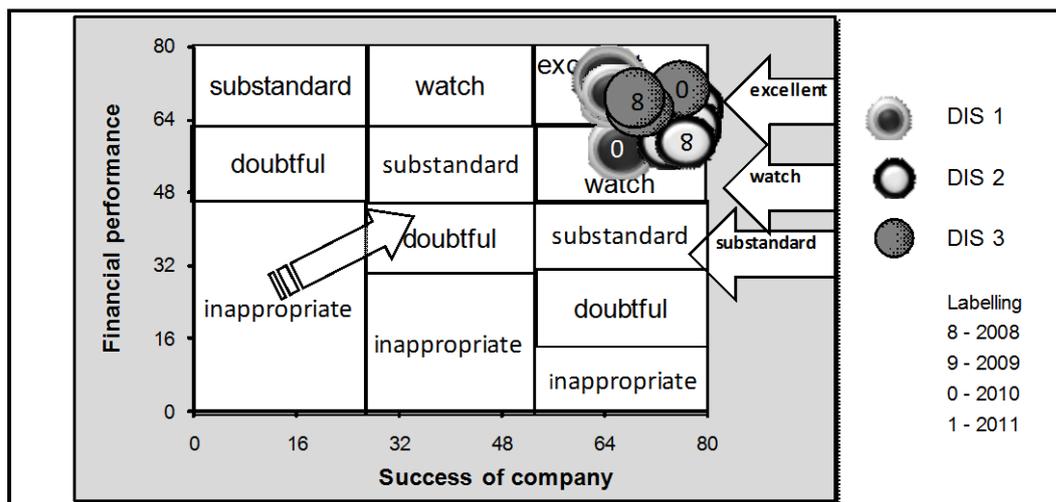
Table 3 - Correlation matrix for CM1

Correlation (conventional financial indicators)											
	TAR	TAL	GW	TD	RI	ROS	TL	CR	ROE	AT	EVA
TA	1.000	.4152	.0197	.1444	.0472	.3811	.3100	.3174	-.1648	-.5075	-.0652
	p= ---	p=.18	p=.95	p=.65	p=.88	p=.22	p=.32	p=.31	p=.60	p=.09	p=.840
TA	.4152	1.000	.2303	.2873	.7965	-.4692	-.2711	-.2504	-.3560	-.2023	-.3952
	p=.18	p= ---	p=.47	p=.36	p=.00	p=.12	p=.39	p=.43	p=.25	p=.52	p=.204
G	.0197	.2303	1.000	.5818	.4253	-.3532	.3632	.3559	.2715	.3932	.1935
	p=.95	p=.47	p= ---	p=.04	p=.16	p=.26	p=.24	p=.25	p=.39	p=.20	p=.547
TD	.1444	.2873	.5818	1.000	.3501	-.1954	.3099	.3154	.1555	.1914	-.0701
	p=.65	p=.36	p=.04	p= ---	p=.26	p=.54	p=.32	p=.31	p=.62	p=.55	p=.829
RI	.0472	.7965	.4253	.3501	1.000	-.5570	-.4277	-.4096	.1786	.4253	-.5018
	p=.88	p=.00	p=.16	p=.26	p= ---	p=.06	p=.16	p=.18	p=.57	p=.16	p=.096
RO	.3811	-.4692	-.3532	-.1954	-.5570	1.000	.4436	.4485	.3568	-.2236	.1209
	p=.22	p=.12	p=.26	p=.54	p=.06	p= ---	p=.14	p=.14	p=.25	p=.48	p=.708
TL	.3100	-.2711	.3632	.3099	-.4277	.4436	1.000	.9991	.0642	-.2839	.7314
	p=.32	p=.39	p=.24	p=.32	p=.16	p=.14	p= ---	p=.00	p=.84	p=.37	p=.007
CR	.3174	-.2504	.3559	.3154	-.4096	.4485	.9991	1.000	.0651	-.2896	.7217
	p=.31	p=.43	p=.25	p=.31	p=.18	p=.14	p=.00	p= ---	p=.84	p=.36	p=.008
ROE	-.1648	-.3560	.2715	.1555	.1786	.3568	.0642	.0651	1.000	.8147	-.1319
	p=.60	p=.25	p=.39	p=.62	p=.57	p=.25	p=.84	p=.84	p= ---	p=.00	p=.683
AT	-.5075	-.2023	.3932	.1914	.4253	-.2236	-.2839	-.2896	.8147	1.000	-.2346
	p=.09	p=.52	p=.20	p=.55	p=.16	p=.48	p=.37	p=.36	p=.00	p= ---	p=.463
EV	-.0652	-.3952	.1935	-.0701	-.5018	.1209	.7314	.7217	-.1319	-.2346	1.0000
	p=.84	p=.20	p=.54	p=.82	p=.09	p=.70	p=.00	p=.00	p=.68	p=.46	p= ---

Source: authors

Statistically significant directly proportional relationship is detected between indicators Current Ratio and Total Liquidity. From the other important dependencies we can highlight significant proportional relationship between indicators Current Ratio and Turn around Liabilities. It is probable, because Current Liabilities are the input for the calculation of Routine Indebtedness and Turn around Liabilities. Statistically significant directly proportional relationship is found between indicators Return on Equity and Assets Turnover. On the basis of this finding the validity of the INFA model is confirmed, because this model in its pyramidal decomposition indicates directly proportional dependence between mentioned indicators. Indicator Assets Turnover is according to INFA model considered as a key performance indicator, what is confirmed by correlation matrix for CM1.

Based on calculations carried out we are able to construct creditworthy model no. 1 (see Figure 1). This model illustrates the position of analysed companies in terms of financial performance and success. In 2008 and 2009 company DIS1 achieved position „excellent”, in 2010 got into position „watch” and in 2011 this company reached position „excellent” again. In the years 2008 and 2009 company DIS2 achieved position „watch” and in 2010 and 2011 got into position „excellent”. Company DIS3 held three years – 2008, 2009 and 2010 in position „excellent” and in 2011 fell into position „watch”. Positions of the enterprises did not change significantly during four analysed years. We can conclude that by applying the first group of financial indicators, the majority of our sample is in the position „excellent”. Composition of the first sample of indicators assessing the financial performance selected rather randomly caused that all the analysed companies are located in the positions „excellent” or „watch” in CM1.



Source: authors

Figure 1 - Creditworthy model no. 1

Enterprises have scope for improvement, however quite limited. This scope provides particularly indicators of liquidity and Assets Turnover. In conclusion we can say that these indicators are precisely those which exhibited the lowest scores since they didn't reach the optimum values. These indicators were simultaneously highlighted in the correlation matrix as the variables with the most significant impact on the indicators EVA and ROE.

4.2. Results for the creditworthy model 2

The second group of financial indicators for the construction of creditworthy model 2 (CM2) consists of indicators that directly or indirectly influence the value and development of the EVA indicator. Calculated values of this group of indicators demonstrate that indicator Current Ratio is below the optimum values in the company DIS2 in the year 2010 and in the company DIS3 in the year 2011. Indicator Cash - to - Cash is negative for every company in each year, so impact of this variable will negatively influence evaluation of the liquidity and activity of the enterprises. Similarly, the values of Capital Turnover and Return on Assets are low too. On the

contrary the values of Weighted Average Capital Cost are high, especially in the case of Company DIS3. These figures highlight the need to improve several indicators and areas of the performance evaluation.

In comparison with the first model, even more noticeable deterioration of the results of enterprise performance appears in the scores. For the indicator Cash - to - Cash none of the companies achieved a single point. This fact indicates problem of the analysed companies in the area of Liquidity and Money Turnover. Weaknesses are also reflected in those areas of performance evaluation, in which indicators do not reach the maximum of 8 points.

Table 4 contains total scores of the second sample of indicators. The mean value of the sample is 56.8 points, median accounts for 61.8 points. The minimum score of 39 points achieved company DIS2 and the maximum score of 74 points obtained company DIS3 in the year 2009. Total score of the analysed companies is 681.8 points, representing a decrease by 122.2 points due to the scores of the first sample.

Table 4 - Total scores of the creditworthy model no. 2

Performance scores	
Selected indicators	Values
Mean value – points	56.8
Error of the mean value	3.4
Median – points	61.8
Modus – points	61.8
Standard deviation	11.6
Sampling variance	135.0
Minimum score – points	38.4
Maximum score – points	74.1
The total sum of points	681.8
Maximum integral indicator	6.4
Minimum integral indicator	3.0

Source: authors

The total scores of group of indicators utilized for the construction of the creditworthy model no. 2 is lower than total scores of the indicators used for the construction of creditworthy model no. 1. We can see this fact in the Table 5.

Table 5 - The comparison of CM1 and CM2

	DIS1	DIS1	DIS2	DIS2	DIS3	DIS3
	2010	2011	2010	2011	2010	2011
Total score for CM1	60	72	64	68	70	68
Total score for CM2	59	67	39	64	54	45
Difference between CM1 and CM2	1	5	25	4	16	23

Source: authors

The largest point difference when comparing CM1 and CM2 shows company DIS2 in the year 2010 and DIS3 in the year 2011. It is due to the rigorous assessment of the Current Ratio and Return on Equity and poor values of the indicators Weighted Average Capital Cost and Cash-to-Cash.

On the basis of the second group of indicators the correlation matrix for CM2 (see Table 6) is constructed. This matrix includes more significant dependencies than correlation matrix for CM1. In addition to above mentioned significant directly proportional relationship between Current Ratio and the EVA indicator, correlation matrix indicates the strong inversely proportional relationship between indicators WACC and EVA. This dependence is expected

whereas WACC enters in the calculation of the EVA indicator. With the increasing value of Cost of Capital, the value of the EVA indicator is declining. Another significant inversely proportional relationship is between the indicators Current Ratio and WACC, therefore the higher is the Current Ratio, the lower the financial risk and the lower the value of WACC is. Very significant directly proportional relationships are between indicators Assets Turnover and ROA, Assets Turnover and ROE, Assets Turnover and Interest Coverage. These relationships are identified in the INFA model while all mentioned variables are key performance indicators.

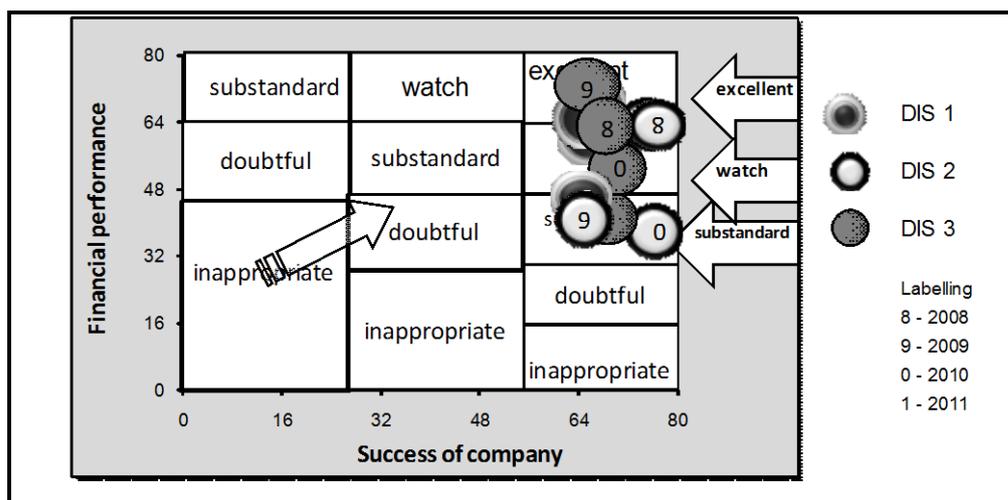
Table 6 - Correlation matrix for CM2

Correlation (modified financial indicators) marked correlations are significant at the level $p < .05000$ N=12											
	CR	CTC	AT	TAR	ROA	PM	WAC	ER	ROE	IC	EVA
CR	1.000	.4805	-.2896	-.4690	.0690	.0232	-.6298	-.2888	.0878	-.1772	.7217
	p= ---	p=.11	p=.36	p=.12	p=.83	p=.94	p=.02	p=.36	p=.78	p=.58	p=.00
CTC	.4805	1.000	-.4422	-.3106	.0396	.2829	-.0216	-.0000	-.0149	-.2062	.1475
	p=.11	p= ---	p=.15	p=.32	p=.90	p=.37	p=.94	p=1.0	p=.96	p=.52	p=.64
AT	-.2896	-.4422	1.000	-.3438	.7763	.0098	.2858	-.1571	.8138	.5766	-.2346
	p=.36	p=.15	p= ---	p=.27	p=.00	p=.97	p=.36	p=.62	p=.00	p=.05	p=.46
TAR	-.4690	-.3106	-.3438	1.000	-.4232	.0125	.2344	.2529	-.4014	-.1479	-.3726
	p=.12	p=.32	p=.27	p= ---	p=.17	p=.96	p=.46	p=.42	p=.19	p=.64	p=.23
ROA	.0690	.0396	.7763	-.4232	1.000	.5033	.2347	.0097	.9451	.5672	-.1036
	p=.83	p=.90	p=.00	p=.17	p= ---	p=.09	p=.46	p=.97	p=.00	p=.05	p=.74
PM	.0232	.2829	.0098	.0125	.5033	1.000	.0607	.6185	.2673	.2568	.0026
	p=.94	p=.37	p=.97	p=.96	p=.09	p= ---	p=.85	p=.03	p=.40	p=.42	p=.99
WAC	-.6298	-.0216	.2858	.2344	.2347	.0607	1.0000	-.0893	.2920	.4951	-.9745
	p=.02	p=.94	p=.36	p=.46	p=.46	p=.85	p= ---	p=.78	p=.35	p=.10	p=.00
ER	-.2888	-.0000	-.1571	.2529	.0097	.6185	-.0893	1.000	-.2584	-.0313	.0361
	p=.36	p=1.0	p=.62	p=.42	p=.97	p=.03	p=.78	p= ---	p=.41	p=.92	p=.91
ROE	.0878	-.0149	.8138	-.4014	.9451	.2673	.2920	-.2584	1.000	.6010	-.1591
	p=.78	p=.96	p=.00	p=.19	p=.00	p=.40	p=.35	p=.41	p= ---	p=.03	p=.62
IC	-.1772	-.2062	.5766	-.1479	.5672	.2568	.4951	-.0313	.6010	1.000	-.4792
	p=.58	p=.52	p=.05	p=.64	p=.05	p=.42	p=.10	p=.92	p=.03	p= ---	p=.11
EVA	.7217	.1475	-.2346	-.3726	-.1036	.0026	-.9745	.0361	-.1591	-.4792	1.000
	p=.00	p=.64	p=.46	p=.23	p=.74	p=.99	p=.00	p=.91	p=.62	p=.11	p= ---

Source: authors

Based on above mentioned facts we can construct creditworthy model no. 2 (see Figure 2). If we compare models CM1 and CM2, we can notice obvious performance deterioration along the Y-axis. Enterprises in terms of performance occur even in the position „substandard” - average. Success of enterprises did not changed because we used the same predictive models as in the CM1. As mentioned above, the number of indicators below the required values exceeded their quantity in the CM1. It is due to the fact that we focused on the selection of key performance indicators, i.e. measures with the larger impact on enterprise performance.

We can conclude that hypothesis pointing to the existence of significant relationship between financial indicators and the EVA indicator were confirmed. Therefore we can say that the selection of financial indicators for enterprise performance assessment influences company performance both in terms of its evaluation and management.



Source: authors

Figure 2 - Creditworthy model no. 2

In the next part of this paper the creditworthy model no. 3 is constructed. With the use of this model we are able to identify whether the application of sectoral indicators will change the performance evaluation of the analysed companies.

4.3. Results for the creditworthy model 3

When constructing creditworthy model 3 (CM3) we use indicators of the energy industry to assess the success of the enterprise. These indicators are identified and elected in accordance with the theory of Balanced Scorecard, with a focus on financial and customer perspective, internal processes and potentials perspective.

As mentioned above, the values of sectoral indicators were obtained from the annual reports of the analysed companies or by direct questioning in these companies. The largest differences among the values of the analysed enterprises were identified in the following indicators: Point of Supply Profitability, Average Interruption Duration of Electricity Distribution to Point of Supply, Number of Failure to Comply with Standard of Quality Events to Recorded Events, Number of Failure to Comply with Standard of Quality Events to Employee and Employee Labour Productivity. With the use of method of scoring, the values of sectoral indicators were converted into points. The top score of 75 points obtained company DIS3 and the worst score of 38 points achieved the company DIS2 (see Table 7). We expect that performance evaluation of enterprises along the X-axis worsens too because the total score of the sectoral indicators is less than the total score of ex-ante models.

Table 7 - Comparison of the scores of ex-ante models and sectoral indicators for success evaluation

	IS1	IS1	IS2	IS2	IS3	IS3
	2010	2011	2010	2011	2010	2011
Total score of the ex-ante models	66	66	77	77	69	69
Total score of the sectoral indicators	38	40	37	43	58	75
Difference	28	26	40	34	11	-6

Source: authors

Deterioration of performance occurred in each enterprise except for company DIS3, in which the evaluation with the use of sectoral indicators is higher compared with the use of ex-ante models.

As in the previous cases we construct correlation matrix (see Table 8) which we use to identify mutual dependencies and their influence on the EVA indicator. The largest correlation coefficient is between Cost Consumption and EVA indicator. Since Cost Consumption is the indicator of financial perspective, this dependence is obvious but it is not statistically significant linear relationship. If we look at other indicators within this group nearly each of the indicators exhibit significant correlation coefficient with the EVA indicator. We can mention dependencies between the EVA indicator and measures: Energy Efficiency of Electricity Distribution, Number of Failure to Comply with Standard of Quality Events to Recorded Events, Share of Losses in the Electricity Distribution, Point of Supply Profitability. There are also important mutual dependencies among sectoral indicators. Strong inversely proportional relationship is detected between Cost Consumption and Point of Supply Profitability and a directly proportional relationship is between Cost Consumption and Number of Failure to Comply with Standard of Quality Events to Employee. The directly proportional relationship is detected also between Energy Efficiency of Electricity Distribution and Share of Losses in the Electricity Distribution. Based on these facts we are able to confirm the correctness of the sectoral indicators selection in terms of the Balanced Scorecard theory, because there are mutual dependencies between these indicators. Indicator Return on Investment exhibits low correlation coefficients; therefore it is necessary to consider its inclusion into the model of enterprise performance evaluation. It is also needful to assess indicators Cost Consumption and Point of Supply Profitability and recalculate them once again.

Table 8 - Correlation matrix for CM3

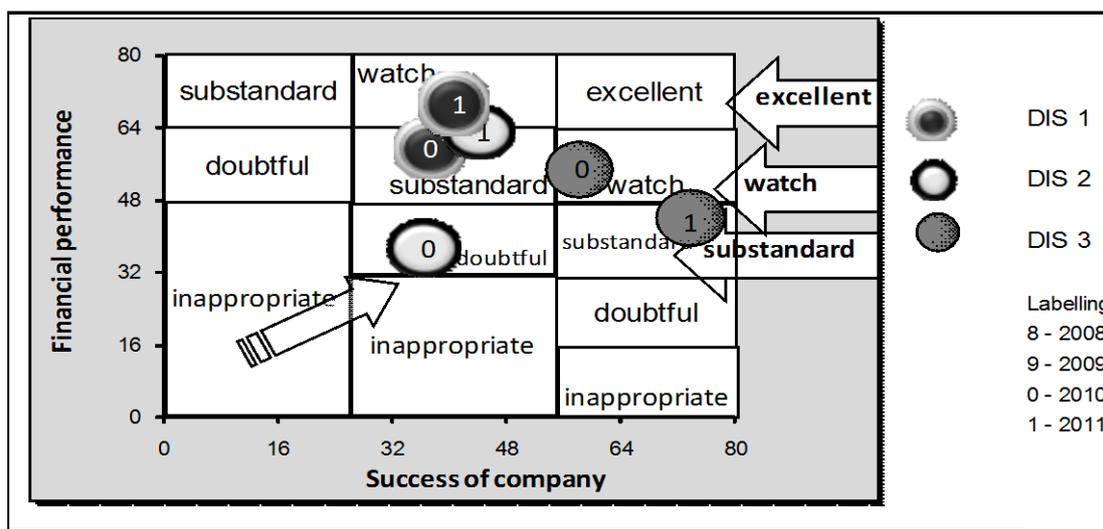
Correlation (sectoral indicators)											
marked correlations are significant at the level $p < ,05000$ N=6											
	CC	ROI	PSP	TED	EE	SL	AID	NFRE	NFE	ELP	EVA
CC	1.000	-.2924	-.8774	.5158	.7553	-.7715	.2671	.8655	.2068	-.7940	.6889
	p=---	p=.57	p=.02	p=.29	p=.08	p=.07	p=.60	p=.02	p=.69	p=.05	p=.13
ROI	-.2924	1.000	-.1365	.0052	-.3720	.3788	.2917	-.2949	.2180	-.0600	-.4464
	p=.57	p=---	p=.79	p=.99	p=.46	p=.45	p=.57	p=.57	p=.67	p=.91	p=.37
PSP	-.8774	-.1365	1.000	-.6536	-.5175	.5334	-.5935	-.7632	-.4123	.8945	-.6318
	p=.02	p=.79	p=---	p=.15	p=.29	p=.27	p=.21	p=.07	p=.41	p=.01	p=.17
TED	.5158	.0052	-.6536	1.000	-.1272	.0989	.8647	.4740	-.0418	-.8977	.3512
	p=.29	p=.99	p=.15	p=---	p=.81	p=.85	p=.02	p=.34	p=.93	p=.01	p=.49
EE	.7553	-.3720	-.5175	-.1272	1.000	-.9995	-.2845	.5227	.1885	-.2525	.6126
	p=.08	p=.46	p=.29	p=.81	p=---	p=.00	p=.58	p=.28	p=.72	p=.62	p=.19
SL	-.7715	.3788	.5334	.0989	-.9995	1.000	.2642	-.5342	-.1777	.2779	-.6220
	p=.07	p=.45	p=.27	p=.85	p=.00	p=---	p=.61	p=.27	p=.73	p=.59	p=.18
AID	.2671	.2917	-.5935	.8647	-.2845	.2642	1.000	.2595	.2742	-.7208	.3860
	p=.60	p=.57	p=.21	p=.02	p=.58	p=.61	p=---	p=.62	p=.59	p=.10	p=.45
NFR	.8655	-.2949	-.7632	.4740	.5227	-.5342	.2595	1.000	.4421	-.6723	.5952
	p=.02	p=.57	p=.07	p=.34	p=.28	p=.27	p=.62	p=---	p=.38	p=.14	p=.21
NFE	.2068	.2180	-.4123	-.0418	.1885	-.1777	.2742	.4421	1.000	-.0704	.5137
	p=.69	p=.67	p=.41	p=.93	p=.72	p=.73	p=.59	p=.38	p=---	p=.89	p=.29
ELP	-.7940	-.0600	.8945	-.8977	-.2525	.2779	-.7208	-.6723	-.0704	1.000	-.4598
	p=.05	p=.91	p=.01	p=.01	p=.62	p=.59	p=.10	p=.14	p=.89	p=---	p=.35
EVA	.6889	-.4464	-.6318	.3512	.6126	-.6220	.3860	.5952	.5137	-.4598	1.000
	p=.13	p=.37	p=.17	p=.49	p=.19	p=.18	p=.45	p=.21	p=.29	p=.35	p=---

Source: authors

Subsequently we construct creditworthy model no. 3 (see Figure 3). This model represents deterioration of the performance evaluation of analysed enterprises, which occurred along the X-axis due to the replacement of prediction models with the sectoral indicators. In 2010 company DIS1 achieved position „substandard” and in 2011 the improvement to the position „watch” occurred. In 2010 company DIS2 placed to position „doubtful” and in 2011 got into position „substandard”. Company DIS3 as opposed to the companies DIS1 and DIS2 deteriorated its position in performance and from the position „watch” in 2010 dropped to „substandard” position

in 2011. In general we can state that the choice of sectoral indicators worsens the overall assessment of enterprise performance and thus creates greater scope for performance improvement in different direction than just increasing the financial indicators.

Pursuant to the above mentioned we managed to prove that there is significant relationship among the sectoral indicators and their selection significantly affects the EVA indicator, respectively the enterprise performance. We detected that the selection of financial and sectoral indicators causes a change in evaluation of the enterprise performance. On the basis of this finding we are able to specify key performance indicators, which allow us to influence and manage the enterprise performance.



Source: authors

Figure 3 - Creditworthy model no. 3

Conclusion

Core research of this contribution consisted of six scientific hypothesis, which were tested with the use of several scientific methods and the methods of statistical analysis. Results of the correlation matrices, verified at the significance level of 0.05, can be summarized as follows:

Within the hypothesis for conventional financial indicators the following findings were obtained:

- In the case of Total Liquidity and Current Ratio we reject the null hypothesis H_{01} stating there is no statistically significant linear relationship between these measures and the EVA indicator in favour of the alternative hypothesis H_{11} (see Table 3).
- Regarding the other correlation dependencies not marked by software Statistica, we fail to reject the null hypothesis H_{01} .

Results of hypothesis related to modern indicators influencing enterprise performance can be summarized as follows:

- In the case of Current Ratio (this dependence has already been demonstrated in correlation matrix for CM1) and Weighted Average Capital Cost we reject null hypothesis H_{02} stating there is no statistically significant linear relationship between these measures and the EVA indicator in favour of the alternative hypothesis H_{12} (see Table 6).
- Regarding the other correlation dependencies not marked by software Statistica, we fail to reject the null hypothesis H_{02} .

As regards the hypothesis set out for sectoral indicators, the results are as follows:

- In the case of marked correlation dependencies in correlation matrix for CM3 (see Table 8) we conclude that there is statistically significant direct, resp. indirect linear relationship between indicators. There is also significant dependency between majority of the individual measures and EVA indicator, but it is not statistically significant linear relationship. Therefore we fail to reject the null hypothesis H_{03} .

If we summarize the results obtained we are able to draw following conclusions:

- Regarding the hypothesis analysing the relationships between conventional financial indicators and the EVA indicator we can conclude that statistically significant linear relationship between these indicators and the EVA indicator was confirmed only in those cases when conventional financial indicators show significant deviation from the optimum values. This was reflected in the case of Current Ratio. This indicator did not reach the required value in the range from 1 to 1.2 and therefore it has been assigned risk margin of 10%. This led to increase in cost - Rate of Equity „ r_e “, and Weighted Average Capital Cost „WACC“. Significant dependencies were not confirmed in the case of financial indicators which achieved the required optimum values. If we summarize the results of the analysis conducted, the greatest impact on the EVA indicator has fundamental factors, influencing Cost of Capital. It regards these indicators: Current Ratio, Return on Assets, Return on Equity, Financial Leverage). If these indicators don't achieve the optimum values, their impact on the EVA indicator will be reflected and performance of the enterprise will change. This confirmed the INFA model. (Neumaierová, Neumaier, 2002).
- As regards the hypotheses based on modern indicators, we can conclude, that statistically significant linear relationship was confirmed only in those cases when it regards indicators directly entering into the calculation of the EVA indicator or measures, which influence the EVA indicator but especially those that have been raised in the INFA model. This verified and confirmed the INFA model (Neumaierová, Neumaier, 2002).
- In order to prove the third group of hypotheses, the significant relationship between the sectoral indicators and also their important impact on the EVA indicator, was confirmed. If we compare the results of two previous groups of hypotheses with the results of the third one, we can conclude, that within this group significant dependencies occur among almost all indicators. This confirmed theory of Kaplan and Norton (2000, 2007), who argue that sectoral indicators significantly affect performance evaluation expressed by EVA indicator. It was also confirmed that there are significant relationships of mutual interoperation between indicators; therefore they constitute an important input for the construction of the strategic management map of future enterprise performance. Based on the research carried out and processing of the results obtained we were able to identify key performance indicators of the given industry and fulfil the stated objective. We can conclude that the choice of financial and sectoral indicators influences the final evaluation of enterprises performance and this selection changes the view of the business performance.

The key indicators of the given industry are: total liquidity, current ratio, return on assets, return on equity, assets turnover, profit margin, rate of equity, weighted average capital cost and cost consumption.

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HOW DO INVESTORS PERCEIVE HIGH SYNCHRONOUS EARNINGS? EVIDENCE FROM UNEXPLAINED VOLUME ON EARNINGS ANNOUNCEMENT DAYS

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Abstract

In this study, we investigate the implications of earnings synchronicity on investor opinion divergence. We document a positive relationship between earnings synchronicity and unexplained volume on announcement days, a proxy for investors' opinion divergence, suggesting that investors have more divergent beliefs for high synchronous earnings which convey little firm-specific information. Increase in the investor opinion divergence for high synchronous earnings could be interpreted as decrease in the quality of information environment. To corroborate this interpretation, we condition the association of earnings synchronicity with unexplained volume on the occurrence of management earnings forecasts, a proxy for complementary firm-specific information source. We find that the effect of earnings synchronicity on the unexplained volume is attenuated for firms issuing management earnings forecasts. This implies that a complementary information source could mitigate differential beliefs or interpretation on earnings among investors.

Keywords: earnings synchronicity, investors' opinion divergence, management earnings forecasts

JEL Classification: G14, M41

1. Introduction

A firm's earnings are influenced by two set of factors: firm-specific factors and common factors. Firm-specific factors include firms' unique operation strategies such as complexity of operations, operating cycle, growth opportunities and etc. Industry-wide and macro-level commonalities, such as similar regulatory requirements and macro-economic conditions influence the same industry firms' earnings in a similar fashion. The more a firm's earnings are influenced by common factors, the more closely its earnings would co-move with that of its industry peer firms. Earnings synchronicity describes how well a firm's earnings co-move with its industry peer firms. Earnings synchronicity captures the systematic portion of earnings that could be potentially useful in forecasting earnings. For example, Kini *et al.* (2009) find increase in analyst forecast accuracy when analysts cover firms which are more exposed to common economic forces. Similarly, De Franco *et al.* (2011) find that earnings commonality improves analyst forecast accuracy and reduces analyst optimistic bias.

Moreover, recent studies suggest that earnings synchronicity or commonality is an important factor for managers' voluntary disclosure decision and investors' reaction to the disclosure. For example, Gong *et al.* (2013) find that managers are more likely to provide management earnings forecasts and investors' reaction to these increases as earnings synchronicity decreases.

In this study we investigate the consequences of high synchronous earnings on investors' process of earnings information by examining the association between earnings synchronicity and unexplained trading volume on earnings announcement days. While earnings synchronicity is an important and interesting attribute of earnings, there is lack of understanding about the role it plays in the capital market. We attempt to fill this void in the literature

We find a positive relationship between unexplained volume on announcement day and earnings synchronicity controlling for firm size, earnings surprise, and other variables identified by previous literature that are associated with unexplained volume. This indicates a larger divergence of investors' opinions for high synchronous earnings. Further analysis reveals that the observed positive relation between unexplained volume and earnings synchronicity is attenuated

for firms that issue management earnings forecasts. This suggests that existence of complementary information sources such as management earnings forecasts could mitigate investors' confusion on earnings information due to a higher portion of common factors in earnings determination.

The next section reviews related literature. Section 2 discusses the related literature and prediction. Section 3 develops the research design. Section 4 describes the data and presents the empirical results. Section 6 offers additional test. Section 7 concludes.

2. Related literature and prediction

Prior literature on firm-specific information mainly examines its capital market consequences. Stock price synchronicity, defined in the similar fashion to earnings synchronicity, has been extensively studied and been long recognized as measure of the relative amounts of market-level and firm-level information capitalized in stock prices (e.g., Roll 1988; Morck *et al.* 2000). Earnings synchronicity, which captures the extent of the co-movement of firms' earnings within the same industry, has not received much attention until recently. Brown and Kimbrough (2010) find that earnings synchronicity is decreasing in firm's intangible asset intensity, suggesting that it is consistent with the resource-based view which posits that intangible investments allow firms to differentiate themselves economically from their rivals. From a voluntary disclosure point of view, Gong *et al.* (2013) show that management guidance is more likely to occur if earnings are less synchronous. Collectively, these evidences suggest that earnings synchronicity could act as a proxy capturing firm's uniqueness of its operation strategies and accounting system as well as affecting market participants' behaviour.

If earnings synchronicity accurately measures firm-specific vs. common economic forces, low synchronous earnings have more firm-specific information in their earnings. This implies a high quality information environment for investors, result a smaller divergence of opinions among investors for low synchronous earnings. On the other hand, high synchronous earnings contain a higher portion of industry-generic information that might already be known to the market. This indicates a low quality information environment for investors who, as a result, face greater information uncertainty about a firm. Thus, high earnings synchronicity firms would experience a larger divergence of investors' opinion on earnings on an earnings announcement day.

Numerous previous studies have used trading volume as proxy for divergent investor opinions. Theoretically, Kim and Verrecchia (1991) show that the volume reaction to the announcement is proportional to the absolute price change at the time of the announcement and the differential precision of preannouncement private information across traders. Kim and Verrecchia (1997) model adds differential interpretations arising from event-period private information that can only be used in conjunction with public announcement which in turn drive trading volume. Empirically, Bamber (1987) and Bamber *et al.* (1999) find that differential interpretations are an important stimulus for trading and earnings events higher trading are more likely associated with more divergent investor beliefs. Ajinkya *et al.* (2004) show a positive relationship between trading activity and analyst forecast dispersion. By comparing to six extent investors' opinion divergence measures to his proprietary data-based measure, Garfinkel (2009) show that unexplained volume is the best proxy for opinion divergence. He argues that because analyst coverage changes the information environment for a stock and analyst forecast data may not be available for all firms, it becomes less preferred. Also analyst forecast dispersion represents disagreement among sophisticated investors rather than the whole group.

3. Research design

3.1. Variable construction

Our measures of earnings synchronicity capture the correlation of a firm's earnings and industry peers' earnings. Specifically, we follow the methodology developed in De Franco *et al.* (2011) and used by Gong *et al.* (2013) to calculate firm-level earnings synchronicity. Step one,

estimate the equation below for each firm i and firm j pair ($i \neq j$) for each firm within the same two-digit SIC industry¹⁰:

$$Earnings_{i,T} = \alpha + \beta Earnings_{j,T} + \varepsilon_{i,T} \quad (1)$$

where $Earnings_{i,T}$ is firm i 's quarterly ROA (calculated as net income before extraordinary items divided by average total assets). We use a rolling window of 16 quarters from quarter $t-17$ to $t-1$ for earnings synchronicity calculation of quarter t .

Step two, obtain the R^2 from estimating the above equation for each firm i - j pair and rank the R^2 's. Each R^2 reflects how well a firm's earnings co-move with its paired firm. Our first earnings synchronicity measure is calculated as the average R^2 of the top four firms with the highest R^2 s within the same two-digit SIC industry, labeled as R_{Top4}^2 .

We also construct a third measure of earnings synchronicity for comparison reason. Morck *et al.* (2000) and several subsequent papers use the R^2 from the regression of the firm's ROA on the industry ROA (calculated as the total industry earnings divided by the total industry assets) to proxy for general earnings synchronicity between individual firm and the industry. This measure is labeled as R_{IndAvg}^2 . Because the R^2 's are bounded within the interval of $[0, 1]$ and thus are unsuitable to be used as dependent variable in regressions, we apply logistic transformations to these variables. Specifically:

$$SYNCH_{Top4} = \ln\left(\frac{R_{Top4}^2}{1 - R_{Top4}^2}\right)$$

$$SYNCH_{IndAvg} = \ln\left(\frac{R_{IndAvg}^2}{1 - R_{IndAvg}^2}\right)$$

Although the two earnings synchronicity measures look similar in calculation they capture different aspects of firm's earnings co-movement with its peer firms'. $SYNCH_{Top4}$ considers only the four most comparable firms in terms of earnings numbers. $SYNCH_{IndAvg}$, however, captures the covariance between a firm's earnings and an industry aggregate measure. The aggregation may potentially lose some firm-specific variation, so we expect the second measure to be the less powerful in terms of representing firm-specific portion of earnings. De Franco *et al.* (2011) document that the R^2 from estimating equation (1) for each firm i - j combination increase the odds of an analyst using firm j as a peer firm in her analyst report for firm i , supporting the view that $SYNCH_{Top4}$ is a stronger proxy for firm-specific information.

Our measures of earnings synchronicity are different from extant earnings attributes, such as persistence, smoothness, timeliness, predictability and etc. All the aforementioned measures are based on single firm's earnings information, independent of other firms' earnings information.

Following Garfinkel and Sokobin(2006) and Garfinkel(2009), we use two constructs of abnormal volume to measure investors' opinion divergence. The first measure ΔTO is defined as:

$$\Delta TO = \frac{\left\{ \sum_{t=-1}^0 \left[\left(\frac{Vol_{i,t}}{Shs_{i,t}} \right)_{firm} - \left(\frac{Vol_t}{Shs_t} \right)_{mkt} \right] \right\}}{2} - \frac{\left\{ \sum_{t=-54}^{-5} \left[\left(\frac{Vol_{i,t}}{Shs_{i,t}} \right)_{firm} - \left(\frac{Vol_t}{Shs_t} \right)_{mkt} \right] \right\}}{50}$$

where $Vol_{i,t}$ is the announcing firm's volume on date t , $Shs_{i,t}$ is firm i 's shares outstanding on day t . So the first item is average market-adjusted daily turnover across the earnings announcement window ($[t-1, t]$, where t is the Compustat earnings date). However, we realize that stocks may have higher turnover overall not only at earnings announcement but also on other regular trading dates. To control for liquidity trading, the second item is the market-

¹⁰ Following previous studies, I exclude holding firms, ADRs and limited partnerships, and restrict the sample to firms whose fiscal year ends in March, June, September, and December. In addition, industries with less than 20 firms per quarter based on the two-digit SIC industry classification are dropped.

adjusted turnover averaged over a pre-earnings announcement period [t-54, t-5] to proxy for firm i's average trading activity.

The second measure of abnormal trading is called standardized unexpected volume (SUV). This measure is developed based on the effect of informedness on trading volume (Holthausen and Verrecchia 1990). It's defined as:

$$SUV_{i,t} = \frac{UV_{i,t}}{S_{i,t}}$$

$$UV_{i,t} = Volume_{i,t} - E[Volume_{i,t}]$$

$$E[Volume_{i,t}] = \hat{\alpha}_i + \hat{\beta}_1 |R_{i,t}|^+ + \hat{\beta}_2 |R_{i,t}|^-$$

where the plus and minus superscripts on the absolute valued return indicate when returns were positive or negative, $UV_{i,t}$ is the prediction error from a regression of trading volume on the absolute value of returns. $S_{i,t}$ is the standard deviation of the residuals from the regression, calculated over the model's estimation window ([t-54, t-5]).

3.2. Empirical model

We estimate the following regression model to examine whether a firm's earnings synchronicity affects the investors' divergent beliefs on earnings announcement day:

$$VolumeMetric = \alpha_0 + \alpha_1 SYNCH + \alpha_2 BM + \alpha_3 SIZE + \alpha_4 PE + \alpha_5 SUE + \alpha_6 NEGSUE + \sum \beta_i IndustryDummies + \varepsilon \quad (3)$$

where the VolumeMetric is either ΔTO or $SUV_{i,t}$ as previously defined and SYNCH is one of the two earnings synchronicity measures. Book-to-market ratio is used to proxy for conservatism (Givoly and Hayn 2000). SIZE is used to proxy for pre-disclosure information (Bamber 1987). Literature suggests it should have a negative relationship with volume since the larger the firm the more pre-disclosure information will be available and thus the smaller the reaction should be. Tkac (1999) also suggests that the market level of equity reflects ongoing levels of firm-specific portfolio rebalancing. PE is a return-based proxy for earnings surprise (Garfinkel and Sokobin 2006), it is the abnormal return calculated using the market model. Including this variable is consistent with theoretical prediction that the volume reaction to the announcement is proportional to the absolute price change at the time of the announcement (Kim and Verrecchia 1991). SUE is an earnings-based proxy for earnings surprise, calculated as the absolute value of the prediction error from a seasonal-adjusted random walk time-series model. NEGSUE is an indicator variable if current earnings are below reported earnings a year ago.

We also use analyst forecast dispersion as alternative proxy for investors' heterogeneous beliefs. The association has been examined in De Franco *et al.* (2011) but no significant relationship has been found. Our measure of analyst forecast dispersion measure differs from De Franco *et al.* (2011) in that we use the last forecast within the 30 day window prior to announcement, while they use the earliest forecast within a year before the fiscal year end date. Our measure captures the investors' disagreement shortly before the event, while their measure proxies for the same thing but at the beginning of the year. We include a similar set of control variables as they did:

$$DISP = \alpha_0 + \alpha_1 SYNCH + \alpha_2 LOSS + \alpha_3 SIZE + \alpha_4 DAYS + \alpha_5 SUE + \alpha_6 NEGUE + \alpha_7 EarPred + \alpha_8 EarVol + \sum \beta_i Year\&IndustryDummies + \varepsilon \quad (4)$$

where LOSS is an indicator variable equals one if earnings is less than zero. Previous research has found LOSS to be positively related to forecast dispersion (Brown 2001). SIZE is included as a proxy for information environment (Lang and Lundholm 1996). DAYS is a measure of the forecast horizon, literature show that forecast horizon affects analyst forecast properties (Sinha *et al.* 1997). SUE is the absolute value of firm i's unexpected earnings and NEGUE is an indicator variable that equals one if actual earnings is lower than forecasted earnings. The last two

variables has been introduced before and are included as proxies for variability of earnings, larger variability firms are harder to forecast (Kross *et al.* 1990).

4. Empirical results

We obtain the sample from Compustat, Center for Research in Security Prices (CRSP), I/B/E/S and First Call Historical Database (FCHD) over the 1996 to 2010 period. The final sample consists of 3,781 firms and 126,654 unique firm-quarter observations with required information to compute earnings synchronicity measures. Table 1 reports the descriptive statistics for all variables. Our earnings synchronicity measures statistics are generally consistent with previous research (Gong *et al.* 2013). R^2_{Top4} are greater than R^2_{IndAvg} as expected. When we merge the database, only about a third of the sample firms are followed by analysts, and about 6% of the firms have issued management guidance (MG).

Table 1 - Descriptive Statistics

VARIABLE	STANDARD					
	Mean	Deviation	10%	Median	90%	N
R^2_{Top4}	0.547	0.173	0.321	0.545	0.778	126654
$SYNCH_{Top4}$	0.225	0.799	-0.749	0.18	1.254	126654
R^2_{IndAvg}	0.134	0.166	0.002	0.068	0.371	102786
$SYNCH_{IndAvg}$	-3.012	2.256	-6.026	-2.625	-0.526	102786
SIZE	5.262	2.465	2.014	5.304	8.433	126654
BM	2.739	5.238	0.421	1.838	6.21	126654
EarVol	0.159	0.044	0.107	0.153	0.22	126654
EarPred	0.251	0.69	-0.036	0.02	0.667	126488
PE	0.001	0.035	-0.035	0	0.038	102245
SUV	0.43	1.359	-0.886	0.054	2.4	102084
ATO	2.668	2.425	0.33	2.22	5.417	101679
DISP	0.002	0.005	0	0.001	0.004	30394
DAYS	2.51	0.71	1.609	2.565	3.332	35737
SUE	0.077	0.282	0.001	0.01	0.117	111425
LOSS	0.332	0.471	0	0	1	126654
NEGUE	0.512	0.5	0	1	1	126654
MG	0.062	0.241	0	0	0	126654

To test the relationship between unexplained volume and earnings synchronicity, we evaluate our data with equation (3). The results are presented in Table 2. As shown, unexplained volume is significant and positively related to earnings synchronicity measures. This result indicates on earnings announcement day, investors have more heterogeneous opinions about high synchronous earnings firms. Our results are consistent between the two unexplained volume measures and stronger for the unexplained change in turnover. Other control variables have consistent sign with previous literature. Size have a positive sign, this is consistent with Bamber *et al.* (2011)'s recent findings. Both control variables which proxy for earnings surprise (PE and SUE) are significant and positive, consistent with previous literature (Bamber 1987). NEGUE being negative indicates a lower than expected volume reaction to bad news.

Table 2 - Association between earnings synchronicity and abnormal volume

	Dependent Var= Δ TO		Dependent Var=SUV	
SYNCH _{top4}	0.063***		0.017*	
	(4.08)		(2.00)	
SYNCH _{indavg}		0.021***		0.003
		(4.43)		(1.28)
BM	-0.002	-0.001	0.001	0.000
	(-0.67)	(-0.59)	(0.38)	(0.21)
SIZE	0.622***	0.490***	0.149***	0.103***
	(46.28)	(31.18)	(20.34)	(11.64)
PE	1.966***	1.671***	0.768***	0.816***
	(8.19)	(6.57)	(5.83)	(5.69)
SUE	0.813***	0.667***	0.177***	0.143***
	(11.59)	(9.08)	(4.60)	(3.46)
NEGUE	-0.061***	-0.075***	-0.118***	-0.125***
	(-3.65)	(-4.12)	(-12.90)	(-12.22)
Fixed Effect	Yes	Yes	Yes	Yes
R-squared	0.0039	0.0006	0.0140	0.0101

Table 3 presents the results using analysts forecast dispersion as proxy for divergence of investors' opinion (regression equation (4)). Consistent with the unexplained volume results, forecast dispersion is positively associated with earnings synchronicity. This result confirms the conjecture that bigger disagreement about firm's earnings when it moves more synchronously with peer firms. The signs on our control variables are consistent with previous research. Positive signs on SUE and LOSS indicate more disagreement for bigger ex post earnings surprise and loss occurrences. Negative sign on SIZE indicates lower dispersion for larger firms, consistent with the argument that larger firms have more pre-announcement information. EarPred has a negative sign as more variability earnings are harder to predict.

Table 3 - Analyst forecast dispersion and earnings synchronicity

Dependent Var: DISP	
SYNCH _{top4}	0.000**
	(2.75)
SYNCH _{indavg}	0.000***
	(4.00)
SUE	0.018***
	(12.05)
LOSS	0.002***
	(21.27)
NEGUE	-0.000
	(-1.63)
DAYS	0.000
	(0.95)
SIZE	-0.001***
	(-2.26)

Dependent Var: DISP		
	(-27.97)	(-24.23)
EarVol	-0.004**	-0.001
	(-2.62)	(-0.89)
EarPred	-0.000***	-0.000***
	(-6.28)	(-6.02)
Fixed	Yes	Yes
R-squared	0.2710	0.2662

5. Additional analysis

Voluntary disclosure literature suggest management issue bad news guidance (warnings) to maintain their reputation (Skinner, 1994; Tucker, 2009) and also for the benefits of information asymmetry reduction. Within the scope of this study, if management guidance serves as an effective source of conveying firm-specific information, then firms that issue guidance would not experience the high unexplained volume when earnings synchronicity is high, because investors' need for firm-specific information that could not be found in high synchronous earnings has been satisfied.

Table 4 - Abnormal volume and earnings synchronicity conditional on management guidance

Dependent Var= ΔTO				
	MG=0		MG=1	
SYNCH _{top4}	0.057***		0.084	
	(3.55)		(1.50)	
SYNCH _{indavg}		0.020***		0.008
		(4.10)		(0.46)
BM	-0.002	-0.002	0.889***	0.746***
	(-0.80)	(-0.66)	(6.14)	(4.36)
SIZE	0.592***	0.463***	1.315***	1.194***
	(42.54)	(28.52)	(17.45)	(12.59)
PE	1.869***	1.608***	3.227**	2.748*
	(7.54)	(6.13)	(3.19)	(2.45)
SUE	0.770***	0.630***	1.365**	1.284*
	(10.81)	(8.45)	(2.59)	(2.46)
NEGUE	-0.045**	-0.063***	-0.082	-0.083
	(-2.59)	(-3.29)	(-1.46)	(-1.30)
Ind&Yr Dummies	Yes	Yes	Yes	Yes
R-squared	0.0036	0.0005	0.0009	0.0001

We divide the sample into two groups by the occurrence of management guidance. The sample was filtered to make sure that management guidance is issued before announcement. Conditional on this dummy variable, the panel regression results are presented in Table 4. When there is a management guidance issuance (MG=1), the positive relationship goes insignificant. This result suggests that with the existence of complementary information source, investors do not have larger heterogeneous beliefs about higher synchronous earnings. While without management guidance (MG=0), the positive relationship remains significant. In other words, while low synchronous earnings contain more firm-specific information, this portion of earnings does not raise investors' concern at earnings announcement as much as the industry-generic portion of

earnings. Dividing the sample into two groups reduces the sample size and could lead to insignificant results. Untabulated results show that including the interaction term of MG and SYNCH does not change the result.

Conclusion

This paper examines the association between earnings synchronicity and divergent investors' opinion. The positive relationship between earnings synchronicity and divergent investors' opinion is significant controlling for firm size and earnings surprise, as well as changing divergence of investors' opinions measures. This result suggests that investors are more uncertain about high synchronous earnings at announcement day. Furthermore, this relationship remains significant when no management forecast is issued, but is gone if there is one. We interpret this evidence as that complementary information source could help eliminate the firm-specific information surprise at earnings announcement and result in a better information environment.

We acknowledge that our management guidance conditional test may have an endogeneity issue. Not controlling for the propensity of management issuing guidance limits power of the interpretation. We also do not control for the timing of individual firms' announcements which may directly affect the information-transfer from early announcers to late announcers. However, if such an information transfer does affect our findings, this would bias against our results in that late announcers should have better information environment no matter high or low synchronous earnings they have.

In summary, earnings synchronicity is an earnings attribute that needs more attention. Our study fills in the gap in literature about the determinants of earnings synchronicity and examining the relationship between earnings synchronicity and firm's information environment contributes to our understanding about this cross-sectional earnings property and the role it plays in the financial reporting environment.

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DOES THE CREDIBLE FISCAL POLICY REDUCE ITS VOLATILITY? THE CASE OF INDONESIA

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Abstract

The objective of this paper is to investigate whether fiscal policy credibility, in form of explicit deficit rule or debt rule numerical constraints, can reduce the degree of its volatility. The main motivation behind this research is in one hand, a negative and robust correlation of fiscal policy volatility and long-run growth documented in several papers and on the other – relatively small number of works that discuss possible relation to the credibility. To test the hypotheses, we use the quarterly data in the case of Indonesia over the period 2001(1)-2013(4). By applying ordinary least squares method, we demonstrate that the impact of fiscal policy credibility on the fiscal policy volatility typically depends on characteristics of fiscal rule commitment. In one hand, the debt rule credibility significantly reduces the fiscal policy volatility. In contrast, the deficit rule incredibility increases the fiscal policy volatility. Those findings suggest the specific enforcement mechanism to promote automatic correction dealing with the dynamics of overall balance deficit.

Keywords: fiscal rules, deficit, debt, credibility, fiscal policy volatility.

JEL Classification: D70, E62, H60

1. Introduction

One of the most striking macroeconomic developments during the last decades is the rise and persistence of large fiscal deficits in a number of countries. This trend had already been visible in the years preceding the implementation of massive fiscal stimulus, following the eruption of the 2007-08 financial crises. Despite recent major fiscal reforms around the world, many countries suffer from recurrent large fiscal imbalances that often reflect lack of fiscal discipline (Woo, 2006).

The lack of fiscal discipline generally stems from the injudicious use of policy discretion. While policymakers can respond to unexpected shocks and in allowing elected political representatives to fulfill their mandates, the discretion can be misused, resulting in persistent deficits and pro-cyclical policies, rising debt levels, and, over time, a loss in policy credibility (Kumar and Ter-Minassian, 2007).

Evidence of pro-cyclicality in fiscal policy has been covered in a number of studies (see for example: Lane, 2003). It seems that counter-cyclicality in developed countries and pro-cyclicality of fiscal policy in developing countries to have become the received wisdom. Moreover, the pro-cyclicality applies to a wide variety of measures including total expenditure, the share of total expenditure in GDP, public consumption, and public investment (Kraay and Servén, 2008).

The mistiming of fiscal interventions in the form of correlation among those types of government expenditures (Gavin and Perotti, 1997) calls for adequate institutions or for rules, or both. While the governments with a strong reputation of fiscal prudence may have less need for discretionary policy action if they have flexible fiscal rules, fiscal rules are mechanisms to support fiscal credibility, sustainability, and counter-cyclical fiscal policies (Gutierrez, 2012). Eventually, all of them can induce the fiscal discipline to reduce fiscal policy volatility.

Knowing the fiscal policy volatility is important for several reasons (Javid *et al.*, 2011). First, due to high deficit volatility, it is not possible to predict the timing and magnitude of fiscal policies and this generates inefficiency of economic decision making. Second, the fiscal deficit volatility may also cause the government spending volatility and the distortions created by temporary or infrequent measures to meet these fluctuations in spending.

Furthermore, when government spending volatility depends on fiscal deficit volatility, the quality and efficiency of the government services may also be reduced. Third, high fiscal deficit volatility may divert investment towards short term investment projects and leads to irreversible

human capital losses. The high deficit volatility may lead to high volatility of interest rates which represents a financial burden for investments.

Indonesia is a good example to identify the relationship between fiscal credibility and fiscal policy volatility. Asian financial crisis in 1997/98 has directed government expenditures to focus on the economic recovery. The sharp increase in fiscal deficits and public debt in that period has raised concerns about the sustainability of public finances and highlighted the need for a significant adjustment over the medium term. According to the Law No. 17/2003, since 2004 Indonesia has been operating a fiscal rule based on maximum deficits and debt replacing the balance budget rule implemented since 1967.

In line with the global financial crisis in 2008, the government attempted to revive economic activity through various fiscal stimulus measures. In fact, the fiscal stimulus programs have contributed substantially to Indonesia faster and stronger than expected recovery (Hur *et al.*, 2010). After that, gradually Indonesia in 2010s is one of the largest developing countries to implement various economic liberalization reforms that produce strong economic growth (Abdullohman, 2013). Surprisingly, the rule has not been tested, as Indonesia's fiscal performance has been significantly better than the limits contained in the fiscal rule (Blöndal *et al.*, 2009).

This paper enriches the literature on fiscal policy in the context of developing countries with focus on Indonesia. We hope that lessons from Indonesia will be useful to develop a better stabilization fiscal policy design for developing countries. The study is organized as follows. Section 2 discusses the theoretical and empirical literature on this area. The methodology and data is presented in section 3. The empirical results are discussed in section 4 and the last section delivers the concluding remarks.

2. Literature review

In the theoretical strand, according to the most widespread definition, fiscal policy rules set numerical targets for budgetary aggregates. More specifically, they pose a permanent constraint on fiscal policy, expressed in terms of a summary indicator of fiscal outcomes, such as the government budget balance, debt, expenditure, or revenue developments (Kopits and Symansky, 1998).

The adoption of fiscal rules is supported by various schools of thoughts. The (Neo) Classical paradigm advocates the importance of fiscal rules that primarily aim at restricting government spending, budgetary deficits, and government debt in order to safeguard fiscal sustainability. The (Neo) Classical paradigm argues that those restrictions are necessary condition to avoid crowding-out effect.

The (New) Keynesian school of thought believes the existence of crowding-in effect induced by budgetary deficit and government debt. Therefore, the (New) Keynesian paradigm emphasizes that fiscal rules primarily aim at stabilizing macroeconomic fluctuations. These fiscal rules are guided by short-run (New) Keynesian principles of fiscal management (see: Marneffe *et al.*, 2011).

In the institutional economics point of view, while the first primary objective of fiscal rules is to enhance budgetary discipline, they can also foster policy coordination between different levels of government depending on their institutional coverage. Fiscal rules typically aim at correcting distorted incentives and containing pressures to overspend, particularly in good times, so as to ensure fiscal responsibility and debt sustainability.

Political economists argue that the adoption of fiscal rules seek to provide a solution to the deficit bias problem that is caused by politicians' short-sightedness, the common pool, and the free rider problems. In their perspective, therefore, the effectiveness of fiscal rules depends on the political and public support of fiscal sustainability and on the existence of a sound fiscal framework.

Those different perspectives provide the same basic idea of fiscal rules. Most of them suggest that fiscal rules should be supported by legal frameworks as prerequisite to ensure credible fiscal policy. It seems that all of the above paradigms agree that in the long-term fiscal rules may further contribute to the reduction of uncertainty about future fiscal policy developments.

In general, the existing empirical studies could be divided into two grand categories. The first group deals with the macroeconomic consequences induced by the fiscal policy volatility. The second one is devoted to explain the volatility of fiscal policy. In the first group, Galí (1994), for example, constructs a theoretical framework predicting output-stabilizing effects of government purchases. Ramey and Ramey (1995) presented evidence that government spending volatility has a negative effect on real GDP per capita growth.

The seminal article by Fatás and Mihov (2003) is particularly enlightening: they firstly estimate a measure of discretionary fiscal policy starting from a government expenditure series in order to exclude endogenous fiscal reactions to economic conditions, and then investigate its effects on output volatility. Conclusions suggest that the aggressive use of fiscal policy reduces macroeconomic stability.

Rother (2004) presents similar results focusing on inflation volatility. Subsequent studies are broadly in line with those initial findings (see, among others, Herrera and Vincent 2008), with some exceptions. For example, Badinger (2009) confirms the positive relationship between discretionary policy and output volatility, but not that between the former and inflation volatility, using data for OECD countries. Recently, Sacchi (2014) comprehensively analyzed the impact of fiscal rule on the stabilization function either on output growth or inflation volatility.

In the second category, although it has received less attention in the literature, excessive volatility in fiscal policy can undermine fiscal sustainability and lead to macro-financial distortions. Ciarlone and Trebeschi (2006) observed the sovereign debt in the developing countries. They found that their key determinants fail to predict the debt crisis. Tunner and Samake (2008) found that the probability of fiscal vulnerability can be reduced by fiscal adjustment programs. Celasun, *et al.* (2007) analyzed the probability of fiscal vulnerability in 5 developing countries. The most interesting result is that the fiscal policy itself is the source of fiscal vulnerability risks.

From a macro-fiscal point of view, Fatás and Mihov (2006) showed that numerical fiscal rules tend to lead to a lower degree of volatility in fiscal policy implementation. Looking at the underlying determinants, Furceri and Poplawski-Riberio (2008) found that smaller countries tend to have more volatile government spending. Debrun *et al.* (2008) study the relationship between fiscal discipline and fiscal rules in the EU-25, and they found that fiscal rules lead to more stable budget policies and less pro-cyclical fiscal policies.

Woo (2009) shows that the degree of social polarization, by influencing the behavior of opportunistic policymakers, is also a factor that affects fiscal policy volatility. Hence, there is strong evidence that fiscal policy volatility, like other features of fiscal policy, is an outcome of opportunistic behavior of policymakers, political games, and conflict. Recently, Agnello and Sousa (2014) observed significant linkages between deficit volatility and the level of economic development, political instability, and inflation, especially in countries with more trade openness.

Other studies directly assess the impact of explicit fiscal rules on fiscal policy volatility. Brzozowski and Siwinska-Gorzela (2010) argued that fiscal rules have a significant impact on fiscal policy volatility, depending on the target of the rule - public debt or fiscal balance - and that, rules will increase or decrease policy volatility. In addition, Tapsoba (2012) directly documented the effect of national numerical fiscal rules upon fiscal discipline in a panel of developing countries and comes to the conclusion that fiscal rules have significant disciplinary effect on fiscal balance.

In the case of Indonesia, specific study dealing with fiscal policy is rare. In general, the previous studies relate with the impact of fiscal policy. Simorangkir and Adamanti (2010), for example, assessed the effectiveness of fiscal stimulus in accordance with the global financial crisis. Using financial computable general equilibrium approach, they found that relative to the effectiveness of fiscal expansion without monetary policy expansion or monetary expansion without fiscal expansion, the combination of those two policies is more effective.

Basri and Rahardja (2011) found that unanticipated shocks in central government spending had a little negative effect on real GDP. By using VAR models, they also found that impact multiplier for unanticipated tax shocks to real GDP are higher than that of unanticipated shocks in government spending. In the same spirit, Hur, *et al.* (2010) found the similar results.

The fiscal stimulus programs have contributed substantially to developing Asia's countries faster and stronger than expected recovery from the global financial crisis.

Regarding to the cyclicity of fiscal policy, Akitoby *et al.* (2004) and Baldacci (2009) had not found any counter-cyclicity in fiscal policy, i.e. the Indonesian fiscal policy tends to be more a-cyclical or even pro-cyclical. Jha, *et al.* (2010) found the absence of cyclicity of fiscal policy in the case of developing Asian countries. Overall, their panel empirical results lend limited support to the popular belief that counter-cyclical fiscal policy boosted aggregate demand and output.

Abdurohman (2013) investigated the practical behavior of fiscal policy in Indonesia in response to economic cycles to establish whether it follows general fiscal wisdom or amplifies the cycle. He showed that fiscal policy in Indonesia tends to be pro-cyclical. Surjaningsih, *et al.* (2012) concluded that the absence of discretionary fiscal policy made by the government. Unfortunately, they did not explore further the volatility of fiscal policy.

In contrast, Javid *et al.* (2011) observed that that high income, rising inflation, and large budget to GDP ratio are associated with budget instability; where as a strong inertia in budget deficit volatility exists. Therefore, Indonesia needs to be cognizant of specific structural and institutional features when employing fiscal policy as an economic stabilization tool (Doraisami, 2013). Those empirical studies bring us back to the issue of credibility of fiscal policy. In the next section, we empirically examine whether fiscal policy credibility significantly reduces the fiscal policy volatility.

3. Research method

Given that a wide range of fiscal rules is conceivable and that the design of the appropriate fiscal framework depends on country-specific circumstances, the effectiveness of fiscal credibility to address the fiscal policy volatility is hard to be generalized, however. Studies of the effect of fiscal institutions in general and fiscal rules in particular, face severe empirical limitations.

As noted by Bova *et al.* (2014), a fiscal rule, however strong, cannot substitute for commitment to comply with the rule, which is largely a political factor, and as such hard to measure. Establishing a direct link between the rule and a given outcome is equally challenging, as the outcome may be due to a host of other factors, some difficult to observe. And even if a link is found, it may be impossible to determine the direction of causality (fiscal discipline may have led to the establishment of the rule, rather than the other way around).

Moreover, in characterizing fiscal policy volatility, it is also hard to distinguish fiscal policy volatility from structural fiscal policy volatility. The former refers to variability in fiscal policy, while the latter refers to changes in policies such as product market regulations, trade taxes, regulatory trade barriers, and credit and labor market regulations (Sahay and Goyal, 2007) which often inherently include in the earlier. All these problems are compounded in the case of developing countries, given limitations regarding the length and reliability of data series and the likely existence of structural breaks.

To avoid those problems, we make some adjustments. First, we take into account government consumption expenditure as main representation of fiscal policy. Second, we choose the sample periods when the political circumstance is not highly fluctuated. Three, as a consequence, we do not explicitly incorporate the political factors rather we assume that the state budget is an optimal resultant of the political process^{*)}. It means that the fiscal policy credibility could have been captured them. Forth, unlike Brzozowski and Siwinska-Gorzela (2010) and Tapsoba (2012) that used dummy variable to cover deficit rule and debt rule, we measure quantitatively the deficit rule and debt rule credibility respectively. The details are explained as follows.

The most important fiscal policy lever in the hands of the Indonesian government is government consumption. It would be worthwhile to see how change in government consumption impacts the final output in the economy. Following methodology used by Akitoby *et al.* (2006),

*) Some major transformations of public finance in early 2000s and budgeting process in Indonesia can be obtained in Blöndal *et al.* (2009).

we suppose there is a steady-state (or long-run path) relationship between government expenditure and output given by:

$$G = A Y^\delta \quad (1)$$

G represents government expenditure and Y means output. Equation (1) can also be written in the first-difference logarithmic-linear form:

$$\Delta \text{Log } G_t = a + \delta \Delta \text{Log } Y_t + \varepsilon_t \quad (2)$$

where Δ is difference operator, $a = \log(A)$ and δ are parameters to be estimated, and ε is unsystematic disturbance terms.

Following Fatás and Mihov (2003; 2006) and Afonso *et al.* (2010), equation (2) can be added by the lagged variable to accommodate persistency:

$$\Delta \text{Log } G_t = a + \delta \Delta \text{Log } Y_t + \rho \Delta \text{Log } G_{t-1} + \varepsilon_t; \quad |\rho| < 1 \quad (3)$$

where ρ indicates the degree of persistence and $(1-\rho)$ is the coefficient of partial adjustment.

The above derivation makes clear the underlying assumption that there is an elasticity relationship between output and expenditure (δ), while the transitory deviations are random (ε). The coefficient of δ also represents the fiscal policy reaction function with respect to the business cycle.

Alternatively, we use cyclical component of the output variable to identify the cyclicity of fiscal policy using Hodrick-Prescott (HP) filter procedure as conducted by Furceri (2007) and Afonso and Furceri (2008):

$$\Delta \text{Log } G_t = a + \delta \text{CY}_t + \rho \Delta \text{Log } G_{t-1} + \varepsilon_t \quad (4)$$

where CY is output gap

$$\text{CY}_t = \text{Log } Y_t - (\text{Log } (Y_t))_{\text{HP}} \quad (5)$$

In cases where δ is insignificant, there is no steady-state relationship between fiscal variable and output. Following Aizenman and Marion (1991), the unexpected effect of fiscal policy can be calculated by fitting a first-order autoregressive process and ρ is best estimated by omitting the output variable such that:

$$\Delta \text{Log } G_t = a + \rho \Delta \text{Log } G_{t-1} + \varepsilon_t \quad (6)$$

Furthermore, according to Fatás and Mihov (2003; 2006), the term of ε in those equations above is a quantitative estimate of the discretionary policy shock in government spending. We also extract the unsystematic component of government expenditure as measure to identify the power of discretionary fiscal policy. The volatility of fiscal policy is measured by the standard deviation (SD) of the discretionary fiscal policy for 4 consecutive quarters:

$$\text{FPVol} = \text{SD}(\varepsilon) \quad (7)$$

Furthermore, budget deficit is the difference between government revenue and government expenditure. This applies for the actual (subscript A) and the planned (subscript P) budgets:

$$\text{Def}_A = \text{Rev}_A - \text{Exp}_A \quad (8)$$

$$\text{Def}_P = \text{Rev}_P - \text{Exp}_P \quad (9)$$

In short, fiscal policy is said to be credible if there is a little difference between actual and projected fiscal measures (Naert, 2011). Hence, the ratio of the actual deficit to the planned deficit represents the deficit policy credibility.

$$Z_1 = \text{Def}_A \div \text{Def}_P \quad (10)$$

The accuracy of deficit rule policy is indicated by a score of 1. If the deficit budget realization in the current period is less than what has been targeted before, the budget deficit credibility index would be indicated less than 1. Meanwhile, if the budget deficit realization exceeds the projected figures, the index will be more than 1.

The similar idea is applied for debt because debt is a legacy of past deficits. Unfortunately, neither flow nor stock of the planned debt for each year in Indonesia is unavailable. Hence, we estimate the projected total debt level using HP filter procedure. The difference between the actual debt stock and the projected debt stock level indicates the debt rule policy credibility.

$$Z_2 = \text{Debt}_A \div (\text{Debt}_P)_{\text{HP}} \quad (11)$$

Eventually, we can construct the fiscal policy volatility (*FPVol*) model that is a function of deficit rule credibility (Z_1), debt rule credibility (Z_2), and other control variables (X):

$$\text{FPVol} = \theta + \varphi_1 Z_1 + \varphi_2 Z_2 + \phi_i X_i + \xi_t \quad (12)$$

The vector X includes economic openness, dummy variable to accommodate the change in fiscal rules (DFR) since 2004, and global financial crisis (DGFR) in 2008. The degree of economic openness is calculated from the following equation:

$$\text{Openness} = (\text{EX} + \text{IM}) \div Y \quad (13)$$

where *EX* is export and *IM* is import values respectively.

The sample periods chosen for this study extend from 2001(1) to 2013(4). The total observation operationally is 52 sample points. Most of the data are publicly available in quarterly. Even the debt data are published in monthly basis. Unfortunately, both the planned budget and the actual budget data are available only in annual basis. We interpolated linearly them into quarterly in order to fit to the other data.

Most of the data are taken from the central bank of Indonesia (www.bi.go.id) and Central Board of Statistics (www.bps.go.id). The total debt (summation of domestic and foreign debts) in domestic currency comes from Debt Management Office (www.djpu.kemenkeu.go.id). All of the variables are stated in 2010 base year (2010 = 1) using GDP price deflator. Most of the results are calculated in econometric program Eviews 8.

4. Results and discussion

Table 1 reports the OLS estimation results of three models specified in the previous section. Estimation of the model with lag of dependent variable, as is actually done by Fatás and Mihov (2003; 2006) and Afonso *et al.* (2010) to avoid endogeneity problems, offers the worst and inconsistent result. The coefficient of lagged dependent variable as equation (3) and (4) is found to be negative implying dynamic instability. So, we did not report them in the Table 1.

Table 1 Estimation results of fiscal policy cyclicality

Dep. Var:	Log-Linear		HP		AR	
	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.
$\Delta \log G_t$						
C	0.0897	0.0201	0.0467	0.1548	0.0725	0.0132
$\Delta \log Y_t$	-3.1472	0.0305	-3.1514	0.0305	-	-
$\Delta \log G_{t-1}$	-	-	-	-	-0.5997	0.0000
R^2		0.0920		0.0920		0.3565
$R^2\text{-adj}$		0.0735		0.0734		0.3431
SEE		0.2308		0.2308		0.1959
F		4.9663		4.9635		26.5957
N		51		51		50

We start with the simplest model connecting directly the growth rates of government spending and output (model log-linear). Surprisingly, the corresponding coefficient is found to be negative, -3.15, and statistically significant. It suggests that the government decreases 3.15 percent as a response of 1 percent increase in output growth. This finding is contrast to the previous

studies in Indonesia such as Akitoby *et al.* (2004), Baldacci (2009), Jha, *et al.* (2010) and Abdurohman (2013).

Furthermore, when we replace the rate of output growth with the growth of output gap based on HP filter procedure, model HP yields the similar coefficient, -3.15. It seems that the actual output growth is highly correlated with the growth of output gap. It implies further that the actual economic growth is almost closely to the potential one. Those two models prove that the government expenditure (in a broader sense: fiscal policy) in Indonesia is moderately counter-cyclical. It suggests that stabilization in recent years – instead of economic growth – has already become one of the primary objectives in Indonesian economic development.

However, incorporating lag of dependent variable in model HP gives the negative sign as found in models log-linear and HP. Those results are confirmed when we execute the autoregressive model by omitting the output growth variable (model AR). The coefficient of autoregression is found also to be negative and statistically significant. In this case, we re-estimate the autoregressive model at the level data.

The later produces much better result. The coefficient of lag dependent variable is 0.93 indicating high degree of persistence. There is only 7 percent partial adjustment to respond to the desired expenditure level. We will use it along with models log-linear and HP (without lag dependent variable respectively) to identify the discretionary fiscal policy and further the volatility of fiscal policy. The calculation results of standard deviation of forecast error for each model are presented in Figure 1.

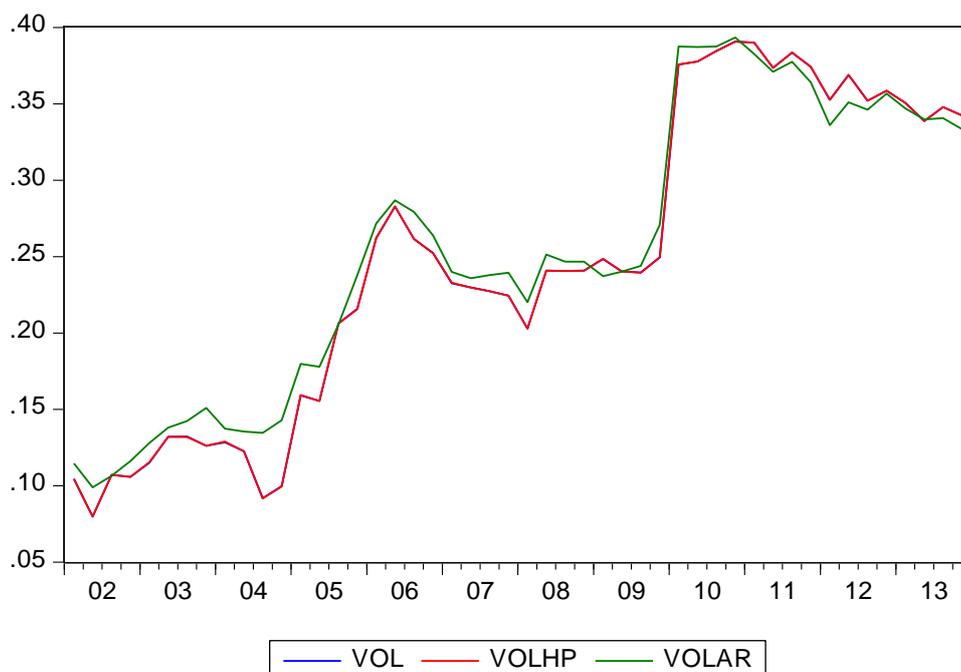


Figure 1 Fiscal policy volatility

Figure 1 offers the volatility of fiscal policy for each measurement. It seems that the three measurements confirm to each other. In the beginning of observation, the degree of fiscal policy volatility was relatively low. Surprisingly, the adoption of fiscal rule in 2004 tended to be followed by the increase in fiscal policy volatility. The high fiscal policy volatility in 2006 was associated with the spike in oil price. The high world oil price enforced the government of Indonesia to enlarge subsidy.

After increasing the domestic oil prices in the surrounding months the volatility of fiscal policy remained stable in the next three years even though still high. The peak of fiscal policy volatility took place in 2009 as a consequence of global financial crisis. In that period, the central government launched fiscal stimuli amounting 73.3 trillion Rupiah (or equivalently 1.7 percent of

GDP) allocated mostly to the social welfare in order to minimize the adverse economic impacts of global financial crisis.

It is also notable that overall the volatility of fiscal policy increases remarkably during observation periods. This raises preliminary hypothesis that the adoption of fiscal rules does not successfully yet reduce the fiscal volatility. In such a case, the fiscal policy credibility plays an important role and potentially can explain. We shall check it again empirically later using sophisticated econometric tools.

Table 2 presents the elementary statistics covering mean, median, and extreme (maximum and minimum) values for variables of interest. The average values of fiscal policy volatility for the three measurements are close to each others. Each the median value is close enough to the respective mean (in particular Z_2 and openness). The closeness of median to the mean value preliminary indicates that all of the variables of interest are normally distributed.

The symmetric distribution of the six variables is confirmed by the moderate value of skewness. Skewness measures the symmetric or normal distribution which the value is expected to be zero. The skewness values for volatility variables are slightly lower than 0 indicating that the series are skewed to the left. In contrast, the skewness values for credibility indices and openness are greater than 0 indicating that the corresponding series are skewed to the right; the upper tail of the distribution is thicker than the lower tail.

Furthermore, the deficit policy credibility (Z_1) has the greatest value of kurtosis. The kurtosis measures the peakedness or flatness of the distribution with an expected value of 3.0. Most of the kurtosis values of the series are less than 3. The result shows that only Z_1 series have kurtosis value exceed 3 implying that the tails of the distribution are thicker than the normal (i.e. leptokurtic).

The Jarque-Bera test is used to test whether the random variables with unknown means and constant dispersions are normally distributed. The Jarque-Bera test has the null hypothesis of normally distributed residuals. The probability value indicates an acceptance of the null hypothesis that the series are normally distributed. The Jarque-Bera tests confirm that all variables (except Z_1) are symmetrically distributed (bell-shaped) indicated by probability value higher than 1 percent.

It is also important to note that the credibility index of deficit rule on the average is lower than unity (0.72) implying that the projected deficit is greater than the actual one. Conversely, the debt rule credibility index on the average is almost 1 indicating that the actual debt stock level equals to the expected value. Given those result above, we can say that the debt rule policy is more credible than that of deficit rule policy.

Table 2 Descriptive statistics of fiscal volatility and fiscal policy credibility

	VOL	VOLHP	VOLAR	Z_1	Z_2	Openness
Mean	0.2462	0.2462	0.2533	0.7217	1.0016	0.5414
Median	0.2406	0.2406	0.2452	0.6975	0.9959	0.5423
Maximum	0.3908	0.3906	0.3933	3.0792	1.0929	0.6669
Minimum	0.0797	0.0797	0.0989	-0.4397	0.9402	0.4375
Std. Dev.	0.1008	0.1008	0.0929	0.6129	0.0369	0.0584
Skewness	-0.0514	-0.0513	-0.0561	1.2016	0.5114	0.0622
Kurtosis	1.6994	1.6996	1.7536	6.5035	2.3619	2.2111
Jarque-Bera	3.4045	3.4032	3.1325	36.0986	2.9070	1.2758
Probability	0.1823	0.1824	0.2088	0.0000	0.2338	0.5284

In the proceeding section, we focus on the impact of the two fiscal rules policy credibility on the fiscal policy volatility. Table 3 reports the OLS estimation results of three regression models as specified equation (12) in the previous section. All of the hypothesized variables are found to be statistically significant at least at 10 percent or even lower confidence level. They are confirmed by the high coefficient of determination (R^2) and F statistic values.

The estimation results show that the impact of the deficit rule is everywhere significant and positive. This indicates that deficit rules increase the volatility of public consumption expenditure. The sign of the coefficient of the debt rule is negative and significant. This suggests that in presence of debt rules attenuates fiscal policy volatility.

It seems that the lower credibility of policy (deficit rule) tends to induce the fiscal policy volatility. The deviations of the deficit from the target are theoretically associated with higher costs in terms of public disapproval or the loss of credibility which translates into larger premium on government securities in the financial markets. Conversely, the higher credibility of policy (debt rule) tends to reduce the fiscal policy volatility. Those findings basically support to the study of Brzozowski and Siwinska-Gorzela (2010) and Tapsoba (2012).

The degree of economic openness can also potentially decrease the fiscal policy volatility. A substantial portion of central government consumption is to purchase goods and services from abroad. Therefore, the international trade fosters the stable fiscal policy. This result is in line with Agnello and Sousa (2014). Hopefully, joining the AEC (ASEAN Economic Community) membership in 2015 will significantly reduce the excessive fiscal policy volatility.

As expected before, the coefficients of dummy variable of fiscal rules adoption and global financial crisis are positive respectively. Those are plausible result because the implementation of fiscal rules in Indonesia is in the earlier steps after switching from the balance budget rule adoption for a long time. Along with the evolution of public finance which is currently taking place continually, the adoption of fiscal rules will reduce the fiscal policy volatility.

Overall, the fiscal policy volatility tends to sharply incline. Since the volatility here refers to government consumption expenditure, we can say that there is high degree of variability and instability or even uncertainty in the government expenditure. The main source of that situation is energy subsidy. Energy subsidy is burden to the budget. Since the budget deficit limit at 3 percent of GDP, an increasing the energy subsidy has cost other important sectors like infrastructure and health (Ikhsan, 2014).

Second, given that subsidies have been a rising component of expenditures in recent years, tax revenues are a declining component of overall revenues as a result of narrowness of revenue base. Presently, the government revenue is dependent mostly on direct taxes on income and contributions natural resources. The contributions from natural resources have been growing over the years. This is a risky situation, considering the fact that oil and gas is not a reliable source of revenue over the medium to long term because the commodities are depleting natural resources, and their prices are volatile.

Third, as a result, Indonesia has one of the lowest tax-to-GDP ratios in the Asia-Pacific region. For example the tax rate in 2011 was only 10.9 percent. The low collection of tax revenues and weak administration are the primary causes. Notwithstanding a nearly fourfold increase in registered taxpayers over the last decade, voluntary compliance and enforcement procedures remain low. This limits fiscal resources and constrains the government's ability to spend on social and economic development resulting in insufficient infrastructure development expenditures.

Table 3 Estimation results of fiscal policy volatility

Dep. Var: FPVol	Log-Linear		HP		AR	
	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.
C	1.2256	0.0000	1.2259	0.0000	1.1510	0.0000
Z ₁	0.0252	0.0440	0.0252	0.0438	0.0253	0.0277
Z ₂	-0.9453	0.0000	-0.9451	0.0000	-0.8946	0.0000
Openness	-0.3227	0.0481	-0.3238	0.0474	-0.2604	0.0798
DFR	0.0887	0.0001	0.0887	0.0001	0.0917	0.0000
DGFC	0.1002	0.0000	0.1001	0.0000	0.0893	0.0000
R ²		0.8156		0.8157		0.8182
R ² -adj		0.7936		0.7938		0.7965
SEE		0.0458		0.0458		0.0419
F		37.1531		37.1858		37.7927
N		48		48		48

Conclusion

Volatility of government spending is an undesirable feature of fiscal policy. The smooth time profile of government spending enhances economic growth and justifies the quest for institutional solutions conducive of steady fiscal policy stance. Deficit and debt rules are among the most widespread legislative measures implemented to that end. The aim of this paper was to provide direct empirical evidence on the relationship between fiscal policy (deficit and debt) credibility and fiscal policy volatility in the case of Indonesia over the period 2001–2013.

The main motivation behind this research is in one hand, a negative and robust correlation of fiscal policy volatility and long-run growth documented in several papers and on the other – relatively small number of works that discuss possible relation to the credibility. To the best our knowledge, this is the first study that investigates the effectiveness of fiscal policy in Indonesia by linking fiscal rules deviation and government expenditure volatility. We use the ordinary least squares method to analyze the quarterly data on deficit rule and debt rule policy and their impact on the government expenditure volatility extracted from discretionary fiscal policy.

Based on statistical analysis, we found that deficit rule policy is less credible compared with the debt rule policy. Furthermore, our pragmatic approach proves that the impact of fiscal policy credibility on the fiscal policy volatility typically depends on characteristics of fiscal rule commitment. In one hand, the debt rule credibility significantly reduces the fiscal policy volatility. In contrast, the deficit rule incredibility increases the fiscal policy volatility. In short, we can conclude that credibility matters; the incredible fiscal deficit rules tend to destabilize fiscal policy, while rules constraining the value of public debt have an opposite result – they tend to have a stabilizing effect.

Those findings provide some important economic implications. First, they suggest the need for specific enforcement mechanism to promote automatic correction dealing with the dynamics of overall balance deficit. Second, the sound and prudent fiscal policy management is necessary to anticipate possible increase in budget deficit in the long-term. Third, as a consequence, to address the credibility problem, it is sometimes suggested to install fiscal councils with independent powers on top of the fiscal rules. Fiscal councils with tasks in forecasting and assessing fiscal policy have been and are being introduced in more and more countries.

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WHAT DRIVES STOCK MARKET DEVELOPMENT? EVIDENCE FROM INVESTOR TYPE

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Abstract

Factors that found driving stock market development in terms of liquidity measuring by aggregate turnover ratio do not necessarily induce all investor types to trade more. Rather than focusing on what drives aggregate trading activities, we focus on how investor types differ in their effects on stock market development. By dividing factors affect trading into macroeconomics, stock market fundamental, and other factors, we find different investor types respond differently to these factors. We find individual investors trade significantly more when stock market return and volatility increase comparing to foreign and institutional investors. When focusing on what factors influences different investor types net buy position, our results confirm that their trading patterns are different and not influenced by exact the same factors. In general, we find individual investor trading direction focuses more on stock market fundamental factors than macroeconomic factors comparing to the other types of investors. Therefore, understanding what influences different investor type trading activities does matter in understanding what drives stock market development.

Keywords: Stock Market Development, Liquidity, Investor Type

JEL classification: G14

1. Introduction

Financial markets is the main engine in driving economic growth. The financial market development helps enhance the role of financial intermediaries as the providers of source of fund to the economy. A well-developed financial market helps to alleviate a firm financial constraints and enhance economic growth through higher level of investment. Financial development is found to have positive effects on real economic activities such as investment, employment, productivity (Ndikumana, 2005; Rajan and Zingales, 1998; Demirgüç-Kunt and Levine, 1996; Levine et al., 2000; Levine and Zervos, 1998, Levine, 1997). Ndikumana (2005) finds larger responsiveness of investment to output growth in countries whose financial systems are more efficient in responding to investor's financial needs. The stock market development is one form of financial development. The developed and well-functioning stock market helps to promote higher level of investment and economic growth through help identifying profitable project and channelling fund to the most profitable investment activity (Ndikumana, 2005). Thus, understanding what drives stock market development are crucial. Various traditional indicators of stock market development demonstrate multi-dimensions of stock market development in terms of market size, liquidity, volatility, and concentration (Garcia and Liu, 1999). The common indicators of stock market development are value of total shares traded as a share of GDP, ratio of the value of total share traded over stock market capitalization, and stock market capitalization as a share of GDP. The larger size and the more liquid stock market indicate a higher stock market development. As the stock market becomes larger and more liquid, it can attract larger number of investors to the market that will result in higher stock market development. Previous stock market development studies mainly

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focused on what drives stock market development at aggregate level and ignores the role of investor types in driving the stock market development. Investors, however, do play an important role in driving the stock market development. The actual participation of investors in the stock market help to enhance the stock market liquidity. As market liquidity illustrates one significant dimension of the stock market development, we are interested in what causes trading activities and the role of investor types in driving market development. In other words, we want to investigate whether role of investor types do matter in understanding what drives stock market development.

By focusing on the role of investor types in driving stock market development, we analyse what factors affect overall trading activities and trading by investor types. We divide the factors that affect investor trading into macroeconomic factors, stock market fundamental factors, and other factors. The reason we focus on both factors affecting overall trading activities and trading by investor types are to confirm that the factors found driving overall trading activities do not necessarily induce all types of investors to trade more. We believe different investor types respond differently to factors affecting stock market development. We use the overall stock market turnover ratio and turnover ratio by investor types as proxies for the overall investor trading activities and trading by investor types. Using Thailand and South Korea investor type trading data, we breakdown investor types into individual, foreign, and institutional investors. To further confirm that roles of investor types does matter in understanding what drives stock market development, we investigate what factors influence different investor types' direction of trade by analysing what factors affect different investor types' net buy ratio. Using different investor types' net buy ratio allow us to observe the factors influence different investor types' direction of trade in addition to what drives their overall trading activities that include both buy and sell transactions. We believe different types of investors have different trading patterns and their trading patterns are not influenced by exact the same factors. Factors that previously found driving the stock market development in terms of overall liquidity might be the factors that drive just one particular type of investors to trade more only. Therefore, instead of focusing on what drives stock market development in aggregate, we focus on what drives different investor type trading activities to understand what drives stock market development. To our knowledge, none of previous literatures related to stock market development have yet focused on the role of investor types in driving the stock market development. We believe our study helps contribute to the stock market development literatures by focusing on the role of investor types in driving the stock market development.

This paper is organized as follow. Section 2 provides literature reviews and motivations, Section 3 provides the data, Section 4 provides research methodology, Section 5 provides estimation results, and Section 6 is conclusion.

2. Literature Reviews and Motivations

Previous literatures support the idea why we should focus on what drives stock market development by looking at the role of investor types. Different types of investors do not follow the same trading strategies and might consider different factors when trading in the stock market. Studies by Kang, Lee, and Park (2010) and Chen et al. (2009) both show different types of investors follow different trading strategies. Kang, Lee, and Park (2010) find domestic and foreign investors have different ways to evaluate stocks. They find domestic investors tend to follow a domestic benchmark and have more biased toward domestic stocks while foreign investors tends to follow a global benchmark and act as the return-chasers across countries. This leads domestic and foreign investors to hold different groups of domestic stocks. Chen et al. (2009) find foreign and domestic investors trade differently when having the same information which results in their different investment performance. Chuang and Susmel (2011) study the overconfidence trading hypothesis by Gervais and Odean (2001) by analyzing trading behaviours of investors in Taiwan. They find that both individual and institutional investors trade more aggressively following the market gains in a bull market, in up-momentum market states, in up-market states, and in low-volatility market states. They also find that only individual investors underestimate the risk and thus trade riskier securities relatively more following market gains than institutional investors.

What they have found conclude that individual investors are more overconfident traders than institutional investors. Their findings are consistent with Gervais and Odean (2001) in which they find individual investors who are considered as inexperienced investors compared to experienced institutional investors tend to be higher confident traders. Using data from Taiwanese stock market that is highly dominated by individual investors, Chuang and Susmel (2011) argue that their findings can explain why the Taiwanese stock market has a high turnover rates.

Other previous empirical evidences also confirm different trading strategies among different investor types. Foreign investors, especially in emerging markets, tend to follow a momentum trading strategy by purchasing the past winners and selling the past losers. Individual investors, on the contrary, tend to follow contrarian trading strategies by purchasing stocks when the market is falling and selling stocks when the market is up. Lin and Swanson (2003) find strong evidence that foreign investors follow momentum trading strategies and prefer large size, high book to market, and high tech stocks and have superior short-term performance but inferior long-term performance. The superior short-term performance is driven by their momentum trading strategies in which the past stock returns strongly affect foreign investor trading patterns in Taiwan. Richards (2005) also finds that foreign investors tend to follow positive feedback trading strategy with respect to global and domestic equity return. He finds that individual investors tend to be on the opposite site of trades to foreign investors. His findings support the standard demand - supply analysis in which the net purchases of one group is related to the net sales of the other group. This implies foreign investors trading represents the shift of the demand curve and the domestic individual investors move along the demand curve and act like the liquidity providers to the foreign investors so that foreign investors can change their trading positions (Richards, 2005). His findings are consistent with the finding of Grinblatt and Keloharju (2000) who use Finnish data to support the claim that foreign investors and sophisticated institutional investors tend to follow momentum trading strategies while less sophisticated investors such as domestic individual investors tend to follow contrarian trading strategies. Other empirical evidence that supports individual investors' contrarian trading strategy is the study by Odean (1998) who finds that individual investors tend to follow contrarian trading strategies in which they sell winners and hold losers as investors tend to realize their gains faster than their loses. He further argues that this individual trading behaviours are also due to their beliefs the current loses might outperform the current winners in the future. A further study by Odean (1999) finds that individual investors who are overconfident continue to trade even though the expected gains through trading are not enough to cover their costs. This will finally results in lower returns for those investors. Thus, his findings that individual investors tend to buy securities whose prices have fallen over the past six months and sell securities that have risen on average in the past recent weeks or individual investors sell winner more than loser stocks confirm that investors follow contrarian trading strategies. A study by Phansatan et al. (2012) using Thailand's weekly aggregate purchases and sales data also confirm different trading patterns among different types of investors. They find that foreign investors tend to follow a positive feedback momentum-like trading strategies. At the same time, they find institutional investors tend to trade against the foreign investors while individual investors show herding behaviour in which they have superior gain from stocks selection but have poor market timing performance.

Therefore, previous studies confirm that different investor types do not follow the same trading patterns and might consider different factors when trading in the stock market. This will certainly affect the stock market development in terms of liquidity. We therefore believe that investor types do matter in understanding what drives stock market development as factors causing them to trade more might be different. Contrary to previous literatures that focusing on what drives stock market development by looking at what drives aggregate trading activities, our study contributes to the existing stock market development literatures by focusing on the role of investor types in driving the stock market development. By knowing what causes different types of investors to trade more will help the policymakers understand different types of investor trading behaviours and thus helping them to formulate policy that enhancing the stock market development.

For factors that affect investor trading and the stock market development, we include macroeconomic, stock market fundamental, and other factors that investors would consider when trading in the stock market. The macroeconomic factors are included since previous literatures find the country growth opportunities and the sounder macroeconomic policies all positively affect the stock market development (Pagano, 1993; Levine and Zervos, 1998; Claessens et al, 2001; Claessens et al, 2006; Billmeier and Massa, 2009). As country fundamental factors are improved, more FDI will be attracted and enhancing the domestic equity market development (Claessens et al, 2001). Claessens et al (2006) find that higher income economies with sounder macroeconomic policies, a more efficient legal systems, greater openness, and higher growth opportunities have higher degree of stock market development. Garcia and Liu (1999) find real income level and growth rate, saving and investment rate, financial intermediary development, and stock market liquidity are all positively affect the stock market development. Therefore, these studies find macroeconomic fundamental factors and degree of country openness positively affect the overall stock market development. The macroeconomics factors that we include in our study are change in coincident index to measure economic condition, change in default spread to measure country default risk, change in consumer price index as a proxy of economic uncertainty, and change in real effective exchange rate as a proxy of exchange rate factor.

For stock market fundamental factors that affect investor trading in the stock market, we include stock market return, stock market volatility, change in stock market P/E ratio, and change in stock market dividend yield. Previous studies find investor trading activities are positively correlated with the stock market return. Sang-Gyung Jun et al (2003) find that the stock market liquidity as measured by trading value and turnover ratio is positively correlated with the stock returns in emerging countries. Chuang and Susmel (2011) also find a significant positive relationship between the lagged market returns for all portfolios and the current portfolios volume. Chordia et al (2001) find that liquidity falls significantly in down markets and recent market volatility induces a reduction in trading activity in the market. Glaser and Weber (2009) find that high past market returns could make investors underestimate the stock return volatility and overestimate their investment skills and ability to pick stocks based on overconfidence; the theory proposed by Gervais and Odean (2001) in which people overestimate their own success. Gervais and Odean (2001) find greater investor confidences causes higher trading volume. Their findings show that trading volume and volatility rise as a result of investors aggressive trading as they are overconfidence and are bias in evaluating their own performance. This is due to investors giving too much importance on their past success thereby lowering their expected profit. Glaser and Weber (2009) argue high returns will make investor overconfident and consequently trade more stocks. Their study finds that both past market return and past portfolio returns affect individual investors trading activities in which individual investors tend to buy high risk stocks and reduce the number of stocks in their portfolio following high portfolio returns. They find that both past market returns and past portfolios returns are positively related to investor market trading activities which are consistent with previous findings (Griffin, Nardari, and Stulz, 2007; Statman, Thorley, and Vorkink, 2006). They also find that the investor market trading activities are strongly related to their past trading activities and positively related to investor investment experience, investor age, and high risk trading strategies. They conclude that overconfidence theories are the reasons for high trading activities. Griffin, Nardari, and Stulz (2007) also find a strong positive relation between past returns and stock market turnovers in many countries. Similarly, Statman, Thorley, and Vorkink (2006) also find the monthly stock market turnover has a positive relationship with the lagged market returns. These studies all confirm that the stock market returns and the past trading volume positively affect investor trading in the stock market.

The other factors includes in our study are the S&P 500 return capturing the foreign stock market return and a dummy variable capturing Asian financial crises in 1997. These factors are considered as the external factors that might affect stock market development and investor trading in the stock market.

Therefore, we believe different type of investors consider these factors differently and follow different benchmarks when trading in the stock market. As foreign and institutional investors often viewed as sophisticated investors and more experienced investors compared to

individual investors, they might consider both macroeconomic factors and stock market fundamental factors when trading in the stock market. On the other hand, individual investors who are found to be overconfident investors (Gervais and Odean, 2001, Chuang and Susmel, 2011) who tend to overestimate their investment skills might rather focus on the stock market fundamental factors more than the macroeconomic factors. Thus, their trading activities might be more speculative than the other types of investors. Our study uses investor type trading data of Thailand and South Korea since both countries have rich investor type data. This allows us to investigate what drives stock market development by focusing on role of investor types. The stock market in Thailand and South Korea have similar characteristic since both markets are highly dominated by individual investors. We hypothesize that different types of investors do not follow exact the same factors, are influenced by the same factor differently, and have different trading patterns. In other words, different type of investor trading behaviors are different and therefore matter in understanding what drives their trading activities and therefore the stock market development.

We find, in overall, the stock market development as measured by turnover ratio is affected by both macroeconomic and stock market fundamental factors. Those factors are the economic condition, the exchange rate, the stock market return, and the stock market volatility. When we take into account the role of investor types in driving the stock market development, we find that although different types of investors consider similar factors when trading in the stock markets, they also consider different factors. While all types of investors trade more when stock market returns are higher, when the economic condition is better, and when the domestic exchange rate is stronger, Thai institutional investors tend to trade more when country default risk is higher while foreign and Thai individual investors tend to trade more when the stock market volatility is higher. We also find that different types of investors in South Korean do not consider exact the same factors when trading in the stock market. In overall, we find that individual investors in both countries are overconfident investors and trade significantly more when the stock market return and volatility increase which implies that they are highly speculative investors compared to the other types of investors.

To prove that different types of investors indeed follow different trading patterns which in turn affect stock market liquidity, we analyse what factors influence each type of investor's direction of trade. We find that different types of investors do not follow exact the same pattern when trading in the stock market. Consistent with our expectations and previous literatures, we find foreign investors are momentum chasers while individual investors are contrarian investors and trade against each other. The evidence in South Korea shows that individual investors are less sophisticated investors compared to the others types of investors. This is due to individual investors increase their net buy positions when the stock market volatility is higher and when stock market is overvalued while we do not clearly find the evidence that institutional and foreign investors increase their net buy position when the stock market is overvalued. In addition, we also find that institutional investors also increase their net buy positions when the stock market volatility is lower. Furthermore, our results also show that stock market fundamental factors play a greater role to individual investor's direction of trade than macroeconomic factors. Therefore, our results show that different types of investors trading activities are not influenced by exact the same factors and they do not follow the same trading patterns when trading in the stock market. Thus, our results confirm that we should not simply generalize what drives stock market development by only looking at what drives the overall trading activities. The same factors that previously found driving the stock market development in terms of overall (aggregate) trading activities do not necessarily induce all types of investors to trade more. Those factors could be the factors that driving trading activities of just one particular type of investors but not all. Therefore, we should focus on the role of investor types in driving the stock market development.

3. Data

We use monthly time series data from January 1994 to March 2012 collected from Thomson Reuters Datastream and CEIC Database in this study. The two dependent variables investigated in this study are *turnover ratio* and *net buy ratio*.

Turnover ratio is used to proxy the overall stock market liquidity and liquidity provided by each investor type investigated. Liquidity is the measure of stock market development in our study since liquidity tells us about the ease and speed at which the market participants can buy and sell securities. Therefore, high liquid market will encourage more investment and allow investors to alter their portfolio quickly and less costly. The more stock market liquidity, the larger amount of saving will be channelled through stock market and will lead to higher stock market capitalization and therefore stock market development (Garcia and Liu, 1999). To compute the *turnover ratio*, total trading value (i.e. buy value + sell value) is scaled by the total stock market capitalization in order to adjust for the time trend that tends to contain in the time series data of trading value/volume.

$$\text{Turnover ratio} = \frac{\text{Buy trading value} + \text{Sell trading value}}{\text{Total stock market capitalization}} \quad (3.1)$$

Since the overall turnover ratio cannot give us an information of different types of investors' direction of trade, therefore, in order to investigate the direction of trading by each investor type, the *net buy ratio* is computed as shown in the following equation.

$$\text{Net buy ratio} = \frac{\text{Buy trading value} - \text{Sell trading value}}{\text{Total stock market capitalization}} \quad (3.2)$$

To analyse the factors affecting stock market development and the direction of trading by each investor type, we divide the explanatory variables into three groups. The first group represents macroeconomic factors including change in default spread measured as a yield of country 10 years government bond minus the yield of 10 year US treasury bond to proxy for the country default risk, change in coincident index, change in consumer price index, and change in real effective exchange rate. An increase in real effective exchange rate implies domestic currency appreciation. The second group includes the factors related to the fundamental of the stock market, which are stock market return, stock market volatility, change in stock market PE ratio, and change in stock market dividend yield. The last group includes other variables that may have significant impacts on the dependent variables which are the S&P 500 return capturing the foreign stock market return and a dummy variable capturing economic crises during our sample period. This dummy variable is equal to one during the Asian financial crisis on 1997. We perform the Augmented Dickey-Fuller test for all variables used to examine the stationarity of the series. The results of this test rejects the null hypothesis of a unit root for all series indicating that all the series follow a stationary process.¹³

Table 1 reports the descriptive statistics for all the variables used. The average turnover ratio for the overall market for South Korea is approximately twice of that of Thailand indicating that the South Korean stock market is much more liquid market and therefore is more developed compared to Thailand. When we look at the average turnover ratio by investor types in both markets, individual investors contributes more than 60% of the liquidity in the market. This finding supports the overconfidence hypothesis by Gervais and Odean (2001) suggesting that individual investors tend to be overconfident investor compared to the other types of investors and findings of Statman, Thorley and Vorkink (2006) in which they argue investor overconfidence can be explained by high observed trading volume of these investors. Foreign investors, however, account for more trading activities compared to institutional investors in the Thai stock market, whereas trading activities of these two types are similar in the South Korean stock market.

Table 2 reports the descriptive statistics of net buy ratio by each investor in the Thai and South Korean stock markets. Table 2 shows that on average foreign investors are net buyers in both markets while institutional and individual investors are net sellers over the period of study. This results partly confirm that different investors follow different trading patterns especially foreign and individual investors that tend to trade against each other. This finding is consistent with Richards (2005) suggesting that net purchases of one group of investor is related to the net

¹³ For the sake of brevity, we do not report the results of the ADF tests, but they are available upon request.

sales of the other group. Individual investors in both markets tend to act as liquidity providers to foreign investors so that foreign investors can change their trading positions over the period of study.

Table 3 reports the correlation matrix of the stock market turnover ratio, turnover ratio by investor types and its determinant variables. The results show the correlation between overall turnover ratio and individual trading are the highest among three types of investors in both countries which is consistent with what we find in Table 1 that both countries stock market trading are dominated by individual investors. The correlation of stock market return and individual investor trading is the highest among three types of investors which is consistent with previous findings that individual investors are overconfident traders and trade more when the stock market return is high (Sang-Gyung Jun et al, 2003; Statman, Thorley, and Vorkink, 2006; Griffin, Nardari, and Stulz, 2007; Chuang and Susmel, 2011). At a preliminary glance, the results from the correlation matrix show that in overall the stock market development is correlated with both macroeconomic and stock market fundamental factors. In addition, different types of investors trading are not correlated with exact the same factors when trading in the stock market.

Table 4 reports the correlation matrix of the investor net buy ratio by investor types and its determinant variables. The negative correlation between foreign investor net buy ratio and individual investor net buy ratio are consistent with previous findings in which foreign and individual investor trade against each other (Richards, 2005). The results also show a negative correlation between foreign investor's net buy ratio and institutional investor's net buy ratio which imply foreign and institutional investors in both countries trade against each other in which in Thailand case is consistent with previous finding by Phansatan et al (2012). However, Thai institutional investors trade in the same direction as Thai individual investors while Korean institutional and individual investor trade against each other. The positive correlation between foreign investor's net buy ratio and stock market return and a negative correlation between individual investor's net buy ratio are consistent with previous finding that foreign investors are momentum chasers while individual investors are contrarian investors (Odean, 1998; Grinblatt and Keloharju, 2000; Lin and Swanson, 2003). The correlation matrix results are consistent with what we expect; that different types of investors do not follow same trading pattern and not look into the same factors when trading in the stock market. Individual investors seem to consider stock market fundamental factors more than macroeconomic factors when changing their net buy ratio.

Table 1: Descriptive Statistics of Monthly Turnover Ratio for Thailand and South Korea data from January 1994 to March 2012.**Thailand**

	Turnover Ratio					Macro Econ Factors			Stock Market Factors				Others	
	<i>Overall MK</i>	<i>Institutional</i>	<i>Foreign</i>	<i>Individual</i>	<i>DEF</i>	<i>COIN</i>	<i>CPI</i>	<i>EXR</i>	<i>RETURN</i>	<i>SD</i>	<i>PE</i>	<i>DY</i>	<i>CRISIS</i>	<i>SP500</i>
Mean	0.1350	0.0151	0.0347	0.0852	-0.0165	0.0011	0.0028	-0.0005	-0.0010	0.0145	-0.0483	0.0096	0.0092	0.0049
Median	0.1257	0.0121	0.0330	0.0722	-0.0150	0.0010	0.0025	0.0006	0.0048	0.0127	-0.0150	-0.0050	0.0000	0.0114
Maximum	0.4164	0.0464	0.0659	0.3413	1.4900	0.0544	0.0262	0.1233	0.2843	0.0467	8.9100	2.0800	1.0000	0.1023
Minimum	0.0344	0.0028	0.0120	0.0176	-2.8800	-0.0639	-0.0306	-0.1883	-0.3592	0.0052	-7.8700	-1.7800	0.0000	-0.1856
Std. Dev.	0.0646	0.0097	0.0114	0.0534	0.4370	0.0117	0.0055	0.0245	0.0916	0.0071	1.7093	0.3511	0.0956	0.0457
Observation	218	218	218	218	218	218	218	218	218	218	218	218	218	218

South Korea

	Turnover Ratio					Macro Factors			Stock Market Factors				Others	
	<i>Overall MK</i>	<i>Institutional</i>	<i>Foreign</i>	<i>Individual</i>	<i>DEF</i>	<i>COIN</i>	<i>CPI</i>	<i>EXR</i>	<i>RETURN</i>	<i>SD</i>	<i>PE</i>	<i>DY</i>	<i>CRISIS</i>	<i>SP500</i>
Mean	0.2968	0.0528	0.0405	0.1944	0.0239	0.0046	0.2294	-0.1091	0.0035	0.0164	-0.0495	-0.0003	0.0092	0.0049
Median	0.2733	0.0485	0.0440	0.1747	0.0050	0.0053	0.2000	0.1250	0.0009	0.0134	0.0000	0.0000	0.0000	0.0114
Maximum	0.8015	0.1382	0.1134	0.6035	8.0100	0.0166	1.7000	7.4800	0.3945	0.0521	7.8000	1.0300	1.0000	0.1023
Minimum	0.1189	0.0213	0.0039	0.0645	-6.1500	-0.0168	-0.5000	-29.1400	-0.3181	0.0051	-15.8000	-1.8900	0.0000	-0.1856
Std. Dev.	0.1183	0.0188	0.0204	0.1000	1.8534	0.0050	0.3532	3.1010	0.0872	0.0087	2.0241	0.2405	0.0956	0.0457
Observation	218	218	218	218	218	218	218	218	218	218	218	218	218	218

Note: *DEF* = change in default spread, *COIN* = change in coincident index, *CPI* = change in consumer price index, *EXR* = change in real effective exchange rate, *RETURN* = stock market return, *SD* = stock market volatility, *PE* = change in stock market P/E ratio, *DY* = change in stock market dividend yield, *CRISIS* = dummy variable for economic crisis, *SP500* = return on the S&P 500 stock index.

Table 2: Descriptive Statistics of Monthly Net Buy Ratio for Thailand and South Korea from January 1994 to March 2012

	Thailand			South Korea		
	<i>Institutional</i>	<i>Foreign</i>	<i>Individual</i>	<i>Institutional</i>	<i>Foreign</i>	<i>Individual</i>
Mean	-0.0001	0.0003	-0.0002	-0.0007	0.0009	-0.0004
Median	-0.0001	0.0000	-0.0001	-0.0002	0.0005	-0.0002
Maximum	0.0039	0.0136	0.0079	0.0114	0.0201	0.0112
Minimum	-0.0044	-0.0097	-0.0094	-0.0180	-0.0109	-0.0079
Std. Dev.	0.0012	0.0035	0.0029	0.0033	0.0043	0.0029
Total	218	218	218	218	218	218

Table 3: Correlation Matrix of the Stock Market Turnover and Determinant Variables

Correlation	Thailand				South Korea			
	Turnover Ratio (<i>TURNOVER</i>)				Turnover Ratio (<i>TURNOVER</i>)			
	Overall MK	Institutional	Foreign	Individual	Overall MK	Institutional	Foreign	Individual
<i>INS TURN</i>	0.4134 (6.6732)**	1 -	-	-	0.7612 (17.2518)*	1 -	-	-
<i>FOR TURN</i>	0.7201 (15.2543)**	0.1628 (2.4254)*	1 -	-	0.2040 (3.0631)**	0.0934 (1.3786)	1 -	-
<i>IND TURN</i>	0.9805 (73.3320)**	0.2839 (4.3525)*	0.6280 (11.8605)**	1 -	0.9703 (58.9712)*	0.6748 (13.4373)*	-0.0054 (-0.0799)	1 -
<i>DEF</i>	0.0312 (0.4590)	0.0670 (0.9865)	-0.0111 (-0.1634)	0.0280 (0.4112)	0.2016 (3.0256)**	0.1767 (2.6385)**	-0.0040 (-0.0589)	0.1985 (2.9767)**
<i>COIN</i>	0.1331 (1.9743)*	0.0713 (1.0507)	0.0815 (1.2028)	0.1306 (1.9366)	0.2462 (3.7331)**	0.2359 (3.5674)**	0.0301 (0.4431)	0.2331 (3.5227)**
<i>CPI</i>	-0.1563 (-2.3259)*	-0.0772 (-1.1386)	-0.0197 (-0.2888)	-0.1708 (-2.5472)*	-0.1088 (-1.6080)	-0.0699 (-1.0303)	-0.0057 (-0.0836)	-0.1137 (-1.6815)
<i>EXR</i>	0.0793 (1.1687)	0.0609 (0.8970)	0.0614 (0.9040)	0.0717 (1.0567)	0.0321 (0.4727)	-0.0467 (-0.6868)	-0.0856 (-1.2626)	0.0679 (1.0004)
<i>RET</i>	0.3365 (5.2526)**	0.1435 (2.1314)*	0.1639 (2.4424)*	0.3459 (5.4179)**	0.2091 (3.1421)**	0.1830 (2.7358)**	0.0195 (0.2862)	0.2018 (3.0288)**
<i>SD</i>	0.0899 (1.3272)	-0.0938 (-1.3843)	0.3053 (4.7118)**	0.0607 (0.8935)	0.5485 (9.6402)**	0.2876 (4.4137)**	0.0743 (1.0947)	0.5653 (10.0719)**
<i>PE</i>	0.2002 (3.0030)**	0.0744 (1.0964)	0.1277 (1.8928)	0.2013 (3.0204)**	0.1332 (1.9755)*	0.0888 (1.3109)	0.0151 (0.2223)	0.1310 (1.9426)
<i>DY</i>	-0.1248 (-1.8484)	-0.0192 (-0.2823)	-0.0607 (-0.8942)	-0.1344 (-1.9937)*	-0.1025 (-1.5151)	-0.0998 (-1.4747)	0.0333 (0.4903)	-0.1077 (-1.5924)
<i>CRISIS</i>	0.0095 (0.1401)	0.0626 (0.9221)	0.0721 (1.0621)	-0.0152 (-0.2229)	0.0238 (0.3503)	0.0596 (0.8780)	0.0993 (1.4665)	-0.0049 (-0.0713)
<i>SP500</i>	0.0183 (0.2687)	-0.0025 (-0.0372)	0.0542 (0.7975)	0.0110 (0.1619)	-0.0400 (-0.5885)	-0.0435 (-0.6392)	-0.1851 (-2.7678)**	0.0019 (0.0286)

Note: t-statistics are reported in the parenthesis. * and ** denote significance at 5 and 1 percent, respectively. *TURNOVER* = turnover ratio for overall market, institutional investors, foreign investors and individual investors, *DEF* = change in default spread, *COIN* = change in coincident index, *CPI* = change in consumer price index, *EXR* = change in real effective exchange rate, *RET* = stock market return, *SD* = stock

market volatility, *PE* = change in stock market P/E ratio, *DY*= change in stock market dividend yield, *CRISIS* = dummy variable for economic crisis, *SP500* = return on the S&P 500 stock index.

Table 4: Correlation Matrix of Investor Net Buy Position and Determinant Variables

Correlation	Thailand's Net Buy Ratio (<i>NETBUY</i>)			South Korea's Net Buy Ratio (<i>NETBUY</i>)		
	Institutional	Foreign	Individual	Institutional	Foreign	Individual
Institutional	1			1		
Foreign	-0.6670 (-13.1568)**	1		-0.6852 (-13.8280)**	1	
Individual	0.3960 (6.3390)**	-0.9483 (-43.9147)**	1	-0.1607 (-2.3927)*	-0.5668 (-10.1110)**	1
<i>DEF</i>	-0.0321 (-0.4718)	-0.0598 (-0.8803)	0.0874 (1.2888)	-0.0904 (-1.3342)	0.3815 (6.0657)**	-0.3840 (-6.1125)**
<i>COIN</i>	0.0392 (0.5765)	-0.0290 (-0.4264)	0.0190 (0.2800)	0.1862 (2.7857)**	-0.0361 (-0.5306)	-0.1118 (-1.6534)
<i>CPI</i>	-0.1487 (-2.2098)*	0.1087 (1.6071)	-0.0706 (-1.0407)	-0.1744 (-2.6036)**	0.1497 (2.2254)*	-0.0085 (-0.1247)
<i>EXR</i>	0.0120 (0.1761)	-0.0504 (-0.7413)	0.0570 (0.8388)	0.0511 (0.7520)	0.1556 (2.3144)*	-0.2558 (-3.8890)**
<i>RET</i>	-0.1577 (-2.3466)*	0.5689 (10.1675)**	-0.6340 (-12.0490)**	-0.0315 (-0.4626)	0.4783 (8.0045)**	-0.5976 (-10.9526)**
<i>SD</i>	0.0831 (1.2255)	-0.1302 (-1.9304)	0.1251 (1.8531)	-0.2166 (-3.2600)**	-0.0350 (-0.5147)	0.3065 (4.7317)**
<i>PE</i>	-0.1583 (-2.3560)*	0.4010 (6.4338)**	-0.4268 (-6.9362)**	-0.0830 (-1.2234)	0.2779 (4.2525)**	-0.2482 (-3.7650)**
<i>DY</i>	0.1141 (1.6878)	-0.4661 (-7.7421)**	0.5258 (9.0847)**	0.0998 (1.4734)	-0.4100 (-6.6070)**	0.4331 (7.0616)**
<i>CRISIS</i>	0.0007 (0.0110)	-0.1094 (-1.6173)	0.1345 (1.9947)*	0.0948 (1.4002)	-0.1182 (-1.7498)	0.0746 (1.0993)
<i>SP500</i>	-0.1095 (-1.6193)	0.3703 (5.8591)**	-0.4097 (-6.6014)**	-0.2114 (-3.1783)**	0.4206 (6.8126)**	-0.3321 (-5.1752)**

Note: t-statistics are reported in the parenthesis. * and ** denote significance at 5 and 1 percent, respectively. *DEF* = change in default spread, *COIN* = change in coincident index, *CPI* = change in consumer price index, *EXR* = change in real effective exchange rate, *RET*= stock market return, *SD* = stock market volatility, *PE* = change in stock market P/E ratio, *DY*= change in stock market dividend yield, *CRISIS* = dummy variable for economic crisis, *SP500* = return on the S&P 500 stock index.

4. Research Methodology

4.1 Factors driving overall stock market development and trading by each investor type

We measure the stock market development using stock market liquidity. The more liquid market will accommodate more investment and therefore increase market capitalization which will lead to greater stock market development. The turnover ratio is computed to proxy stock market liquidity. To determine factors driving the overall stock market liquidity for Thai and South Korean stock markets, the following regression is estimated for each market.

$$\begin{aligned}
 \text{TURNOVER}_t = & \alpha_0 + \beta_1 \text{TURNOVER}_{t-1} + \beta_2 \text{DEF}_t + \beta_3 \text{COIN}_t + \beta_4 \text{CPI}_t + \beta_5 \text{EXR}_t \\
 & + \beta_6 \text{RET}_t + \beta_7 \text{SD}_t + \beta_8 \text{PE}_t + \beta_9 \text{DY}_t + \beta_{10} \text{CRISIS}_t + \beta_{11} \text{SP500}_t + \varepsilon_{1t}
 \end{aligned}
 \tag{4.1}$$

Where *TURNOVER* is overall stock market turnover ratio used to proxy overall stock market development through market liquidity. $TURNOVER_{t-1}$ represents the AR (1) process in the model to allow the impact of the past information of the variable and control for potential autocorrelation in trading activity (Glaser and Weber, 2009). Glaser and Weber (2009) find investor market trading activity is strongly related to the past trading activity. Therefore, we expect to see a significant positive relationship between current turnover ratio and past turnover ratio.

For the macro factors, *DEF* denotes the change in default spread. Default spread is the yield of the country's 10-year government bond minus the yield of 10-year US Treasury bond as a proxy for the country default risk. We expect a negative relationship between the country default spread and the stock market turnover ratio since lower country default spread imply lower country risk and lower risk of holding country securities.

COIN denotes change in coincident index which is a proxy for economic condition. We expect a positive relationship between a stock market turnover ratio and the economic condition since good economic conditions will result in higher firm expected profit which will further result in higher stock price and more investor trading in the stock market. As higher income or higher economic growth illustrates the expansion phase of business cycle which will result in more profitable companies being quoted on the stock markets, therefore, the investors will likely to invest in the stock market during those good times. Thus, a better economic environment and fundamentals will attract investors into the market and therefore enhancing the stock market development (Claessens et al., 2006). This will result in the larger stock market capitalization and higher trading volume (Billmeier and Massa, 2009). Therefore, we expect a positive relationship between the economic condition and stock market development.

CPI denotes change in consumer price index which is a proxy for economic uncertainty. We expect a negative relationship between the stock market turnover and inflation since higher inflation induces uncertainty and increase the probability that central bank might raise the interest rate to keep inflation under control. Thus, higher inflation will negatively affect the stock price, firm future earning, and therefore investor trading in the stock market.

EXR denotes change in real effective exchange rate which is a proxy for exchange rate factor. Increase in the real effective exchange rate imply a domestic currency appreciation. We expect a positive relationship between the exchange rate and the stock market turnover ratio since the currency appreciation will attract the capital inflows and investors to the market. Thus, we expect that currency appreciation will results in higher stock market development.

Considering stock market related factors, *RET* denotes stock market return. Glaser and Weber (2009) find that past returns affect trading volume since high returns make investors overconfident and consequently trade more based on overconfidence theory. Their findings are consistent with a study by Griffin, Nardari, and Stulz (2007) and Statman, Thorley, and Vorkink (2006) whom also find that stock market trading volume has a positive relationship with past market returns. Thus, based on previous studies and overconfidence hypothesis in which high past market returns could make investors underestimate the stock return volatility and overestimate their investment skills and ability to pick stocks (Glaser and Weber, 2009), we expect a positive relationship between the stock market return and stock market development. In other words, high stock market returns attract investors to the market and therefore results in greater stock market development through higher stock market turnover ratio.

SD denotes stock market volatility. We expect a negative relationship between the stock market development and stock market volatility. This is due to the fact that high stock market volatility may imply high speculative activities in the market and is likely to negatively affect the stock market development.

PE denotes change in stock market P/E ratio. P/E ratio is usually used by investors and stock analysts as one of the indicators to determine whether the stocks are reasonably priced (Shen, 2000). According to Shen (2000), a low P/E ratio implies the stock is undervalued. Therefore low P/E ratio tends to be followed by high stock prices and high trading volume since trading volume is expected to positively related with stock returns. On the other hands, a high P/E ratio implies stock price is

overvalued. Thus, high P/E ratio tends to be followed by low stock prices and low trading volume. Therefore, we expect a negative relationship between stock market P/E ratio and the stock market turnover ratio and therefore the stock market development.

DY denotes change in stock market dividend yield. Dividend yield is included as a proxy for future earnings and future stock return which might be another factor that investors consider when they invest in the stock market. Fama and French (1988) find that dividend yields have a significant power to forecast stock return as predicting power increases over the return horizons from one month to four years. In addition, dividend yields also reveal expectations about the firm future returns and cash flow (Chen (b), 2012). Since stock price also equals to the expected value of future dividend received, higher dividend yield might associated with higher future stock returns and therefore positively affect the stock market turnover and the stock market development. Therefore, we expect a positive relationship between the stock market dividend yield and the stock market turnover ratio.

We add the S&P 500 return to capture external factors that might impact the Thai and Korean stock markets. The crisis dummy is included in the model to pick up the extreme events that have taken places in the markets. This dummy variable is equal to one for the Asian Financial crisis in 1997 and zero otherwise.

The overall stock market turnover ratio can be categorized into each investor type-institutional investors, foreign investors and individual investors. This allows us to investigate sensitivity of trading activity of each investor type to each determinant. For instance, foreign investor may consider a set of information or factors when they make a decision to trade, while the trading decision by the local institutions and individual investors could be driven by other information or variables. To examine factors determining the trading activities of each investor type, the equation (4.1) is re-estimated using the turnover ratio for each type of investors instead of the overall market turnover ratio. We estimate turnover by investor types jointly by using Seemingly Unrelated Regression to take into account that the error terms across investor type equations might be correlated.

We expect the same factors found driving the overall (aggregate) trading activities do not necessary induce all types of investors to trade more. We expect different investor types might follow a different set of information and might be influenced by different factors when trading in the stock market. We expect local individual investors who are overconfident investors and tend to overestimate their investments skills would mainly focus on domestic stock market fundamental factors while foreign investors would consider both macroeconomic and stock market fundamental factors when trading in the stock market. This is due to they are more sophisticated investors and are return chasers globally. Therefore, we expect economic condition, country default risk, exchange rate, inflation rate as well as the S&P500 return matter more for foreign investor trading than local individual investors. We also expect institutional investors to consider both macroeconomic and stock market fundamental factors when trading in the stock market since they are also often viewed as sophisticated and experienced investors as compared to individual investors. We believe that different types of investors trading behaviours will affect the market liquidity and stock market development.

4.2 Factors influencing trading direction of each investor type

The previous section examines factors determining trading activities of each investor type. However, as stated earlier, we compute turnover ratio from total trading value which includes both buy and sell transactions, thus we could not identify the direction of the trade (i.e. whether they are net buy or net sell) of each investor type. Therefore, this section examines the effects of each determinant on each investor type's direction of trade by estimating the following regression.

$$\begin{aligned} NETBUY_t = & \alpha_0 + \beta_1 NETBUY_{t-1} + \beta_2 DEF_t + \beta_3 COIN_t + \beta_4 CPI_t + \beta_5 EXR_t \\ & + \beta_6 RETURN_t + \beta_7 SD_t + \beta_8 PE_t + \beta_9 DY_t + \beta_{10} CRISIS_t + \beta_{11} SP500_t + \varepsilon_t \end{aligned} \quad (4.2)$$

where *NETBUY* is the net buy ratio for institutional investors, foreign investors and individual investors. We also estimate net buy ratio by investor type equations jointly by using Seemingly Unrelated Regressions to take into account correlation in error terms across equations.

As we expect different types of investors to consider different factors when trading in the stock market, we expect foreign and domestic investors to follow a different benchmark and trade against each other since following different benchmark will lead them to holds different groups of domestic stocks (Kang, Lee, and Park, 2010). Consistent with previous studies, we expect foreign investors to follow momentum trading strategy by buying past winning stocks and selling past losers while we expect individual investors to follow a contrarian strategy (Grinblatt and Keloharju, 2000; Hong and Lee, 2011; Phansatan et al, 2012). Therefore, we expect a positive relationship between the foreign investor's net buy ratio and stock market return while expect a negative relationship between the individual investor's net buy ratio and the stock market return. Consistent with our argument above, we expect foreign investors to be more experienced and sophisticated investors compared to local individual investors and therefore focusing on both macroeconomic and stock market fundamental factors when changing their net buy positions in the stock market. Therefore we still expect foreign investors to consider country risk, economic condition, inflation, exchange rate factor, and S&P500 return more than local individual investors as they are return chasers globally.

5. Estimation Results

Consistent with our arguments, results on Table 5 and 6 show that the overall stock market turnover in both Thailand and South Korea has a positive relationship with the past market turnover, the economic condition, the exchange rate, and the stock market return. The results show both macroeconomic and stock market fundamental factors influence the stock market development. The better economic condition results in higher firm expected profit while the stronger exchange rate value attracts capital inflow and investors to the market. Therefore, both results in higher stock market development. The positive relationship between the stock market return and overall stock market turnover is expected since both markets are dominated by individual investors. Higher stock market return will make investors, especially the individual investors, overconfident and trade more. Thus, our finding is consistent with overconfidence hypothesis and previous findings that investors look at market return and trade more as they are overconfident and are bias in evaluating their own performance. The positive relationship between the stock market volatility and the stock market turnover is unexpected since the results imply higher volatility results in more investors trading in the stock market. Nevertheless, though the relationship is initially unexpected, the results is not surprising given that both stock markets are heavily traded by individual investors whom tend to engage in highly speculative trading activities. Therefore, it is possible that higher current stock market volatility induce more speculative activities in the stock market and therefore attract overconfident investors to trade more. In addition to those factors, the South Korean stock market turnover is also higher when stock market P/E ratio and dividend yield are higher. The positive relationship between the P/E ratio and the stock market turnover is also unexpected but nevertheless is consistent with our finding of positive relationship between the stock market turnover and stock market volatility. This is due to higher P/E implies stock market is overvalued which implies speculative trading activities do occur in the stock market that is dominated by individual investors. This finding might also imply that investors who invest in South Korean stock market are highly speculative and overconfident investors who are after high yields and a high volatility market and thus trade more when the stock market volatility and P/E ratio are higher.

Table 5: Factors driving overall stock market development and trading by each investor type: Thailand

Independent Variables	Turnover Ratio (<i>TURNOVER</i>)			
	Overall MK	Institutional	Foreign	Individual
<i>Constant</i>	0.0284 (2.8104)**	0.0017 (1.6590)	0.0042 (2.3012)*	0.0103 (1.8085)
Lag <i>TURNOVER</i>	0.6472 (9.9207)**	0.8180 (28.9463)**	0.6809 (17.9057)**	0.7434 (25.0601)**
Macro Factors				
<i>DEF</i>	0.0073 (0.8844)	0.0017 (2.0720)*	0.0007 (0.5111)	0.0036 (0.7309)

<i>COIN</i>	0.6919 (2.9904)**	0.1038 (3.4826)**	0.1393 (2.9193)**	0.4416 (2.5334)*
<i>CPI</i>	-0.4192 (-1.0005)	-0.0406 (-0.6265)	0.1463 (1.4079)	-0.4245 (-1.1170)
<i>EXR</i>	0.3159 (3.2974)**	0.0300 (2.0509)*	0.0708 (3.0100)**	0.1929 (2.2415)*
<u>Stock Market Factors</u>				
<i>RET</i>	0.2882 (4.7190)**	0.0146 (2.3823)*	0.0352 (3.5850)**	0.2163 (5.9727)**
<i>SD</i>	1.3565 (3.4418)**	0.0597 (1.1284)	0.4354 (5.1055)**	0.8467 (2.7447)**
<i>PE</i>	0.0020 (1.1465)	0.0003 (1.1955)	0.0004 (0.8724)	0.0015 (1.0061)
<i>DY</i>	0.0178 (1.7105)	0.0015 (0.9510)	0.0043 (1.6976)	0.0087 (0.9335)
<u>Others Factors</u>				
<i>Crisis</i>	0.0532 (2.3096)*	0.0084* (1.9995)	0.0018 (0.2682)	0.0438 (1.7828)
<i>SP500</i>	-0.0904 (-1.2643)	-0.0003 (0.0356)	0.0041 (0.2933)	-0.0767 (-1.4889)
R^2	0.6486	0.7283	0.4846	0.6945
Adjust R^2	0.6928	0.7138	0.4571	0.6782

This table reports the estimates of the following equation

$$TURNOVER_t = \alpha_0 + \beta_1 TURNOVER_{t-1} + \beta_2 DEF_t + \beta_3 COIN_t + \beta_4 CPI_t + \beta_5 EXR_t + \beta_6 RET_t + \beta_7 SD_t + \beta_8 PE_t + \beta_9 DY_t + \beta_{10} CRISIS_t + \beta_{11} SP500_t + \varepsilon_t \quad (4.1)$$

where *TURNOVER* = turnover ratios for overall market, institutional investors, foreign investors and individual investors, *DEF* = change in default spread, *COIN* = change in coincident index, *CPI* = change in consumer price index, *EXR* = change in real effective exchange rate, *RET* = stock market return, *SD* = stock market volatility, *PE* = change in stock market P/E ratio, *DY* = change in stock market dividend yield, *CRISIS* = dummy variable for economic crisis, *SP500* = return on the S&P 500 stock index. t-statistics are reported in the parenthesis. * and ** denote significance at 5 and 1 percent, respectively. Turnover ratio by investor type regressions are estimated jointly by Seemingly Unrelated Regression.

Table 6: Factors driving overall stock market development and trading by each investor type: South Korea

Independent Variables	Turnover Ratio (<i>TURNOVER</i>)			
	Overall MK	Institutional	Foreign	Individual
<i>Constant</i>	0.0265 (1.7230)	0.0058 (2.2598)*	0.0004 (-0.1826)	-0.0125 (-1.3641)
Lag <i>TURNOVER</i>	0.5259 (9.9987)**	0.7466 (23.4436)**	0.9144 (34.4118)**	0.6763 (20.7210)**
<u>Macro Factors</u>				
<i>DEF</i>	0.0009 (0.2820)	0.0009 (0.9730)	0.0004 (0.5751)	-0.0018 (-0.4751)
<i>COIN</i>	4.1261 (3.8461)**	0.3429 (2.0204)*	0.3428 (2.4878)*	2.1791 (3.0534)**

<i>CPI</i>	0.0009 (0.0821)	-0.0013 (-0.5611)	0.0032 (1.7227)	-0.0012 (-0.1239)
<i>EXR</i>	0.0032 (2.5224)*	-0.0004 (-1.5793)	-0.0001 (-0.3169)	0.0025 (2.1924)*
<u>Stock Market Factors</u>				
<i>RET</i>	0.4494 (4.2378)**	0.0704 (4.3012)**	0.0085 (0.6244)	0.3673 (5.5119)**
<i>SD</i>	5.7500 (7.5809)**	0.3491 (3.4442)**	0.0985 (1.2020)	3.9413 (8.3351)**
<i>PE</i>	0.0029 (2.6664)**	-0.0001 (-0.1949)	-0.0003 (-0.4774)	0.0033 (1.1204)
<i>DY</i>	0.0689 (2.1242)*	0.0147 (2.8726)**	0.0035 (0.8359)	0.0550 (2.6497)**
<u>Others Factors</u>				
<i>Crisis</i>	0.0232 (0.7426)	0.0099 (1.1820)	0.0061 (0.8801)	0.0193 (0.5623)
<i>SP500</i>	-0.1571 (-1.4421)	-0.0123 (-0.6125)	-0.0062 (-0.3713)	-0.0656 (-0.8058)
<i>R²</i>	0.7466	0.6351	0.7925	0.7839
<i>Adjust R²</i>	0.7331	0.6156	0.7815	0.7723

This table reports the estimates of the following equation

$$\begin{aligned}
 TURNOVER_t = & \alpha_0 + \beta_1 TURNOVER_{t-1} + \beta_2 DEF_t + \beta_3 COIN_t + \beta_4 CPI_t + \beta_5 EXR_t \\
 & + \beta_6 RET_t + \beta_7 SD_t + \beta_8 PE_t + \beta_9 DY_t + \beta_{10} CRISIS_t + \beta_{11} SP500_t + \varepsilon_{it}
 \end{aligned}
 \tag{4.1}$$

where *TURNOVER* = turnover ratios for overall market, institutional investors, foreign investors and individual investors, *DEF* = change in default spread, *COIN* = change in coincident index, *CPI* = change in consumer price index, *EXR* = change in real effective exchange rate, *RET* = stock market return, *SD* = stock market volatility, *PE* = change in stock market P/E ratio, *DY* = change in stock market dividend yield, *CRISIS* = dummy variable for economic crisis, *SP500* = return on the S&P 500 stock index. t-statistics are reported in the parenthesis. * and ** denote significance at 5 and 1 percent, respectively. Turnover ratio by investor type regressions are estimated jointly by Seemingly Unrelated Regression.

To better understand what drives stock market development when we expect different investor types do not consider exact the same factors when trading and the factors found driving the stock market development do not necessarily induce all investor types to trade more, we focus into the role of investor types in driving the stock market development. Consistent with previous findings, all types of investors' turnover ratio are positive related to their past trading activities and economic condition. In other word, past trading activities and good economic condition induce all types of investors trading in both South Korea and Thailand. Consistent with what we expected, the results in Table 5 and Table 6 show that although different types of investors trading are affected by similar macroeconomic and stock market fundamental factors, their trading are not affected by exact the same factors. In Thailand case, in addition to economic condition, all types of investors trading are positively related to an exchange rate value. Consistent with our argument and previous results, the stronger exchange rate value induces more investor trading in the stock market regardless of which type of investor they are. However, the institutional investors trading unexpectedly has a significantly positive relationship with a country default risk. In terms of stock market fundamental factors, all types of investors trading have significant positive relationship with a stock return. In other words, all types of investors trading increase when stock market return increases. The relationship is particularly strong for individual investor since the coefficient of individual investor is the highest among three types of investors. The coefficient is 0.2163 for individual investor and 0.0352 and 0.0146 for foreign and institutional investor respectively. This finding is consistent with previous findings that individual investors are overconfident investors and tend to overestimate their investment skills. The significant positive

relationship between the individual investor trading and the stock market volatility in which the coefficient are the highest compared to other type of investors (0.8467 for individual investors and 0.4354 for foreign investors) also confirm that these individual investors are overconfident and highly speculative investors. The stock market volatility, however, seems to have no influence on institutional investor trading. The significant positive correlation between the stock market return and volatility with the overall investor trading seems to be influenced by foreign and individual investors trading.

The results in South Korean case show that the stock market fundamental factors play more of a role than macroeconomic factors for investor trading especially for institutional and individual investors. All investor types trade more when the economic condition is good but only individual investor trades significantly more when exchange rate value is stronger. The results that we find previously on the overall South Korean investor trading seem to be driven by individual investor trading. The results in Table 6 shows that institutional investors trade more when the stock market return, stock market dividend yield, and stock market volatility are high. Unlike in Thailand case, the stock market fundamental factors seem to have no influence on foreign investors trading. The results we find for South Korean individual investor trading are similar to Thailand case since the results show that they are overconfident investors and are highly speculative as the coefficient on the stock market return (0.3673 for individual investor and 0.0704 for institutional investor) and stock market volatility (3.9413 for individual investors and 0.3491 for institutional investor) are the highest among three types of investors. In addition, they also trade more when the stock market dividend yield is high. In other words, individual investors trade more when the stock market return and volatility increase and when they expect higher future return.

In conclusion, although different types of investors consider similar factors when trading in the stock market, their trading activities are not driven by exact the same factors. Individual investor seems to focus more on stock market fundamental factors and their trading activities seem to be more speculative than other type of investors. Thus, what causes overall trading activities to increase do not necessarily cause all types of investors to trade more. Since the investor turnover ratio includes both buy and sell transactions, to better understand what drives stock market development, we further analyse what factors influence different types of investors' direction of trade through analysing what influence their net buy position. We would like to confirm that different investor types trading patterns are not the same and are not driven by exact the same factors. By analysing investor's direction of trade, we would like to further confirm that the role of investor types does matter in understanding what drive stock market development.

Table 7 and 8 show factors influencing trading direction of each investor type. The trading direction of each investor type in Thailand are related to stock market fundamental and other external factors only. Consistent with our expectation, all investors' net buy ratio are highly positively related to their past net buy ratio. Consistent with previous studies and our hypothesis, foreign and individual investors do trade against each other in which foreign investors are momentum chasers while individual investors are contrarian investors. The stock market return seems to be only stock market fundamental factor that influence foreign and Thai individual investors' direction of trade. Institutional investors, on the other hand, are not significantly influenced by any factors. The results in Thailand confirm our argument that different types of investors do follow different trading patterns and are influenced by the same factor differently.

The results in Table 8 also confirm our argument that different types of investors do not follow the same trading patterns in South Korea. The results for South Korea, however, show that the macroeconomic factors, the stock market fundamental factors, and the other external factors influence all types of investors net buy position. Similar to Thailand case, all types of investors' direction of trade are influenced by their past net buy position and foreign and individual investors do trade against each other. Foreign investors in South Korea also follow momentum trading strategies while individual investors follow contrarian trading strategies. We find that individual investors increase their net buy position when country default risk is lower while inflation rate significantly affects both institutional and foreign investors' net buy ratio. Stock market fundamental factors seem to influence individual investor's trading direction more than macroeconomic factors. The finding that institutional investors increase their net buy positions when the stock market volatility is lower, partly show that

they are somewhat sophisticated investors. Both institutional and foreign investors' direction of trade are both affected by S&P500 return also partly show that they look beyond domestic benchmark when trading in the stock market and thus are more sophisticated investors. South Korean individual investors, on the other hand, increase their net buy position when the stock market P/E ratio is high or when the stock market is overvalued, thus partly show that they are less sophisticated and highly speculative investors compared to the other types of investors. The trading pattern of the South Korean individual investors here is consistent with the results that we find in Table 6 which show that they are overconfident and highly speculative investors as they increase their net buy position when the stock market volatility is up and the market is overvalued. Thus, the results partly confirm that South Korean individual investors are highly speculative investors compared to the other types of investors. From the results that we find in both countries, we could not clearly conclude that foreign investors consider both macroeconomic and stock market fundamental factors when changing their net buy positions and thus are more sophisticated investors than individual investors. However, the results here, especially in South Korea's case, partly confirm that individual investors are highly speculative investors and less sophisticated traders compared to foreign and institutional investors. This is due to individual investors increase their net buy positions when the stock market volatility is high and when the market is overvalued. Therefore, after analyzing what factors influence each investor type's direction of trade, our results show that different types of investors follow different trading patterns and are influenced by the same factor differently. Since different types of investors follow different trading patterns, we could not generalize what drives stock market development by simply looking at what drives overall stock market liquidity. Investor type, therefore, does matter, in better understanding what drives stock market development.

Table 7: Factors influencing trading direction of each investor type: Thailand

Independent Variables	Net Buy Ratio (<i>NETBUY</i>)		
	Institutional	Foreign	Individual
<i>Constant</i>	-0.0001 (-07182)	0.0006 (1.3595)	-0.0005 (-1.3633)
<i>Lag NETBUY</i>	0.2067 (4.9945)**	0.2057 (5.0275)**	0.2053 (5.0228)**
<u>Macro Factors</u>			
<i>DEF</i>	-0.0000 (0.0567)	-0.0003 (-0.5631)	0.0003 (0.7603)
<i>COIN</i>	0.0055 (0.8232)	-0.0207 (-1.3209)	0.0152 (1.2542)
<i>CPI</i>	-0.0264 (-1.8087)	0.0409 (1.1742)	-0.0145 (-0.5372)
<i>EXR</i>	0.0006 (0.1791)	-0.0053 (-0.6896)	0.0047 (0.7926)
<u>Stock Market Factors</u>			
<i>RET</i>	-0.0016 (-1.1455)	0.0173 (5.3543)**	-0.0157 (-6.2815)**
<i>SD</i>	0.0087 (0.7343)	-0.0335 (-1.2072)	0.0248 (1.1574)
<i>PE</i>	-0.0001 (-1.6701)	0.0002 (1.1452)	-0.0001 (-0.5599)
<i>DY</i>	-0.0002 (-0.4836)	-0.0007 (-0.7799)	0.0008 (1.2746)
<u>Others Factors</u>			

<i>Crisis</i>	-0.0007 (-0.7174)	0.0039 (1.7369)	-0.0032 (-1.8514)
<i>SP500</i>	-0.0008 (-0.3828)	0.0083 (1.8027)	-0.0076 (-2.1209)
R^2	0.1352	0.4327	0.4859
Adjust R^2	0.0891	0.4024	0.4585

This table reports the estimates of the following equation

$$NETBUY_t = \alpha_0 + \beta_1 NETBUY_{t-1} + \beta_2 DEF_t + \beta_3 COIN_t + \beta_4 CPI_t + \beta_5 EXR_t + \beta_6 RET_t + \beta_7 SD_t + \beta_8 PE_t + \beta_9 DY_t + \beta_{10} CRISIS_t + \beta_{11} SP500_t + \varepsilon_t \quad (4.2)$$

where *NETBUY* = the net buy ratios for institutional investors, foreign investors and individual investors, *DEF* = change in default spread, *COIN* = change in coincident index, *CPI* = change in consumer price index, *EXR* = change in real effective exchange rate, *RET* = stock market return, *SD* = stock market volatility, *PE* = change in stock market P/E ratio, *DY* = change in stock market dividend yield, *CRISIS* = dummy variable for economic crisis, *SP500* = return on the S&P 500 stock index. t-statistics are reported in the parenthesis. * and ** denote significance at 5 and 1 percent, respectively. Net buy ratio by investor type regressions are estimated jointly by Seemingly Unrelated Regression.

Table 8: Factors influencing trading direction of each investor type: South Korea

Independent Variables	Net Buy Ratio (<i>NETBUY</i>)		
	Institutional	Foreign	Individual
<i>Constant</i>	0.0009 (1.6447)	-0.0003 (-0.4345)	-0.0012 (-2.8155)**
<i>Lag NETBUY</i>	0.2925 (6.7736)**	0.3305 (8.6843)**	0.2931 (6.9504)**
Macro Factors			
<i>DEF</i>	0.0002 (0.8110)	0.0002 (0.8610)	-0.0004 (-2.2698)*
<i>COIN</i>	0.0531 (1.3269)	-0.0866 (-1.9594)	0.0590 (1.8767)
<i>CPI</i>	-0.0015 (-2.7491)**	0.0015 (2.5590)*	0.0001 (0.2488)
<i>EXR</i>	0.0000 (-0.0310)	0.0000 (0.1520)	-0.0000 (-0.0313)
Stock Market Factors			
<i>RET</i>	0.0027 (0.6898)	0.0200 (4.5885)**	-0.0214 (-6.9544)**
<i>SD</i>	-0.0746 (-3.0889)**	0.0419 (1.5891)	0.0449 (2.3883)*
<i>PE</i>	-0.0002 (-1.1399)	-0.0003 (-1.5698)	0.0005 (3.8262)**
<i>DY</i>	0.0001 (-0.0671)	-0.0001 (-0.1010)	-0.0005 (-0.5025)
Others Factors			
<i>Crisis</i>	0.0019 (0.9311)	0.0003 (0.1227)	-0.0015 (-0.9412)
<i>SP500</i>	-0.0177 (-3.6746)**	0.0218 (4.1127)**	-0.0033 (-0.8786)
R^2	0.3107	0.5084	0.4458
Adjust R^2	0.2738	0.4822	0.4162

This table reports the estimates of the following equation

$$NETBUY_t = \alpha_0 + \beta_1 NETBUY_{t-1} + \beta_2 DEF_t + \beta_3 COIN_t + \beta_4 CPI_t + \beta_5 EXR_t + \beta_6 RET_t + \beta_7 SD_t + \beta_8 PE_t + \beta_9 DY_t + \beta_{10} CRISIS_t + \beta_{11} SP500_t + \varepsilon_t \quad (4.2)$$

where *NETBUY* = the net buy ratios for institutional investors, foreign investors and individual investors, *DEF* = change in default spread, *COIN* = change in coincident index, *CPI* = change in consumer price index, *EXR* = change in real effective exchange rate, *RET* = stock market return, *SD* = stock market volatility, *PE* = change in stock market P/E ratio, *DY* = change in stock market dividend yield, *CRISIS* = dummy variable for economic crisis, *SP500* = return on the S&P 500 stock index. t-statistics are reported in the parenthesis. * and ** denote significance at 5 and 1 percent, respectively. Net buy ratio by investor type regressions are estimated jointly by Seemingly Unrelated Regression.

Conclusion

Previous literatures merely look into what drives the stock market development at aggregate level by either focusing on what causes the stock market to be larger or more liquid. To our knowledge, none of these literatures have actually focused on what drives the stock market development by focusing on the role of investor types. Since investor trading in the stock market certainly affects the stock market liquidity, which is one indicator of stock market development, what drives different types of investors trading in the stock market is crucial to better understand what drives stock market development. Therefore, we look beyond what drives market liquidity at aggregate level and look into what drives different types of investor trading in the stock market.

We find that, in overall, the stock market turnover is significant positively related to the past trading activities and increases when the economic condition is good, when exchange rate value is stronger, and when the stock market return is up. Inconsistent with what we expected, the stock market turnover in both countries increase when the stock market volatility is higher, which partly shows that the stock market in both countries are highly speculative markets. This finding is consistent with the results that we find these stock market trading are dominated by individual investors who are highly speculative and overconfident investors.

When we look into the role of investor types in driving the stock market development, we find both macroeconomic and stock market fundamental factors influence all types of investors trading in the stock market. We find that though different types of investors consider similar factors when trading in the stock market, they do not consider exact the same factors when trading. Therefore, our findings confirm our arguments that we should not look into what drives stock market development by merely looking at what drive aggregate market liquidity since those factors do not necessarily induce all types of investors to trade more. Our findings thus show that role of investor types does matter in understanding what drives stock market development. We find different type of investor trading are not influenced by exact the same factors when trading in the stock market. We also find that individual investors are overconfident traders and highly speculative investors compared to the other types of investors in both countries.

In order to further confirm that the role of investor types do matter in understanding what drives stock market development, we analyse what influences each investor type's direction of trade to show that different investor types follow different trading patterns and are influenced by the same factors differently. Our findings confirm that different types of investors do have different trading patterns in which we find foreign investors are momentum chasers and individual investors are contrarian investors. Our results also partly confirm that foreign and institutional investors are more sophisticated investors compared to individual investors since they look beyond domestic benchmark when changing their net buy position in the stock market. In addition, institutional investors also increase their net buy position when the stock market volatility is lower. Individual investors, on the other hand, are highly speculative investors who increase their net buy position when the stock market volatility is higher and when the market is overvalued. Thus, individual investors are highly speculative and are less sophisticated investors compared to the other types of investors. Thus, our results show that different types of investors do follow different trading patterns and role of investor types do matter in understanding what drives stock market development. Nevertheless, since the market liquidity, a measure of stock market development in both countries, are driven by trading of highly speculative individual investors, this raises a question of sustainability of stock market

development using the market liquidity as a measurement. Future research might study on the sustainability of stock market development for the stock market that are heavily dominated by highly speculative investors.

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PUBLICITY, ADVERTISING AND SPIRITUALITY

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Abstract:

Advertising industry is more and more often associated to brilliant minds in areas such as: psychology, sociology, anthropology, who turned a job into a full time task of “penetrating the collective public mind, (...) its manipulation, exploitation and control”. That is why, ever since its beginnings, the advertising industry was admonished by social critics for taking materialism to the highest levels; to replace inner happiness and intrinsic motivation with the wish to be productive in society only to the extent of consuming and buying happiness. Therefore, over time, advertising and publicity have raised pros and cons; while some voices describe advertising as a motor of society, driving economic development, there are others that strongly criticize advertising creations, blaming it of manipulation. Conversely, reality proves that a number of other factors exercise a major influence on the customers: experience, price, traditions, age, fashion, religion, etc thus, the fight between advertising pros and cons has led to the emergence of theories regarding its efficiency. Controversy related to the relationship between the rational and the emotional is still ongoing, the more so as the conventional alternative states that we should not let ourselves be affected by emotion when we make decisions, also, religious doctrines state that the mind and the body are two separate entities.

Keywords: marketing, advertising industry, advertising effect, consumer psychology, emotional advertising, faith and spirituality

JEL Classification: A13, M37, D87, Z12

1. Introduction

*Consciousness gives people the right to pursue happiness.
You have to catch it yourself. B. Franklin*

Often, “advertising calls on what is missing in society” [Mooij, 2010] as that “distorting mirror” [Pollay, 1986] that only reflects certain values and lifestyles. Professor Guy Cook [1992], in *The Discourse of Advertising* goes along similar lines: “advertising radically reflects the changes in technology and the media, in the economic and social relationships, reflects our inner ego and our group identity”.

In other words, a first rule for successful advertising is nothing but a requirement for the copywriters to have a grasp of basic psychology and psycho-sociology (see Table 1, *A psychological approach versus a psycho-sociological approach to advertising*), and to turn the “advertiser - artistic director” dyad into a triad: “psycho-sociologist-advertiser-artistic director” [Chelcea, 2012].

Table 1: A psychological approach versus a psycho-sociological approach to advertising

<i>A psychological approach to advertising</i>	<i>A psycho-sociological approach to advertising</i>
<ul style="list-style-type: none"> ▪ before 1925, advertising was first <i>informative</i>, focusing on the description of product characteristics and use; ▪ then, up until the end of World War II, a period referred to by William Leiss [Leiss <i>et al.</i>, 2006] as <i>the iconographic age</i>, advertising revealed the symbolic value of the products, with the core of advertising shifting from the object to the person, picturing the elites and their success due to the use of the advertised products; ▪ the third stage, from 1945 to 1965, was referred to as <i>narcissist</i>, with the consumers being encouraged to consider the products as part of their own personality, and the advertising 	<ul style="list-style-type: none"> • it shows how <i>belonging to a group</i> leads to a certain buying behaviour, to a specific way of perceiving and evaluating ads, advertising messages becoming a force in their own right, and providing social cohesion; • Harry Hollingworth, the creator of a <i>theory according to which human figures used in advertising increase the effectiveness of the advertising message</i>, concluded, in his experiments, that the images of a female faces (especially of actresses) or of children are more strongly committed to the memory than male faces; • the Dutch psycho-sociologists Bob M. Fennis and Wolfgang Stroebe [2000] consider, as a <i>response</i>

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discourse predominantly emotional, charged with sensuality and metaphor;

- advertising is not omnipotent, it does not change human nature, but contributes to the development of higher level *needs* and proposes new ways of satisfying biological requirements; “ads cannot create new needs, they may especially revive them, awaken them, discover them, and to a lesser extent fabricate them” [Drăgan, 2007]; *Primum vivere, deinde philosophari* (O. Klineberg);
- to claim that advertising manipulates, using *subliminal stimuli*, is to raise questions, as subliminal advertising relies on a kernel of truth: we can be influenced without being aware of it, when people have less involvement in their behavioural decision, in their consumer behaviour; *subliminal perception* relies on the existence of a sensitivity threshold in every one of us, a threshold that varies not only from one person to another, but also based on the concrete state of the respective person; as William James said: *we are aware of what draws our attention and are not aware of what does not*;
- subliminal advertising, combined with eroticism and pornography, still fascinates certain categories of the public; ads that contain sexual information manage to draw attention and retain it for longer, in the consumer’s memory, than those that do not contain such information. However, there are not sufficient data on record to support the idea that exposure to sexual information leads to an increase in sales. Cultural and religious constraints come into play here; a veritable commandment might be: *Never produce an ad you would not wish your family to see* [Ogilvy, 2009];
- advertising exploits the human tendency to draw quick conclusions in the absence of a strong enough factual support: a quick generalisation, encouraged by the *credo consolans* philosophy: people believe because they enjoy it, Gardner says;
- advertising asks us to choose between two complete opposites, a reasoning considered fallacious in the very presentation of one facet of the issue only - *the red herring* reasoning consists of an attempt on the part of ad creators to divert attention from the arguments in favour of the product or brand.

model to the issue of information acquisition and processing, as provided by advertising, the four stages: *subconscious analysis*, which assumes a generic supervision of the environment, without a specific aim; *focused attention*, a conscientious focusing on the stimulus and its classification; *understanding*, consisting of the shaping of semantic interferences; *reasoning*, a process where semantic representation of the stimuli is related to previously stored buyer’s knowledge;

- *subconscious information processing* results in its storage into the implicit memory, only retaining the perceivable characteristics of the advertising message, and not its meaning;
- Robert G. Heath proposed a *model of processing advertising messages at the low level of attention*, based on the following assumptions: at the low level of attention we process the advertising messages almost continuously; this processing is performed at a subconscious level; it results in sensory associations that define the brands in our minds and are transferred to the long-term memory; the sets of sensory associations strongly influence the buying decision, without us being aware of it [Pringle & Field, 2008]. Effortless processing of information is experienced by the consumers as a positive emotion, leading to a positive evaluation of the stimulus;
- in the process of focusing attention, *short-term memory* plays a very important role, thus helping identify two categories of factors that determine attention focusing: stimuli-related factors (characteristics of the products and of their image) and factors related to the personality features and the concrete situation in which the consumer is placed;
- specialist literature refers to *three characteristics of the stimuli* that attract our attention involuntarily: prominence, absolute prominence, and novelty;
- unlike *prominent stimuli*, drawing attention by contrast with the context, *absolute prominent stimuli*, are remarkable in themselves, being: strongly emotional, concrete and generating living images, close in time and space to the field of perception. Equally suggestive to ad creators are the results of research of *advertising tricks, with novelty features*: the travelling speed of a light spot vertically and horizontally. The light spot, moving at the same speed, seems to descend or ascend faster if it is actually perceived as moving horizontally. The “Ebbinghaus illusion”, a visual illusion, like the “human face – vase” illusion or the “Rubin faces”, taking their name from the Dutch psychologist Edgar Rubin, are tricks frequently used in advertising [Ebbinghaus, 2012].

Source: own elaboration

Advertising, the most expressive form of mass culture, that “cultural industry”, that “spearhead of mass culture models” becomes, according to Brune [1996], the promoter of middle

class-specific consumerism. The effects of advertising are not limited to people themselves, as a complex phenomenon, they are reflected in culture, in the volume of knowledge, values and rules of a given society. In order to seduce the consumers, advertising resorts to sensorial images and show material and erotic stimuli, while the characters and communication situations are sketchy and stereotypical. Thus, advertising provides stereotypes of thinking and behaviour, sets of images, ideas and evaluations, that the receiver uses in defining his own behaviour.

In Pollay's opinion, in juggling with emotions, stereotypes and manipulation of ideas taken from real-life situations, advertising has reduced us to a state of "irrational consumer". The value, the benefits of a product, in Scott's understanding [Scott, 1904], may be suggested by the creator of the advertising message, by associating information strictly related to the human personality and the typology of the target audience behaviour, with product-specific objective elements, in a pictorial representation. In explaining human behaviour, Lewin [1951] used the concept of a psycho-social field. In his approach, the behavioural response is based on the mental processes of the individual and on its physical and social environment.

2. Description of the study area

With the most spectacular role among the classic product promotion types and means, advertising is the message paid for by the sponsor, the owner of the products/ services, through a brokerage relationship between its company and the potential consumer, in most cases through the mass media channels.

The basic function of advertising is to convince a certain segment of the public and ranges from the shaping or change of attitude in the target audience toward a product/ service or idea, to creating the desire to take action. Ad creators focus on the consumer psychology, while the marketing personnel emphasize the economic coordinate of the market on which the offer is being launched.

2.1. Opinions pros and cons publicity

In our times, people begin to take an interest in a multitude of diverse information, a natural phenomenon, generated by the range of accumulated knowledge and experience over time. In the case of accumulated experience, success begins to wane. Pro and con theories of advertising efficiency (see Table 2, *Opinions pros and cons publicity*) triggered the need for methods to measure their effects; the effects are influenced by many factors including: the kind of message, the age of the market, any rival advertising, the degree of investment.

Table 2: Opinions pros and cons publicity

Opinions cons publicity	Opinions pros publicity
<ul style="list-style-type: none"> ▪ a manipulative force, that determines customers to perform illogical, senseless acts (Vance Packard); ▪ consumers pay to be persuaded of the need for the product being advertised. ▪ "a formidable form of brutalisation, treating man as the most obtuse of all animals" (Georges Duhamel); ▪ "an insult to our senses, falsifies epithets, it corrupts all qualities and criticisms" (Paul Valery); ▪ advertising tries to adapt its language to the majority, in order to be better perceived, understood, which makes it, according to some critics, become vulgar; ▪ advertising speeds up product obsolescence, artificially enhances certain production behaviours and provides false economic dimensions; ▪ advertising creates frustration and resentment to 	<ul style="list-style-type: none"> ✓ the purpose of advertising is to create and fuel the wish to be embraced by the community and be as sexually attractive as possible (John K. Galbraith); ✓ the vulgarisation of advertising is described as natural and even rewarded (John Fiske); ✓ "the flower of contemporary life is an assertion of optimism" (Blaise Cendrars); ✓ advertising is an economic process that supports the "flow" of product/service production to the consumers and draws attention to service quality; ✓ advertising presents new ways of life, enabling the diversity of life in the community, thus increasing the integrity of the consumers; ✓ advertising may generate optimism and self trust in the consumers, thus reinforcing the sense of being.

the targets who cannot afford to procure the advertised product, thus fuelling social conflicts;

- advertising creates fake needs and causes confusion in taking on roles in society;
- advertising cultivates euphoria, hedonism, narcissism and individualism;
- advertising disturbs the individuals' relating to their environment, offering an illusive world.

Source: own elaboration

Although there is no perfect method of measuring the effects of advertising, and the lack of standardisation makes it difficult to apply and interpret the results, the specialists refer to at least five evaluation methods, as follows: evaluation of notoriety, campaign balance, the impact of calculated variables, exposure calculation and the barometer.

The advertisement components, such as the title, the text, the slogan, the logo and the illustration determine its classification into one of three types of ads: transformational, purely informative and frequently repeated; these types of ads require a correct adjustment of the promotion strategies, based on the objective of the advertising message corroborated with the product lifecycle, the advertising budget, customers' preferences, so that some specialist authors refer to the early "Pavlov advertising" age, the "standards" age or the "fiction-based advertising" age.

However, in the field of marketing and advertising, he is still a prisoner of preconceived ideas and stereotypes and perceptibly limits human discretion and capacity to correctly assess other human beings, which may deprive the marketers of the possibility of objectively assessing individuals as consumers, thus leading to erroneous conclusions, at the expense of perception of the specific target groups and of the business as a whole, Marder says [2002].

2.2. Effective advertising

In an objective note, it is obvious that in this whole context, traditional research methods, may not fulfil their mission to really find out what consumers think. All the more so as our irrational mind – assaulted by cultural, educational prejudice, deeply rooted in the tradition we subscribe to by our spatial belonging, the community, the society, the group we belong to, in tandem with a number of other subconscious factors - exercises a strong, but imperceptible influence on our decisions related to acquisition and consumption.

Moreover, marketing and advertising researchers have observed, for decades, the restrictions imposed by the old market research methods, with analysis focusing on finding answers in the post-rational stage. It was only in recent years that science facilitated an efficient device that can help "decode" the customers' thoughts considering that human thoughts and emotions are the result of this subconscious human activity and the actions it triggers cannot be explained in a conscientious context, which is why most of the market research cannot reveal the true preferences of the targeted subjects.

A new area of study suggests that the consumer's response to advertising is based on his cognitive efficiency rather than on marketing manipulation. Results show why direct exposure to repeated ads increases consumer preference for the advertised products and, more importantly, for the advertising messages where the consumers are the least aware of repetitiveness (of having seen it before). *Watch out for your brain, watch out for your wallet!*, said Ian Cook, a psychiatry professor with *Semel Institute for Neuroscience and Human Behavior at UCLA*, following the discovery of areas of the brain involved in the emotional and decision making process; including Cingular orbital-frontal areas and, previously, the amygdalis and the hippocampus – the area in charge of memory he noticed significant levels of intense activity, whenever the participants in the experiment were watching *logical persuasion ads*.

Joseph LeDoux, one of the well-known neurologists world-wide, conducted extensive research on how emotions affect our brain, memory and decision making. He noticed an emotional and physical response, before engendering a first thought/ rational action, such as the situation where we avoid collision with a bus by taking a step backward, and only seconds later realise why. Furthermore, LeDoux discovered that emotions, especially fear, release chemicals that help induce the building of

synapses; the amygdalis – the emotional core of the brain, is responsible for the release of such substances that cause the building of new synaptic links.

In this context, emotions, an important part of the decision-making process in the customer, accounting for about 50% of the decision, determines the emotional experience that may generate a total positive experience in the customer. This explains why anthropomorphism, the endowing of human features to inanimate objects, is a procedure used in advertising, and branding experts know how important it is, this being one of the secrets of presenting anthropomorphism in children products, where “cuteness” induces a feeling of pleasure and the desire to acquire various items such as cereals, juices, toys, etc.

2.3. Ethics and spirituality in publicity

The Christian doctrine about body, mind and human in general is different from metaphysical theories. Since the beginning of times, the Christian thinking, supported by the revelation, has recognized a certain spirituality of the soul, whilst carefully avoiding to be confused with the of the heavenly spirituality. Nevertheless, sometimes the Church fathers have had difficulties to clearly and distinctly express the difference between the soul and divine, difficulties due to philosophical principles which influenced the Christian thinking, but also due to the errors of the biblical Exegesis. The Bible explicitly makes the distinction between the soul and the body, and at the same time argues just as explicitly their inseparable unity. *Feed your body, without killing it through greed! (Saint John Goldmouth)*

Making its presence more and more felt in the modern organization of life, the advertising, by means of the media, proves to be in the contemporary world a significant force of persuading vigor, which has influence on mentality and behavior. The Church was often in charge of mass-media, their role and responsibilities, considering these tools as *gifts of God* which can unify the people; the reason why the consumer behavior within the advertising messages is studied also through the prism of spirituality is a simple one, within the current society the advertising deeply influences the way people see life, the world and themselves, in particular as regards the values and criteria of judgment and behavior. These are concepts that should raise an honest and profound interest from the part the Church.

The supporters of spirituality do not share the opinion of those who said that the advertising simply reflects the attitudes and cultural values of the world in which we live. No doubt the advertising, as well as the social communication tools in general, acts as a mirror. Nevertheless, similar to the general media, it also contributes to shaping a reality which sometimes reflects and distorts the real image. At the opposite pole, the specialists in advertising choose between the values and attitudes which should be promoted and encouraged, by promoting some of them and ignoring the others. Such a selection shows how false is the idea that the advertising reflects the culture of the world in which we live. The publicity may contribute, in fact, to the increase of the quality of society through a meaningful and inspiring action, that stimulates people to act in such a way that their actions are for their benefit and that of the others. Advertising may cheer through simple humor, good taste and the type of entertainment which is its main trait. Some of the publicity work represent masterpieces of popular art, having a life force and an enthusiasm which are only its own.

In many cases, social welfare institutions, including those of a religious nature, use advertising to communicate their messages: those of faith, patriotism, tolerance, compassion and altruism, charity towards the needy; messages that relate to health and education, constructive and useful ads, which in various ways, educate and motivate people Advertising can be of good taste and compliant to the highest moral principles; sometimes even morally uplifting; but they can also be vulgar and morally degrading. They often deliberately appeal to motivations such as envy, status seeking and lust. Moreover, today, some advertisers consciously seek to shock and titillate by exploiting such morbid, perverse or pornographic issues. Creators of commercial advertising sometimes include religious themes or use religious images or personages to sell products. This can be done in a respectful and acceptable way, but the practice is offensive when turning religion into a tool. However, as the rule, the issue of truth in advertising is a little more subtle: it is not that what advertising says is obviously a falsehood, only that it can distort the truth by implying or withholding relevant facts.

As Pope John Paul II observed, truth and freedom, both individual and social levels, are inseparable; without truth as the foundation, as a starting point and criterion of discernment, judgment, choice and action, there can be no authentic exercise of freedom. But there is a fundamental principle that the advertising may not deliberately seek to deceive, whether it does so explicitly or implicitly, whether it does by omission. *The proper exercise of the right to information demands that the statement to be true and complete view of justice and charity. This includes the obligation to prevent, in any circumstance, any manipulation of the truth.* (Pope John Paul II , 1987)

3. Recommendations and conclusions

Considering as a first conclusion of the study that effective advertising is emotional, it is absolutely necessary requirement to respect the human person, the right and the obligation they have to make the responsible choice, freedom inside. (Paul VI , 1977)

Essential guarantees of correct behavior ethically in the advertising industry are primarily well-formed and responsible consciences of professional advertisers who know that they should not be put exclusively to the service of those who order and finance their work and they must respect and uphold the rights and interests of their audience and contribute to the common good.

Voluntary codes of ethics, one of these external sources of support, however, prove to be effective only where willingness of advertisers offers the possibility to comply strictly with them. It is for the advertisers, advertising operators and directors and managers of the offering as a mean to promote, pursue, implement ethics codes already set properly so that they can get public involvement.

Representatives of the population should participate in stating, implementing and periodic reviewing of professional ethics codes in the advertising field. These representatives should include people who are concerned with the study of ethics and also preachers, as well as representatives of consumers' organizations. Individuals should organise themselves into groups of such associations, in order to guarantee their interests against commercial interests.

The regulation of the advertising content and practice, already existing in many countries, can and must be extended beyond the mere prohibition of false advertising, in the strictest of sense the social means of communication used shall not cause material injury to public morality, nor to the progress of human society.

Media should be involved in informing the public on the world of advertising. Given the great social impact of the publicity, it is appropriate for the mass-media to regularly monitor and analyze the activities of advertising specialists.

Whilst attempting to reveal the deepest secrets of the human consumption behavior, I have considered the advertising creation in a strategic manner, slightly unusual, by setting a "dialogue" between an imaginary consumer, as an active participant, through his own mind, with the advertising, whose advertising messages can sometimes convince us to let them "seduced" and even "manipulate" us. If this is only a false impression of the consumer, as a result of the behavior of the human's persuasion skills of marketing, a simple myth, it means that the reality lies in our mind power, those somatic markers, those " human brain bookmarks", which may influence the reasons for which we acquire and consume a product to the disadvantage another. (Lindstrom, 2011)

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THE PUBLIC TRANSPORTATION OF RUSSIA AND SWEDEN. A COMPARATIVE ANALYSIS OF SERVICE QUALITY FROM CUSTOMER PERSPECTIVE

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Abstract

This article presents the research results of an empirical study on the public transportation systems of two cities – Kaliningrad and Karlstad. Both cities are located in the Baltic region and possess a number of weighty differences and similarities. The research methodology is based on a conventional instrument – the SERVQUAL model, which insures the validity of research results on service quality estimated from customers' perspective. Research has as once again proven the postulates of the disconfirmation paradigm, zone of tolerance, prospect theory, and the comparison-level theory. The service environment category, which includes the tangibles dimension of SERVQUAL, has proven to cause the most dissatisfaction for passengers in Kaliningrad. While the biggest expectations-perceptions' gap in Karlstad lies within the assurance group of factors. Due to the significant difference in the intervals of the zone of indifference and minor difference in the overall service quality values, replacement of the existing public transportation system of Kaliningrad with the European approach of Karlstad seems inappropriate.

Keywords: service quality, SERVQUAL model, public transportation, Baltic region.

JEL Classification: R40, L920, L80

1. Introduction

The Kaliningrad oblast of Russia and the Värmland county of Sweden are the two distinct territories of the Baltic region. Their public transport systems differ significantly, as with regards to the market structure – a single accredited public carrier in Sweden and a multiple number of private companies in Russia, and concerning such factors as the ticket price, bus frequency, the service delivery attributes (e.g. the ticket-buying process), etc. Notwithstanding the differences in the service design, the two major cities of the given regions – the city of Kaliningrad in Kaliningrad oblast and the city of Karlstad in Värmland county, possess weighty similarities. Both Kaliningrad and Karlstad, included into the research area of this study, are the capital cities (i.e. administrative centres) of the respective territorial units. The cities are distanced from the respective country's capital, whereas the county itself is being a border territory in both cases. Availability of industry does not interfere with positioning of these provincial cities as centres for tourism and recreation. Whereas the presence of big universities insures large numbers of students, including international. The purpose of this study is to investigate the customers' perceptions over the service quality of the two different public transportation systems used in Russia and Sweden, using empirical evidence from the cities of Kaliningrad and Karlstad.

2. Theoretical framework

Service quality is generally conceived to be a matter of individual 'taste', subjectively evaluated on a basis of 'fitness for purpose' (Bruhn and Georgi, 2006; Parasuraman *et al.* 1985; Pullen, 1993). Scholars argue for the vital equilibrium of expectations and perceptions of a customer (Parasuraman *et al.* 1985; Wiesniewski, 2001), the significance of customer relationship and feedback (Anton, 1996; Grönroos, 2000), including complaints (Tronvoll, 2008). Yet it is fairly complicated to satisfy the individual needs and requirements with regards to 'standardized' types of services which is the public transportation (Cavana *et al.*, 2005; Pollitt and Smith, 2002; Pullen, 1993; Silcock, 1981).

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The only frontline line employee available is the driver (sometimes a conductor as well), who is there to concentrate on driving, dealing with hundreds and thousands of passengers every day.

Scholars allocate several types of quality drivers, which affect different areas of the entire service provision. The following general categories of quality drivers are identified: technical and functional quality (Grönroos, 1984), inter-personal and non-personal attributes (Driver and Johnston, 2001), service product, service delivery and service environment (Rust and Oliver, 1994), interaction quality, physical environment quality and outcome quality (Brady and Cronin Jr., 2001). Evaluating the service quality of public transportation based on customers' perspective requires the assessment of factors that influence customer's decision making over the level of service quality provided.

Disconfirmation paradigm

The disconfirmation paradigm postulates that service quality, hence the customer's satisfaction, depends upon the size of disconfirmation experienced by a customer relative to the initial expectations (Anderson 1973; Oliver 1980; Osmon and Dover 1979; Parasuraman *et al.* 1985; Tse and Wilton 1988). Customers' expectations can either be positively or negatively disconfirmed as well as confirmed over the subjective judgment on the service performance (Hill 1986; Oliver 1997). The positive disconfirmation indicates that service performance has exceeded customer's prior experiences and expectations, while negative disconfirmation suggests poor service quality from the customer's point of view. In case when service performance coincides with the expectations, the service quality is neutral (i.e. confirmed).

According to Oliver (1997), the expectancy-disconfirmation theory (EDT) is influenced by two main forces namely assimilation and contrast effects. In fact these effects are the two sides of the same coin, that provide insights on customer's evaluation of personal satisfaction based on comparison of the service performance to the expectations, build upon previous experience and knowledge. That is whether the current service experience can fit into the customers' notion of a good service (Bolton and Drew 1991; Ganesh *et al.* 2000; Oliver and DeSarbo 1988; Tse and Wilton 1988).

Zone of tolerance

The dis-confirmation of customers' service expectations comprise of a range of levels rather than being uncontested. According to Woodruff *et al.* (1983), the expectations' disconfirmation has a certain interval around a performance norm (i.e. confirmation), which is likely to be considered equivalent to the norm. This interval is known as 'zone of indifference' (equally known as 'zone of tolerance' or 'acceptance zone'), indicating customer's tolerant attitude towards minor service failures. It is notable, that Zeithaml *et al.* (1993) suggests that the 'zone of tolerance' is defined as a range between two edges: the adequate and the desired service expectations. Thus, if customer's perceptions over the service performance are slightly above or below the expected level, the perceived service quality will lie within the latitude of acceptable performance, placing it into the 'indifference zone' (Edvardsson, 1997; Olshavsky and Miller, 1972; Olson and Dover, 1977). A considerable negative disconfirmation places the quality of an experienced service outside the acceptable norm to be recognized as such (Tronvoll, 2008).

Prospect Theory

According to the prospect theory developed by Kahneman and Tversky (1979), it is hard to obtain the objective data on the overall service quality from customers' perceptions; at least for the strategic quality improvement purposes. This is because customers tend to weight negative effects (i.e. losses) more heavily than positive effects (i.e. gains). Thus, a single negative incident may considerably affect the aggregate evaluation of a service experience marking it as negative, despite a number of positive features of the service (Kahneman and Tversky 1979; Mittal *et al.* 1998; Oliver 1997). Tronvoll (2008) believes that the ratio could be one negative variation to five positive deviations. This suggests that a research on customers' perceived service quality should be based on a complex tool, able to distinguish, recognize and evaluate the performances of a number of different factors.

Comparison-level theory

Based on the comparison-level theory, customers tend to compare the expected service performance of the service provider with the alternatives available on the market (Festinger 1954). Therefore, the customer's subjective comparison levels significantly influence his or her expectations. As it is mentioned by Thibaut and Kelley (1959), an ideal standard, against which a customer evaluates the accuracy and attractiveness of the service, is named a 'comparison level'. Whereas the lowest level of service performance acceptable by the customer in light of available opportunities is called a 'comparison level for alternatives'. Customer's satisfaction with the service quality is determined by matching the comparison level (i.e. expectations over the quality outcomes) and the comparison level for alternatives, based on experience and knowledge (Thibaut and Kelley, 1959; Tronvoll, 2008). Moreover, a customer with a negative service experience gained from using another service provider will enter the relationship with a reduced comparison level, overestimating the service performance and vice versa (Tronvoll, 2008; Ganesh *et al.* 2000).

3. Methodology

The literature review suggests that customer's evaluation of the service quality is a complex multidimensional process. In order to draw a conclusion over the service quality researcher is required to account individual's expectations, that set a comparison level, as well as the perceived assessment of the service performance, which is influenced by customer's notion of fairness (i.e. of what is acceptable), the prior experience, knowledge and availability of alternatives, as well as the contextual environment.

One of the conventional and scientifically approved methods of measuring customers' perceived service quality is the SERVQUAL model (Cavana *et al.*, 2005; Durvasula *et al.*, 1999; Fick and Ritchie, 1991; Frost and Kumar, 2001; Sultan and Merlin, 2000; Young *et al.*, 1994). The SERVQUAL dimensions – tangibles, reliability, responsiveness, assurance, and empathy, originally proposed by Parasuraman (Parasuraman *et al.*, 1985), are acknowledged as a backbone of the service quality (Badri *et al.*, 2005). The SERVQUAL instrument enables us to identify and measure the distinct factors of the service quality, while neutralizing the issue of subjectivity raised in the prospect theory. Moreover, using the comparative approach in our survey, we will be able to measure the gap between the 'proper' (i.e. expected) and the actual service performance that will simultaneously highlight customer's zone of indifference. Additional factors affecting the perceived service quality are personality traits, cultural peculiarities and contextual resources, which are to be considered in this research.

The empirical research on service quality of the public transportation in the city of Kaliningrad will replicate the study on public transportation of Karlstad, conducted by the author and colleagues earlier (see: the Service and market oriented transport research group – SAMOT). The research design is based on a questionnaire survey, structured under the 22-items mode of the SERVQUAL instrument, systematized under the respective SERVQUAL dimensions. A total number of 22 questions asked, which are a subject to respondents' evaluation on the scale from 1 – strongly disagree, to 7 – strongly agree. Questions compiled to reveal important demographic factors and other personality traits of respondents are as follows: gender, age, education, profession, availability of a car or a bicycle, frequency of bus usage and the main reason for using public bus transport, prior experience and the income level.

Adhering to the formula on the required sample size, which was applied in the first study held in Karlstad, ensures 95% confidence interval that the whole population of the city share the opinion of the respondents (Anton, 1996, p.89):

$$\text{Sample Size} = 2500 * N * (1,96)^2 / (25 * (N-1) + 2500 * (1,96)^2) \quad (1)$$

where N represents Total Population (population of Kaliningrad is 433,5 thous.pers.); 1.96 is the confidence coefficient: Z-score.

Thereby, the required sample size for analysing the public transportation of Kaliningrad is 384 pers., which nearly equals the 385 accurately filed questionnaires received. The respondents are current users and customers of the public bus companies based in the city, which is ensured by the respective questions.

4. Research results

The research results are drawn from analysis of 385 questionnaires in case of Kaliningrad and 607 responses in case of Karlstad. The gender distribution was well balanced in both cases: 59.2% of women and men – 40,8% in Kaliningrad and 49,6 / 50.4 % in Karlstad, which is due to the judgmental sampling method used. The age diversity of respondents covered all age groups, from 14 to 98 year old. The vast majority of respondents in Kaliningrad fell into the age groups of 19-25 years old – 21% and 26-55 years old – 47%, while in Karlstad most respondents were between 26-55 years old – 59%.

As to ensure the competence of respondents concerning the public transportation services, individuals were asked a question on the frequency of public transport usage. Nearly 90% of respondents from Karlstad consider themselves as active users of public transport, while in Kaliningrad this figure is slightly below 80% (42.9% of respondents use it every day and 34.5% - several times a week). Thus, respondents can be regarded as familiar with the quality of service and can fully evaluate it.

In total 57 urban transport routes in Kaliningrad were evaluated. The route number 36 leads in the number passengers, which is used almost by 18% of respondents. The bus numbers 28 (8.6%), 5 (7.8%), 11 (7%), 21 (6.2%), and 7 (5.5%) have also received high rates of usage frequency, all of which pass through the city centre and connect it to the suburbs. Our research has shown that these buses account for more than half of the total load on the city public transport. Moreover, in the morning and evening rush hours these buses are overcrowded, which can also be considered as a factor that negatively affect the overall perception of public transport quality. The respondents in Karlstad have stated 25 bus routes in total (some of which were defined as intercity buses). The most frequently used bus lines are number 1 (31.9%) and 2 (27.3%), which also connect the city centre with such remote locations as university and shopping centres (e.g. Bergvik and IKEA).

Public transportation is widely recognised as socially significant type of service. This statement is proven by the income distribution of the passengers. Out of the 270 respondents who reported their income level in Kaliningrad, 33% belong to the lower middle category and 50% in the middle-income category based on the average income level in Kaliningrad region. This indicator in Karlstad was consimilar: out of 331 responses, 62.8% of respondents belong to the lower middle category.

As it is mentioned earlier, a comparison level for alternatives places a significant impact on the overall assessment of the service quality made by the customer. A private vehicle is an obvious alternative to public transport. Research results suggest that in Kaliningrad 35% of the respondents have a car and 37% a bicycle. Whereas in Karlstad these figures are 29 and 65% respectively. Additionally a number of respondents in Kaliningrad noted that the car is often used by other family members, while bicycle is mostly used for leisure purpose. In Karlstad, on the other hand, bicycle is considered to be a complete alternative to bus services.

In case of Kaliningrad, we have also found a direct relationship between income level and the vehicle ownership: 80% of respondents with an income above average have a car, 42.6% - with an average income and 22.5% - with an income below average. In Karlstad, these figures were 44, 14 and 30% respectively, hence no correlation was found. However, these results suggest that personal transportation can be an alternative for the vast number of city residents. Thus, the service quality in public transport is an acute problem for retaining the customers and provides congestion relieve to the city traffic.

Since customers' expectations over the service quality are directly dictated by the purpose of using the service, therefore the needs to be satisfied define how the service should be provided. Almost half of respondents in Kaliningrad and a 31% in Karlstad use public transportation several times a day to reach a place of work and back. These passengers expect the bus to be on schedule and value convenient location of the bus stops. In addition, they perceive cleanliness of the cabin and the on-board temperature to be critical, as it directly affects the condition their office clothes. A third of the respondents in Kaliningrad and nearly half in Karlstad are students, who value compliance with the schedule and availability of direct connections, as to avoid purchase of multiple tickets. Tourism and leisure was mentioned by 43.7% respondents in Kaliningrad and 23% in Karlstad as the main reason to use public transportation. Such passengers consider cleanliness and comfort to be crucial in the service provision, value driver's competence and assistance to passengers with prams and disabled.

Adherence to schedules and route of traffic is especially significant in the evening. As with regards to the overall service quality assessment, no significant differences was found (Figure 1).

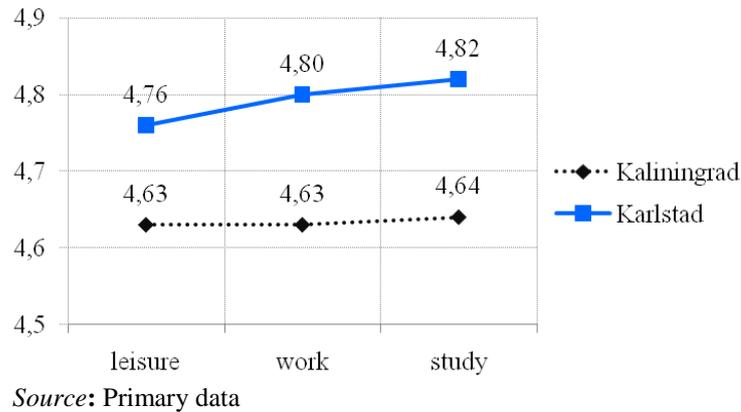
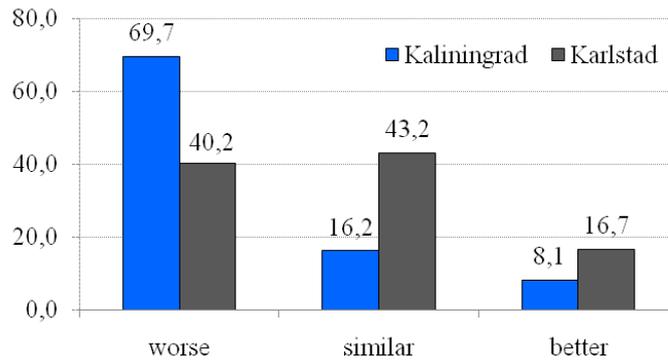


Figure 1 - Assessment of the overall service quality by the purpose of usage category

In case of Karlstad, we have failed to obtain a sufficient number of responses to the question on the customer’s profession. Therefore, no generalisation is possible. However, in case of Kaliningrad we found that an impolite behaviour of employees and other passengers are particular disturbing the respondents, who are frontline employees themselves. For example, sales representative, waiter, sales manager, teacher, etc. Passengers whose professional activities relate to frequent interaction with other people are most sensitive to social stimuli in transport (e.g., using a mobile phone on-board, loud laughter, rude or tactless behaviour, etc.) and, therefore, are more likely to negatively evaluate the quality of service.

Another influential factor for customer’s evaluation of the service quality is previous experience of using public transport in other cities, including abroad. Hypothetically, according to the disconfirmation paradigm, if prior experience was satisfactory, the assessment of the current service provision might be underestimated. Conversely, the negative experience can be a reason to overstate the quality of public transport services in the hometown. According to the survey, 68.8% of all respondents in Karlstad and 60,8% in Kaliningrad, including 39.3% of men and 60.7% of women, have experienced public transportation in other cities. Out of the total number of respondents who answered this question in Kaliningrad, 69.7% indicated that the quality of public transport service is lower than in major tourist centres and capital cities in the USA, EU, CIS and Russia, which they used as a benchmark. While 16.2% reported a similar or higher level of the quality of public transport in Kaliningrad, which was generally compared to the Baltic countries, Poland, Czech Republic, CIS countries and some large Russian cities (e.g. Volgograd, Izhevsk, Omsk, Orel, Saransk, Ufa, Chelyabinsk, Yakutsk, Astrakhan, Pskov, Livny, Tambov, Kaluga, Rostov, Tver, Tula, Samara, Perm, and Kostroma). Another 6% of respondents could not give a comparative evaluation. A significant difference in evaluating a particular city in relation to Kaliningrad demonstrates a certain percentage of subjectivity in the estimates obtained. For comparison, 43.2% respondents in Karlstad stated that the level of service quality is similar (i.e. indifferent). Nearly as much responses received the option ‘worse’ – 40.2%. The public transportation in Karlstad is considered to be better than elsewhere only by 16.7% of respondents (Figure 2).



Source: Primary data

Figure 2 - A comparative evaluation of the service quality in relation to public transport experienced in other cities, including abroad

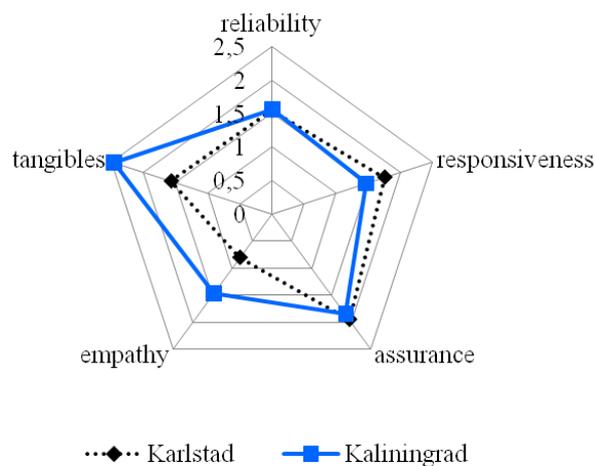
Analysis of the SERVQUAL dimensions allocate the following gaps between the expected and perceived service quality of the public transportation in the cities of Kaliningrad and Karlstad presented in Table 1 and visualized in Figure 3.

Table 1 - SERVQUAL gaps in the public transportation of Karlstad and Kaliningrad

Category	Group	Gap		Category average gap	
		1	2	1	2
outcome attributes	reliability	1,545	1,560	1,545	1,560
	responsiveness	1,762	1,464		
process attributes	assurance	1,959	1,855	1,511	1,597
	empathy	0,812	1,474		
service environment	tangibles	1,575	2,468	1,575	2,468

Note: 1 stands for Karlstad and 2 – Kaliningrad.

Source: Primary data



Source: Primary data

Figure 3 - SERVQUAL gaps in the public transportation of Karlstad and Kaliningrad

The biggest issue of the public carriers in Kaliningrad is an insufficient material and technical base, i.e. the tangible assets. The service environment category, which involves the comfort and cleanliness of buses and the bus stops, suggests that customers expect a much better quality. This notion is reflected in a considerable expectations-perceptions' gap – 2,468, equally stating that service quality is only 62% of the level it should be. Passengers argue for an intolerable on-board temperature and a state of the cabin, an unkempt appearance of employees and vehicles, partly due to the aging of vehicle fleet. The inability to control on-board temperature is the most acute problem, which is assigned to the lowest grade by 27.5% of respondents. In Karlstad, the tangibles SERVQUAL dimension received a score of 76% of the maximum value, which is a good result. The bus fleet is equally not new, but a strict control over the cleanliness of the busses, their uniform model and colour, as well as modern and comfortable bus stops overwhelmed the drawbacks.

The process attributes is a second category of quality factors that characterises the performance level of the carrier's duties, responsiveness of staff and their willingness to empathize with the passengers' problems.

Factors of the assurance group indicate the second largest gap between customers' expectations and perceptions in Kaliningrad (1,855) and the biggest gap in Karlstad (1,959). Assurance dimension reflects the employees' strive to fulfil their duties related to the provision of safety and knowledge of the route. More than 30% Kaliningradians indicated careless driving style of the drivers (of minibuses in particular), which does not only cause discomfort, but also endangers their health and lives. Another biggest problem is disrespectful passengers disturbing others. It is marked by 30% of all respondents. People mentioned that conductor usually does not interfere in to the conflict with drunken passengers and gives no attempt to disembark them off the bus. Respondents in Karlstad had somewhat similar perceptions. Due to the absence of the small and agile minibuses, the factor of careless driving gained a slightly better score. It is the second most irritating factor in the assurance group. While the biggest problem is drunken, dirty and inadequate passengers. However, it is possible that severity of this factor is overstated due to the national mentality.

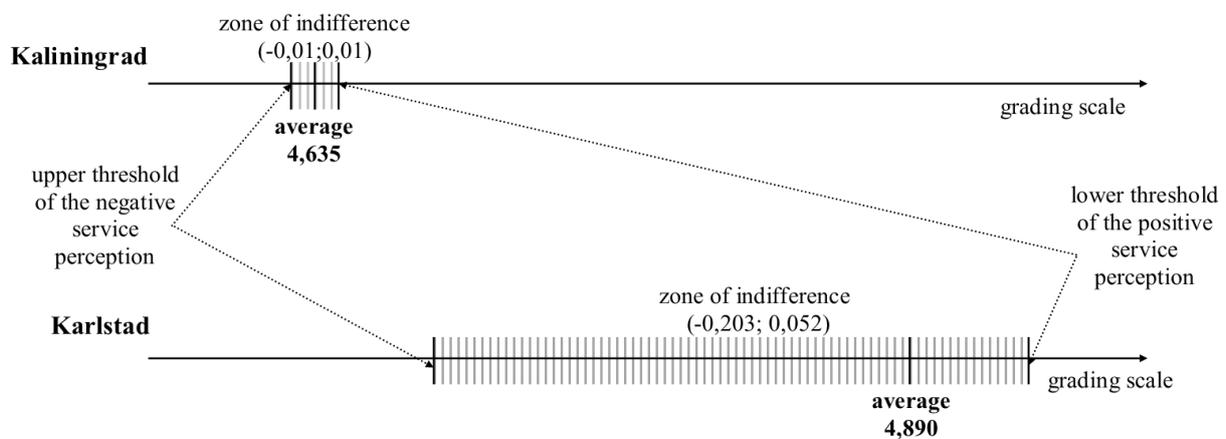
Empathy dimension reflects the degree of sympathy and empathy of the employee to the passengers' problems in case of an unpredictable situation. It estimates humanistic qualities of employees, rather than their ability to follow instructions. In case of Kaliningrad, the empathy group of factors showed the second closest values to the reference point of all five groups (i.e. the gap of just 1,474). In general, the staff of urban transport in Kaliningrad makes advances to the passengers in various situations. They are willing to let the passenger disembark in case of a traffic jam, wait for a person running towards the bus to get on, and let a passenger travel for free in case of need, which is indicated by nearly 50% of respondents. The most significant negative impact on the perception of service quality has inadaptability of urban transport for people with disabilities and passengers with prams. Minibuses (i.e. route taxis), in particular, are not equipped for this kind of traffic, and entry or exit of the bus requires assistance. 48.6% of respondents negatively assessed the level of employee's assistance to passengers with disabilities and passengers with prams, which is not set as their professional duty. In Karlstad, the empathy dimension received the lowest gap figure – 0,812, which means that passengers perceive it to be 86% of the perfect level. Although 23.6% of respondents negatively evaluated the level of employees' assistance to handicap passengers, children and seniors. In case of Karlstad, this question could equally be regarded in the responsiveness dimension, since it is directly related to the official duties of the driver.

Responsiveness dimension shows the degree of responsiveness of the staff and their willingness to help customers as part of their official duties. More than 50% of respondents in Kaliningrad positively evaluated the factors within this dimension, resulting in a lowest gap detected – 1,464. However, in Karlstad this gap is the second largest – 1,762 overall. 46% of respondents state that employees rarely have a solution to their problem, often redirecting a complaint to someone else (67.4%).

The latter category – outcome attributes, includes reliability factors, reflecting the degree of passengers' confidence that the company will fulfil its obligations properly with regards to the service provision. This category received high marks from the citizens of both cities – 76.2% satisfaction in Kaliningrad and 76.4% in Karlstad. In Kaliningrad, the most criticism deserved the failure to comply with bus schedules and a long waiting time at the bus stop, while the driver is waiting for the bus to be

full (30% of respondents). Additionally 24% of respondents indicated unavailable information on bus schedule, while 18% are unsure if it is available. Thus, almost 40% of the passengers cannot exactly indicate whether the bus complies with the schedule. In Karlstad, the biggest problem occurs with the ticket validating machines (the score of 4.33 on the scale from 1 to 7). Passengers confront with the situation when the machine does not ‘recognise’ their travel card, while others are unsure whether it does the debiting correctly.

The average overall perceived service quality in Kaliningrad is 4,635 and in Karlstad – 4,890. The interval between the upper threshold of a negative perception of the service and the lower threshold of a positive perception of the service is defined as the zone of indifference. It shows the possible range of the mean values of the service quality assessments, in which there will be no significant (i.e. qualitative) changes in the nature of the overall perceived level of service quality by the citizens. This assumption suggests that customers will perceive the service quality to be much better if the measures implemented will transcend the lower threshold of a positive perception of the overall service quality (Figure 4).



Source: Primary data

Figure 4 - Zone of indifference on the grading scale of service quality in public transport

For Karlstad, the zone of indifference is greater than for Kaliningrad. This can be interpreted as follows. A minor zone of indifference means that even small changes in the level of quality in public transport of Kaliningrad entail a qualitative change (as in the positive and negative direction) in the evaluation of citizens. In Karlstad, the perception of service quality is more stable, hence, for it to be changed more effort is required. Additionally a relative safety margin is established, which is expressed in the strain range in the direction of the minimum relative to the average. It ensures a certain time lag to maintain the level of service quality its positive perception before it drops in case of systemic failure.

Conclusion

The cities of Kaliningrad and Karlstad represent two alternative urban transport systems. Kaliningrad has large number of private carriers serving the routes. Multiple firms serve a single route or a number of similar ones, which intensifies competition between individual firms. The city authorities approve a single ticket price, which is kept at a relatively low level (approx. 30 euro cent). Low ticket price complicates the technological modernization of the bus fleet (i.e. intensive development) and forced a fierce competition for the number of passengers (i.e. extensive growth). In Karlstad, there is one company-carrier, which is selected on a competitive basis. This allows to maintain consistency of the services provided. However, it does not stimulate the company to transport a large number of passengers. High ticket price (approx. 2.80 euro) makes this business profitable. Therefore, competition between the companies is shifted into the sphere of acquiring a permission to manage public transportation services. It stimulates a managing company to exercise constant technological upgrading, but does not always guarantee an increase in the serviced quality perceived by the population.

In the study, we were eager to compare how the citizens of each city evaluate the level of service quality generated by each of the systems. Whether it is possible to say that one approach is better than the other. During the study an average evaluation of the quality of public transport services for each of the cities were obtained. It is found that the overall perception of quality in both cases is similar, which does not give preference to one of the two systems. Both in Karlstad and Kaliningrad citizens pointed out a number of problems in the field of public transport services. Some of them are common, for example tactless behaviour of other passengers. However, the overall quality of service is rated high enough in both cases. An average score of 72.4% satisfaction in Kaliningrad (gap of 1,76) and a 76% in Karlstad (gap of 1,53).

Yet an interesting relationship is spotted. If a person has had a negative experience of using public transport, individual's standard-score was slightly lower than that of respondents whose previous experience was positive. This again confirms the postulates of the comparison-level theory. Those who had a positive prior experience, generally gained in major tourist and business centres or capital cities, imposed stringent requirements for quality of service in their hometown (i.e. Kaliningrad and Karlstad). However, their assessment is an ideal standard, the level to which a company needs to strive for. Analysis of the estimates of the different groups of respondents enabled us to determine the so-called zone of indifference. We assume that this range (i.e. zone) reflects the acceptable fluctuation of values over the perceived level of service quality, which will not lead to significant changes in the overall perception made by citizens.

This opens up an interesting point, showing the differences in the two systems of public transportation. Karlstad has a considerable interval within the indifference zone. It can be hypothesized that in order to bring the system out of balance a significant external or internal influence is required. On the one hand, it gives some stability in the level of service quality perceived by the citizens; on the other hand, it indicates that only a significant change or technological improvement can change the overall perception of quality. This might require substantial financial investments, which is unlikely to be achieved without governmental assistance.

For Kaliningrad, the indifference zone is small. Therefore, it can be hypothesized that the effect of both the internal and external factors on the system will lead to a significant shift in the quality estimates made by the population. Current economic conditions are not conducive to active implementation of innovative solutions by the companies in Kaliningrad as to overcome the pressing problems indicated in this study. However, there are a number of positive aspects. High competition between firms stimulates an increase in the number of routes and buses on them, which allows reducing the waiting time for the bus. A waiting time of 15-20 minutes is considered to be significant in Kaliningrad. For a tourist town with nearly half million population this is an important factor. In our view, for a positive qualitative change of the perceived service performance a small but systematic change is required. Local authorities should encourage companies-carriers to execute intensive development and growth of interest in the introduction of technological change. Abrupt replacement of the existing public transportation system of Kaliningrad with the European approach of Karlstad in the current contextual environment seems inappropriate and may lead to negative consequences.

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FINANCIAL INTEGRATION, VOLATILITY OF FINANCIAL FLOWS AND MACROECONOMIC VOLATILITY

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Abstract

Macroeconomic instability is usually associated with increased short-term volatility in key fundamental variables. The recent literature that empirically examines implications of the macroeconomic volatility provides strong evidence of its negative growth effects. Stable macroeconomic environment represents a substantial fundamental pillar of a long-term economic growth. International financial integration as one of the phenomenon of last few decades still differentiate economists examining its direct and side effects on macroeconomic performance and volatility. In the paper we examine the relationship between international financial integration, volatility of financial flows and macroeconomic volatility. Examination of the international financial integration and its effects on macroeconomic volatility or stability is particularly important due to existence of generally expected positive relationship between macroeconomic volatility and economic growth, common trends of decreased macroeconomic instability worldwide and occurrence of negative sides of financial integration - financial crises. Following our results we suggest that relationship between financial integration, volatility of financial flows and macroeconomic volatility is positive, however not significant. Moreover the relationship is stronger in case of developing countries.

Keywords: international financial integration, macroeconomic volatility, volatility of international financial flows

JEL Classification: C32, E31, F41

1. Introduction

Empirical literature provides rich evidence about the effects of international financial integration on economic growth. Moreover, many authors examined the causal relationship between international financial integration and economic growth. Most of the empirical studies suggest that, on average, more financially integrated economies performs better than less financially open economies, in terms of improvements in per capita output as a measure of standards of living. However, many of studies also come to the conclusion that the relationship between financial integration and economic growth is not always strong or robust. There has also been a rigorous debate about the relationship between macroeconomic volatility and financial integration. However, empirical evidence on the effects of international financial integration on volatility is far more limited. While the key features together with the main and side implications of international financial integration represents the crucial topic of economic research for decades, the results of many empirical studies provides different or even biased conclusions.

The main objective of the paper is to investigate effects of international financial integration and the volatility of financial flows on macroeconomic volatility that enables us to highlight some key stylized facts about their mutual relationship.

In the first section we summarize an overview of selected theoretical and empirical literature examining the relationship between international financial integration and macroeconomic volatility. Theoretical literature doesn't provide clear conclusions on key

implications of international financial integration on the volatility of main macroeconomic variables. However, empirical studies reveal both positive and negative effects on different samples of countries considering particular time periods. At the same time, results seem to be sensitive to the set of initial conditions that individual studies emphasize as underlying determinants of causal linkages between the quantity of cross-country capital flows and associated direct and indirect effects on the performance of countries. As a result, investigation of the vulnerability of overall output and its main components to the relative changes in external financial openness of countries still attracts many authors.

Further, we examine the volatility of financial flows measured by cross-sectional median or mean of standard deviation in different group of countries. Our sample of countries consists of industrial and developing countries with substantial differences in the size external financial openness. We expect that our results confirm the existence of significant differences between (a) international financial integration and the volatility of financial flows and (2) macroeconomic volatility. We suggest that the volatility of financial flows increases with rising external financial openness.

Volatility of financial flows will be examined at different time periods proving vital information about fundamental features of the dynamics in the process of international financial integration in our sample of countries. We observed that the volatility of financial flows increased over the examined periods in all subgroups of countries. Key features in the examined trend will be highlighted considering the estimated volatility of particular types of international financial flows and in its changes over time. We provide the evidence that contribution of individual capital flows is substantially important in determining overall volatility of financial flows. We also highlight that flows of foreign direct investments (FDI) are less volatile than other types of private capital flows.

In the next section we evaluate the relationship between international financial openness and the volatility of financial flows in individual group of countries. We show that the strongest positive relationship experienced countries from the group of developed economies followed by more and less financially integrated countries. We suggest that increasing financial openness causes higher volatility of international financial flows. We also estimate macroeconomic volatility measured by cross-sectional medians of the standard deviation of total output as well as its main components - final consumption, private consumption and investments. As a result, changes in the macroeconomic volatility can be conventionally decomposed into the volatility of individual components of total output. We suggest that that developed countries maintained substantially lower levels of macroeconomic volatility in comparison with developing countries even though these countries are the most financially integrated. On the other hand, different results are obtained for the group of developing countries. More financially integrated economies tend to experience clearly higher macroeconomic volatility than economies less financially integrated. Moreover, we provide the evidence of the decreasing trend in macroeconomic volatility in all groups of countries over time.

Finally, we emphasize key aspects of the relationship between international financial integration and macroeconomic volatility. We found that there is positive, but not so significant relationship between financial openness and individual components of total output. In the last section we also examine the relationship between the volatility of financial flows and macroeconomic volatility. Our results confirmed generally expected positive relationship between both variables in all groups of countries.

2. Overview of the Literature

Our motivation to investigate the relationship between international financial integration (in terms of its size and relative changes) and macroeconomic volatility (or

stability) may be summarized as follows. (1) Large number of studies revealed negative relationship between macroeconomic volatility and economic growth. Macroeconomic instability reduces dynamics of economic growth and its sustainability in the long run. As a result, investigation of the relationship between the size of financial openness (considering its generally increasing trend over time in the most countries) and macroeconomic volatility is motivated not only by an intention to examine stability issues in unequally financially integrated countries but also to assess key implications on economic growth and its sustainability. Reasonability of this idea is quite challenging especially during so called “bad times” (i.e. current economic crisis) and related higher volatility of international capital flows as well as macroeconomic variables. (2) Most of the developed and developing countries experienced periods of reduced macroeconomic volatility during the pre-crisis period (Kose et al., 2010). Considering the general trend of increasing financial openness, many studies (i.e. Sutherland (1996), Mendoza (1992), Souza (2004), Razin and Rose (1994)) provided evidence of international financial integration serving as a crucial vehicle for maintaining the macroeconomic stability. (3) Finally, many authors emphasize that highly financially integrated economies are more likely exposed to the turmoil on the financial markets that may turn into financial crisis. As a result, highly financially opened economies may suffer from excessive macroeconomic instability followed by output growth rates reduction or even lagging recession due to easy transmission of external shocks among financially integrated countries (i.e. Friedrich, Schnabel and Zettelmeyer (2010), Kaminsky and Reinhart (1999), Glick, Guo and Hutchison (2004)).

International financial integration, its crucial patterns, trends and effects on macroeconomic volatility, still represents challenging area of economic research. Following the results of many research studies, examination of mutual relationship between international financial integration and macroeconomic volatility, leads to different empirical conclusions. This fact is not surprising, given that economic theory does not provide comprehensive and clear view of how the increasing international financial openness and international financial integration should affect the volatility of macroeconomic outcomes and others macroeconomic variables. The ambiguity of results proposed by large number of empirical studies is caused by a relative variety in methodology and econometric techniques and variability of samples of countries and time horizons included in the most of regression models. Moreover, different threshold effects that determine the growth effects of international financial integration also contributed to the relative diversity of empirical results. Kose *et al.* (2006) highlights the composition of capital flows, domestic financial development, institutional development and discipline, macroeconomic discipline and trade openness as the main determinant affecting the impact of international financial integration on macroeconomic volatility. Composition of international capital flows is probably the most crucial determinant affecting macroeconomic volatility. Taylor and Sarno (1999) revealed that FDI flows are more stable and persistent than other groups of international capital flows. These results are confirmed by Hausmann and Fernandez-Arias (2000), who confirmed that although the volatility of FDI flows followed increasing trend in last few decades, it still remains much lower than the volatility of other types of capital flows.

Fischer and Reisen (1992), Bekaert, Harvey and Lundblad (2006), IMF (2007) and Herrera and Vincent (2008) revealed significantly negative relationship between financial openness and macroeconomic volatility. Bekaert *et al.* (2004) analyzed effects of stock market liberalization and capital account openness on the volatility of real consumption growth rate over the 20 years period. Their results show a strong negative correlation between international financial liberalization and the volatility of consumption. Bekaert *et al.* (2002) show, that overall capital account openness has weaker influence on output and consumption volatility. Therefore, the authors suggest that it is the integration of stock markets worth

reducing the volatility of output. Herrera and Vincent (2008) show similar results. According to their research, higher integration of domestic financial markets to international capital markets is associated with lower macroeconomic volatility.

On the other hand, Kose et al. (2003) provides a comprehensive analysis of changes in macroeconomic volatility in the large group of industrial and developing countries over 50 years (76 countries, period 1960-1999). Authors divided developing countries into two groups (more (MFI) and less (LFI) financially integrated countries). Their results show a positive though insignificant impact of international financial integration on the volatility of domestic output and domestic consumption. In case of the relative volatility of consumption, expressed as the ratio of the consumption and volatility of output, they confirmed that international financial integration has a positive and significant impact.

Mendoza (1992) suggested that the volatility of output increases with increasing degree of international financial integration when countries experience large and long-term shocks. However, the relationship is insignificant too. Baxter and Crucini (1995) partially confirm the Mendoza's findings about the volatility of output though they rejected results about the volatility of consumption. Volatility of real and relative consumption is decreasing by growing international financial integration. Study of Gavin and Hausmann (1996) shows that capital account openness is a significant potential channel of macroeconomic volatility causing domestic output fluctuations in Latin America. Study is focused on the period 1970-1992.

Islam and Stiglitz (2000) confirmed that financial openness significantly contributes to the volatility of GDP growth per capita in developed and developing OECD countries. Evans and Hnatovska (2006) suggest that there exist a nonlinear relationship between macroeconomic volatility and international financial integration. International financial integration causes an increase in the volatility of output and consumption initially, but this relationship is gradually replaced by a much larger decrease in the volatility of macroeconomic variables. The final effect of changes in the macroeconomic volatility is positive for the country.

On the other hand, the lack of empirical evidence about the existence of the relationship between international financial integration and macroeconomic volatility is presented by Razin and Rose (1994), Butch, Döpke and Pierdzioch (2002) and others.

Razin and Rose (1994) investigated effects of the current account and capital account openness on the fluctuation of total output, consumption and investments on the sample of 138 countries during the period 1950-1988. Their study employed a cross-sectional analysis based on the following regression model:

$$\sigma_{j,i} = \alpha + \beta_{j,C} FC_i + \beta_{j,K} FK_i + \varepsilon_{j,i} \quad (1)$$

where $j = Y, C, I$ are dependent variables (output, consumption and investments) measured by the standard deviation of variables (σ), and FC_i and FK_i are the degree of current account and capital account openness. Authors suggest that there is no significant relationship between external financial openness and relative volatility of output, consumption and investment.

Buch, Döpke and Pierdzioch (2002) focused on OECD countries for the period 1960-2000. Authors employed the following regression model:

$$\sigma_{i,t} = \alpha_{0,i} + \alpha_{1,t} + \beta_1 \sigma_{i,t}^{controls} + \beta_2 FO_{i,t} + u_{i,t} \quad (2)$$

where $\sigma_{i,t}$ represents a standard deviation of the cyclical component of real GDP calculated in 5 year time periods and $FO_{i,t}$ represents the size of financial openness.

Effects of international capital mobility on the macroeconomic stability investigated Pappas (2010). The results of his study did not reveal the existence of a strong and stable relationship between indicators of financial openness and macroeconomic stability (measured by the stability of output and consumption). Kose et al. (2003) indicate that O'Donnell (2001) examines changes in the volatility of output growth over the period 1971-1994 in 93 countries. He concludes that greater degree of financial integration is associated with lower (higher) rate of output fluctuations in OECD (non-OECD) countries. His research also informs that countries with more developed financial markets are capable reducing volatility of output through their international financial integration. Aghion, Benerjee a Piketty (1999) developed a theoretical link between financial integration and volatility of output, measured by standard deviation of real GDP growth rates. They argue that countries with less advanced level of financial market development can experience more volatile real GDP growth rates due to increasing international financial integration. Same notion can be found in the paper published by Eozenou (2008). They used a generalized method of moments for estimating panel of 90 countries over a 40 years period. On the contrary Beck *et al.* (2011) show that domestic financial market doesn't play a significant role in determining the influence of financial integration on macroeconomic volatility. Using a panel consisting of 63 countries over the period 1960-1997 they cannot find a robust relationship between the volatility of economic growth and domestic financial development.

3. Data and Methodology

In our study we employ data from the database of Lane and Milesi-Ferretti (2007) which consist of comprehensive data on foreign financial assets and liabilities for a large sample of countries for the period 1970-2011. For measure of financial integration (openness) we employ modified conventional indicator of the external trade openness and calculate financial integration as sum of capital inflows and outflows divided by GDP. We also calculate international financial integration using financial flows subcategories - foreign direct investments, portfolio investments and debt investments. Following methodology employed by Kose et al. (2003), median of standard deviation was calculated for particular variables to measure their cross-sectional volatility. Additionally, standard deviation was calculated for the whole period observed as well as particular sub-periods on a ten year basis (1970-1979, 1980-1989, 1990-1999, and 2000-2009) to review changes in the volatility over the time. Summary of data sources employed in the paper provides Appendix A.

We define a measure of overall and decomposed macroeconomic volatility in few ways. First, we use the volatility of real GDP per capita growth for evaluating the overall macroeconomic volatility. Then we calculate decomposed volatility as the real private consumption per capita growth. Because the cyclical components of government consumption may affect households' consumption, we also use the constant final consumption expenditure per capita growth to measure the volatility of consumption. This could be particularly important for less developed economies as well as more open economies that tend to have higher ratios of government consumption to output. Then we calculate ratio of the volatility of final consumption to the volatility of output to evaluate patterns of consumption smoothing. We expect that this ratio should be significantly lower in industrial countries in comparison with developing countries. Finally we calculate the volatility of real total investment growth per-capita. Investments are measured by gross fixed capital formation as the portion of total output. Suggested decomposition enables us to reveal different effects of international financial integration on households and business sector.

Evaluation of effects of international financial integration on macroeconomic volatility it is convenient to split the group of developing countries into two sub-groups according to the average measures of the financial openness over the last four decades. Full sample of our countries is divided in two groups (developed and developing countries) following the classification provided by International Monetary Fund. In order to examine the effects of international financial integration we follow the approach employed by Kose et al. (2003) and subdivide developing economies into two groups: more financially integrated (MFI) and less financially integrated (LFI). The key criterion employed to organize countries into these two groups is cross-sectional median of financial openness representing the value 1.028 for the whole sample of developing countries over the period 1970-2011. Following this procedure we have obtained 23 developed countries, 32 MFI countries and 48 LFI countries.

Appendix B provides a list of countries decomposed into four groups in our sample. Countries were decomposed into four groups for analytical purposes only and it has no additional interpretation.

4. Trends in Financial and Macroeconomic Volatility

4.1 Evaluation of Volatility of Financial Flows

Financial openness increased in the most countries all over the world during the period of the last four decades. Intensified international financial integration followed by higher financial openness caused an increase in the volatility of international financial flows. Due to existing differences in the dynamics of international financial integration and associated volatility of international financial flows, many authors focused on examination of the relationship among financial integration, the volatility of financial flows and macroeconomic volatility. In Table 1 we summarize the evolution of the volatility of international financial flows over time.

Our results confirm that the volatility of international financial flows is generally higher in the group of developed countries in comparison with developing countries. In addition, the volatility of international financial flows rises with higher international financial openness. Volatility of financial flows of LFI economies is clearly smaller than of those from the group of MFI economies.

Table 2 summarizes estimated results for the volatility of financial flows measured by cross-sectional mean of standard deviation. While the volatility of LFI economies remained at the same levels despite the changed measurement, we observed a substantial increase in the volatility of financial flows in the group of developed and MFI economies. Our results also indicate that the volatility of financial flows in MFI economies is even higher than the volatility in developed countries revealing higher diversity of calculated results in the countries from this group. Moreover, coefficients of the volatility of financial flows significantly drop to from 2.136 to 0.875 (for the whole period) if the outliers are excluded from the analysis. After this adjustment, the results are more consistent with previous table.

Table 1. Cross-sectional Volatility of Capital Flows Measured by Median of Standard Deviation

Volatility of financial flows (median)					
Standard deviation ¹⁶	1970-2011	1970-1979	1980-1989	1990-1999	2000-2009
Developed economies	1.501	0.092	0.201	0.407	0.646
MFI	0.607	0.196	0.396	0.248	0.311
LFI	0.320	0.077	0.137	0.158	0.164

Source: Authors calculations

¹⁶ Median of standard deviation for each group of countries

Tables 1 and 2 also summarize estimated volatilities of international financial flows decomposed into individual decades (columns 2-5) within the whole period to examine the evolution of main trends. It seems that median volatility rises over the observed period in all three groups of countries. As we expected, the most dynamic changes in terms of a relative increase in the median of standard deviation experienced developed economies. We suggest that this trend was caused by the rapid growth of the financial openness in developed economies over the examined period. Quite similar results are reported by the Table 2. In general, increasing financial openness is obviously accompanied by the excessive growth of the volatility of financial flows. This relation is observable mainly in developed countries and MFI economies. The overall dynamics in the volatility of financial flows is thus positively affected by financial openness.

Table 2. Cross-sectional Volatility of Capital Flows Measured by Mean of Standard Deviation

Volatility of financial flows (mean)					
Standard deviation ¹⁷	1970-2011	1970-1979	1980-1989	1990-1999	2000-2009
Developed economies	2.091	0.125	0.246	0.591	1.192
MFI	2.136	0.387	0.944	0.745	1.162
LFI	0.331	0.089	0.174	0.164	0.191
Developed economies ¹⁸	1.743	0.120	0.250	0.481	1.005
MFI ¹⁹	0.875	0.409	0.640	0.363	0.377

Source: Authors calculations

Examination of the volatility of international financial flows revealed interesting implications of international financial integration according to the relative differences in the overall performance of the countries. Subsequent decomposition of international capital flows into key components provides additional information about the sources of the volatility of international financial flows according to the typology of capital movements (foreign direct investment (FDI) and debt investments (portfolio debt investment included)²⁰ are concerned). In Table 3 we investigate cross-sectional differences in the volatility of particular financial flows. This approach will be helpful in the next section of the paper to examine the relative importance of individual financial flows in determining the overall volatility of financial flows.

Following our results we suggest that the contribution of debt investment flows is clearly more important in determining the overall volatility of financial flows. In Table 3 shows the volatility of FDI and debt investment as ratio to GDP. It seems that FDI flows represents less volatile component of private financial flows given their long-term character and relatively stable nature. This is consistent with the paper Taylor and Sarno (1999). Authors conclude that FDI flows are more stable and persistent than other groups of financial flows. These results are also confirmed by Hausmann and Fernandez-Arias (2000), who conclude that even the volatility of FDI flows has been continuously increasing over the last few decades, it still remains generally much lower than the volatility of other types of international financial flows. Authors highlight that the most volatile flows of FDI can be found in MFI economies. However, the difference from developed countries is relatively small. Debt financial flows tend to be far more volatile and sensitive to sudden reversals than FDI. This conclusion also results from our analysis. In addition, according to Table 3 we

¹⁷ Mean of standard deviation for each country group

¹⁸ Ireland excluded as outlier

¹⁹ Bahrain, Liberia, Mauritius and Singapore excluded as outliers (the group of four the most financially opened and volatile countries)

²⁰ Portfolio equity investment are excluded from analysis due to lack of data available

suggest that the volatility of FDI and debt flows remains relatively stable in each group of the countries. However, increments between individual periods have risen slightly in most cases.

Table 3. Cross-sectional Volatility of Different Capital Flows Measured by Standard Deviation²¹

Volatility of financial flows					
FDI/GDP					
Median of Standard deviation	1970-2011	1970-1979	1980-1989	1990-1999	2000-2009
Developed economies	0.148	0.008	0.014	0.035	0.066
MFI	0.186	0.040	0.029	0.054	0.095
LFI	0.086	0.011	0.009	0.027	0.052
Mean of Standard deviation	1970-2011	1970-1979	1980-1989	1990-1999	2000-2009
Developed economies	0.192	0.015	0.023	0.052	0.108
MFI	0.464	0.072	0.056	0.177	0.333
LFI	0.089	0.022	0.014	0.035	0.055
Debt investments/GDP					
Median of Standard deviation	1970-2011	1970-1979	1980-1989	1990-1999	2000-2009
Developed economies	0.451	0.052	0.093	0.099	0.242
MFI	0.470	0.136	0.205	0.188	0.180
LFI	0.223	0.062	0.103	0.106	0.163
Mean of Standard deviation	1970-2011	1970-1979	1980-1989	1990-1999	2000-2009
Developed economies	0.681	0.074	0.102	0.153	0.460
MFI	0.851	0.238	0.475	0.449	0.357
LFI	0.227	0.068	0.129	0.116	0.169

Source: Authors calculations

As we already suggested, the volatility of financial flows is affected by increasing financial openness. We provide some stylized facts concerning the volatility of financial flows. Note: VoFF - volatility of financial flows, FI - financial integration

Source: Authors calculations

Figure 1 outlines the volatility of financial flows according to the measure of international financial integration for the full sample of countries as well as individual subsamples of countries. It is clear that countries with higher financial openness obviously experience higher volatility of financial flows. Note: VoFF - volatility of financial flows, FI - financial integration

Source: Authors calculations

Figure 1 confirms the results from previous sections. Positive relationship is presented in all countries group. However, the contribution of international financial integration in determining the volatility of financial differs for each group of countries.

Table 4. Correlation between Financial Integration and Volatility of Financial Flows

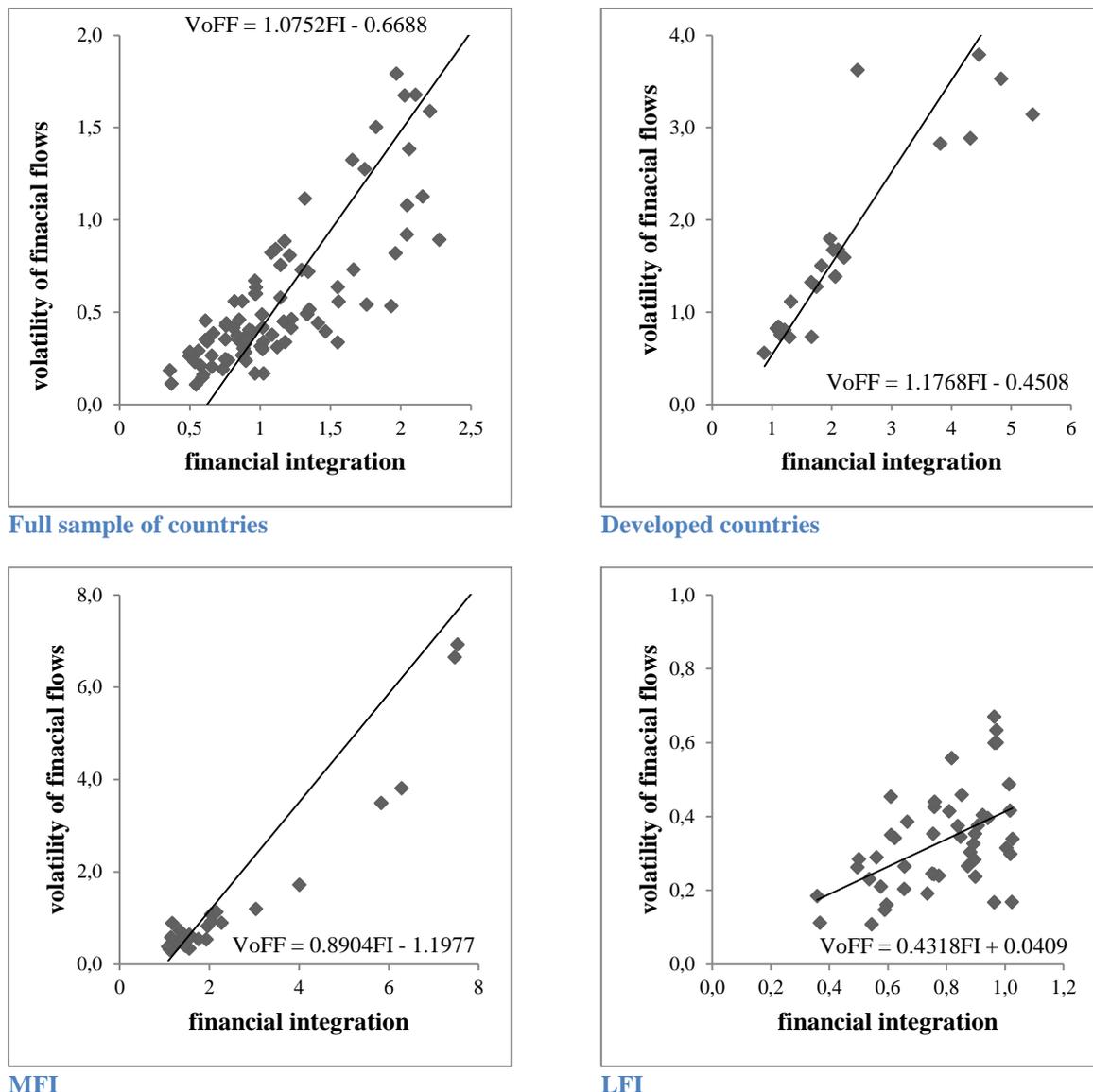
Group of countries	Correlation coefficient
All countries	0.851
Developed economies	0.930
MFI	0.816
LFI	0.503

Source: Authors calculations

In Table 4 we provide results of a simple correlation analysis between international financial integration and the volatility of financial flows. It seems that financial integration has the highest influence on the volatility of financial flows in the group of developed countries (the coefficient of correlation is 0.930). Slightly reduced effect of international financial integration we observed in the group of MFI countries (the coefficient of correlation

²¹ FDI and debt investments measured as total FDI inflows and total debt inflows respectively

is 0.816). LFI group of countries experienced lower interconnection between both variables (the coefficient of correlation is 0.503). We suggest that the relative importance of financial openness in determining the volatility financial flows in LFI economies is clearly marginal and doesn't affect the volatility of financial flows as the primary factor.



Note: VoFF - volatility of financial flows, FI - financial integration
Source: Authors calculations

Figure 1. Financial Integration and Volatility of Financial Flows

We may summarize that higher volatility of international financial flows induced by increasing international financial openness is followed by higher macroeconomic volatility. If this assumption is correct then macroeconomic volatility in developed countries should be the highest from all groups of countries. However, empirical validity of this assumption needs to be tested.

4.2 Macroeconomic Volatility

In this part of the paper we investigate macroeconomic volatility in all three groups of countries. Table 5 (column 1) shows the cross-sectional medians of the volatility of output,

consumption and investment growth over the whole period of four decades. Developed countries maintained substantially lower macroeconomic volatility than other two groups of countries. Despite higher volatility of international financial flows and higher financial openness it seems that developed countries were able to maintain generally low levels of the overall macroeconomic volatility. It seems that international financial integration and increasing volatility of international financial flows was not associated with corresponding increase in the macroeconomic volatility in developed countries.

On the other hand, our results revealed different results for the group of developing countries (both MFI and LFI). In general, developing countries tend to experience more intensive fluctuations in macroeconomic variables in comparison with developed countries. Following the results from Table 5 (column 1) we suggest that MFI economies experienced substantially higher rates of the volatility in macroeconomic variables than LFI countries. Moreover, in case of the volatility of investments, the gap is even much higher. As a result, increasing financial openness seems to be associated with undesirable effects on the macroeconomic stability in developing economies. Therefore, it is important to investigate more details about trends in macroeconomic volatility during the subsequent periods.

Table 5. Macroeconomic Volatility

Macroeconomic volatility of growth rates for selected variables ²²					
Output	1970-2011	1970-1979	1980-1989	1990-1999	2000-2009
Developed economies	2.200	2.486	1.771	3.360	2.167
MFI	5.017	4.669	4.416	4.062	2.354
LFI	4.173	3.499	4.109	4.081	2.437
Final consumption	1970-2011	1970-1979	1980-1989	1990-1999	2000-2009
Developed economies	1.725	1.948	1.368	1.279	1.010
MFI	6.778	6.735	6.483	4.836	4.127
LFI	5.182	4.558	4.549	4.050	3.142
Ratio of total consumption to output	1970-2011	1970-1979	1980-1989	1990-1999	2000-2009
Developed economies	0.167	0.235	0.742	0.879	0.783
MFI	0.468	0.593	0.859	0.867	0.856
LFI	0.385	0.545	0.915	0.925	0.883
Private consumption	1970-2011	1970-1979	1980-1989	1990-1999	2000-2009
Developed economies	2.085	2.444	1.978	1.730	1.499
MFI	8.542	8.517	7.920	5.972	4.463
LFI	5.867	4.966	5.059	4.377	3.607
Investments	1970-2011	1970-1979	1980-1989	1990-1999	2000-2009
Developed economies	6.326	6.158	6.149	5.403	5.986
MFI	20.996	16.577	16.219	16.541	11.116
LFI	14.670	12.560	13.733	12.968	8.825

Source: Authors calculations

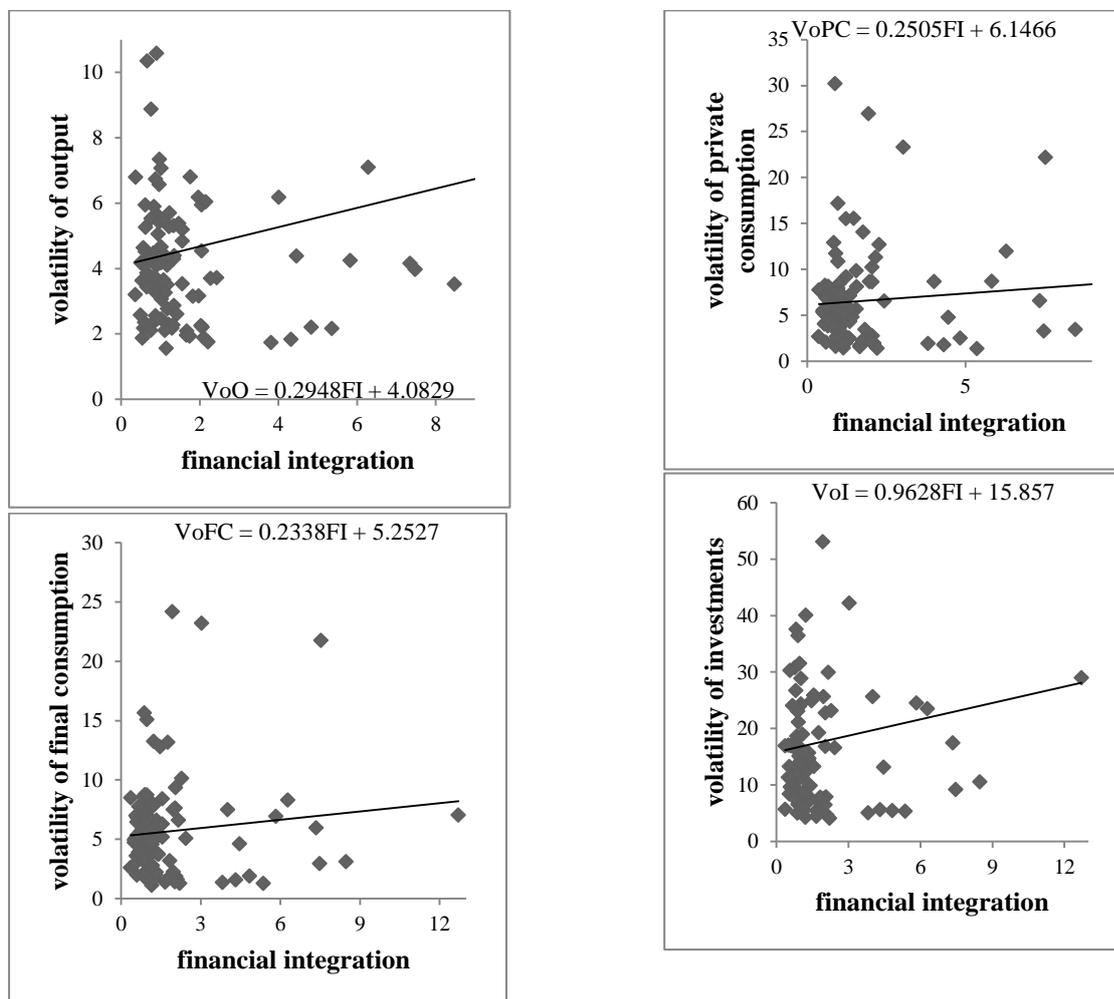
Table (columns 2-5) highlights changes in macroeconomic volatility of growth rates of selected variables during all four decades. In general, developing countries experienced decreasing trend in macroeconomic volatility over time. Moreover, this trend was obvious in both MFI and LFI economies. However, the decrease is more dynamic in the group of MFI countries. We suggest that increasing financial openness associated with higher volatility of international financial flows was associated with higher macroeconomic stability in developing countries, especially MFI countries. This conclusion is obvious even though the overall macroeconomic volatility in MFI countries exceeded macroeconomic volatility in LFI countries in each individual decade.

²² Median of standard deviation for each group of countries

Intensive international financial integration initially causes macroeconomic instability in developing countries. However, increasing openness to global financial markets causes significant economic improvement over time due to associated positive implications. We suggest that increasing financial openness affects macroeconomic volatility in the positive way. In other words the relationship between examined variables is negative.

A. Financial Integration and Macroeconomic Volatility

In the next section we observe mutual relationship between financial openness (financial integration) and macroeconomic volatility. We employed following measurements of macroeconomic volatility - the volatility of real GDP per capita growth, the volatility of real private consumption per capita growth, the volatility of real final consumption per capita growth, the volatility of real gross fixed capital formation per capita growth and as ratio of the volatility of total consumption to the volatility of output. We expect that financial integration has positive effect on macroeconomic volatility. As a result, an increase in financial integration is followed by the drop in macroeconomic volatility.



Note: VoO - volatility of output, VoPC - volatility of private consumption, VoFC - volatility of final consumption, VoI - volatility of investments, FI - financial integration

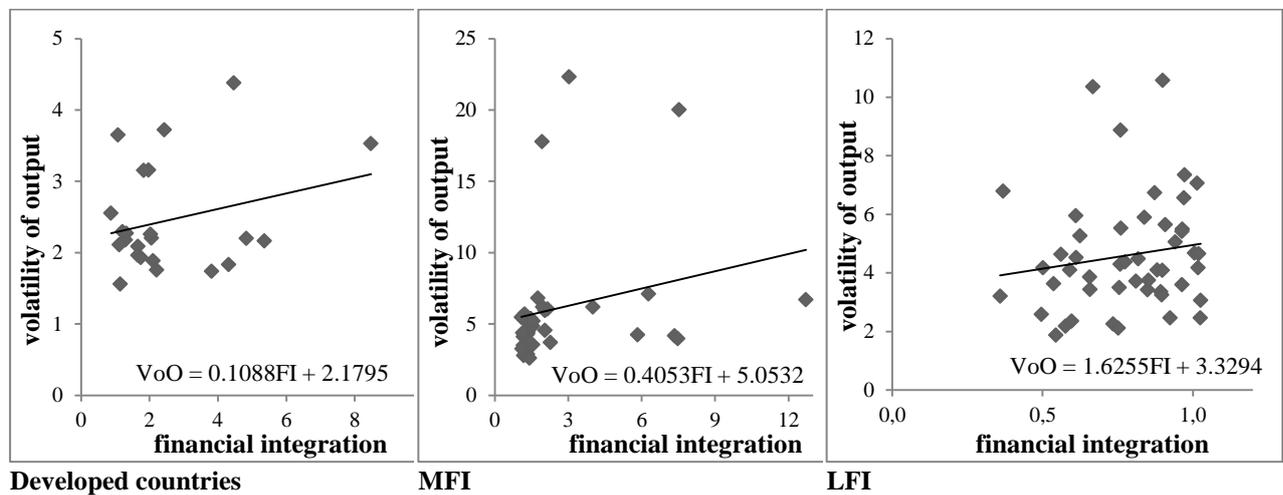
Source: Authors calculations

Figure 2. Financial Integration and Macroeconomic Volatility

In Figure 2 we summarize the relationship between financial integration and the volatility of total output and its selected components for the full sample of countries. Our results revealed generally positive relationship in all four cases. Participation of countries in the process of financial integration is thus associated with increased macroeconomic volatility. It seems that intensified cross-border capital movements operate as a vehicle for weakening the macroeconomic stability, though this relationship does not seem to be significant. At the same time, our expectation about the existence of negative relationship was not confirmed.

Our results are consistent with empirical results of other authors (i.e. Kose *et al.*, 2003). The strongest relationship was observed between financial integration and overall output. Investments seem to be the most sensitive component of the output in terms of its exposure to the relative changes in financial integration.

Error! Reference source not found. provides brief overview of identified relationship between financial integration and the volatility of output in countries decomposed into three groups. Our estimations confirmed expected positive relationship between both indicators in all three groups of countries.



Note: VoO - volatility of output, FI - financial integration
 Source: Authors calculations

Figure 3. Financial Integration and Volatility of Output

Despite generally low levels of correlation between financial openness and overall output in all three groups of countries we observed decreasing trend in this causal relationship considering the level of financial integration (Table 7). As a result, total output in LFI countries seems to be least vulnerable to relative changes in the financial openness from the whole group of countries.

Table 6. Correlation between Financial Integration and Volatility of Output

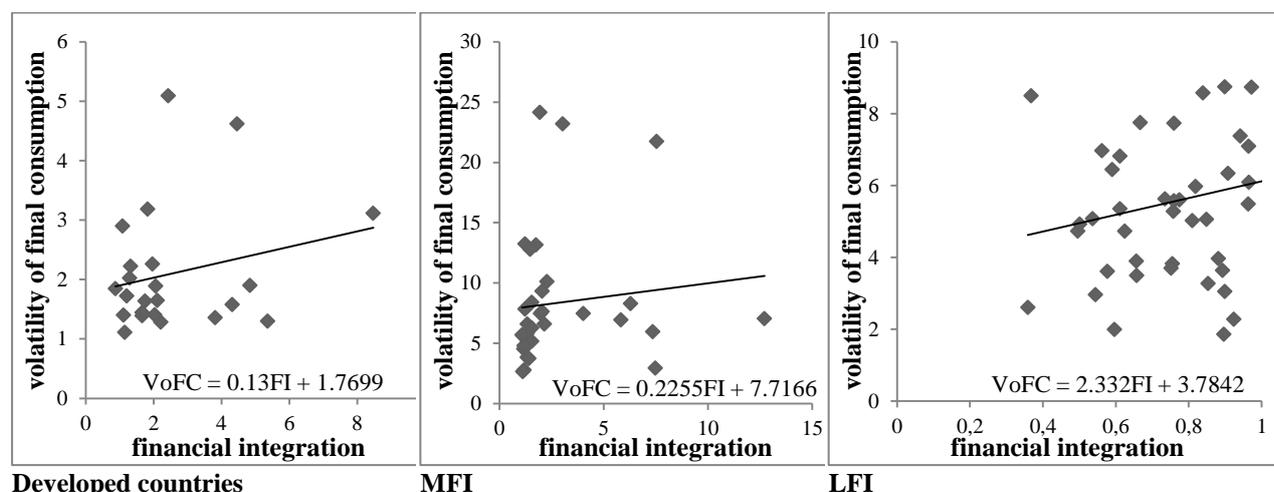
Group of countries	Correlation coefficient
All countries	0.181
Developed economies	0.265
MFI	0.234
LFI	0.151

Source: Authors calculations

Lagging involvement of less developed countries in the process of international financial integration is obviously decelerated by low intention of financial markets and

individual investors to internationally share high risk with underdeveloped market economies. Low degree of financial openness reduces transmissions of external shocks (i.e. banking and financial crisis) to low financially integrated economies and thus anchors macroeconomic stability by reducing the dynamics of macroeconomic volatility. At the same time, low participation of such economies in the international risk sharing and cross-country portfolio holdings clearly reduces wide range of growth benefits resulting from foreign capital inflows considering low domestic savings, technology gap and low productivity.

In the following part of the paper we investigate the relationship between international financial integration and selected components of total output in all three groups of countries. Results are particularly important for identification of the sources of macroeconomic instability determined by relative changes in the size of the cross-country capital flows exchanging in the individual groups of countries.



Note: VoFC - volatility of final consumption, FI - financial integration

Source: Authors calculations

Figure 5. Financial Integration and Volatility of Final Consumption

The relationship between international financial integration and the volatility of final consumption for all three groups of countries is summarized in the Error! Reference source not found.. As we expected, there is a positive relationship between both variables in each group. However, significance of this relationship seems to quite low especially in both groups of developing countries.

Positive relationship between both variables corresponds with generally expected positive welfare effect of financial integration on domestic consumption. Results presented in Error! Reference source not found. indicate similar trends in both total output and final consumption (especially due to private consumption) in developing countries from 1970s till 1990s. Consumption smoothing over time helped to reduce the overall macroeconomic volatility in this group of countries during this period operating as a stabilizing factor of effects associated with rapidly growing financial integration. As a result, wealth effects of financial integration are associated especially with developed countries (Table 8). At the same time, the volatility of final consumption is least correlated with financial integration in MFI revealing its lower dependence on the dynamics of financial openness especially during the period from 1970s till 1990s.

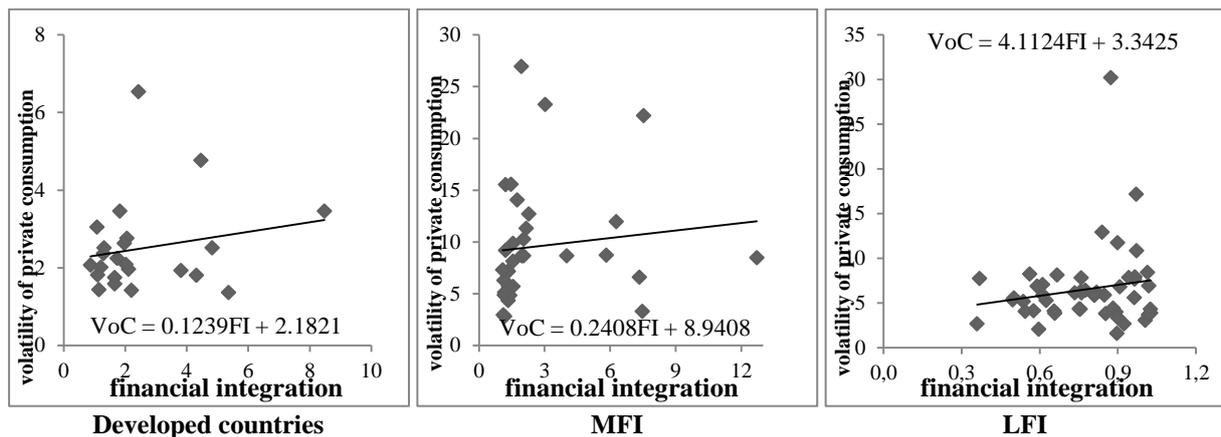
Table 8. Correlation between Financial Integration and Volatility of Final Consumption

Group of countries	Correlation coefficient
All countries	0.109
Developed economies	0.229
MFI	0.111
LFI	0.153

Source: Authors calculations

We suggest that final consumption operated as a destabilizing factor (especially due quite volatile private consumption) of the overall macroeconomic stability in the group of MFI (in comparison with both developed and LFI countries) during the most of the selected period. While the volatility of final consumption in MFI was much less dependent on the dynamics of financial integration, we assume that this trend was associated with growth effects of generally higher stocks of accumulated foreign assets (in comparison with LFI countries) and corresponding higher dynamics of total output.

In Figure 6 we summarize the relationship between financial integration and the volatility of private consumption in the individual groups of countries. Following the conclusions from the previous section Figure 6 similarly confirmed the existence of a positive relationship between financial integration and the volatility of private consumption in all three groups of countries.



Note: VoPC - volatility of consumption, FI - financial integration
 Source: Authors calculations

Figure 6. Financial Integration and Volatility of Private Consumption

However, our results indicate some differences in the intensity of the relationship between financial openness and private consumption (in comparison with final consumption). While the volatility of private consumption seems to be less correlated with financial integration in developed countries (especially during first three decades), the relationship in MFI countries remained unchanged and slightly increased in LFI countries (though still lagging behind developed countries).

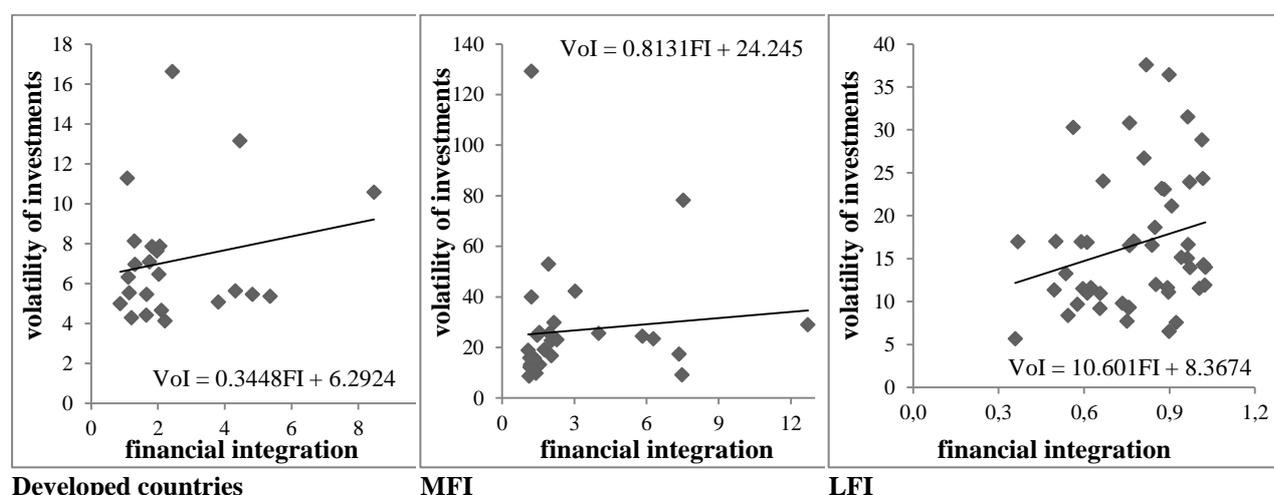
Table 9. Correlation between Financial Integration and Volatility of Private Consumption

Group of countries	Correlation coefficient
All countries	0.096
Developed economies	0.192
MFI	0.112
LFI	0.167

Source: Authors calculations

Low levels of financial integration in LFI countries induced higher exposure of private consumption to the relative changes in capital inflows from abroad, while private consumption MFI countries is more vulnerable to the changes in the stock of capital from abroad (this conclusion is also confirmed at the following section of the paper examining effects of the volatility of financial flows).

Finally, Figure 7 examines mutual relationship between financial integration and domestic investments. Similarly, we observed a positive relationship between both variables. While generally of a low significance, the strongest relationship was identified in LFI countries confirming our assumption about relatively high importance of foreign capital inflows for investment activities particularly in low financially integrated underdeveloped economies with insufficient accumulation of domestic savings.



Note: VoI - volatility of investments, FI - financial integration
Source: Authors calculations

Figure 4. Financial Integration and Volatility of Gross Fixed Capital Formation

Our conclusions are even more interesting provided that the relationship between the level of financial openness and the volatility of domestic gross investments is the weakest from all components of total output for the whole sample of countries. This suggestion is also valid for both developed (except for private consumption) and MFI countries. At the same time, the weakest correlation between financial integration and gross domestic investments in MFI countries, provided significant volatility of this variable (see Table 5 for details), addresses opened questions to the examination of possible sources of a substantial volatility of investments in this group of countries during the most of the analyzed period. In the next section of the paper we indicate that provided the lowest level of financial openness, gross domestic investments in LFI are quite sensitive to the volatility of foreign capital inflows highlighting the reliance of real output growth rates in the countries from this group on the confidence and concern of the foreign investors.

Table 7. Correlation between Financial Integration and Volatility of Investments

Group of countries	Correlation coefficient
All countries	0.121
Developed economies	0.204
MFI	0.094
LFI	0.243

Source: Authors calculations

Examination of the relationship between financial integration and the volatility of total output and its main components may be summarized as follows. The strongest relationship was identified between financial integration and the volatility of total output. We suggest that increasing international financial integration has positive though less significant effect. Moreover, positive effect is increasing with rising financial integration of a country. On the other hand, different implications revealed investigation of the relationship between financial integration and the volatility of consumption and investments. While results for the group of developed countries still indicate higher exposure of later two variables to the financial integration, the situation changed in both groups of developing countries. Our results indicate that low levels of financial integration of countries from the group of developing economies induce higher vulnerability of particular economies to the volatility of consumption and investments than in MFI countries. We suggest that growth rates of domestic consumption and especially investments in LFI are more sensitive to the relative changes in the financial openness than MFI countries revealing (1) limited internal sources of growth and (2) higher dependence of economic convergence on external sources in LFI countries. As a result, while financial integration operates as a traditional vehicle of higher macroeconomic volatility, our results indicate that the general trend of decreasing macroeconomic volatility during the period before the crisis was not primarily driven by financial integration. Considering that there is no clear empirical evidence about direct interconnection between decreasing macroeconomic volatility and rising financial integration, we suggest that decreasing trend in macroeconomic volatility during the period of last four decades was caused by other determinants affecting the dynamics of real output and its main components.

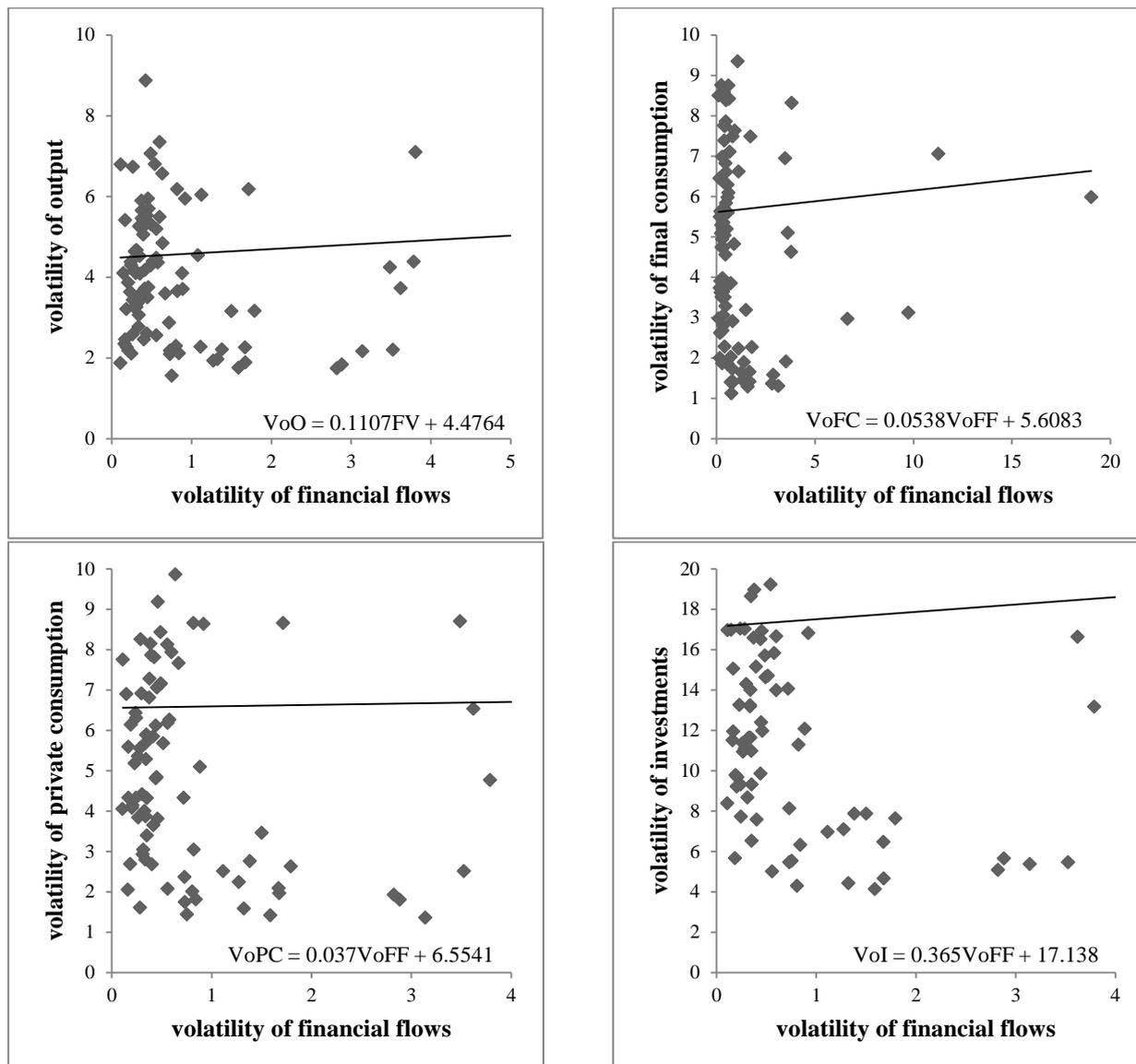
B. Volatility of Financial Flows and Macroeconomic Volatility

In the last section of the paper we analyze the relationship between the volatility of financial flows and macroeconomic volatility. Following our previous results revealing a positive relationship between financial integration and macroeconomic volatility we expect that there exist a positive relationship between the volatility of financial flows and macroeconomic volatility too.

In Figure 8 we summarize the relationship between the volatility of financial flows and the volatility of total output and its selected components for the full sample of countries. Our investigation indicates generally positive relationship in all four cases. The intensity of the relationship seems to be less dynamic when examining the volatility of financial flows (Figure 8) in comparison with stocks of capital (financial integration) (Figure 2) for all variables and all countries in one group. However, decomposition of countries into individual groups revealed distortions in aggregated results that have to be explained in details. Except for MFI, our results indicate stronger relationship between the volatility of financial flows and the volatility of key variables in both remaining groups of countries (developed and LFI economies). It seems that the volatility of financial flows is associated with higher volatility of macroeconomic variables revealing negative implications of dynamic changes in the cross-country capital allocation.

While our analysis did not examine the particular contribution of capital inflows and outflows to the volatility of main macroeconomic variables, we suggest that macroeconomic volatility of less developed countries (and LFI at the same time) is more sensitive to the foreign capital inflows considering generally negative international investment position (net balance of foreign assets-liabilities balance sheet). We assume that inflow of foreign capital and its dynamics determines growth rates of employed variables more significantly than the overall stock of foreign capital indicating limitations of growth incentives associated with financial integration of less developed countries over time. Relative differences resulted from

stocks and flows approaches in LFI countries correspond with least strong relationship between financial integration and the volatility of financial flows (Table 4).

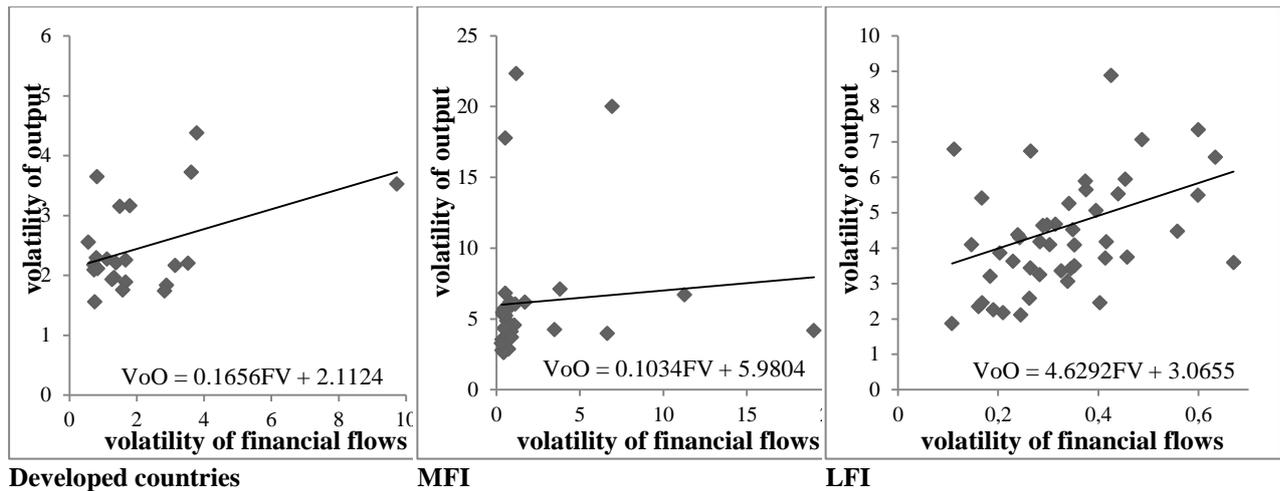


Note: VoFF - volatility of financial flows, VoPC - volatility of private consumption, VoFC - volatility of final consumption, VoI - volatility of investments

Source: Authors calculations

Figure 8. Volatility of Financial Flows and Macroeconomic Volatility

At the same time, different results for the group of MFI countries (vulnerability to flows) confirm key outcomes of the previous section (vulnerability to stocks) about reduced exposure of key macroeconomic variables in MFI but less developed countries.



Note: VoFF - volatility of financial flows, VoO - volatility of output
Source: Authors calculations

Figure 9. Volatility of Financial Flows and Volatility of Output

Figure 9 examines the relationship between the volatility of financial flows and the volatility of output in all three groups of countries. As we expected, total output seems to be more vulnerable to the relative changes in the external capital flows in developed and LFI countries. These results correspond to our key findings resulted from the previous section of the paper emphasizing the least vulnerability of MFI economies. Our findings also indicate that the volatility of total output in both groups of countries is higher when examining its exposure to the flows (Table 11) as when examining its exposure to stocks (Table 7).

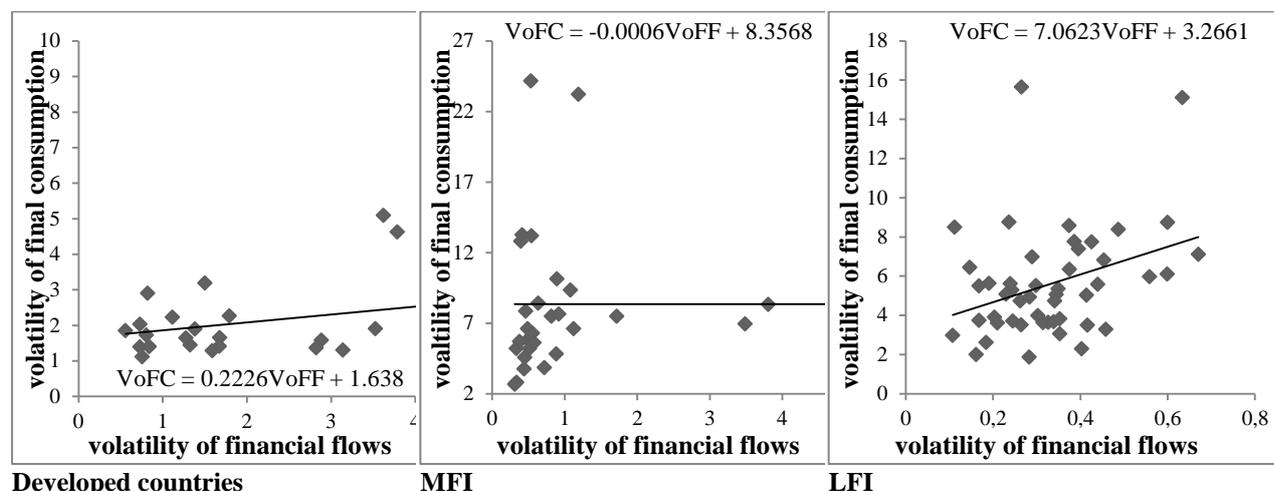
Table 11. Correlation between Volatility of Financial Flows and Volatility of Output

Group of countries	Correlation coefficient
All countries	0.086
Developed economies	0.429
MFI	0.086
LFI	0.319

Source: Authors calculations

It seems that changes in the direction as well as the dynamics of foreign capital flows are followed by sharp changes in the total output in LFI economies considering generally low levels of financial depth in these countries that make them hard to cope with highly volatile foreign capital flows as suggested by Kose et al. (2003) (foreign capital flows thus operates as sudden external shock with negative impact on macroeconomic stability). However, it doesn't seem to be the case of MFI economies with deeper and higher developed financial sector that is associated with lower volatility of macroeconomic variables (Easterly, Islam and Stiglitz, 2001) regardless of the dynamics in the volatility of international financial flows. Finally, strong evidence of the positive relationship between the volatility of financial flows and the volatility of output in developed countries confirms theoretical assumptions about linkage between instability of financial flows and associated macroeconomic volatility in highly financially opened economies that increase their vulnerability to external shocks. However, our results indicate that theory does not provide sufficient fundamental background for clear explanation of the effects of the volatility of financial flows on the volatility of output for our sample of developed and developing economies. It seems that despite rich empirical evidence of possible implications associated with the volatility of international financial flows, there is still a crucial need for a further investigation examining possible channels of the financial

volatility transmission into domestic economy under wide variety of country specific circumstances and associated effects on macroeconomic volatility.



Note: VoFF - volatility of financial flows, VoFC - volatility of final consumption
Source: Authors calculations

Figure 10. Volatility of Financial Flows and Volatility of Final Consumption

In Figure 10 we investigate the relationship between the volatility of financial flows and the volatility of final consumption in each group of countries from our sample. Our results correspond with to our previous conclusions resulting from Figure 9. We observed strong positive relationship between both variables in developed and LFI countries. We suggest that high volatility of consumption in developed countries caused by the volatility of financial flows is caused by wealth effects associated with improved international risk sharing opportunities through high volatility of cross-border capital flows (as indicated by Table 1). However, despite relatively strong relationship between the volatility of financial flows and the volatility final consumption it seems that highly financially integrated countries (developed economies) are able to smooth their consumption over time provided its generally lower volatility in comparison with the volatility of total output (as indicated by Table 5).

Results for the group of MFI economies revealed insignificant relationship between the volatility of financial flows and the volatility of final consumption. It seems that despite relatively high levels of financial integration, the final consumption in countries from this group is not affected by the volatility in financial flows. Similarly to our previous results we suggest that the volatility of output is more vulnerable (though with less significance) to stocks of assets than to flows of capital. At the same time, high volatility of consumption in MFI economies (see Table 5 for more details) indicate their reduced ability to smooth their consumption over time that is caused especially by their reduced ability to absorb structural shocks.

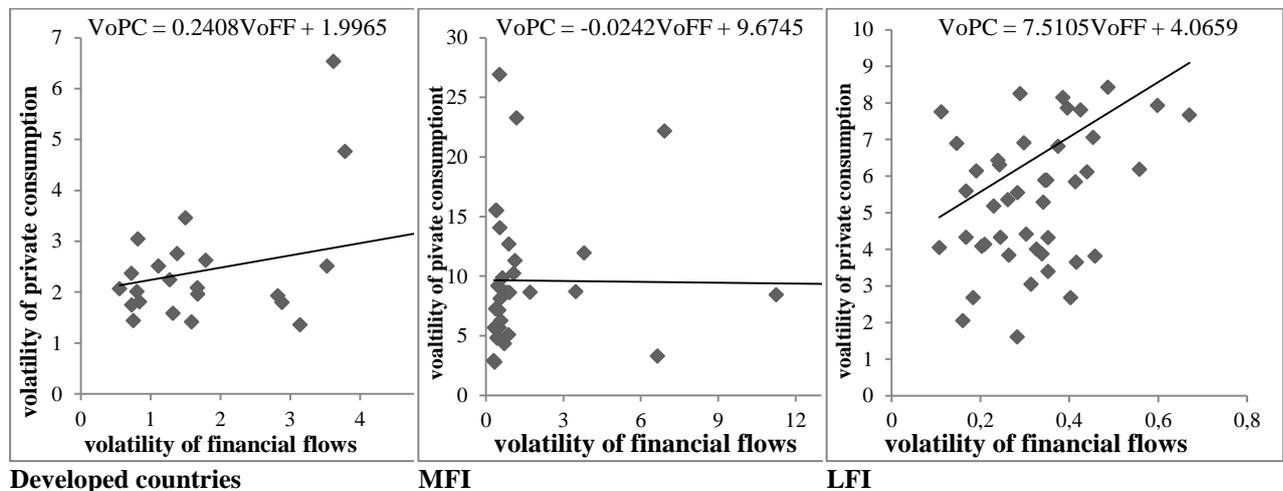
Table 8. Correlation between Volatility of Financial Flows and Volatility of Final Consumption

Group of countries	Correlation coefficient
All countries	0.032
Developed economies	0.418
MFI	0.022
LFI	0.446

Source: Authors calculations

Finally, we observed strong relationship between the volatility of financial flows and the volatility of final consumption in LFI economies. In line with our previous results it seems that consumption in countries from this group is clearly more vulnerable to flows than to stocks of foreign capital. While the wealth effect associated with foreign capital flows seems to be significant, reduced consumption smoothing is present during the most of the analyzed period.

Figure 11 summarizes the relationship between the volatility of financial flows and the volatility of private consumption. Our results indicate that there are no significant differences between effects on final consumption and private consumption in case of developed countries. Volatility of both variables is positively affected by the volatility of financial flows. At the same time, the intensity of the relationship is the strongest in this group of countries relatively to the full sample of countries.



Note: VoFF - volatility of financial flows, VoPC - volatility of private consumption
Source: Authors calculations

Figure 11. Volatility of Financial Flows and Volatility of Private Consumption

Similar results provide overview of the relationship between the volatility of financial flows and the volatility of private consumption in LFI economies. While the identified relationship is still positive, its significance slightly decreased (in comparison with the volatility of final consumption). It seems that reduced wealth effect on private consumption in LFI countries induced by budgetary constraints is associated with limited international risk sharing provided generally low levels of financial integration (and corresponding low volatility of financial flows). However, private consumption in LFI countries is still more vulnerable to the relative changes in the international financial flows than to stocks of foreign capital (financial integration).

Table 9. Correlation between Volatility of Financial Flows and Volatility of Private Consumption

Group of countries	Correlation coefficient
All countries	0.018
Developed economies	0.398
MFI	-0.016
LFI	0.225

Source: Authors calculations

Examination of the volatility of financial flows and the volatility of private consumption revealed the negative though clearly insignificant relationship between both

variables in MFI economies. This investigation together with results for the volatility of final consumption provides spurious information about stabilizing effects of foreign capital inflows in MFI countries. At the same time, insignificant relationship between both variables (flows and consumption) indicates an absence of the wide range of growth benefits resulting from foreign capital inflows. As we already mentioned, MFI countries benefits more from stock of accumulated capital (higher level of financial integration in comparison with LFI economies) than from inflows of foreign capital within particular period.

Figure 12 provides brief overview of the relationship between the volatility of financial flows and the volatility of investments in all three groups of countries. While the results for the whole sample of countries revealed significant influence of the flows on the volatility of investments, estimates for individual groups of countries indicate some differences. Rigorous interpretation of key findings of this section is particularly important due to significant volatility of investments in all three groups of countries during the whole observed period that make them the most volatility component of the total output.

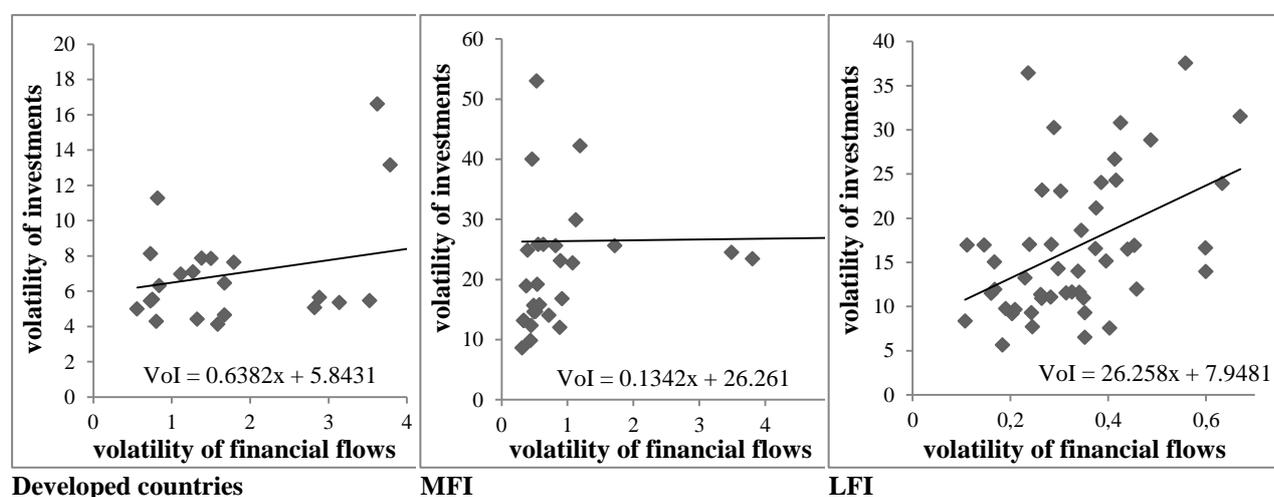


Figure 12. Volatility of Financial Flows and Volatility of Investments

Note: VoFF - volatility of financial flows, VoI - volatility of investments

Source: Authors calculations

We suggest that assessment of the relationship between the volatility of financial flows and the volatility of investments may reveal substantial implications of the international risk sharing and associated changes in the cross-country portfolio holdings on the macroeconomic volatility across the countries from our sample.

Table 10. Correlation between Volatility of Financial Flows and Volatility of Investments

Group of countries	Correlation coefficient
All countries	0.058
Developed economies	0.403
MFI	0.022
LFI	0.446

Source: Authors calculations

Our results indicate relatively strong positive relationship between the volatility of financial flows and the volatility of investments in developed and LFI economies. Developed countries experienced periods of increased volatility of financial flows since the beginning of the 1980s. At the same time, the volatility of investments remained relatively low in comparison with developing countries. High depth of the domestic financial sector together

with intensive international risk sharing enabled developed countries to maintain increasing trend in the gross investments to output ratio over time. This positive implication is even more valuable considering that many countries from the group, operating as net creditors in the intertemporal trade, were able to reduce the overall macroeconomic volatility in the recent years especially due to stabilization of the domestic investments growth rates.

LFI countries, despite relatively high positive relationship between the volatility of financial flows and the volatility of investments, experienced periods of imbalanced growth and relative macroeconomic instability during the most of the observed period. It seems that despite high inflows of foreign capital clearly supplementing the lack of domestic savings, volatile external sources of investments induced economic growth

Acknowledgement

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Conclusion

In the paper we have analyzed the relationship between financial integration, volatility of financial flows and macroeconomic volatility during the period of last four decades on the sample of developed and developing countries. While theory does not provide clear evidence on key implications of international financial integration on the volatility of macroeconomic variables, empirical literature reveals both positive and negative effects on different samples of countries considering particular time periods. Moreover, we provided the evidence of the decreasing trend in macroeconomic volatility in all groups of countries over time.

Examination of sources of the volatility of financial flows revealed increased contribution of debt flows to the dynamics in financial integration and thus becoming the key element in determining macroeconomic volatility. Following our results we suggest that higher volatility of international financial flows induced by increasing international financial openness was followed by higher macroeconomic volatility. These findings were confirmed by examined positive relationship between financial integration and main components of the total output. As we expected investments seem to be the most sensitive component of the total output to relative changes in the financial openness. In line with empirical literature we found low significant though positive relationship between financial integration and the total output and its components in all three groups of countries (highest in developed countries).

Our results also indicate that macroeconomic volatility in both developed and LFI countries is more vulnerable to the financial volatility (volatility of flows) than to the size of financial openness (volatility of stocks). This implication is more crucial when comparing LFI and MFI economies. Inflows of foreign capital and its dynamics determines macroeconomic volatility in LFI economies more significantly than the overall stock of foreign capital indicating limitations of growth incentives associated with financial integration of less developed countries over time. Volatility in foreign capital flows is followed by more dynamic changes in the total output in LFI economies due to low levels of financial depth in these countries that make them hard to cope with highly volatile foreign capital (foreign capital flows thus operates as sudden external shock with negative impact on macroeconomic stability). However, it doesn't seem to be the case of MFI economies with deeper and higher developed financial sector that is associated with reduced volatility of macroeconomic variables.

Finally, despite examined positive relationship between the volatility of financial flows and macroeconomic volatility it seems that highly financially integrated countries (developed economies) are able to smooth their consumption over time more effectively. As a result, effects of volatility of financial flows on economic growth are less significant. At the

same time their intensive involvement in the cross-border capital exchanging enables them to benefit from the international risk sharing and cross-country portfolio holdings more effectively than developing countries especially due to developed financial sector.

Our further research will be focused on more in-depth examination of the volatility-growth patterns across countries classified into more specific sub-groups. At the same time, we employ conventional econometric methods to examine the relationship between variables more precisely. We also expect that investigation of the shock absorption capabilities of the different samples of countries would be contributive for exploration of the volatility-growth relationship during the particular sub-periods. Finally, effects of the fiscal and monetary policies will be examined to highlight policy implications to the financial integration.

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APPENDIX

A. Sources of data in the paper

Data Type	Source
Total assets, Total liabilities	LMF database
GDP current per capita growth	LMF database
GDP constant per capita growth	UNCTAD
Real household consumption expenditure per capita growth	UNCTAD
Final consumption expenditure (constant) per capita	UNCTAD
Gross fixed capital formation (constant) per capita GROWTH	UNCTAD
Country classification – developed, developing	IMF
FDI liabilities per GDP	LMF database
Debt investment per GDP	LMF database

B. List of countries decomposed into individual groups

The sample of countries contains 23 developed countries, 32 more financially integrated countries and 48 less financially integrated countries.

industrial countries
Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Malta, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, United States
developing countries
Algeria, Argentina, Bahrain, Benin, Bolivia, Brazil, Burundi, Cameroon, Central African Rep., Chad, Chile, Colombia, Congo, Dem. Rep. of, Congo, Republic of, Costa Rica, Côte d'Ivoire, Dominican Republic, Ecuador, Egypt, El Salvador, Equatorial Guinea, Ethiopia, Fiji, Gabon, Gambia, The, Ghana, Guatemala, Guinea, Guyana, Haiti, Honduras, India, Indonesia, Iran, Islamic Republic of, Israel, Jamaica, Jordan, Kenya, Lebanon, Liberia, Madagascar, Malawi, Malaysia, Mali, Mauritania, Mauritius, Mexico, Morocco, Myanmar, Nepal, Nicaragua, Niger, Nigeria, Oman, Pakistan, Panama, Paraguay, Peru, Philippines, Qatar, Rwanda, Samoa, Saudi Arabia, Senegal, Sierra Leone, Singapore, South Africa, Sri Lanka, Sudan, Swaziland, Syrian Arab Republic, Thailand, Trinidad and Tobago, Togo, Tunisia, Turkey, Uganda, Uruguay, Venezuela, Rep. Bol., Zambia
more financially integrated economies
Bahrain, Bolivia, Chile, Congo, Dem. Rep. of, Congo, Republic of, Côte d'Ivoire, Egypt, El Salvador, Equatorial Guinea, Guyana, Israel, Jamaica, Jordan, Lebanon, Liberia, Malaysia, Mauritania, Mauritius, Nicaragua, Panama, Paraguay, Qatar, Saudi Arabia, Singapore, Sudan, Swaziland, Trinidad and Tobago, Togo, Tunisia, Uruguay, Venezuela, Rep. Bol., Zambia
less financially integrated economies
Algeria, Argentina, Benin, Brazil, Burundi, Cameroon, Central African Rep., Chad, Colombia, Costa Rica, Dominican Republic, Ecuador, Ethiopia, Fiji, Gabon, Gambia, The, Ghana, Guatemala, Guinea, Haiti, Honduras, India, Indonesia, Iran, Islamic Republic of, Kenya, Madagascar, Malawi, Mali, Mexico, Morocco, Myanmar, Nepal, Niger, Nigeria, Oman, Pakistan, Peru, Philippines, Rwanda, Samoa, Senegal, Sierra Leone, South Africa, Sri Lanka, Syrian Arab Republic, Thailand, Turkey, Uganda

COOPETITION AND GAME THEORY⁺

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Abstract:

The purpose of this research is to discuss how to use game-theoretical models in coopetition studies and bridge the gap between coopetition studies and game theory. The paper's main contribution is twofold. First, it is argued that there are advantages to using game theory in coopetition studies. Second, the game-theoretical models in coopetition studies for normal-form and extensive-form games are demonstrated.

Keywords: coopetition, cooperation, game theory, normal-form games, extensive-form games, non-zero sum game.

JEL Classification: C72, C78, C79, M21

1. Introduction

Although it is well known that game-theoretical models are useful for analyzing various situations and markets, it is rarely used to investigate cooperative situations. Although coopetition studies have a long history, few researchers built game-theoretical models in the case of coopetition.²³

There are three potential reasons why game-theoretical model is so rarely used in coopetition studies. First, most research in coopetition is in management rather than economics. Moreover, game theory uses mathematical (and seemingly complex) models and equations based on (applied) microeconomics. Second, an important aim of many coopetition studies is to bring sophistication to the concept of coopetition and coopetition-related terms such as value net.²⁴ However, game theory seems unsuited to this task. Third, case-study methods are used in coopetition studies.²⁵ These methods involve using a few specific companies, industries, countries or regions to shed light on coopetition principles and characteristics. However, case studies are based on observing situations and do not lend themselves readily to game-theoretical model.

The purpose of this research is to describe how to use game-theoretical models in coopetition studies. To bridge the gap between coopetition studies and game theory, in this paper, we describe the relationship between coopetition studies and game theory.

2. Game theory in coopetition studies

It is very important that what game-theoretical model is rarely used in coopetition studies does not mean that game theory is not useful for coopetition studies. For example, Brandenburger and

⁺ The authors appreciate helpful comments from participants at the Sixth Workshop on Coopetition Strategy in Umea in 2014. Mahito Okura would like to acknowledge financial support from the Japanese Ministry of Education, Culture, Sports, Science, and Technology in the form of a Grant-in-Aid for Young Scientists (B), No. 24730362.

²³ Although eighteen years have passed since Brandenburger and Nalebuff (1996) published their pioneering study of coopetition, there are a small number of exceptions. For example, see Dearden and Lilien (2001), Okura (2007, 2008, 2009, 2012), Ngo and Okura (2008), Sun *et al.* (2008), Carfi (2010, 2012), Carfi *et al.* (2011), Carfi and Schiliro (2011a, 2011b, 2012), Carfi and Trunfio (2011), Biondi and Giannoccolo (2012), Carfi and Musolino (2012a, 2012b, 2013a, 2013b, 2013c, 2014a, 2014b, 2014c), and Ohkita and Okura (2014). Moreover, in the works of Carfi and Carfi *et al.*, the model of cooperative game is used together with the complete analysis of a differentiable game – see, for that, Carfi (2008, 2009a, 2009b), Carfi and Musolino (2011a, 2011b, 2014d, 2014e), Carfi and Perrone (2011a, 2011b, 2013), Carfi and Ricciardello (2010, 2012) - in order to exploit comprehensively and exhaustively the cooperative interaction.

²⁴ For example, the subtitle of Dagnino and Rocco's (2009) Part I, which contains four papers, is "conceptual development".

²⁵ For example, the subtitle of Dagnino and Rocco's (2009) Part II, which contains five papers, is "case-based inquiry".

Nalebuff (1996, pp. 5–8) argued that game theory is useful for understanding cooperative situations.²⁶ Lado *et al.* (1997, p. 113) argued that game theory can explain behavior in the context of interfirm relationships. Clarke-Hill *et al.* (2003) and Gnyawali and Park (2009) explained game theory approach in cooperation situation.²⁷ Okura (2007, 2008, 2009, 2012) and Ohkita and Okura (2014) explained the advantages of using game theory in cooperation studies. Pesamaa and Eriksson (2010) explained the usefulness of game theory for investigating actors' interdependent decisions. Rodrigues *et al.* (2011) applied game theory for investigating strategic cooperation. Ghobadi and D'Ambra (2011) summarized the characteristics, strengths and limitations to use Game Theory in cooperation studies. Bengtsson and Kock (2014) pointed out that game theory is one of the research perspectives in cooperation studies. Carfi (2010, 2012) has defined and applied a new analytical model of cooperative game, after that he and various collaborators have developed the applicative aspects of the new model in several directions, such as Management, Finance, Microeconomics, Macroeconomic, Green Economy, Financial Markets, Industrial Organization, Project Financing and so on – see, for instance, Carfi *et al.* (2011), Carfi and Schiliro (2011a, 2011b 2012), Carfi and Trunfio (2011), Carfi and Musolino (2012a, 2012b, 2013a, 2013b, 2013c, 2014a, 2014b, 2014c).

3. Advantages of using game theory in cooperation studies²⁸

There are three advantages to using game theory in cooperation studies.

First advantage is that game theory is a very suitable methodology for analyzing inter-firm relationships because game theory can shed light on situations in which individual action directly affects the payoffs of others (Shy 1995, p.11). Inter-firm relationships are a necessary condition to realize cooperation because cooperation is one of the situations in which some relationships among multiple firms are surely existed. From that viewpoint, the market structures and conditions that treated in both cooperation studies and game theory are very similar. *For example*, Ohkita and Okura (2014) considered the situation in which legal software firms decide the amount of investments for excluding (a fraction of) illegal software firms and the number of software. In this situation, it is easy to prospect that cooperation, which contains cooperative investments and competitive number of software, may be realized. Then, this situation is the subject in cooperation studies. At the same time, this situation contains inter-firm relationships among legal and illegal software firms. Then, this situation is also the subject in game theory.

Second advantage is that game theory can easily depict co-operative situations by isolating the cooperative and competitive aspects of the co-opetition using multiple stages. Generally speaking, cooperation situation is tendency to be complex because at least two aspects (competitive and cooperative aspects) are simultaneously appeared. *For example*, Okura (2009) considered the situation in which life insurance firms choose the investment levels for preventing insurance fraud and their quantities. In order to confirm whether cooperation situation in which they cooperatively conduct the investment, while competitively choose their quantities is realized, both decisions and the relationship between two aspects must be considered. In game theory, this situation can be depicted as extensive-form game and simply derive subgame-perfect equilibrium which is similar to Nash equilibrium. By backward induction, we firstly consider second stage and then investigate first stage. In other words, multiple and complex relationships which consist of cooperation are decomposed and we can analyze it stage by stage even if there are many and complex-related stages.

Third advantage is that game theory is very rigorous and provides sophisticated solutions and equilibrium concepts. In other words, results from game theory are very reliable. In other words, results derived from game theory can be easily generalized even if the focus of the analysis is specified. *For example*, Okura (2012) considered the situation in which insurance firms decide the training investment levels for insurance agents to maintain market confidence and their quantities. This research explicitly indicated analyzing insurance market, but the results derived from this

²⁶ Stein (2010: p.257) mentioned that Brandenburger and Nalebuff (1996) “explain ‘co-opetition’ as an approach that intends to explain competition and cooperation in business networks in the spirit of game theory.”

²⁷ However, Clarke-Hill *et al.* (2003) used both cooperation and competition instead of cooperation.

²⁸ The advantages of using game theory for this type of study are well documented in previous work (Okura, 2007, 2008, 2009; Ngo and Okura, 2008; Carfi and Schiliro, 2012; Baglieri *et al.*, 2012; Ohkita and Okura, 2014), thus this section is the summary of these previous studies.

analysis can be used in other markets. For example, suppose that firms invest for educating their employees and they compete in travel industry. The results in Okura (2012) are also applicable if uneducated employees may lower market confidence by inappropriate actions such as fraud and plunder.

4. Normal-form games in competition studies

Normal-form games comprise players, strategies, and payoffs. To explain these three elements, we use a simple example. Suppose that a boy and a girl (a couple) want to see a movie, and they have two choices, “Mission Impossible” (movie M) and “Pirates of the Caribbean” (movie P). Although the boy prefers to see movie M and the girl prefers to see movie P, both want to see a movie together. Thus, the boy’s (girl’s), preferences, in order, are as follows: see movie M (movie P) together; see movie P (movie M) together; see movie M (movie P) alone; see movie P (movie M) alone. This game-theoretic situation is represented by the 2×2 matrix in Figure 1, referred to as Example 1 hereafter. In Figure 1, the pair of values in each cell (from left to right) represents the boy’s and girl’s payoffs, respectively. The matrix illustrates the players (the boy and girl), the strategies (movies M and P), and the payoffs (the values).

		Girl	
		Movie M	Movie P
Boy	Movie M	5,3	2,2
	Movie P	0,0	3,5

Figure 1 Battle of sexes

If the boy and girl simultaneously choose the movie, which one do they see? That is, what is the outcome? This depends on the equilibrium, which is an important concept in game theory. In a normal-form game, the standard equilibrium concept used is the Nash equilibrium, at which “no player can profitably deviate, given the strategies of the other players” (Osborne and Rubinstein, 1994: p. 15). Given this definition, the Nash equilibrium outcomes are “see movie M together” and “see movie P together”. Although both of these outcomes cause the boy or girl to complain (the girl, for example, if “see movie M together” is the outcome), there is no alternative outcome that is better for both.²⁹

Next, consider a slightly different situation. Suppose that the girl also prefers to see movie M rather than movie P. Now, both the boy and girl want to see movie M. How does the Nash equilibrium change? To investigate this situation, we use the matrix in Figure 2, referred to as Example 2 hereafter.

		Girl	
		Movie M	Movie P
Boy	Movie M	5,5	2,0
	Movie P	0,2	3,3

Figure 2 Coordination game

Because the girl’s preferences differ between Examples 1 and 2, her payoffs differ. In this case, the Nash equilibrium outcomes are “see movie M together” and “see movie P together”. Thus,

²⁹ A game such as that in Example 1 is sometimes termed a “Battle of the Sexes”. See, for example, Osborne and Rubinstein (1994, p. 15).

although the girl’s payoffs differ, the Nash equilibrium is the same in Examples 1 and 2. However, it is clear that both the boy and girl prefer “see movie M together” to “see movie P together”. Hence, if “see movie P together” were to be the outcome, both the boy and girl could do better by changing their strategies. However, “see movie P together” constitutes a Nash equilibrium because both the boy and girl prefer to seeing a movie together. One way of ensuring that the outcome is “see movie M together”, or of ruling out “see movie P together”, is to introduce a coordinator to arrange strategies. For example, suppose that a friend of the boy and girl plays the role of coordinator. In this situation, by indicating what strategies are desirable, the coordinator can ensure that the best outcome (“see movie M together”) prevails. That is, the coordinator can ensure that cooperation between the boy and girl improves both their payoffs.³⁰

In example 2, although an undesirable outcome constitutes a Nash equilibrium, there can be a desirable outcome in the absence of a coordinator. However, it is possible for an undesirable outcome to constitute a unique Nash equilibrium. That is, in the absence of a coordinator, there is no desirable outcome. To analyze such a situation, we introduce a different example, referred to as Example 3 hereafter. Suppose that two firms, A and B, sell identical products to consumers. Firms choose between “high price” and “low price”. Firm A’s (B’s) preference is that firm A (B) chooses “low price” and firm B (A) chooses “high price”. This would give firm A (B) a competitive advantage and higher profits. Firm A’s second preference is that both firms choose “high price”. Its next preference is that both firms choose “low price”. The worst outcome for firm A is that firm A (B) chooses “high price” and firm B (A) chooses “low price”, in which case, many consumers would buy the product from firm B (A). Example 3 is illustrated by the matrix in Figure 3, in which the pair of values in each cell (left to right) represents firm A’s and firm B’s payoffs, respectively.

		Firm B	
		High	Low
Firm A	High	4,4	1,5
	Low	5,1	2,2

Figure 3 Prisoner’s dilemma

In Example 3, “both firms choose low price” is the unique Nash equilibrium. It is clear that “both firms choose high price” constitutes a better outcome for both firms than “both firms choose low price”. As in Example 2, both firms can do better by changing strategies. However, unlike in Example 2, “both firms choose high price” is not a Nash equilibrium. Hence, in Example 3, the desirable outcome cannot emerge from voluntary actions. In this case, a third party acting as coordinator might be able to bring about the desirable outcome. However, the coordination required in Example 3 differs from that required in Example 2. In Example 2, the desirable outcome (“see movie M together”) constitutes a Nash equilibrium. Thus, the coordinator simply informs the boy and girl of the best strategy. By contrast, in Example 3, the desirable outcome (“both firms choose high price”) is not a Nash equilibrium. Thus, even if the coordinator informs both firms of the desirable strategy, either firm will want to deviate from it because the desirable strategy is not the best strategy for each individual firm. To prevent such deviation, rules and/or incentive mechanisms are needed. In summary, cooperation is more difficult in Example 3 than in Example 2. Labeling “both firms choose high price” and “both firms choose low price” as “cooperation” and “competition”, respectively, clarifies why cooperation is more difficult to achieve in Example 3.³¹

³⁰ A game such as that in Example 2 can be termed a “coordination game” because it highlights the importance of coordination between players. See, for example, Osborne and Rubinstein (1994, p. 16).

³¹ The game in Example 3 is the well-known “Prisoner’s Dilemma”, in which a desirable outcome does not necessarily emerge even if the players pursue their preferred strategies. Many forms of researches in the

Our final example of a normal-form game illustrates a cooperative situation, referred to as Example 4 hereafter. Because cooperation incorporates both cooperation and competition, we must consider at least two kinds of strategies and matrices. Suppose that two firms, A and B, choose between “cooperation” and “competition” in two types of strategies represented by “strategy X” and “strategy Y”. The matrices presented in Figure 4 constitute Example 4. In Figure 4, from left to right, cell entries represent payoffs to firms A and B, respectively. Clearly, both firms choose “competition” in strategy X, whereas they choose “cooperation” in strategy Y. Hence, because both cooperation and competition prevail, there is cooperation in Example 4.

		[Strategy X]	
		Firm B	
		Cooperation	Competition
Firm A	Cooperation	6,2	3,3
	Competition	3,3	5,5

		[Strategy Y]	
		Firm B	
		Cooperation	Competition
Firm A	Cooperation	6,6	1,5
	Competition	5,1	4,4

Figure 4 Cooperation and competition game (1)

However, cooperation does not necessarily emerge from voluntary actions. Consider Example 5, as depicted in Figure 5, which illustrates a slightly different situation. Clearly, the unique Nash equilibrium is for both firms to choose “competition” in strategies X and Y. Hence, in Example 5, cooperation does not emerge voluntarily. However, the matrix for strategy Y in Figure 5 has the same characteristics as that in Example 3. This means that, in strategy Y, “both firms choose cooperation” is better for both firms than “both firms choose competition”. Thus, a coordinator may be able to engineer the desirable outcome in strategy Y.³² Cooperation, in the form of competition in strategy X and cooperation in strategy Y, can also be achieved by the coordinator.

		[Strategy X]	
		Firm B	
		Cooperation	Competition
Firm A	Cooperation	6,2	3,3
	Competition	3,3	5,5

		[Strategy Y]	
		Firm B	
		Cooperation	Competition
Firm A	Cooperation	4,4	1,5
	Competition	5,1	2,2

Figure 5 Cooperation and competition game (2)

5. Extensive-form games in competition studies

In many situations, players choose their strategies not simultaneously but sequentially, which gives rise to multiple types of strategies. For example, suppose that firms choose product quality and price. Firms normally choose quality before choosing price. Moreover, the quality level chosen in the first stage is arguably related to the subsequent pricing decision. Hence, this situation differs from those illustrated in Examples 4 and 5 in which strategies X and Y are (implicitly) independent.

Extensive-form games are used to analyze sequential decision making.³³ In addition to the players, strategies, and payoffs incorporated in normal-form games, extensive-form games include a set of moves. In the above example, quality choice is the first move and pricing is the second move.

Prisoner’s Dilemma are existed. For example, Gibbons (1992: Section 2.3) and Osborne and Rubinstein (1994: Chapter 8) explained the long-term version of the Prisoner’s Dilemma, which is a “repeated game”.

³² As we mentioned when explaining Example 3, some rule and/or incentive mechanism is also needed to maintain the desirable outcome.

³³ To simplify the explanation of extensive-form games, we omit strict definitions and proofs. For details of such definitions and proofs, see, for example, Gibbons (1992: Chapter 2).

To illustrate the extensive-form game, we incorporate sequential moves into Example 1. Rather than have the boy and girl simultaneously choose their strategies, we introduce a “lady-first rule”, which means that the girl chooses first. This yields Example 6. The lady-first rule explicitly introduces decision ordering, for which we need to replace the matrix representation with one based on a tree diagram. Figure 6 uses a game tree that is common in game theory to represent the sequential moves. In Figure 6, the pairs of values (from left to right) at the end of each branch represent the boy’s and girl’s payoffs, respectively.

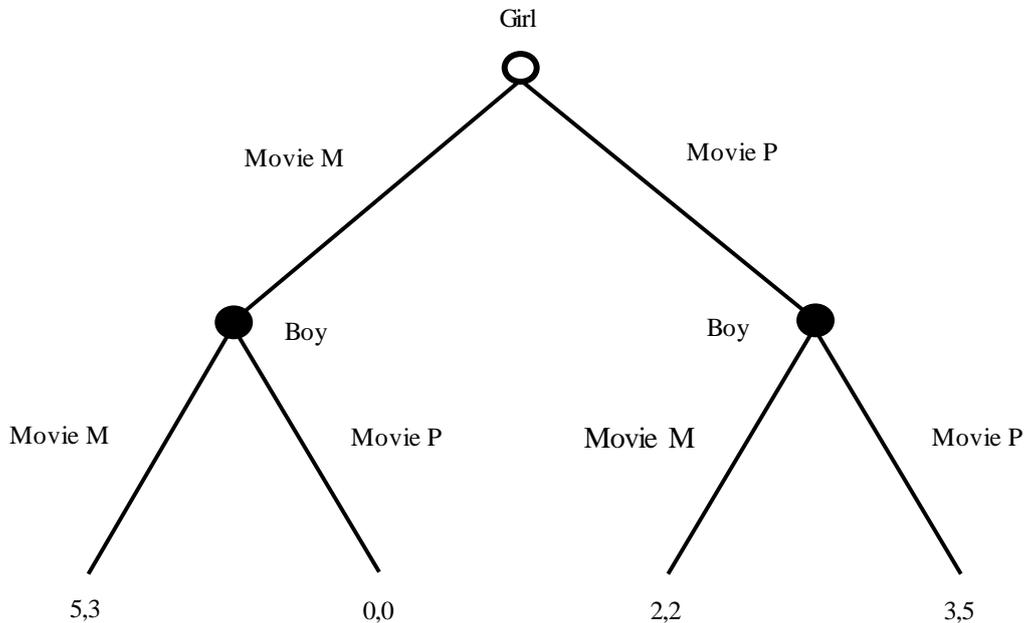


Figure 6 Extensive-form game

To determine the outcome in Example 6, we must apply the appropriate equilibrium concept. In the terminology of game theory, for extensive-form games, this is the subgame-perfect equilibrium. Simply put, the subgame-perfect equilibrium is the Nash equilibrium in all parts of the game that can be termed “subgames”. The subgame-perfect equilibrium can be derived by computing the Nash equilibrium at each sequential move. In game theory, it is standard practice to determine the subgame-perfect equilibrium by using “backward induction”. In the price–quality example, this involves analyzing the pricing decision first although price is chosen second. Applying backward induction to Example 6 reveals that the unique subgame-perfect equilibrium is “girl chooses movie P, boy chooses movie M”. Introducing sequential moves into Example 1 eliminates one Nash equilibrium (“girl chooses movie M, boy chooses movie P”) because the girl is the first mover and she can decide which movie the couple sees together.

The extensive-form game represents a useful way of analyzing cooperative situations because players choose multiple kinds of strategies and some (or all) of these strategies have decision orderings and relationships. In particular, a combination of normal-form and extensive-form games is a powerful tool for analyzing cooperative situations. To explain how cooperative situations can be analyzed by using a combination of normal-form and extensive-form games, we use Example 7, which is based on the work of Ohkita and Okura (2014).

Suppose that two legal-software firms, A and B, play a two-stage game. In the first stage, both firms decide whether to invest in protecting their intellectual property rights. Such investment reduces the number of illegal-software firms in the market. In the second stage, both firms choose their quantities. In this game, there is bound to be competition over quantities because, in the second stage, market size is given. By contrast, investment may be cooperative as well as competitive. Figure 7

illustrates the first stage of the normal-form game incorporating the two strategies “investment” and “no investment”.³⁴

		Firm B	
		Investment	No Investment
Firm A	Investment	6,6	1,8
	No Investment	8,1	2,2

Figure 7 Investment game

Clearly, “both firms choose no investment” is the unique subgame-perfect equilibrium. This is despite the fact that “both firms choose investment” is undoubtedly better for both firms. Such investment would benefit to both firms by reducing the number of illegal-software firms, thereby potentially increasing their market shares (because there would be fewer illegal-software firms). However, the benefit from the investment affects not only invested firms but also non-invested firms. Thus, this gives each firm an incentive to free ride by not investing. Such underinvestment could be remedied by coordinating firms’ investment strategies. For example, an industry association could charge firms a membership fee and use the funds raised to coordinate firms’ investments. In this way, cooperative investment organized through the association might improve firms’ payoffs. Cooperative investment and quantity competition would combine to generate cooperation.

Example 7 shows that games can combine cooperative and competitive elements, which can be analyzed stage by stage. Even if cooperative and competitive aspects are related, game theory enables one to derive results formally through the use of techniques such as game tree and by deriving the subgame-perfect equilibrium by backward induction.

Concluding remarks

In this paper, we discussed how to use game-theoretical models in cooperation studies and bridge the gap between cooperation studies and game theory. Our contribution is twofold. First, we explained the advantages of using game theory in cooperation studies. Second, we showed how game theory’s normal-form and extensive-form games can be used in cooperation studies. These related contributions should improve the quality of research in cooperation because many researchers in game theory are interested in analyzing competitive situations. Furthermore, the introduction of game-theoretical models in cooperation studies should foster collaboration among researchers in management and economics.

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³⁴ Ohkita and Okura (2014) computed mathematically the amount of investment. However, for simplicity, we use the numerical example in Figure 7.

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APPENDIX A

In this appendix, we present an original recent definition of a cooperative game in normal form. The model suggests useful solutions to a specific cooperative problem, defined by the set of strategy profiles at the disposal of the two players and by a set of possible convenient *ex ante* agreements on the common strategy set. This analytical framework enables us to widen the set of possible solutions from purely competitive solutions to cooperative ones and, moreover, incorporates a solution designed “to share the pie fairly” in a win–win scenario. At the same time, it permits examination of the range of possible economic outcomes along a cooperative dynamic path. We also propose a rational way of limiting the space within which the cooperative solutions apply. The basic original definition we propose and apply for cooperative games is that introduced by Carfi and Schiliro (2011a, 2011b) and Carfi (2012). The method we use to study the payoff space of a normal-form game is due to Carfi (2008, 2009a, 2009b, 2012), Carfi and Musolino (2011a, 2011b, 2012a, 2012b, 2013a, 2013b, 2013c, 2014a, 2014b, 2014c, 2014d, 2014e), and Carfi and Schiliro (2011a, 2011b, 2012). A complete treatment of a normal-form game is presented and applied by Carfi (2012), Carfi and Musolino (2011, 2012a, 2012b, 2013a, 2013b, 2013c), Carfi and Perrone (2011a, 2011b, 2013), Carfi and Ricciardello (2010, 2012) and Carfi and Schiliro (2011a, 2011b, 2012). Carfi (2008) proposes a general definition and explains the basic properties of Pareto boundary, which constitutes a fundamental element of the complete analysis of a normal-form game and of a cooperative interaction.

Let E , F , and C be three nonempty sets. We define a two-person cooperative gain game carried by the strategic triple (E, F, C) for any pair of the form $G = (f, >)$, where f is a function from the Cartesian product $E \times F \times C$ into the real Cartesian plane R^2 and $>$ is the usual strict upper order of the Cartesian plane, defined, for every couple of points p, q , by $p > q$ if and only if $p_i > q_i$, for each index i . In this setting, the difference between a two-person normal-form gain game and a two-person cooperative gain game is simply the presence of the third strategy Cartesian factor C .

Let $G = (f, >)$ be a two-person normal-form cooperative gain game carried by the strategic triple (E, F, C) . We use the following terminology. First, the function f is the payoff function of the game G . Second, the first component f_1 of the payoff function f is the payoff function of the first player and, analogously, the second component f_2 is the payoff function of the second player. Third, the set E is the strategy set of the first player, the set F is the strategy set of the second player. Fourth, the set C is the cooperative strategy set of the two players. Fifth, the Cartesian product $E \times F \times C$ is the cooperative strategy space of the game G . In this notation, the first component f_1 of the payoff function f , of a cooperative game G , is the function of the strategy space of the game G into the real line defined by $f_1(x, y, z) = pr_1(f(x, y, z))$, where pr_1 is the usual first projection of the Cartesian plane; analogously, we proceed for the second component f_2 .

The strategic interpretation of this model is as follows. There are two players, each of whom has a strategy set in which to choose his/her own strategy. Moreover, the two players can cooperatively choose a strategy z in a third set C . The two players choose their cooperative strategy z to maximize (in a sense to be outlined subsequently) the gain function f .

To derive bargaining solutions for a cooperative game, the payoff function of a two-player cooperative game is considered (as in the case of normal-form games). This function can be a vector-valued function with values from the Cartesian plane R^2 . So that we can consider the maximal Pareto boundary of the payoff space, we denote by $\text{im}(f)$ the image of the function f , which forms the appropriate zone for the bargaining solutions. $\text{im}(f)$ represents the set of all possible payoffs (outputs) of the function f .

In the family of normal-form games associated with a cooperative game, for any cooperative strategy, z , selected in the cooperative strategy space C , there is a corresponding normal-form game represented by $G_z = (f_z, >)$ based on the strategy pair (E, F) whose payoff function remains the section $f(\cdot, z): E \times F \rightarrow R^2$ of the payoff function f of the cooperative game, where the section of f is defined, as usual, on the competitive strategy space, $E \times F$, by $f(\cdot, z)(x) = f(x, z)$ for every bi-strategy x in the bi-strategy space $E \times F$.

For a general solution, the two players could choose the cooperative strategy z in order as follows. First, the Nash equilibria of G_z are “better” than the Nash equilibria in every other game $G_{\bar{z}}$. Second, the supremum of G_z is greater than the supremum of any other game $G_{\bar{z}}$. Third, the Pareto maximal boundary of G_z is “higher” than that of any other game $G_{\bar{z}}$. Fourth, the Nash bargaining solution in G_z is better than that in $G_{\bar{z}}$. Fifth, by fixing a common standard type of solution for any game G_z as, say $S(z)$, the set of these solutions, we can consider the problem of finding the optimal solutions in the set-valued path S , defined on the cooperative strategy set C . We note, fundamentally, that in general, because the above criteria are multicriteria, they generate multicriteria optimization problems.

Let us formalize the concept of a game family associated with a cooperative game. Let $G = (f, >)$ be a two-player cooperative gain game with payoff vector function f that is carried by the strategic set triple (E, F, C) . We term the family of normal-form games associated with the cooperative game G the family of normal-form games $G = (G_z)_{z \in C}$, which we denote by G , which has, for any cooperative strategy z selected in the cooperative strategy space C the normal-form game $G_z = (f_z, >)$ as a z member based on the strategy pair (E, F) with the payoff function being the section $f(\cdot, z): E \times F \rightarrow R^2$ of the payoff function f of the cooperative game G .

What is remarkable about any family of normal-form games $G = (G_z)_{z \in C}$ is that we can associate with it a family of payoff spaces $(\text{im}(f_z))_{z \in C}$, a family of Pareto maximal boundaries $(bd^*G_z)_{z \in C}$, a family of suprema $(\text{Sup } G_z)_{z \in C}$, etc. In addition, we can interpret any of the above families as set-valued paths in the strategy space $E \times F$. These induced set-valued paths of solutions are of primary interest in any study of a cooperative game G .

APPENDIX B

In this appendix, we present an original recent definition of a cooperative game in extensive form. An elementary extensive-form cooperative two-player game G is defined by: (1) an initial node at 1; (2) a set of cooperative moves associated with the node 1, say C ; and (3) an extensive-form game $G(z)$ corresponding to any strategy z in C .

Let $N(z)$ be the set of equilibria of the game $G(z)$, and let $N(G)$ be the disjoint union of the family $N = (N(z))_{z \in C}$ (namely, the set of all pairs $(z, e(z))$ with z in C and e being the equilibrium of $G(z)$). Moreover, let $N'(z)$ be the set of Nash payoffs of $G(z)$. A purely cooperative Nash equilibrium of G is any equilibrium e of $N(G)$ that is efficient (generates a Pareto maximum) such that the corresponding payoff is maximal with respect to the usual order of the plane.

To find a possible solution, we can use classic bargaining methods. For example, consider the game G such that $C(1) = [0, 1]$ and $f(z)(x, y) = (x - y + z, y - x - z)$, where the pair (x, y) belongs to the square $[0, 1]^2$. The set of all Nash equilibria of any $G(z)$ is $\{(1, 1)\}$ and the set of all Nash equilibria of the game G is the Cartesian product $[0, 1] \times \{(1, 1)\}$. All these Nash equilibria are Pareto efficient, because the set $N'(G)$ of Nash payoffs is the segment $[0, 1](1, -1)$ with end points $(0, 0)$ and $(1, -1)$. A potential bargaining solution can be attained at $z = 1/2$.

LOGISTIC COSTS OF QUALITY AND THEIR IMPACT ON DEGREE OF OPERATING LEVERAGE

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Abstract

The development of logistics increasingly emphasizes its relationship with quality management. This follows from a broader definition of quality, which affects every area of the company. Logistics by its association with the elements influencing on the satisfaction of customer needs plays a very important role in customer service. Therefore, given the fact that the issue of quality has a wide range of impacts on the logistics, quality must be considered as one of the most important determinants of the efficiency of logistics systems, and the development of logistics enterprises. *Therefore, departments connected with logistics are generating costs of quality. The article presents the relationship between the cost of quality and logistics costs. New division of logistics costs of quality shows the impact of these costs on EBIT (Earnings Before deducting Interest and Taxes) and their influence on operation risk, which is measured by DOL (Degree of Operating Leverage).*

Key words: logistic costs of quality, costs of quality, costs of logistic, degree of operating leverage, DOL, EBIT, quality improvement.

JEL Classification: L15, M21

1. Introduction

Today's turbulent business environment has produced an ever greater awareness amongst managers of the financial dimension of decision making. 'The bottom line' has become the driving force which, perhaps erroneously, determines the direction of the company. In some cases this has led to a limiting, and potentially dangerous, focus on the short term. The costs of satisfying customer demand can be significant and yet, surprisingly, they are not always fully understood by organizations. Satisfying customer expectations generates costs connected to quality of products/services, customer service and all process of order realization. Focused attention on quality (and its improvement), performance optimization and their positive effect on enterprises is also confirmed by professional literature (Pawliczek, Piszczur, 2013). Quality is very wide definition, contains all activities in company, also logistic. Logistic activity does not just generate cost, it also generates revenue through the provision of availability – thus it is important to understand the profit impact of logistics and supply chain decisions. At the same time logistics activity requires resources in the form of fixed capital and working capital and so there are financial issues to be considered when supply chain strategies are devised (Christopher, 2011). Proper accounting system and management of logistic cost of quality can better determine the quality of decision-making in the area of improving the quality of logistics operations.

2. Literature review

Logistics costs comprise a significant and relevant proportion of business costs: depending on the method applied and the industry in question, their share of company turnover in developed economies tends to be at least 10 percent (Engblom, *et al.*, 2012), (Užík, Šoltés, 2009). They can measure performance in the area of logistics and supply chains (Gunasekaran, Patel, Tirtiroglu, 2001), (Šoltés, Gavurová, 2013). Literature review shows that, there are many different approaches to logistic costs. Heskett *et al.* (1973) identify transportation, warehousing, inventory carrying and administration as components of logistics costs, a classification that has been widely used. Gunasekaran *et al.* (2001) include the opportunity cost of capital and storage, risk costs, and the possible costs of lost sales under inventory costs, thus combining the elements of inventory carrying and warehousing. Beamon (1999), on the other hand, distinguishes between operating costs and inventory costs, whereas Lambert and LaLonde (1976) separate warehousing and inventory carrying costs, but include some of the components of warehousing costs, such as the inventory service costs

and storage space costs in inventory carrying. Engblom *et al.* (2012) and Bačík and Fedorko (2013) conclude that, these four cost components seem to be in general use on the one hand, but on the other hand authors tend to define the limits of the categories in unique, inconsistent ways. They analyze total logistics costs as group of six individual components: transport, warehousing, inventory carrying, logistics administration, transport packaging, and indirect costs of logistics. This classification has four groups common with proposition of Ślusarczyk (2011), his classification includes also: transport, warehousing, inventory carrying, logistics administration. He divides logistic cost into seven groups: transport costs, costs of maintaining inventories materials, storage costs of raw, materials, semi-finished products, costs of maintaining stocks of finished products, logistics administration, warehousing of finished products, administration costs involved in logistics processes, opportunity costs. The different categories of logistics costs are associated with elements of logistics product. Today, customers are buying not only the product itself in the meaning of its physical characteristics but the benefits of the product. As part of the purchased benefits are elements related to logistics such as cargo, packaging, storage and transport. Therefore, trying to improve the quality of customer service, the company makes changes in the structure of logistics product. So how do we see, quality affects many areas of the company including the area of logistics. Therefore, in the framework of logistics costs, we can distinguish those which belong to the cost of quality.

Literature review shows that, there are many different definitions and approaches to quality costs. ASQ (American Society for Quality) underlines that the cost of quality (CoQ) isn't the price of creating a quality product or service. It's the cost of not creating a quality product or service. In dictionary EOQ costs of quality are defined as a expenditures of producers, users and companies on quality of products or services (Nenadal, 1995). CoQ is usually understood as the sum of conformance plus non-conformance costs, where cost of conformance is the price paid for prevention of poor quality, and cost of nonconformance is the cost of poor quality caused by product and service failure (Tawfek, El-Deen, Mohammed, Razek, 2012), (Gavurová, 2012), (Grzebyk, 2011).

There are several methods that can be used to collect, categorize and measure quality costs. The traditional *P-A-F method* suggested by Juran (1951) and Feigenbaum (1956) classifies quality costs into prevention, appraisal and failure costs. Prevention costs are associated with actions taken to ensure that a process provides quality products and services, appraisal costs are associated with measuring the level of quality attained by the process, and failure costs are incurred to correct quality in products and services before (internal) or after (external) delivery to the customer. The cost categories of *Crosby's model* (Crosby, 1979) are similar to the P-A-F scheme. Crosby sees quality as "conformance to requirements", and therefore, defines the cost of quality as the sum of price of conformance and price of nonconformance (Crosby, 1979). The price of conformance is the cost involved in making certain that things are done right the first time and the price of non-conformance is the money wasted when work fails to conform to customer requirements. Another formal quality costing approach is the *process cost model*, which was developed by Ross (1977) and first used for quality costing by Marsh (1989); it represents quality cost systems that focus on process rather than products or services. Several references propose CoQ models that include the additional category of intangible costs. These are costs that can be only estimated such as profits not earned because of lost customers and reduction in revenue owing to non-conformance. The importance of opportunity and *intangible costs for quality costing* has been recently emphasized in the literature. Dale and Plunkett (1999) describe a less formal method based on *collecting quality costs by department*. Another recently proposed CoQ methodology is a *method based on a team approach*, in which the aim is to identify the costs associated with things that have gone wrong in a process (Robison, 1997). No matter which quality costing approach is used, the main idea behind the CoQ analysis is the linking of improvement activities with associated costs and customer expectations, thus allowing targeted action for reducing quality costs and increasing quality improvement benefits. Therefore, a realistic estimate of CoQ, which is the appropriate tradeoff between the levels of conformance and non-conformance costs, should be considered an essential element of any quality initiative and a crucial issue for any manager (Schiffauerova, Thomson, 2006), (Gavurová, 2011), (Gavurová, Šoltés, Balloni, 2014). ABC model is alternative approach, which can be used to identification from products quantity and localization of quality costs, and in consequence helps to management of costs in more effective way. Long – term goal of ABC method is eliminate worthless activities and continuous processes and quality improvement to create zero defects. Connection between model of quality costs and ABC

model is create common data base, which delivers information about different costs. Investigation of Ruhupatty, LeRoy and Maguad, Ben (2014) showed that, also in service sector cost of quality can be estimated using the activity-based costing model. Connection of costs of quality with ABC model helps translate the magnitude of quality problems into monetary terms, administrators can evaluate the relative importance of these problems and identify opportunities for cost reduction.

Costs of quality and logistic costs are part of total costs. Level of those costs and their structure has influence on total costs and company profit. Costs of quality can be generated in each units of company, also in logistic unit. That's why logistic cost is a part of quality costs. The part of logistic costs which have influence on quality of product or customer service are defined as logistic costs of quality. Logistic costs of quality (LCoQ) are expenditures of companies on quality of products or services, which are generated in group of logistic costs. In group of logistic costs are seven categories of costs: transport costs, costs of maintaining inventories materials, storage costs of raw, materials, semi-finished products, costs of maintaining stocks of finished products, logistics administration, warehousing of finished products, administration costs involved in logistics processes, opportunity costs.

3. Methodology

Literature review shows that, there are many definitions and models of logistic costs and quality costs. The aim of presented article is to show influence of logistic costs of quality on level of operating risk. Level of operating risk will be measured by indicator of operating leverage (DOL). Degree of operating leverage (DOL) is defined as the percentage change in operating income - EBIT, earnings before interest and taxes, that results from a given percentage change in sales (equation 1). Operating leverage is the degree to which a firm uses fixed costs in its operations. The higher there relative fixed costs (% of total costs), the higher the firm's degrees of operating leverage. In firms with high degree of operating leverage, a small change in revenues will result in a larger change in operating income because most costs are fixed (equation 2) (Pareja, 2010).

$$DOL = \% \Delta EBIT / \% \Delta S^{35} \quad (1)$$

where: DOL – degree of operating leverage,
% Δ EBIT – percentage change of EBIT
% Δ S – percentage change of sales

Interpretation of equation 1 answers in question: how much will increase EBIT when sales grew by 1%. Influence fixed and variable costs on degree of operating leverage shows equation 2.

$$DOL = S - VAR / S - VAR - FIX \quad (2)$$

where: S – sales
VAR – total variable costs
FIX – total fixed costs

Review of literature shows that, the impact of logistics costs of quality on DOL is not possible thanks to the traditional classification of quality costs. Traditional classification of costs of quality includes division of quality costs in P-A-F model, *Crosby's model* or *process cost model*. Therefore, author proposes a new classification of costs of quality. New classification of CoQ divides them into two groups, fixed costs of (FCoQ) and variable costs of quality (VCoQ). Because logistic costs of quality are a part of quality costs, we can also divide them into fixed logistic costs of quality (FLCoQ) and variable logistic costs of quality (VLCoQ). New classification of CoQ and LCoQ allows identify COQ and LCoQ also in traditional models. Prevention, appraisal and failure costs can be fixed or variable costs. This new approach allows company, estimate influence of structure of CoQ and LCoQ on the degree of operate leverage, which is also indicator of operation risk (equation 3, interpretation of equation 2 and 3 is the same as equation 1).

$$DOL = S - (VAR_k + VAR_p) / S - (VAR_k + VAR_p) - (FIX_k + FIX_p) \quad (3)$$

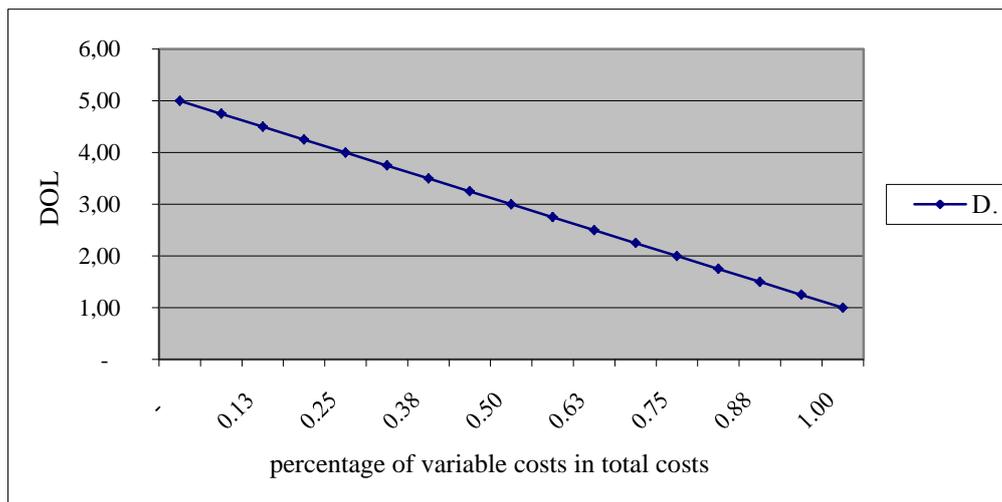
³⁵ Equation 1 and 2 are from (Dębski, 2005), equation 3 is from (Mizla, Pudło).

where: VAR_k – total variable quality costs;
 VAR_p – other variable costs;
 FIX_k – total fixed quality costs;
 FIX_p – other fixed costs.

To demonstrate the impact of LCoQ on DOL, author used the simulation method. Simulated values were random selected.

Result and conclusion

Graph 1 presents percentage of variable costs in total costs (simulation of random values). To show influence of structure of CoQ and LCoQ on DOL, we assume that, the value of total costs do not change. The change is only in structure of total variable and total fixed costs. We also assume that, changes in structure of total costs are caused by changes in value of LCoQ, which affect on value of VAR_k or FIX_k (see equation 3). Prevention FLCoQ can be cost of purchase of a car, which can shorten delivery time to customers and improve the quality of service. Buying a new car can positively affect the regularity of supply, which can cause a drop in warehousing costs that depend on the number of orders and production, therefore, are classified into category of VLCoQ. Buying warehouse management system, which is prevention cost in category of FLCoQ, can decrease failure costs, which appears during errors in completing of orders in warehouse. Errors in completing of orders do not appear, when there are no orders that are why these costs are in the group of VLCoQ. It is also necessary to add, it is very difficult to make such changes in the structure of total cost, where the decrease in variable costs will cause exactly the same increase in fixed costs (see Graph 2).



Graph 1 – Value of DOL depending on percentage of variable costs in total costs.

Source Own work

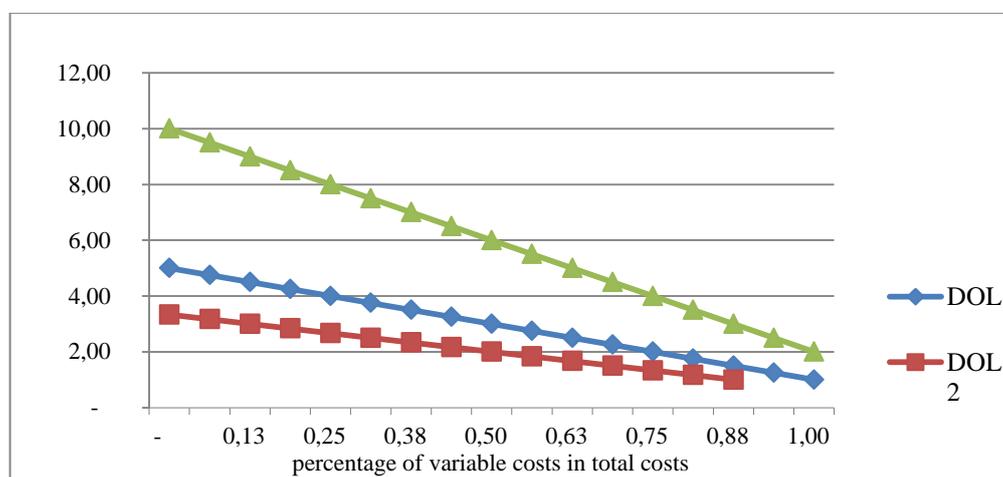
Analyse Graph 1 shows, that changes in structure of LCoQ affecting value of total costs of quality (without changing the value of total cost), may have positive and negative influence on operating risk. Company achieves positive effect of operation leverage when sales do not decrease and $FLCoQ > VLCoQ$. In this situation, company has lower costs per unit and higher profit form one unit. Company can use this situation to decrease price, which can cause increase sales and increase value of operation leverage. The higher the value of DOL the faster EBIT grows of course when sales increases. Negative effect of operating leverage is opposite situation, when company sales decreases, the higher value of DOL, the bigger decrease of EBIT.

Positive and negative effect of operation leverage also depends on changes in economy, which affect value of sales. That is why during economic crises it is better to have more variable cost than fixed costs in structure of total costs. The main aim of optimalization of logistic activities in supply chain is minimalization total costs of logistic and also logistic quality costs.

Changes in the structure of total cost are very often irregular, it means that decrease in variable costs not always cause the same increase in fixed costs. Graf 2 shows variants of random

values of total costs, and three levels of DOL. We assume that increases and decreases value of total costs are because of changes in structure of LCoQ.

Increase of total company costs with the same percentage share variable costs in total cost, achieve bigger value of DOL (see Graph 2, comparison DOL and DOL3, e.g. 0,25 percentage variable costs in total costs, DOL equals around 4, DOL3 equals around 8), the opposite situation is in DOL2. Changes in total costs and structure of total costs have consequences in the change in sensitivity of EBIT to fluctuations in sales.



Source: Own work

Graph 2 – Variants of random values of total costs and tree levels of DOL.

Results of presented simulations help to improve quality of undertaken decisions in area of quality and logistic. Thanks to the calculation of the indicator of operating leverage (DOL), the enterprise can calculate, how a change in the structure of the LCoQ appeared after improvements/deterioration in quality in supply chain affects the level of operating profit. Moreover, this indicator shows the percentage change of operating profit caused by changes in sales. Christopher (2011) claims, that the logistics system of any business will usually be a heavy user of fixed assets. The plant, depots and warehouses that form the logistics network, if valued realistically on a replacement basis, will represent a substantial part of total capacity employed (assuming that they are owned rather than rented or leased). Materials handling equipment, vehicles and other equipment involved in storage and transport can also add considerably to the total sum of fixed assets. Many companies have outsourced the physical distribution of their products partly to move assets off their balance sheet. Warehouses, for example, with their associated storage and handling equipment represent a sizeable investment and the question should be asked: Is this the most effective way to deploy our assets? Knowing how LCoQ impact on operating profit, helps the company answer to this question. In conventional distribution systems, it is not unusual to find factory warehouses, regional distribution centers and local depots, all of which represent significant fixed investment. This investments generate FCoQ, also the big category of logistic fixed costs are wages of employees. Increase FLCoQ increases DOL. The traditional concepts of economic order quantities can often lead to excessive levels of raw materials inventory as those quantities may not reflect actual manufacturing or distribution requirements. High level of inventory generates high level of VLCoQ. Decreasing level of inventory is possible to achieved through the techniques of materials requirement planning (MRP), distribution requirements planning (DRP), *pick-to-light* warehouse *technology*, voice - directed warehousing. Using IT in all subjects in supply chain have also influence on FLCoQ (decrease costs of wages, training costs).

Ruhupatty, LeRoy, Maguad, Ben A. (2014) underlines that in the interest of management to identify where the cost of quality is concentrated, whether it is in prevention, detection, internal failure, or external failure. A cost of quality that is mostly due to internal and external failures indicates that the pursuit of quality may have failed. Ideally the bulk of quality cost should be in prevention. Identifying where quality cost is concentrated will help administration to evaluate the

effectiveness of each faculty and identify ways to ensure effective failure prevention with the objective of minimizing if not eliminating internal and external failures. That is the reason why the quality changes in LCoQ should eliminate failure prevention. From different variants of quality improvement projects (in area of logistic too), company should choose the one, which has the best cost structure, the structure of costs which will maximize profit per unit at a definite level of sales.

Conclusion

Logistic costs of quality (LCoQ) are expenditures of companies on quality of products or services, which are generated in group of logistic costs, they are connected with operations in all process of realization of order. Logistics costs comprise a significant and relevant proportion of business costs: depending on the method applied and the industry in question, their share of company turnover in developed economies tends to be at least 10 percent (Engblom, Solakivi, Töyli, Ojala, 2012). The main benefit of cost sharing on the FLCoQ and VLCoQ determine their impact on EBIT and operating risk (DOL). Article shows how managers can improve undertake decisions in area of quality improvements and pricing in conditions of economic growth and crisis.

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ANALYSIS OF SELECTED DEMOGRAPHIC ASPECTS OF DAY SURGERY IN SLOVAK HEALTH POLICY

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Abstract

Also in Slovak health care day surgery is considered to be highly effective, since the treatment is focused to cure the patient in the shortest period of time without excessive pain and stress, providing highest quality with as little expenditure as possible. In 2009 new regulations came into effect in Slovakia concerning day surgery, which also promoted the development of day child surgery. Rigorous regulations apply for day child surgery to ensure higher responsibility within surgeons and all the medical staff. Suggested partial analyses of day surgery of the juniors obtained during the period of 2009 – 2012 in Slovakia indicate the importance to analyze data accessible at the National Health Information Center, as well as the importance of connection with demographics. These analyses enable us to adequately provide day surgery in individual regions of Slovakia, as well as to interconnect this treatment with optimal funding via health insurance companies, which will lead to increased efficiency of health care.

Keywords: day surgery, healthcare system, efficiency of the healthcare system, state health policy, development barriers in day surgery.

JEL Classification: I13, I18, H51.

1. Introduction

Healthcare system is affected by significant factors, which are constantly increasing the need for funding (Tkáčová and Bánociová, 2013; Szabo *et al.* 2013). The largest single component of expenditure – around one third of total health spending in OECD countries and the EU is a sector of hospitals. It provides a wide range of diagnostic and therapeutic services for people with various medical problems, which require different intensive, complex and expensive treatment. In the light of the importance of addressing the issue of resource constraints in the health system, politicians of different countries in the last two decades have been searching for the optimal tools to control health spending and to promote the efficiency of the management of health facilities (Janke, 2011; Janke and Pridavok, 2012; Lafortune, Balestat and Durand, 2012) and to support effective management of health facilities (Esser & Ward, 2013). These tools took the form of various incentives in the form of providing optimal financial payments or set restrictions on hospital budgets (Belu and Bica, 2013; Hoffman, 2013; Lashgari, Delavari, Kheirkhah and Antucheviciene, 2013). In Slovakia, it is very frequent to proclaim the question of unitary vs. pluralistic system of public health insurance, also linked to the issue of lack of resource efficiency using in the health system. In spite of annual increase in the financial resources in the Slovak health sector, it permanently signalizes their continuing deficits, while the required effectiveness of their use is not achieved (Gavurová and Šoltés, 2013). It is the role of state health policy, which must be oriented to taking action in order to achieve the required efficiency for the benefit of the "customer", or the "consumer" of health services (Minarik and Kraftova, 2012). Complementary to them, the state health policy must eliminate measures, which indirectly withdraw funds without visible effect. One important area in which we see a clear possibility of financial savings in the health system, as well as in national economic context is delivering health care in day surgery form (Buzink *et al.* 2012; Šoltés, 2011; Šoltés and Radoňák, 2012a, b). From an economic perspective, this area provides many opportunities to reduce the operating costs of hospitals and also request reimbursement from health insurance companies (HIC), but it may have a positive impact on the area of sickness by faster re-engagement with the patient in everyday life, or to work process (Elvir-Lazo and White, 2010).

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2. Aim of the research

Our own research, from which we present the partial results in the chapter 2, focused on the use of day surgery in Slovakia (Gavurová, Šoltés, Kafková and Černý, 2013) and it was the first implemented research of this kind in our country (Gavurová and Hyránek, 2013). Ambitions that led us right to this issue have a basis in detection of potential improvement in the process of increasing the efficiency of the health system (Gavurová and Šoltés, 2013). In this process, it is not just about the financial aspects, but important for us was especially the sight of the main actors – contradictory responses regarding the efficiency and effectiveness of deployment and use of day surgery performance. On the one hand, we have found the direct and indirect evidence of functional application of day surgery performance in the Slovak health facilities and its potential benefit by achieving the objectives of the Slovak Republic health policy. On the other hand, there are critical feedbacks on the lack of effects from the use of day surgery associated with low evaluations of placed performances, which are inadequately overvalued and that prevents the development compared to the one achieved abroad. As an example of differences in the use of day surgery we propose: USA and Canada 65-70% of all surgical procedures, 43% is declaring Sweden, United Kingdom 51% and 61% is declaring Norway. In Slovakia, the number of day surgery performances moves only about 7% - 10% (Gavurová *et al.* 2013). The primary objective of using day surgery is that the patient with less complicated performance was separated (and hence less traumatized by hospitalizations on department in the hospital), protected from nosocomial infections (from the hospital), he or she has a greater comfort to easier recover at home. Day surgery in Slovakia has been performed on the basis of Regulation guideline by the Ministry of Health of the Slovak republic (MoH SR) since 2006, ever since about one third of patients, especially in large public hospitals has been hospitalized for less than 72 hours. The aim of the Regulation guidance aim was, among other things, to establish criteria for contraindications of day surgery patient (medical and social) and after establishing day surgery for paediatric patients. Day surgery is currently being implemented with much better instrumentation compared with the equipment in the hospital. Its implementation, however, requires a clear separation of the day surgery department from the conventional department. Although, HIC are interested in day surgery, the fact remains that not every patient is suitable for day surgery performance (in Slovakia, the social factor is very important - for older people). Despite existing legislation and the extensive support of MoH SR, as well as the support of HIC and other participants of Slovak health care, no progress has been reported within the last few years. This is attributed to the wrong funding policy of medical interventions, determined by the pricelist of HIC, depending on whether they are of state or private ownership. There also absent analyses of comorbidities impacts on the risk of day surgery performances, re-evaluation of really performed types of day surgery performances, etc. Without effective measurements, analyses and implantations of their outputs to the system of day surgery and their subsequent transformation into strategic objective of Slovak healthcare, without these actions the development of day surgery will not be possible in the future.

2.1 The research methodology

For the purposes of our research and analysis, we have day surgery procedures in juniors in Slovakia monitored on the basis of the Annual Statement of the MoH SR 1-01 and the Official Gazette of MoH SR dated 1.3.2006, the part 9-16, section 23 - Vocational guidance of the MoH SR about day surgery procedures. The basic structure of the statement is shown in Table 1. Through this report, there are presented data collected in the National Register (National Health Information Centre (NHIC, 2013) of provided day surgery performances since 2009, the last available data we have obtained on the contractual basis of cooperation from NHIC for the year 2012. Table 1 shows the number of patients divided into two groups: operated and hospitalized after surgery. Day surgery is defined as medical attention, where the patient's condition does not require hospitalization and the patient can be discharged into home treatment in stable condition within 24 hours after the medical intervention. Patients required hospitalization can be characterized as the ones who after day surgery, due to complications, stayed in hospital longer than 24 hours. The latter types of day surgeries are financially demanding since they are funded by HIC with the set amount of financial resources regardless of the needed duration of hospitalization of the patient. Hospitalized patients are all those who after day surgery treatment due to arising health complications were not allowed to leave the

clinic within 24 hours, as it is specified for day surgery performance. Performance, after which the patient remains hospitalized contributes to additional financial intensity because reimbursement for day surgery performance from HIC is carried by a lump sum irrespective of the continued need for hospitalization of the patient.

Table 1 - Annual Statement of the MoH SR 1-01 and the Official Gazette of MoH SR dated 1.3.2006, the part 9-16, section 23 - Vocational guidance of the MoH SR about day surgery procedures

Type of day surgery procedures	Code of performance	Number of Patients			
		Operated		from that hospitalized after surgery	
		Age category of Juniors *	Age category of Adults	Age category of Juniors *	Age category of Adults
		0 - 18	19+	0 - 18	19+
Procedures	a	1	2	3	4

Source: NHIC; * as NHIC does not have specifically structured categories of children and adolescents, we will use the appellation junior for all of age 0-18.

According to the Official Gazette of MoH SR day surgery divided into seven specializations: Surgery, Orthopedics, Department of Trauma and Plastic surgery (hereinafter Surgery), Gynecology and obstetrics, Ophthalmology, Otorhinolaryngology, Urology, Dentistry and Gastroenterological surgery and Gastroenterology. Day surgery procedures are reported in a minimum extent in the last two fields, and thus, we did not include them into other analyses. We used cross tables that are part of Microsoft Excel in order to analyze a ratio of hospitalized patients (juniors). In the cross tables, there is tested a mutual dependency between sign couples is tested. In testing, real absolute calculations are compared in the individual table fields with so-called expected absolute calculations that would occur in case, we would use independent questions. Zero test hypotheses are as follows: given two signs do not correspond with each other. Alternative hypothesis: given two signs correspond with each other. We chose as a critical p-value: $p=0.001$. However, zero hypothesis elimination does not propose a statement of dependency form or a reason of test significance. In testing of the significance of two categorical signs relation, we use the following values. The symbol f_{ij} labels real count in i - line and j - column of the table.

Sum of j - column is:
$$c_j = \sum_{i=1}^R f_{ij} \tag{1}$$

and sum of i - line is:
$$r_i = \sum_{j=1}^C f_{ij} \tag{2}$$

Total sum of the table is:
$$W = \sum_{i=1}^R r_i = \sum_{j=1}^C c_j \tag{3}$$

Expected count is:
$$E_{ij} = \frac{r_i c_j}{W} \tag{4}$$

The value “Adjusted Residual“, which we will use, is defined as follows:

$$AR_{ij} = \frac{f_{ij} - E_{ij}}{\sqrt{E_{ij} (1 - \frac{r_i}{W}) (1 - \frac{c_j}{W})}} \tag{5}$$

In cross table, abbreviation “AR” (Adjusted Residual) is placed under absolute count. It is the value that shows size of deviation between real and expected counts, and also to its direction. If AR value is negative, then the real count is lower as expected (in the given field, there is smaller number

as it is expected in case of tested independency of the signs). If the value is positive, then the real count is higher than expected (in the given field, there is larger number than expected). The mark presents a deviation direction. Absolute value of AR indicates whether the recognized difference between real and expected count is significant (to simplify your orientation in the tables, we used AR values that are round to one tenth). If $|AR|$ is larger than 2, then the difference between real and expected count is significant on $p < 0.05$ level. If $|AR|$ is larger than 2.6, then the difference between real and expected count is significant on $p < 0.01$ level. In case, $|AR|$ value is larger than 3.3, the difference between real and expected count is significant on $p < 0.01$ level. As a consequence of a larger number of the test and a larger number of operated patients, we will consider this value $|AR| > 3.3$ as significant difference between real and expected count in the given field. If a combination of two signs in some field of the table does not occur, the operation performances of a given day surgery field were not realized.

2.2 Partial research results

In this subchapter, we present the results of the dependency ratio analyses of hospitalized juniors on regions in 2009-2012 on the basis of notions and relations given in the methodological part. The researched issue focused on finding whether a hospitalized patient ratio – juniors depends on regions for individual years and specialized fields. We are testing a statistical hypothesis that states that a hospitalized patient ratio is the same for all regions in a given (fixed) year and a field, while we suppose that the representation of individual types of day surgery performances is approximately the same for same regions in a given field. If the test is significant, then the opposite is correct: a ratio of hospitalized in at least one region is different (significantly larger or smaller), then expected in a given year and the specialized field. In the Tables 2 – 5, there are presented results obtained during 2009-2012, which include real numbers and AR (already mentioned residuals in methodological part) to find the reasons of test significance.

Table 2 - Operated juniors vs. regions of the Slovak Republic in specialized fields of day surgery 2009

FIELD			REGION								TOTAL
			BC	BL	KI	NI	PV	TA	TC	ZI	
SURG	Non-hosp	Count	87	441	307	15	72	71	77	220	1290
		AR	0,4	2,9	-0,4	-1,4	0,2	1,1	-7,4	1,0	-
	Hosp	Count	1	1	6	1	1	0	10	2	22
		AR	-0,4	-2,9	0,4	1,4	-0,2	-1,1	7,4	-1,0	-
	Total	Count	88	442	313	16	73	71	87	222	1312
GYN	Non-hosp	Count	15	11	12	18	21	-	15	92	184,0
		AR	1,1	-1,2	-8,8	1,2	1,3	-	1,1	3,6	-
	Hosp	Count	0	2	12	0	0	-	0	0	14
		AR	-1,1	1,2	8,8	-1,2	-1,3	-	-1,1	-3,6	-
	Total	Count	15	13	24	18	21	-	15	92	198
OPHT	Non-hosp	Count	9	-	14	-	9	-	-	32	64
		AR	-3,2	-	0,7	-	0,6	-	-	1,4	-
	Hosp	Count	2	-	0	-	0	-	-	0	2
		AR	3,2	-	-0,7	-	-0,6	-	-	-1,4	-
	Total	Count	11	-	14	-	9	-	-	32	66
ORL	Non-hosp	Count	0	1002	444	202	606	2	68	479	2803
		AR	-49,5	10,4	4,0	7,0	13,0	0,7	2,9	11,3	-
	Hosp	Count	482	93	62	0	0	0	4	0	641
		AR	49,5	-10,4	-4,0	-7,0	-13,0	-0,7	-2,9	-11,3	-

Total		Count	482	1095	506	202	606	2	72	479	3444
UROL	Non-hosp	Count	8	-	750	12	2	133	27	67	999
		AR	0,1	-	1,7	0,1	0,0	-2,5	0,2	0,3	-
	Hosp	Count	0	-	0	0	0	1	0	0	1
		AR	-0,1	-	-1,7	-0,1	0,0	2,5	-0,2	-0,3	-
TOTAL	Count	8	-	750	12	2	134	27	67	1000	

Source: own elaboration in SPSS software, version 19

Note: Abbreviations to the table: Specialized Field: SURG: Surgery, Orthopedics, Department of Trauma and Plastic Surgery, GYN: Gynaecology and Obstetrics, OPHT: Ophthalmology, ORL: Otorhinolaryngology, UROL: Urology; Region: BC: Banská Bystrica, BL: Bratislava, KI: Košice, NI: Nitra, PV: Prešov, TA: Trnava, TC: Trenčín ZI: Žilina.

Table 3 - Operated juniors vs. regions of the Slovak Republic in specialized fields of day surgery 2010

FIELD		REGION									TOTAL
			BC	BL	KI	NI	PV	TA	TC	ZI	
SURG	Non-hosp	Count	75	142	299	69	89	105	200	320	1299
		AR	0,7	3,8	5,9	-1,8	-13,6	3,2	-6,9	6,2	-
	Hosp	Count	5	0	0	11	55	0	48	0	119
		AR	-0,7	-3,8	-5,9	1,8	13,6	-3,2	6,9	-6,2	-
TOTAL	Count	80	142	299	80	144	105	248	320	1418	
GYN	Non-hosp	Count	10	9	4	29	138	2	1	64	257
		AR	0,7	0,6	13,9	1,2	3,5	0,3	0,2	1,9	-
	Hosp	Count	0	0	11	0	0	0	0	0	11
		AR	-0,7	-0,6	13,9	-1,2	-3,5	-0,3	-0,2	-1,9	-
TOTAL	Count	10	9	15	29	138	2	1	64	268	
OPHT	Non-hosp	Count	2	36	23	1	12	1	-	28	103
		AR	0,3	-3,2	1,3	0,2	0,9	0,2	-	1,5	-
	Hosp	Count	0	6	0	0	0	0	-	0	6
		AR	-0,3	3,2	1,3	-0,2	-0,9	-0,2	-	-1,5	-
TOTAL	Count	2	42	23	1	12	1	-	28	109	
ORL	Non-hosp	Count	479	767	708	488	1043	77	218	574	4354
		AR	5,6	-11	10,8	5,7	9,0	1,7	-3,2	5,3	-
	Hosp	Count	0	118	111	0	0	1	25	5	260
		AR	-5,6	11	10,8	-5,7	-9,0	-1,7	3,2	-5,3	-
TOTAL	Count	479	885	819	488	1043	78	243	579	4614	
UROL	Non-hosp	Count	4	18	956	17	4	127	28	232	1386
		AR	-	-	-	-	-	-	-	-	-
TOTAL	Count	4	18	956	17	4	127	28	232	1386	

Source: own elaboration in SPSS software, version 19

Table 4 - Operated juniors vs. regions of the Slovak Republic in specialized fields of day surgery 2011

FIELD			REGION								TOTAL	
			BC	BL	KI	NI	PV	TA	TC	ZI		
SURG	Non-hosp	Count	391	305	386	96	173	429	257	487	2524	
		AR	9,0	7,2	0,4	-6,3	-23,2	3,3	5,5	2,5	-	
	Hosp	Count	0	4	67	49	212	50	10	66	458	
		AR	-9,0	-7,2	-0,4	6,3	23,2	-3,3	-5,5	-2,5	-	
	TOTAL		Count	391	309	453	145	385	479	267	553	2982
	GYN	Non-hosp	Count	10	-	50	68	14	18	14	21	195
AR			2,1	-	-9,8	6,2	2,5	-0,4	2,5	3,1	-	
Hosp		Count	0	-	75	0	0	9	0	0	84	
		AR	-2,1	-	9,8	-6,2	-2,5	0,4	-2,5	-3,1	-	
TOTAL		Count	10	-	125	68	14	27	14	21	279	
OPHT		Non-hosp	Count	7	-	46	8	31	-	2	60	154
	AR		1,1	-	-6,6	1,2	2,5	-	0,6	3,8	-	
	Hosp	Count	0	-	25	0	0	-	0	0	25	
		AR	-1,1	-	6,6	-1,2	-2,5	-	-0,6	-3,8	-	
	TOTAL		Count	7	-	71	8	31	-	2	60	179
	ORL	Non-hosp	Count	123	831	1249	215	2270	275	484	1256	6703
AR			-65,3	9,6	12,5	4,8	11,2	0,3	-0,1	12,4	-	
Hosp		Count	523	2	0	0	91	27	51	1	695	
		AR	65,3	-9,6	12,5	-4,8	-11,2	-0,3	0,1	12,4	-	
TOTAL		Count	646	833	1249	215	2361	302	535	1257	7398	
UROLOG		Non-hosp	Count	1	9	1174	78	26	163	25	118	1594
	AR		0,0	0,1	2,4	0,3	0,2	-4,2	0,2	0,4	-	
	Hosp	Count	0	0	0	0	0	2	0	0	2	
		AR	0,0	-0,1	-2,4	-0,3	-0,2	4,2	-0,2	-0,4	-	
	TOTAL		Count	1	9	1174	78	26	165	25	118	1596

Source: own elaboration in SPSS software, version 19

Table 5 – Operated juniors vs. regions of the Slovak Republic in specialized fields of day surgery 2012

FIELD			REGION								TOTAL	
			BC	BL	KI	NI	PV	TA	TC	ZI		
SURG	Non-hosp	Count	467	453	269	104	253	171	192	550	2459	
		AR	10,0	-3,1	-8,3	-7,1	3,4	0,3	5,1	-0,4	-	
	Hosp	Count	31	180	175	85	48	51	20	177	767	
		AR	-10,0	3,1	8,3	7,1	-3,4	-0,3	-5,1	0,4	-	
	Total		Count	498	633	444	189	301	222	212	727	3226
	GYN	Non-hosp	Count	71	-	93	8	30	6	15	17	240
AR			7,2	-	-6,6	-4,3	4,4	-2,4	3,0	1,8	-	
Hosp		Count	0	-	104	22	0	11	0	4	141	
		AR	-7,2	-	6,6	4,3	-4,4	2,4	-3,0	-1,8	-	
TOTAL		Count	71	-	197	30	30	17	15	21	381	

FIELD			REGION								TOTAL	
			BC	BL	KI	NI	PV	TA	TC	ZI		
OPHT	Non-hosp	Count	8	3	49	8	42	-	4	54	168	
		AR	1,0	0,6	2,9	-11,5	2,7	-	0,7	3,1	-	
	Hosp	Count	0	0	0	22	0	-	0	0	22	
		AR	-1,0	-0,6	-2,9	11,5	-2,7	-	-0,7	-3,1	-	
	TOTAL		Count	8	3	49	30	42	-	4	54	190
			AR									
ORL	Non-hosp	Count	148	615	1532	726	1883	359	536	1491	7290	
		AR	-33,7	9,8	16,5	3,8	3,7	-12,4	8,9	-8,2	-	
	Hosp	Count	280	0	0	67	218	156	2	335	1058	
		AR	33,7	-9,8	-16,5	-3,8	-3,7	12,4	-8,9	8,2	-	
	TOTAL		Count	428	615	1532	793	2101	515	538	1826	8348
			AR									
UROL	Non-hosp	Count	6	19	786	170	38	149	41	136	1345	
		AR	-5,3	1,1	1,7	2,0	1,0	-5,8	-1,8	3,2	-	
	Hosp	Count	5	0	45	5	1	29	6	0	91	
		AR	5,3	-1,1	-1,7	-2,0	-1,0	5,8	1,8	-3,2	-	
	TOTAL		Count	11	19	831	175	39	178	47	136	1436
			AR									

Source: own elaboration in SPSS software, version 19

2.3 Interpretation of test results

We present the following results according to the individual years in various specializations on the basis of the results presented in the Tables of the subsection 2.2:

2009

Surgery: The Trenčín Region (AR = 7.4), where excessively large amount of 10 juniors out of the total number of 87 operated juniors were hospitalized, is the main cause of significance.

Gynecology and Obstetrics: The main cause of significance is Košice Region (AR = 8.8), where excessively large amount of 12 juniors out of the total number of 24 operated juniors were hospitalized. The second cause of significance is Žilina Region (AR = -3.6), where none of the total number of 92 operated juniors was hospitalized.

Otorhinolaryngology: In this case, the independence assumption is highly corrupted within all the departments. The main cause of significance is Banská Bystrica Region, where all the operated juniors, 482, were hospitalized. The rest of the regions had a significantly smaller (sometimes identically zero) ratio of hospitalized people in 2009. In Prešov Region, none of the total operated juniors, 606, were hospitalized. A similar situation occurred in Žilina and Nitra Regions.

Ophthalmology and Urology: The test is insignificant, and the ratio of hospitalized juniors does not depend on a region.

2010

Surgery: The main causes of significance are Prešov and Trenčín Regions, where an excessively large amount of juniors out of the total number of 55/144 or 48/248 operated juniors were hospitalized. The second causes of significance are Žilina, Košice and Bratislava Regions, where not even one junior was hospitalized.

Gynecology and Obstetrics: The main cause of significance is Košice Region with an excessively high ratio of hospitalized juniors (11/15). The second cause of significance is Prešov Region without any hospitalization (0/138).

Otorhinolaryngology: Even in 2010, the independence ratio of hospitalized juniors is highly corrupted within all the departments. The main cause of significance is a significantly higher ratio of hospitalized juniors in Bratislava (118/885) and Košice Region (111/819). The second cause is a zero (lower) ratio of hospitalized juniors in Prešov, Banská Bystrica, Nitra and Žilina Regions.

Ophthalmology and Urology: The test is insignificant, and the ratio of hospitalized juniors does not depend on the region.

2011

Surgery: The main causes of significance are Prešov and Nitra Regions with an excessively high ratio of hospitalized juniors 212/385 or 49/145. The second causes of significance are Banská Bystrica, Bratislava, Trnava and Trenčín Regions with a very low ratio of hospitalized juniors.

Gynecology and Obstetrics: The main cause of significance is Košice Region with an excessively high ratio of hospitalized juniors (75/125). The second cause of significance is Nitra Region without any hospitalization (0/68).

Ophthalmology: On the contrary to 2009 and 2010, the test is significant in 2011. In the Košice Region, there was a significantly higher ratio (5/71). On the other hand, zero was in the Žilina Region (0/60).

Otorhinolaryngology: Even in 2011, the independence ratio of hospitalized juniors is highly corrupted within all the departments. The main cause of significance is a significantly higher ratio of hospitalized juniors in Banská Bystrica Region (523/646). All the rest of the regions, except Trnava and Trenčín Regions, have a significantly lower ratio of hospitalized juniors.

Urology: Test is insignificant, and the ratio of hospitalized juniors does not depend on the region.

2012

Surgery: The main causes of significance are Košice and Nitra Regions with an excessively high ratio of hospitalized juniors 175/444 or 85/189. The second causes of significance are Banská Bystrica, Prešov and Trenčín Regions with a low ratio of hospitalized juniors.

Gynecology and Obstetrics: The main causes of significance are Košice and Nitra Regions with an excessively high ratio of hospitalized juniors 104/197 or 22/30. The second causes of significance are Banská Bystrica and Prešov Regions that include no hospitalization (0/71 or 0/30).

Ophthalmology: On the contrary to 2009 and 2010, the test is significant in 2012 again. The high ratio of hospitalized juniors was in the Nitra Region (22/30).

Otorhinolaryngology: The main cause of significance is a higher ratio of hospitalized juniors in the Banská Bystrica Region (280/428), Trnava Region (156/515) and Žilina Region (335/1826). On the other hand, a smaller number of hospitalized juniors are in the Bratislava, Košice, Nitra, Prešov and Trenčín Regions.

Urology: Higher ratio of hospitalized juniors on the contrary to an expected ratio was recorded in the Banská Bystrica Region (5/11) and Trnava Region (29/178).

3. Discussion

We summarized the test results of the dependence ratio of the hospitalized juniors on a region in the Table 6 in order to increase the total overview of the interpreted results in the subchapter 2.2. There are given the regions of significantly increased (Region +) or decreased (Region -) ratio to expected ratio according to the years and specialized fields. The Table 6 proposes that the increased / decreased ratio of hospitalized juniors during 2009-2010 was in three departments: Surgery, Gynecology and Obstetrics and Otorhinolaryngology. In 2011, one more field was added, Ophthalmology. In 2012, the increased / decreased ratio of hospitalized juniors within a region appeared in each specialized field.

Table 6 - Region representation in significantly increased and decreased ratios of junior hospitalization in specialized fields and years

Year	Field	Region +	Region -
2009	Chir	TC	-
2009	Gyn	KI	ZI
2009	ORL	BC	BL, KI, NI, PV, ZI
2010	Chir	PV, TC	BL, KI, ZI
2010	Gyn	KI	PV

Year	Field	Region +	Region -
2010	ORL	BL, KI	BC, NI, PV, ZI
2011	Chir	NI, PV	BC, BL, TA, TC
2011	Gyn	KI	NI
2011	Oftal	KI	ZI
2011	ORL	BC	BL, KI, NI, PV, ZI
2012	Chir	KI, NI	BC, PV, TC
2012	Gyn	KI, NI	BC, PV
2012	Oftal	NI	-
2012	ORL	BC,TA,ZI	BL, KI, NI, PV, TC
2012	Urol	BC, TA	-

Source: own elaboration

In our analyses, we focused on the evaluation of hospitalized child patients – juniors to the age of 18, to whom specific particularities are related to, while providing day surgery in Slovakia. In medical analyses, age is considered as the only most convenient predictor of using medical services (Pol & Thomas, 2013). Age is related to the level of their medical services usage as well as to a type of the provided performance and circumstances of its realization, the use of institutional and outpatient healthcare, examinations and performances, insurance and many other aspects. The hospitalization ratio is related to the given aspects. There exist many other predictors of using the medical services, such as income, family status, sex, education, occupation and status at work, religion and religiousness, etc. The given facts significantly emphasize a slight connectivity of population and medical politics, and their problem separation. The influence of medical politics is evident in various demographic processes in the society, such as its influences on the level of birth rate (e.g. regularization of abortions that are also practiced by day surgery), morbidity patterns (form of health insurance), mortality rate, etc. Demographic changes occur in the structure and range of medical needs of the population that significantly influence source separation in public health. The understanding of the complexity of the demographic factor connectivity with different components of medical system will support a formation of an efficient platform in order to formulate an effective legislative framework in the Slovak medical politics. In Slovakia, there were absent some studies that declared day surgery use connected with chosen demographic aspects. Different medical reforms, whose effects did not form an adequate platform for day surgery system, were considered as one of the reasons. Another reason was a permanent instability of HIC in the Slovak market of health insurance. This instability negatively influences the whole system of day surgery, initiates significant issues related to HIC refunds for surgical performances, as well as to their monthly financial limits that cause the creation of waiting lists in the facilities of day surgery, as well. It is inevitable to accept such healthcare system regulations, in which simple performances will reach lower payments, and vice versa. Otherwise, there will not be any radical changes in the development of day surgery. As our analyses have shown, there is a need for specialization of individual hospitals to perform certain types of day surgery. Financially demanding and risk involving performances should be executed in large university hospitals, where more advanced medical attention is provided in case of complications. With the clinic specialization higher effectiveness in health care can be attained, together with the reduction of hospital beds and shortening the waiting lists of day surgery.

Conclusion

In the article, we presented chosen results of our analyses that focused on day surgery system in Slovakia. Our primary ambition was to show the importance of economical analyses that are connected with demographic characteristics, which serve to obtain a valuable platform for national and international benchmarking, as well as further development of day surgery in a process of medical system efficiency increase of individual countries. We discovered unequal development in a number of realized day surgery performances in the individual regions in a group of juniors as well as we specified the revealed anomalies in this process by these analyses. They may have a double character. The analyses may either signalize the implemented changes of “own” methodologies in presenting the performances of day surgery in the individual hospitals (their transformation to separately reimbursed

performances – SRP, or deliberate transfer of a patient to hospitalized day surgery, its specification as a risky situation without any complementary analytical evidences in order to obtain more profitable financial reimbursement for a performance, etc.). The second effect may be classified as an issue with insufficient use and development of day surgery that is related to politics, pricing, HIC, short-term contracts between HCP and HIC, as well as other system causes (legislative, process, information issues of day surgery discipline of the providers, etc.). Bed capacities in the hospitals should parallel improve with a development of day surgery. Many of those hospitals have already re-profiled bed devices to day surgery devices. Next development of day surgery in the following years in Slovakia will depend on many influences. Firstly, there is financial influence that will depend on the HIC access to (and their positions) a day surgery system, its main actors, as well as on government support. The HIC should limit the limited number of day surgery performances and to determine unit price per performance to the level of hospitalized patient, at least. Also, it will depend on further development of surgical methods and anesthetic care, and their influence on mini-invasive surgery and surgical complications, and the mortality rate. Another important determinant is the social factor that influences on the length of stay in a hospital after operation, as well as on the performance choice by day surgery form. Satisfaction of the patients with the realization of day surgery performance, also satisfaction of the doctors and medical staff with conditions to practice day surgery performances, as well as possibilities and means of effective communication of medical personnel with patients are very important.

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ECONOMIC FACTORS INFLUENCING WELLBEING AND THE QUALITY OF LIFE

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Abstract

Our paper reports on the results of the research aiming at revealing economic factors influencing the wellbeing and the quality of life in Tyumen region located in the Eastern Siberia in the Russian Federation.

Our results demonstrate that the economic wellbeing and the material prosperity are positively and significantly correlated with to the feeling of happiness. The influence of education level on life quality and satisfaction comes through as slightly less significant. Moreover, it appears that women in general are more satisfied with their economic and social conditions than men.

Keywords: *economics of happiness, quality of life, consumer satisfaction, Tyumen region, Russian Federation*

JEL Classification: C01, I15, I30, J17

1. Introduction

At present, there are more scientists who tend to think that countries should neither try to assess their power, nor the wealth, but the happiness of their citizens. So, if the gross domestic product is an economic development indicator for the industrial economy, it is not that effective for the post-industrial economy. A world happiness report, covering 130 countries, was compiled only twice. Happiness and wellbeing in the given version is a value that reflects the national wellbeing and can be determined by six factors – actual GDP per capita, healthy life time people's self-assessment, freedom to live one's life upon one's choice, freedom from corruption, charity (see e.g. Biageti and Guarani, 2014). Russia is on the 68th position among the estimated countries. Foreign scholars note that the level of happiness in Russia is extraordinarily low for the country at such level of economic development.

The economic theory of happiness has not yet taken its firm place in the publications of Russian scholars of economics, except in some scarce sources (Antipina, 2012). There are no empirical studies that could explain specific features and peculiarities of the "Russian" happiness with an exception of those carried out to collect the data within the framework of international investigations of the countries.. This happens despite the fact that Russia has a huge territory with a large number of constituting regions which considerably vary in terms of a level of social-economic development, climatic conditions, population density, urbanization level, etc., which, respectively, could considerably influence the level of happiness and satisfaction of people living in those regions.

We have made an attempt to investigate the life satisfaction and level of perceived happiness of resident of the Tyumen region – a Russian oil and gas province located in Western Siberia. The results regard to Russia, partly postulated in the scientific literature, were confirmed, though a part of findings enables to speak about some specific feature in terms of the Russians' life satisfaction and felt happiness. We managed to figure out that the region's residents' level of life satisfaction is equal to the developed countries values, except for the individuals in the age group over 55 years. Happy people are more satisfied with their lives, and the other way round, those, whose satisfaction with life is high, say more often, that they are happy. This is a classic scenario, and we did not find any differences concerning the investigated region. Material wealth, money are positively and significantly related with a feeling of happiness at the level of 5%. A conclusion may be drawn that

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the less money the person has, less happy he, or she will feel. Health appeared to have a negative relation with the feeling of happiness: excellent health at the level of 10%, good health at the level of 5%. The influence of education level on the life satisfaction appeared insignificant.

The paper has the following structure. In the first part of the paper we have stated the place of the «happiness» category in the scientific publications and described the main results of empirical investigations, carried out by the European and American scholars. The second part describes the database and methods. In the third part we present the main results and provide their interpretation.

2. Wellbeing and the quality of life: a short literature review

The philosophy of happiness appeared back in Ancient Greece. The successors of eudaemonism considered happiness to be the principal value of life and subordinated ethics and morals to it. Among the later ideas the philosophy of happiness may be found in the ethics of utilitarianism. The founder of this trend Bentham formulated the goal of utilitarianism simply: the more people are happy, the better.

The economic theory of happiness is one of the theories which is operated by the specialists, trying to find out, what flaws the contemporary economy has. In their opinion, understanding the notion of life quality as a number of objective values (purchasing power, per capita income, etc.), economists miss its «human» constituents – among other items the life satisfaction. The first scientific investigations in the economic theory of happiness appeared in the 1970s. These principles were developed by the Nobel Prize Winner Kahneman (Kahneman 1999; and Kahneman and Sugden, 2005), as well as the American economist Easterlin (2003; 2005).

In the 2000s, there was a large boost of interest to happiness not only from philosophers, psychologists, sociologists, but also from economists. Frey states that the studies of happiness have a considerable potential in order to make revolutionary changes in economics (see e.g. Frey, 2008). In this respect, it becomes interesting to know what results were achieved by the scholars, dealing with the happiness investigations, at this point, as well as what issues are the most controversial.

We consider valid the grouping the array of scientific publications in the fields as: 1) theoretical studies, as a rule, interdisciplinary, which try to formulate what the happiness is and to gain new theoretical knowledge about this category with the help of historical, sociological, psychological methods (see e.g. Frey and Stutzer, 2000; Alesina et al, 2004; or Seligman, 2002), descriptive studies, that make a goal for themselves to acquire the empirical data (Kašík and Šnapka, 2013), enabling to penetrate deeper into the matter of happiness, to study separate characteristics and features of the given phenomenon (see Diener, 1997; Oswald, 1997; Ryan and Deci, 2001; and Blanchflower and Oswald, 2008), and methodological studies, aimed at the development and improvement of methodological instruments in the studies of happiness.

There are some results of economic theory of happiness, conclusively presented in the scholars' papers. To be more specific, a phenomenon, known as the «Easterlin paradox», is a pattern, formulated in 1974 by Easterlin, then specified more by him as well in 1995. The essence of the phenomena is as follows: the population of rich countries is happier as a whole, than the population of poor countries, but in the developed countries, despite the growth of the gross domestic product per capita, the subjective estimations of happiness do not rise. In other words, a growth of income of a separate individual makes him or her happy, but the growth of income of all the population of the country does not increase their common happiness.

The psychologist Veenhoven (2003) offered a generalized value of life satisfaction in this or that country, which is named HLY (Happy Life Years), which combines the data about the lifespan and about the degree of life satisfaction. Besides, the degree of life satisfaction is not the felt happiness. In some countries, the total life satisfaction is low, and there are many happy people there. Usually, it is typical for developing countries, where the current state of events improves, and in this context the currently spent life seems especially unsuccessful for the respondents.

What concerns dynamics of happiness for a typical citizen of a country, the studies in this field are carried out by Oswald, Clark, King, etc. The dynamics of happiness may be described with a graph, having a «U» - type shape, where the lowest values belong to the age of 44-46 years.

This is explained by the fact that during the period of active professional experience people are the least satisfied with their life – they have to give up their pleasures for the income and career. This age is a peak of depressions in Great Britain. The growth of happiness level of people above 60

years (even on the background of the health worsening) means that the pension system, healthcare, etc. make the life of the elderly comfortable and worthy (Alesina *et al.*, 2004).

The happiness curve, drawn on the basis of the studies, implemented in the USA, looks slightly different. In the American society the «bottom» of the curve is located within the range of 50-53 years, but argumentation of the given situation will be, in our viewpoint, similar to the British one.

Let us introduce some more interesting results. The studies by the American economists Stevenson and Wolfers (2009) found out that since 1970's the level of happiness of American and European women keeps decreasing and approaches the men's values. While before that time the economic development influenced the men's and women's happiness differently – women were happier.

Lyubomirsky *et al.* (2005) found out that happy people reach more success in their lives, than unhappy ones. According to their viewpoint, a happy person is very likely to be successful in professional activity: he or she is creative in solving assigned tasks, gets less tired, his or her enthusiasm brings a big benefit, from the amount of which happiness is also dependant. Thus, the happier person in each country, the higher is their economic effectiveness and the richer is the society.

Some scholars offer measuring happiness with the help of objective, for example medical parameters. Studies in the field of physiology reveal a relation of wellbeing with defensive powers of the organism (a happy person resists virus infections easier, happy people are less likely to have high blood pressure [28]). A considerably big number of publications is dedicated to the studies of the influence of inequality degree in the society on the individual wellbeing, including health (Smith, 1999). Such studies are aimed at measuring happiness with the help of economic parameters (Layard, 1980).

Concerning the studies of factors, determining the subjective estimate of the life satisfaction, they are divided into 2 groups: economic and non-economic. The economic factors should include: a degree of economic development of the country as a whole; presence or absence of work (or a source of income), amount of individual income; rates of inflation and unemployment, variations of business activity in the country and in the world. Non-economic factors: formal features (sex, age, race); individual traits of a person (pessimist/optimist, introvert/extravert); social status (education, profession, marital status); way of spending time (communication with the close people and friends, going in for sports, or hobbies, engagement in the life of the community, rest); life conditions (climate and environmental conditions, social stratification, law and order) (Inglehart and Klingemann, 2000; Gaucher, 2009).

The research carried out in Great Britain show, that people with the university diploma are less satisfied with their lives and are more likely to be the subject to stresses, than the people without education. But in many countries (e.g. USA, Switzerland, and Latin American countries) there is a positive correlation between the level of education and the level of happiness.

3. Data and methods

For achieving the goals of our analysis, we used the data of a sociological survey conducted in the city of Tyumen, Tyumen region, in February-March 2014 using the own questionnaire. The data are representative for the population of the age from 18 years and above. Representativeness is controlled corresponding to sex, age, and education. The total number of the respondents in the sample frame was 287. The type of selection we used was non-probabilistic (the version of selection quota). The objects under investigation were the following age groups: 18-25 years, 26-35 years, 36-54 years, and above 55 years.

In order to verify the relation of a degree of life satisfaction with the level of felt happiness, as well as to check the inverse relation between the given values we used two models of linear regression, calculated on the basis of the least square method (Table 1 and Table 2). The meaning variables, as the basis of the first model, influencing the life satisfaction, are the following:

- age (4 age groups, enumerated above);
- sex (gender);
- education (secondary, incomplete higher, higher, academic degree);
- level of felt happiness (the respondents chose: 1) Yes, I am happy; 2) No, I am not happy; 3) I am not certain);
- content of happiness for the individual (emotional side of life or material one);

- material riches (is the money a measure of happiness for the individual, or not);
- perfect health condition;
- good (satisfactory) health condition.

The second model checks, for how much the level of felt happiness depends on the level of the life satisfaction. The factors, determining happiness, are the same variables as in the first model, except for the level of felt happiness. Instead of this variable there is the «life satisfaction» value used, measured in the questionnaire according to the range from 1 to 10 (the higher is the mark, the higher is the level of the individual's life satisfaction at the present moment).

4. Model estimation results and discussions

We calculated the regression equations with the help of the Ordinary Least Squares in order to analyze the determiners of the individuals' life satisfaction at the present moment on the one hand, and the factors determining the level of felt happiness on the other. These models are often used in the research of the same format (see e.g. Strielkowski, 2012). The results are presented in the Tables 1 and 2 respectively for each model.

Table 1: Economic factors, determining the wellbeing in the Tyumen region

	Coef.	Std. Err.	t	p > [t]	95% Conf .interval	
age	-.1619507	.1111899	-1.46	0.146	-.3808319	.0569304
gender	.3667795	.2049881	1.79	0.075	-.0367466	.7703056
educ	.0932872	.1105648	0.84	0.400	-.1243634	.3109377
happy	-1.169951	.1246857	-9.38	0.000	-1.415399	-.9245027
emot	.2934418	.2326236	1.26	0.208	-.1644856	.7513692
money	-.5593407	.4396919	-1.27	0.204	-1.424889	.3062078
exhealth	.1671226	.3604979	0.46	0.643	-.5425298	.8767751
ghealth	-.0539236	.2177643	-0.25	0.805	-.4825999	.3747528
constant	8.493557	.5915273	14.36	0.000	7.329115	9.657999
R2				0.279		
Adj. R2				0.258		
N =				287		

Source: Own results

It seems that in terms of the results obtained from our econometric analysis of wellbeing and the quality of life, the situation as yields from our model and describing the state of things in Russian Federation is very peculiar.

Table 2: Economic factors, determining the quality of life in the Tyumen region

	Coef.	Std. Err.	t	p > [t]	95% Conf .interval	
satisf	-.2055893	.0219104	-9.38	0.000	-.2487206	-.162458
age	-.0686548	.0466063	-1.47	0.142	-.1604008	.0230912
gender	.2310812	.0853049	2/71	0.007	.0631555	.3990068
educ	.01884	.0463938	0.41	0.685	-.0724877	.1101678
emot	.0766758	.0976852	0/78	0.433	-.1156209	.2689725
money	.3586195	.1835969	1.95	0.052	-.0027972	.7200363
exhealth	-.229924	.1505472	-1.53	0.128	-.5262813	.0664333
ghealth	-.1699352	.0907251	-1.87	0.062	-.3485307	.0086603
constant	2.802661	.2807705	9/98	0.000	2.249954	3.355367
R2				0.2957		
Adj. R2				0.2754		
N =				287		

Source: Own results

First of all, our results show the dynamics of happiness of the individual is different from those obtained in the case of the American and Europeans society, as described by Blanchflower and Oswald (2008):

1. It appears that the lowest happiness values are typical for the age group of 26-35 years, which varies from the practice of the earlier studied countries, but is completely logical for Russia, because in Russia the period of marriage and bearing children is considerably shifted to the younger age for the both sexes. Correspondingly, the amount of responsibilities, which are to be born, grows in the younger age, maximizing the labor effort in a wish to achieve the material wellbeing and stability, frequently at the expense of pleasures.
2. Our calculations of dependence of the life satisfaction from the age showed the following: the older the respondent is, the less satisfied with his or her life he or she is. This contradicts the conclusions, made by Blanchflower and Oswald (2008) for the individuals above 61 years of age. Though in Russia such tendency has several explanations. Firstly, retirement is combined for the majority of the population with a sharp decrease of income on the background of worsening health, expensiveness of qualitative medicines and medical services, expensive household services. The situation is aggravated by the accumulating and insurance mechanisms of comfortable old age implementation being undeveloped. Secondly, taking the average lifespan of Russians (69 years) into consideration, the majority of the population unfortunately does not come into the happy age of wisdom, which occurs after 75 years.

Gender is positively related to the life satisfaction and is significant at the level of 10%. Women in the Tyumen region are more pleased with their lives, than men. This tendency, in our strong conviction, may be transferred to the Russian society as a whole, though it is in some contradiction with the research of Stevenson and Wolfers (2009), which state that since 1970's the women's happiness gets slowly equal to the men's happiness in the developed countries. While earlier in the opinion of the same authors, starting from the 1930s the economic development influenced the men's and women's happiness differently – women were happier.

It might be that the difference in wellbeing and the satisfaction with life perceived by the Russian women, compared to the American and European women, can be explained by the differences in the value orientations. Even by the example of the investigation, carried out by us, it becomes obvious that for the great majority of the Russian women the family and children are the main priority and a guarantee of a happy life. She would sacrifice her career without any regret, if it is harmful for the family relations and bringing up children. Considering the renovation and strengthening of religious orthodox traditions in Russia, according to which the objective for a woman is to serve for a man and help in achieving his goals, as well as children bringing up, it can be forecast that the women in Russia will not stop feeling themselves less happy for the nearest decade and will not adopt the men's style of behavior in the society and in self-realization. We think that this could be studied in detail within the framework of a separate study.

We found out, that the level of felt happiness is negatively related to the life satisfaction at the level of 5%. This means, that happy people are more satisfied with their lives. As it was earlier stated, happy people achieve a larger success in their lives, than the unhappy ones. The influence of other factors (education, health) on the life satisfaction appeared insignificant.

The second model of linear regression suggests fairly different configuration of variables. Here we find out, what factors determine the happiness of the individual, and in what degree they influence on the feeling of happiness. In the given model the meaningful variables are the life satisfaction, age, sex, money, excellent, or good health.

Our study showed that the more respondents are satisfied with their lives, the more they state that they are happy. This is a classic scenario for the country with the developed economy. Moreover, it appears that the material values and money is positively and significantly related to the feeling of happiness (at the significance level of 5%). Thence, one can imply that the less money a person in our sample possesses the less happy, satisfied and secure she or he feels. Our measure of health appeared to have negative relation with the feeling of happiness a perfect health at the level of 10%, a good health at the level of 5%. The worse the respondent estimates his or her health, the less frequently he or she speaks about happiness.

What concerns the level of education and its influence on the life satisfaction and wellbeing, there is no influence recorded in the both models.

Conclusions and implications

Overall, our results demonstrate that happy people are more satisfied with their lives and, on the other hand, the respondents highly estimating their life satisfaction also frequently declared that they were genuinely happy. We discovered that there is a specific dynamics of happiness in Russia, which might be very different from that in the developed countries. The elderly people in the Russian Federation appear less happy and satisfied with their lives, than the elderly abroad, which is a distinctive signal, reflecting the non-satisfactory level of social security, material wellbeing, plenty healthcare services for the people of the old age. Our study confirmed that the material riches, money influence the people's feeling of happiness. The less money the person has, the less happy he or she will feel. Women appear to be are happier than men. Also, the people, estimating their health as excellent and good, are more satisfied with their lives and are happier.

The implemented study enabled to outline the directions of the following studies, in which we particularly plan to study the causes of life dissatisfaction by the elderly in more detail; boundaries of income, enabling the increase of the happiness level, as well as people's satisfaction. Besides, we consider interesting to study the influence of cultural values of this or that society on the life satisfaction.

Summarizing our results, one should note that the level of happiness is unlikely to be the only factor of economic development, but it is an important addition to the other indicators of progress. Nevertheless, the authorities of a number of countries plan to shift the emphases from the quantitative values to the estimation of the total happiness of their citizens during the determination of effectiveness of economic policy in the nearest future in order to form a new development model, basing upon the mental wellbeing improvement.

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THE ARCHITECTURE OF MANAGEMENT COCKPIT FOR SUPPORT OF DECISION-MAKING

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Abstract:

Present time is characterized by limited availability of resources. Not only organizations are limited by amounts of nonrenewable natural resources, but also by amounts of renewable resources like human, financial and time resources. Today issue with resources is raising demand for them. It is this rising demand that leads to optimization of handling, choosing and use of these resources by use of Decision support systems.

The goal of this article is to define the management cockpit architecture of research portal designed to support decision-making not only from technical-technological point of view but also from user-content angle. This article explores modern approaches to management cockpit and modern methods and methodologies related to Business Intelligence, Competitive Intelligence and Decision support systems. By comparison of modern cockpit approaches is defined architecture that connects technical-technological view and user-content view and by that assigns software tools to decision-making activities.

The main reason for creating and using management cockpit is to effectively use information technologies at day to day management tasks. Management cockpit is designed to ease and accelerate decision-making processes of company management. The emphasis is on involvement of knowledge discovery in databases and its use in management decision-making. By creating a management cockpit we can present company data to managers in a form from which they can use them in their decision-making processes.

Keywords: management Cockpit, decision-making, decision support systems, application support, business intelligence, web application.

JEL Classification: C80, M15

1. Introduction

Managerial decision making is a process that is based on a complex dynamic environment. Recent trend puts increasingly higher demands on managers and it's required more challenging tasks from them. In accordance with the increasing globalization and the associated increase of the availability of information resources it is necessary to provide to managers a tool to allow easy and quick orientation in the data that serves as background material for their decisions.

Every organization should focus on optimizing the workflows while ensuring compliance with regulation and dynamically responding to the market situation and customer requirements (Rábová, 2012). One option is to create a control center of information used for this purpose.

During last years, information and communication technologies are developing very dynamically and are penetrating into a lot of various business areas. Its perceiving is progressively changing from something rather sporadic and rate, bringing a competitive advantage on market, to absolute necessity determining existence or inexistence of certain enterprise among organizations able to compete (Chalupová, Motyčka, 2008).

The goal of this article is to describe the architecture of such a center to support decision-making processes, both in terms of technical-technological, and user-content.

Neumann *et al.* (Neumann *et al.*, 2009) call such a center as a cockpit. This cockpit provides to managers an possibility to customize their reports on project management for each observer so that everyone sees relevant information.

The idea of cockpit originated from aerospace and aeronautics. A flight, for example, could be considered as a process that is comparable to a development of projects. Coworkers of different areas

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participate in the same process (pilots, air safety, passengers, etc.). Every participant requires different information about the flight (process) or plane (product). The passenger on the one hand would like to see information about the flight distance and the time to destination on his private screen. The pilot on the other hand needs to understand the technology, operational reliability and other characteristics of the plane. Lastly, the flight safety is provided with information about the airspace and the planes that are passing through it, in order to be able to coordinate safe routes.

2. Problem formulation

Today, there are of the three main views on cockpits function and application. The first one has already been mentioned and it is the cockpit for air traffic control. The second view is a management application, which serves for managing software development and the third view is an application called "management cockpit", which is used to provide relevant information to managers of businesses by using information technologies.

The first approach is not suitable for our needs. It provides only the views and concepts of behavior of applications based on the cockpit.

The second approach to the concept of cockpit is a management application used for software development. Software development is defined as a team effort to develop multi-version system consisting of different parts. This team effort must be coordinated to ensure correct interaction of individual components involved in software development. Distributed software development is a very challenging task, which is further complicated, when the development begins to move from local to global perspective and team members begin to use different development tools and processes. And in these situations comes the cockpit as management application serve to manage software development. According to D.L. Parnas (Parnas, 1978) there are several ways you can avoid problems in complex software development. They are mainly:

- modularize the software into separate units,
- assign different roles to different teams,
- establish agreed-upon interfaces,
- and define specific synchronization points.

These possibilities cockpit solves as management application for managing software development. Through the cockpit are provided to management all information needed to control and manage software development.

The third view, which from our point of view plays a key role, is a management application called "management cockpit". Management cockpit is concept for the ergonomic design of a meeting room for company management (Figure 1). It is intended to make management teams more productive by improving communication between team members and by focusing them on the strategic issues (Daum, 2012). In its basic we can imagine management cockpit as a room with lot of screens, on which is displayed various information.



Figure 1 - Management cockpit (Daum, 2012)

From definition of management cockpit results that management cockpit can be focus on the providing comprehensive and general information for managers, or information about specific departments or processes needed for correct decision making. So it must be valid: "To make management cockpit effective and useable, it must provide correct information to the right users at the right time". Management Cockpit is an application used for decision support.

All described approaches to cockpit have one feature in common, respectively function, which is to provide relevant information to certain persons. Da Silva *et al.* established nine dimensions that define a software cockpit. Definition of these dimensions also covers the management cockpit. These dimensions are: target audience, supported task, data collection, data analysis, data presentation, timelines, sensitivity of data, display modes, and display device [Da Silva *et al.*, (2007)].

2.1 Business intelligence

Business Intelligence (BI) is complex of approaches and the application of IS/ICT, which almost exclusively to support analytic and planning activities of enterprises and organizations, and they are built on the principle of multidimensionality, which here means the opportunity to look at reality from several possible angles (Novotný *et al.*, 2005).

According to Vercelise (Vercellis, 2009) BI may be defined as a set of mathematical models and analysis methodologies that exploit the available data to generate information and knowledge useful for complex decision-making processes.

So BI is a set of processes, applications and technologies designed to promote effective decision-making processes in the company. It supports the analysis and planning activities of enterprises and organizations and they are built on the principles of multi-dimensional views of business data. BI applications cover analysis and planning functions of most areas of corporate leadership, *i. e.* sales, purchasing, marketing, financial management, controlling, property, human resources, production, IS/ICT, etc.

The tools and Business Intelligence including production source systems, temporary storage of data, operational data storage, transformation tools, integration tools, data warehouses, data marts, OLAP, reporting, management application (EIS)⁴⁰, data-mining, tools to ensure quality, tools for metadata management, and other (Novotný *et al.*, 2005). Use of BI for support of decision-making processes is described in Kříž *et al.* (Kříž *et al.*, 2011).

2.2 Competitive intelligence

The task of Competitive Intelligence (CI) is primarily a search on key issues related to current and future situation in terms of potential threats and opportunities. It mostly concern thematic area (Key Topic Information) which are specified in the intelligence matters (the Information Key Questions), in particular:

- Issues related to mergers and acquisitions (who with whom and against whom); planning venture capital, stock quotes, etc.;
- Negative information about business partners and customers;
- Issues relating to current and potential competitors;
- Issues associated with scientific and technological development;
- Questions related to defensive CI.

Further clarification of the Information Key Questions is reported in article of Marc and Molnar (Marc, Molnár, 2009).

When we search for the answers to those questions CI uses a whole range of highly professional information technology.

CI activities mainly consist of:

- analysis and synthesis of data or the information which is then transformed into strategic knowledge;
- gathering information about competitors, when such information is various types, which put together a mosaic picture of the competition;

⁴⁰ Executive Information Systems

- also information from the neighborhood of studied subjects: market, country, law and legislation, political and demographic context (e.g. investment penetrations to unknown, remote, or even exotic markets)

Detailed look at issues of CI can be found in Molnár (Molnár, 2009).

2.3 Decision support systems

Decision support systems (DSS) discipline spreads about 40 years back and was mostly focused on assisting managers (Dařena, 2011). Decision support systems are defined in terms of the roles they play in decision processes. They provide knowledge and/or knowledge-processing capability that is instrumental in making decisions or making sense of decision situation. They enhance the processes and/or outcomes of decision making. The support furnished by the system allows a decision episode to unfold

- in more-productive ways (e. g., faster, less expensively, with less effort)
- with greater agility (e. g., alertness to the unexpected, higher ability to respond),
- innovatively (e. g. with greater insight, creativity, novelty, surprise),
- reputedly (e. g. with higher accuracy, ethics, quality, trust),
- with higher satisfaction by decisional stakeholders (e. g., decision participants, decision sponsors, decision, consumer, decision implementers)

These concepts are illustrated in Figure 2.

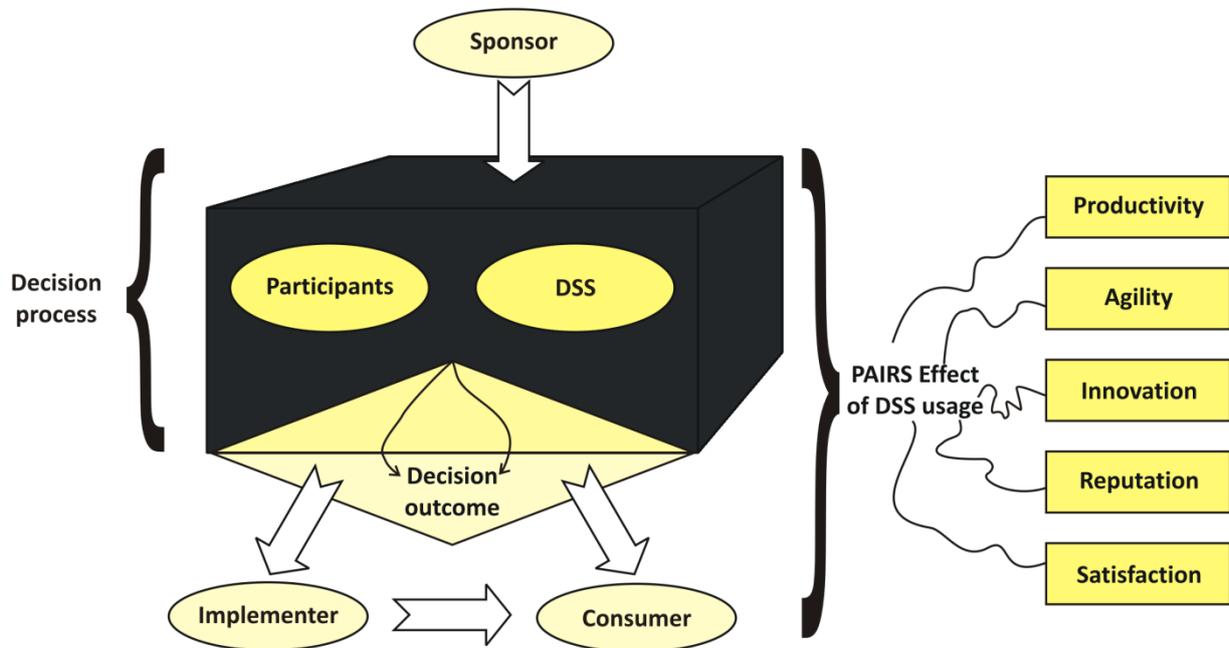


Figure 2 - The role of a decision support system in decision making [Burstein, Holsapple, (2008)]

The black box, which represents a decision process, can be thought of as: being sliced into three stages of intelligence, design, and choice; containing a particular decision mechanism such as optimization, elimination-by-aspect, and so forth. As the two windows into the decision process indicate, the process can involve the actions of a DSS as well as other participants. When a DSS is involved in a decision process, it affects the process and outcome in at least one of the indicated PAIRS (productivity, agility, innovation, reputation, satisfaction) direction (Hartono, Holsapple, 2004).

Decision support system can be used also for group decision making, where a set of experts are involved in decision process concerning the evaluation of a set of alternatives (Pasi, Yager, 2011).

3. Problem solution

Management cockpit is a sum of hardware and software tools and methods for information acquiring and processing, their subsequent presentation and their storing for later use.

Proposed management cockpit was defined according to dimensions defined by da Silva *et al.* (Da Silva *et al.*, 2007). The dimensions are:

- target audience – management cockpit is intended for managers, that means senior management personal of company;
- supported task – application will serve to support strategic decision making, resource management, development and implementation of products, monitoring and improvement;
- data collection – data for cockpit will be acquired from organization information system and by use of OLAP technologies modified to required form;
- data analysis – for data analysis there will be used techniques for data mining such as classification, finding sequences, creation of association rules, clustering, prediction and more;
- data presentation – data will be primarily presented by use of web interface. Secondary tool for data presentation will be outputs from application to many widely used formats, such as cvs, pdf.
- timeliness – will be ensured by time stamping every database entry with time;
- sensitivity of data – access to data will be secured by login, which means management cockpit will be a multiuser application where only certain users are allowed to see certain part of data;
- display modes – proper display of data it is very important for users to have the ability not only to view data in predefined view modes but also to define his own view. The management cockpit proposed by use will have this functionality;
- display devices – when creating management cockpit it is important to think about number of computer screen that can to display data. Managers usually work on theirs PC or they use notebooks, so our application will be displayed on only on computer screen.

Based on these nine dimensions we have defined global architecture of management cockpit.

3.1 Global architecture

Basic question when designing management cockpit whether the application will be desktop or web based. Data, which is cockpit supposed to provide are very sensitive and company management usually do not want to share this data with others. It might seem that using application on web will increase the risk of access of unauthorized persons but the data still have to be placed on database server so they are accessible to all users and always current. Because of that network communication cannot be avoided and even web based application can be accessible only from local network. Nowadays it is very popular to have a corporate information system as web based system. Internet environment has many advantages, such as availability, simple update, multiuser interface and more. Because of those reasons is the management cockpit web based application.

As seen in Figure 3 we propose management cockpit as traditional web architecture with three layers. Manager is accessing system through web interface which shows tools from application layer. Within the application layer the user can adapt cockpit appearance to his/her own imagination. Application layer is connected to data layer and because of that connection the user always has current information from transaction database and from aggregated data. The application layer consists of many components to decision support. For this part can be used component-based modelling according to Gössler, Sifakis (Gössler, Sifakis, 2005).

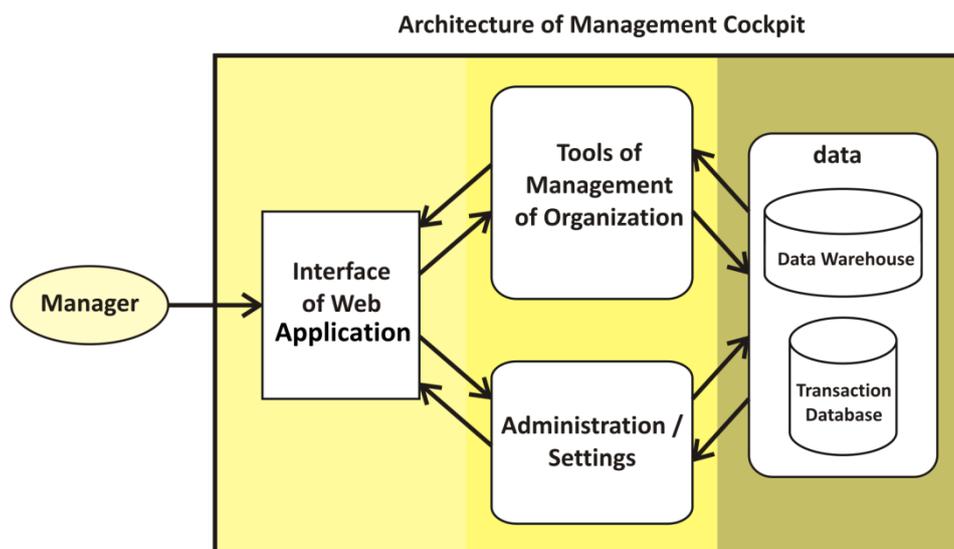


Figure 3 - Global architecture of management cockpit

3.2 Presentation layer

From the perspective of management cockpit user the presentation layer is very important part of system, because user uses presentation layer to be in direct contact with system. Key attributes of management cockpit user interface are clarity and portability.

Clarity means that in any moment user must always be sure what he is doing. To ensure that three basic rules must be meet:

- User knows in which part of cockpit he is currently working;
- User must be sure how to achieve the required objective;
- To achieve the required objective the user must make the least amount of steps when navigating system.

Portability is the capability of operating not only on desktop PC but also on other output devices such as projector, laptops, pocket PC, mobile phones and specialized equipment.

In terms of windows distribution the cockpit should be application with one divided window or with windows that is changing content (based on activity that is currently performed). This structure of application is best described by two approaches, one-window drilldown and extras on demand (Tidwell, 2005).

One-window drilldown means that only one window is open at any time and only through that window is user interacting with system. Extras on demand refers to advanced functionality can be displayed when requested (printing options, graphs export options, issue of payment order when checking invoices and more). This approach is mainly important for speeding up the work with system because it allows advance user to execute certain advanced functionalities directly.

3.3 Application layer

Application layer of management cockpit can be view from two points of view. First is a manager point of view which means view of managerial activities which support will be included in cockpit. Second point of view is informatics. Informatics view represents individual models, methods, technologies and other tools which can be used to support managerial activities.

Managerial activities supported by management cockpit can be divided into four categories:

- Support for strategic management;
- Support of resource management;
- Design, development and realization of products;
- Monitoring and improving;
- Each of these processes uses different information technology tools such as: statistical tools, probability and probability distributions, market research, methods for decision

support, prediction, graph algorithms, simulation, gaining knowledge from databases, visualization.

Connection of both views is represented in Figure 4, and will be discussed in following text.

Support for strategic management is for senior management and is a set of tools which ease process of planning, setting goals, configuration and management of corporate culture or quality control. To set successful strategy the manager needs much information both from internal and external environment. He needs to know how is his company doing and also how his competition is doing. He has to be able to estimate trends in production etc.

Information from internal environment is available from company information system and its extension in form of Business Intelligence. To observe external environment the manager can use tools from Competitive Intelligence. In some cases can be use artificial intelligence (Pokorný *et al.*, 2007 and Štenc *et al.*, 2012).

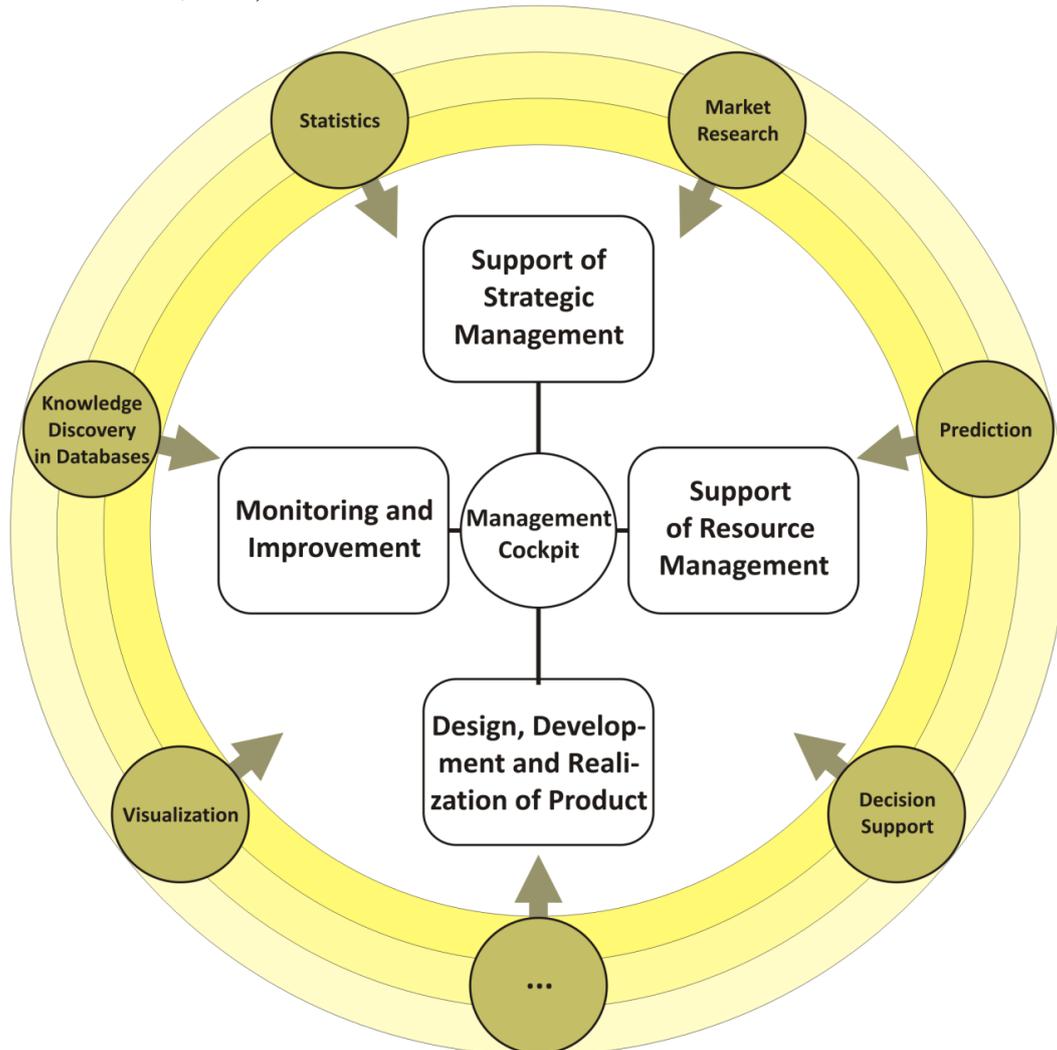


Figure 4 - Application architecture

For *Support of resource management* are usually created ERP module (within the information system). These modules are primarily intended for resource management. Contrary from this we propose to include these modules directly into management cockpit. By this we achieve unifying all functions in one place and in single form.

When working with resources the most used tools are statistical tools such as calculation of average, median, representation of time series, calculation of moving average etc. Regression analysis and prediction are also widely used. In terms of human resources we can include the possibilities from project management based on network graphs or tools for assigning tasks and competences to certain employees. It is designed so that manager has always overview of current internal and external

financial resources. This part of the cockpit will also provide information regarding company infrastructure.

Part of cockpit for *design, development and realization of products* is for every company unique. By product design we do not mean creation of specific product but rather acquiring material for actual design. To acquire this material we mostly use tools for market research. It is necessary to identify customer requirements or anticipated trends in customer requirements. For this we can use method for data-mining from databases. Based on previous figures we can predict trends and do regression analysis.

When developing a product the first thing is to create model of product on which we can examine the gaps and identify potential problems. There is a validation and review of product and if possible we should use simulation tools. After the creation of model, in the actual realization of product there is a lot of texting and improvement. The manager must always have information on the current state of development. All the steps in development have to be properly recorded so that it is possible to control and monitor the successful and timely development of products.

When realizing the final product it is necessary to consider sales of product and product propagation. It is necessary to coordinate propagation with production to ensure that funds are invested where they bring highest benefits.

Monitoring and improving does not only effect production. It is important to determine customer satisfaction, track completion, deal with production optimization, monitor implementation of plans and activities of employees. Monitoring and improving must be done constantly. In this part the individual processes are examined and we try to find optimal solutions. Many tools can be used for monitoring and improving, ranging from data-mining to various surveys and subsequent analysis.

Evaluation and exact description of the achieved results and/or stating the statistical significance.

3.4 Data layer

An important question is how to store data to subsequent analysis. Nowadays for storing data are still mostly used relational database. The structure of stored data can be variable, and over time can appear additional attributes that need to be monitored. In order for any such modification would not change the data model is designed universal conceptual model which is based on model described in (Turčínek, 2011).

In any system, there are different types of objects (user, event, ...) that have different attributes. The proposed model allows adding different types of attributes through a common administration such as via the web interface. This model includes the following types of attributes:

- texts (limited to a certain number of characters);
- large text (also with a limited range, but with a much greater capacity);
- numbers (integer, real);
- files (images, pdfs, etc.);
- logical values (attribute takes values yes, no);
- selections (attribute has predefined options from which to choose).

In entity attribute type different types can specify for more accurate processing of the system (for example, specify a file type because displaying). All attributes that can be assigned to object are located in the entity attributes. They are characterized by its identifier, name and type. Objects may access to information system. For this reason, the entity objects contain data for logging in. In order to classify objects, it is created an entity where is kept this classification (object types). The fact that the object can act in more roles is saved by entity object specification. To objects can be provided under its system different rights. These rights are then placed into an entity rights and permissions for each type is stored in the entity authorization. Assign attributes to object types is located in entity attributes' characteristics.

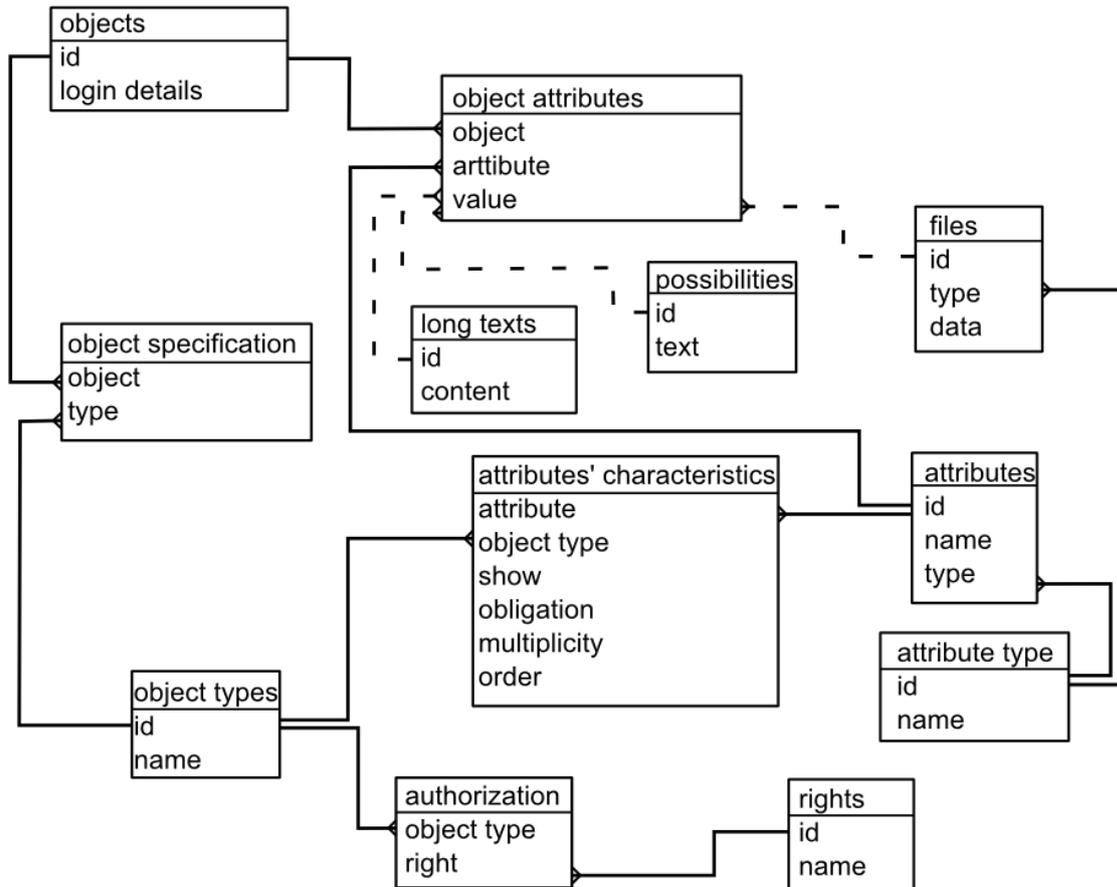


Figure 5 - Universal data model

Information about individual objects is then stored in the entity *object attributes*. To specific object and attribute is assigned a value. Column value is a string of variable length (generally in database systems, known as VARCHAR) with a fixed maximum length. If the attribute value can be written as a string of length less than or equal to maximum (number, short texts, etc.) it will be entered directly into this column. However, if we want to store a file, the value stored in column value will serve as a link into table files (indicated by a dashed line) where files are stored. The same is valid for large texts. For type selection, then this value refers to the specific option from the table possibilities.

This model is described in more details in (Turčinek, 2011).

Conclusion

All management activities are interconnected and it is difficult to determine boundaries between them. Many tools can be used in more than one area. For every management activity is important to have as much information (related to the area) as possible so the manager can make informed decisions. Tools that help managers to make informed decisions belong to Decision support system group. Between those tools is management cockpit.

Management Cockpit was defined as a sum of hardware and software tools and methods for data processing and to define cockpit more we used Da Silvas (Da Silva *et al.*, 2007) divisions according to dimensions. Huge advantage of management cockpit is interaction, because it allows to make informed decisions and to perform them directly. Because of that we can use tools such as Business intelligence or Competitive intelligence.

Management cockpit must be well-arranged. This is achieved by well-designed interface and many different visualization elements which facilitate easy orientation in data. In the future, when creating user interface, it will be necessary to account all user requests, their motivations and

stereotypes used when using cockpit. This is necessary for interface to be friendly, intuitive and effective.

Data used in management decisions must be always current and available to manager at any time. Because of that it was decided to create cockpit as web based application which is accessible at any place connected to internet. Because the application is web based the data will always be current.

One of the questions that will have to be answered before creating cockpit is competence of user who will be using the cockpit. Because management cockpit will serve not only to acquire information but also to make decisions is necessary to ensure that the person making decision is a person who can make the decision. This is done by creating an authorization of users and assigning permissions to these users.

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TOPSIS METHOD AND ITS APPLICATION TO THE LOCAL SELF-GOVERNMENT OF THE SLOVAK REPUBLIC

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Abstract:

The economy of municipalities in the Slovak Republic is regulated by a law that regards the indebtedness of municipalities as the only and the most important criterion. The aim of the paper is to propose an alternative to the legal perspective on the evaluation of the municipality economy. The paper focuses on the characterization of the chosen MCDM method – the TOPSIS method as a suitable alternative for the complex evaluation of the municipalities' economy and their mutual comparison. This method is applied to a set of municipalities in the Presov Self-Governing Region in 13 independent districts aiming at ranking municipalities based on their economy according to selected criteria. Results of the application are further statistically studied focusing on the identification of the correlation between the result achieved and the size of the municipality.

Keywords: MCDM methods, TOPSIS technique, municipality, Presov Self-Governing Region.

JEL Classification: H11, H21, H72, C44, C58

1. Introduction

The economy of each economic subject is regulated by a legislature that defines its scope of activity. In the Slovak Republic, the municipalities' economy is regulated by the Act No. 583/2004 Coll. on Budgetary Rules for the Self-Governing Territorial Units that considers indebtedness as the only and the most important evaluation criterion (§ 19): "The municipality is obliged to introduce healing regime, if the total amount of its obligations after the term of repayability overlaps 15 per cents of real current incomes of the municipality of the preceding budget year and if it did not repay some allowable obligation in 60 days from its repayability". The healing regime precedes the introduction of the forced administration and among other it signifies the loss of the freedom over the management of finances by the municipality. At the same time, the Act (§ 17) amends that the municipality is allowed to use reimbursable sources of financing (i.e. credits, loans) for the repayment of its obligations only if "the total sum of the debt of the municipality or higher regional unit does not exceed 60 per cents of real current incomes of the preceding budget year and the sum of the annual instalments of the reimbursable sources of financing including the repayment of profit does not exceed 25 per cents of real current incomes of the preceding budget year." There is no framework in the Slovak republic (including any legislation) that would complexly evaluate the economy and the effectiveness of economy of municipalities, and this absence is considered as the main research problem, solution to which is presented in this paper.

2. Municipality as the research subject

The term public administration was introduced in the time of the Roman law, and according to Frumanova (2012, 328) it represented the administration of the human community organized in a state with a system of government. In the contemporary understanding as a set of activities of a deliberate character that are performed in relatively permanently organized entities (Kaderabkova and Pekova 2010, 300), it is divided into the state government and the self-government.

According to Kadecka (2003), the local self-government as a part of the second unit of the public administration is practiced by subjects different from state and it is related to a specific (mainly legislatively regulated) territory. The main definition of the municipality of presented in the Constitution of the Slovak Republic (1992 Art. 64) that defines municipalities as "independent

territorial and administrative units of the Slovak Republic, associating individuals permanently residing therein.”

The Municipal System Act No 369/1990 Coll. (1990, § 1) amends that is it “a legal entity independently managing its economy, property and income.” At the same time, the municipality can be viewed as a social organism that is geographically defined and is relatively stable. It is characterized by a set of dynamic signs that differentiate it from other forms of settlements (Toth 1998, 194).

The higher territorial unit is represented by the self-governing region defined by the Act on the Self-Government of Upper-Tier Territorial Units No 302/2001 Coll. (2011, § 1) as “independent territorial self-governing and administrative unit”. This act also defines 8 self-governing regions, and municipalities from one of them (Presov Self-Governing Region with the administrative office in Presov) represent the selected set of the paper.

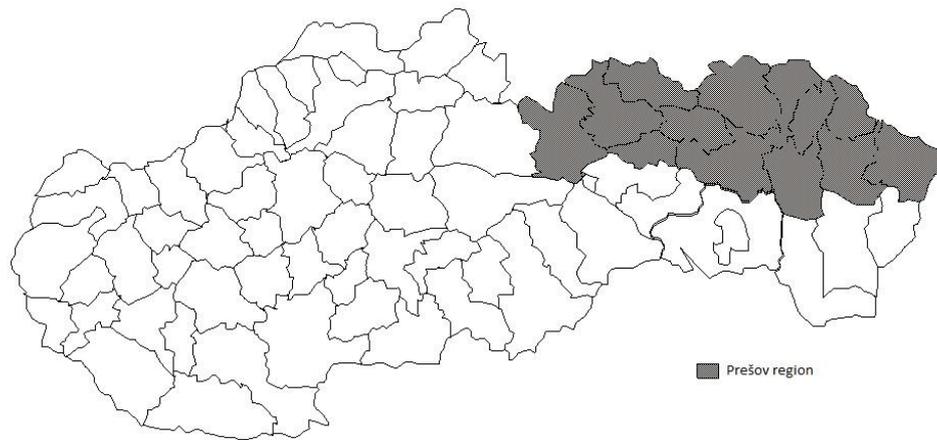


Figure 1: Presov Self-Government Region – geographical representation

3. MCDM Methods

In the time of the increasing global competition, the society more and more focuses on the identification and selection of alternative resources (Wu, Hsieh, Chang 2013). In the last decade, the decision making on the basis of several criteria has become a rapidly growing field mirroring constant changes in each sector of the economy (Jahanshahloo, Hosseinzadeh Lotfi, Izadikhah 2006). The problem MCDM methods focus on is to find and evaluate the optimal variant within available options. Since it is complicated to find the most advantageous alternative, several methods and processes focusing on correct decision making found their use in practice (Wu, Hsieh, Chang, 2013). One group is represented by MCDM methods consisting of the following steps:

- To identify evaluation criteria so they mirror the ability of the subject to reach the set aim,
- To identify a group of alternatives that are able to reach the set aim,
- To evaluate alternatives according to selected criteria,
- To apply the selected MCDM method,
- To accept one of the alternatives as an optimal or preferred one,
- If the selected alternative is not accepted, to add new information and criteria and to repeat the process (Opricovic, Tzeng 2004; Jahanshahloo, Hosseinzadeh Lotfi, Izadikhah 2006).

On the basis of the above mentioned procedure, Milani, Shanian, El-Lahham (2008) identify 4 main elements of each of MCDM methods – alternatives, criteria, weight of criteria and the decision matrix (Figure 2).

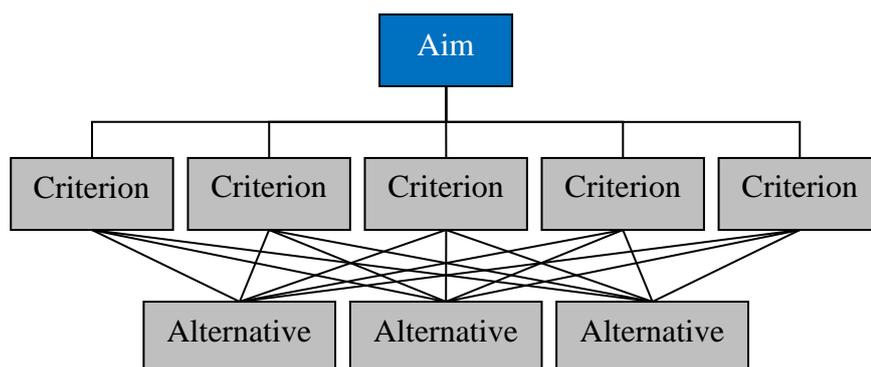


Figure 2: Hierarchical structure of the MCDM method, Izadikhah (2008)

One of MCDM methods is the TOPSIS technique that is defined below and it is applied as a primary source of the evaluation of the municipalities' economy.

3.1 TOPSIS technique

The first describing this method were Yoon, Hwang in Milani, Shanian, El-Lahham (2008), stating that the basic starting point was the assumption that the best variant should have the smallest possible distance from the ideal solution. The result of Lai *et al.* (1994) is described as a solution that exists in the moment when the contentment with the distance of alternatives to the Positive Ideal Solution (PIS) and the Negative Ideal Solution (NIS) are the same (Opricovic, Tzeng 2004). The result is also strongly determined by the decision maker (Varsanyi 2008). The PIS presents the solution, an alternative that maximizes the revenue criteria and at the same time minimizes the cost criteria. On the contrary, the NIS maximizes the cost criteria and minimizes those of the revenue. Appropriate criteria for the prediction of economic development can be considered monetary variables (Ungureanu, Matei 2008).

According to Shih, Shyur, Lee (2006) the TOPSIS allows the decision maker to solve and analyze the problem, to compare alternatives and create their ranking order. At the same time, this method is labelled as the most straightforward from MCDM methods; and according to Pavic, Novoselac (2013) this method is a suitable instrument for the decision making based on incomplete data. The scope of data is according to Kandakoglu, Celik, Akgun (2009) and Shih, Shyur, Lee (2007) not determining for its use, i.e. it is possible to use data of an arbitrary scope.

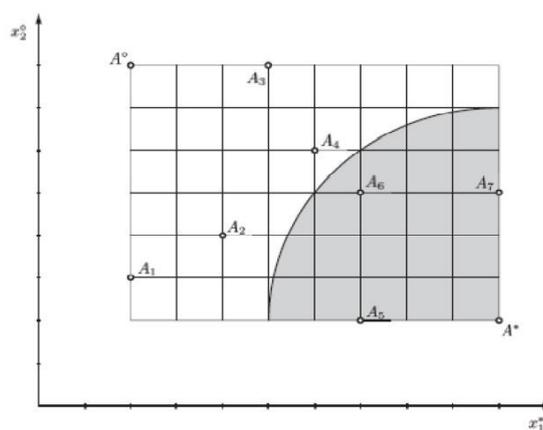


Figure 3: Geometrical representation of TOPSIS method Source: Pavic, Novoselac (2013)

The view on advantages or disadvantages of this method is different and each perspective mirrors its use in concrete situations. Advantages that make the TOPSIS the main MCDM method compared to other relevant methods (AHP, ELECTRE) are according to Shih, Shyur, Lee (2006) following:

- Logic representing the rationality of the human choice,
- General value reflecting at the same time the best and worst values of criteria,
- Simple calculation that is easy to program,
- The measured result of alternatives is possible to illustrate through the polyhedron (min. in 2 dimensions).

Bhutia, Phipon (2012) also consider as strong points of the method the following:

- Simple usage,
- Ability to work with all types of criteria (subjective and objective),
- Rationality and intelligibility,
- Straightforwardness of the calculation,
- Concept allowing to depict the best alternative through the mathematical calculation.

The main disadvantage of the TOPSIS methods is according to Kandakoglu, Celik, Akgun (2008) and Shih, Shyur, Lee (2006) the absence of the possibility of the allocation of weight to monitored criteria and the absence of a consistent control from the point of the decision maker. This is the reason why is this method dependent on the process of the finding of the relative importance of various attributes in relation to the reaching of the set aim.

The TOPSIS as a MCDM method represents a practical tool for the selection and creation of the ranking of a larger number of alternatives with various applications. In the scope of such methods, TOPSIS is used as the main decision making technique in the “Asia Pacific Area”. Its usage is identified by Olson (2004) further in manufactures, financial investments, evaluation of sports teams, and application of automated processes. The method was also used to compare the performance of the society and as the financial index for the evaluation of the performance in a specific field that allowed a detailed comparison. Shih, Shyur, Lee (2006) identify its use in for example Water management, Robot selection or Facility location selection. Zolfani, Antucheviciene (2012) add fields like Risk assessment of construction projects or Comparison of the regional aircraft parameters. Parvu (2007) analyzes the use of different mathematical models for the management of universities.

3.1 Methodology

The part on methodology briefly describes the application of the TOPSIS technique. Based on interviews with municipalities’ representatives and government auditors (control authorities), there is articulated a set of 8 criteria that represent the main starting point for the application of this MCDM method. The last part of this chapter presents the identification of the selected set of municipalities.

The application of the TOPSIS techniques is divided according to various authors between 5 steps (Wu, Hsieh, Chang, 2013), (Opricovic, Tzeng 2004) up to 9 steps (Zolfani, Antucheviciene 2012). Based on the studied literature and articles, this paper presents the process that is used in the evaluation in this article:

The first step of the TOPSIS application is the creation of the criterial matrix that is according to Milani, Shanian, El-Lahham (2008) representing the ranking of alternatives according to respective previously identified criteria (characteristics) and is depicted as follows:

$$D = \begin{pmatrix} & X_1 & X_2 \dots & X_j \dots & X_n \\ A_1 & x_{11} & x_{12} \dots & x_{1j} \dots & x_{1n} \\ A_2 & x_{21} & x_{22} \dots & x_{2j} \dots & x_{2n} \\ \vdots & \vdots & \vdots & \vdots & \vdots \\ A_i & x_{i1} & x_{i2} \dots & x_{ij} \dots & x_{in} \\ \vdots & \vdots & \vdots & \vdots & \vdots \\ A_m & x_{m1} & x_{m2} \dots & x_{mj} \dots & x_{mn} \end{pmatrix} \quad (1)$$

with: A_i = i alternative,
 X_{ij} = value of the j criteria that is reached by the i alternative

In the next step, Peng *et al.* (2012) normalize this matrix via the use of the equation:

$$r_{ij} = x_{ij} / \sqrt{\sum_{j=1}^j x_{ij}^2} \quad (2)$$

The acquired data matrix is multiplied by weights of respective criteria via the equation (Peng *et al.* 2012)

$$v_{ij} = w_{ij} \cdot r_{ij} \quad (3)$$

with: v_{ij} = weight normalized value
 w_{ij} = weight of criterion

This acquired normalized matrix contains values through which it is able to identify the PIS and the NIS. These variants may represent real alternatives as well as hypothetical alternatives (created out of best or worst gained results). The identification of the PIS and the NIS is possible to depict via the equation:

$$H_j = \max(w_{ij}), D_j = \min(w_{ij}) \quad (4)$$

with: H_j = PIS, D_j = NIS

The distance from such acquired PIS and NIS is calculated according to:

$$d_i^+ = \left[\sum_{j=1}^k (w_{ij} - H_j)^2 \right]^{1/2}, d_i^- = \left[\sum_{j=1}^k (w_{ij} - D_j)^2 \right]^{1/2} \quad (5)$$

with: d^+ = distance from the PIS
 d^- = distance from the NIS

From the perspective of alternatives, the desired is the minimization of the distance from the PIS (d^+) and maximization of the distance from the NIS (d^-). The main criterion according to which the ranking of alternatives is created is represented by the relative distance (proximity) to the PIS that take into account both identified distances from the previous step via the equation.

$$c_i = \frac{d_i^-}{d_i^- + d_i^+} \quad (6)$$

with: c_i = relative proximity to the PIS

The final step that is not included as a step in the application of the TOPSIS method by some authors (Milani, Shanian, El-Lahham, 2008; Wu, Hsieh, Chang 2013), is the creation of the ranking order based on the relative proximity of the alternative to the PIS. The best alternative (subject) is the alternative with the lowest value reached.

In the scope of the research, there were identified overall 8 indicators of the evaluation of municipalities' economy that have been evaluated in 2012. The identification of individual indicators originated from personal consultations with government auditors of the Financial Control Administration and representatives of municipalities:

- R1 – CMA per inhabitant, i.e. overall expenditure per inhabitant,
- R2 – Share of foreign resources on overall municipality assets,
- R3 – Overall revenues per inhabitant of a municipality,
- R4 – Economic result per municipality inhabitant,
- R5 – Assets profitability,
- R6 – Standard expenditures per municipality inhabitant,
- R7 – Foreign resources per municipality inhabitant,
- R8 – Standard revenues per municipality inhabitant.

In this paper, the weight of selected criteria is not studied, neither is its influence on the results gained. Selected criteria were equivalent, i.e. the weight of each criterion was 0.125.

The research sample is represented by municipalities of the Presov Self-Governing Region in the total of 13 districts.



Figure 4: Districts of the Prešov self-governing region

From the overall number of 661 municipalities, 5 have been discarded (Bardejov district – Ondavka, Humenné district – Nechválková Polianka, Valaškovce, Kežmarok district – Javorina, Stráne pod Tatrami) based on the incomplete data from the studied year 2012.

The evaluation of municipalities on the basis of the above identified and studied criteria was implemented on each district individually. The district with the lowest number of municipalities and thus with the lowest number of alternatives is the Medzilaborce district (23), and on the other hand, the largest district is the Prešov district (91). After the execution of 13 individual analyses, there were identified three municipalities with the lowest relative proximity to the ideal variant (PIS) in each district. This way, in the last stage of the analysis, a group of municipalities (39) was created, and the whole process was repeated. For the sake of understandability of the whole process, the application of the TOPSIS technique is described on this group of municipalities.

Apart from the demonstration and the application of the TOPSIS technique as a MCDM method for the evaluation of the municipality economy, in the last step it was researched whether the success factor (in the identified group of the best evaluated municipalities) has any influence on the size of the municipality. The premise for such argument is that larger municipalities are able to realize savings on the scale, and they dispose of a more qualified personal structure for a more effective ensuring of all processes on the level of the municipality. As a suitable coefficient, the Kendall-Stuart tau-c characteristic was selected:

$$\tau_c = \frac{n_c - n_d}{n^2(k-1)/2k} \quad (7)$$

with: n_c – number of concurring pairs (i.e. in case of $x_i > x_j$ and $y_i > y_j$ or $x_i < x_j$ and $y_i < y_j$ for every sample of n observations of the pair of variables X and Y);
 n_d - number of non-concurring pairs (i.e. in case of $x_i > x_j$ and $y_i < y_j$ or $x_i < x_j$ and $y_i > y_j$);
 k – lower value from m, n .

The coefficient reaches values from -1 to 1; a high value attests the high dependency of variables. The testing of significance is based on the calculation of the p-value, with the significance of the factor is accepted if the calculated value is lower than 0.05. For the purposes of analyses the MS Excel and a statistical program Statistica 12 were used.

3.1 Results and discussion

In the scope of the above characterized sample of municipalities in the Presov Self-Governing Region, the TOPSIS technique was applied to individual districts. In the sense of the described process, it represents the PIS alternative composed of the best results gained (that can be real as well as hypothetical). Subsequently, the relative proximity expresses the distance from this best alternative and so the alternative (municipality) with the lowest value is considered to be the best one. In the scope of individual districts, the lowest possible value was acquired in the Stara Lubovna district (Vislanka municipality) – 0.207. On the contrary, the municipality with the highest relative proximity to the PIS was the Geraltov municipality (Presov district) – 0.842. According to set criteria and

processes, the municipalities' economy is most balanced in the Levoca district (scale of 0.26); the highest differences in the municipalities' economy were observed in the Presov district (0.610).

Table 1 - Threshold values of relative proximity to PIS in individual districts of the SR

	Bardejov	Humenne	Kezmarok	Levoca	Medzilaborce	Poprad	Presov	Sabinov	Snina	Stara Lubovna	Stropkov	Svidnik	Vranov n. T.
MAX	0.688	0.818	0.685	0.682	0.767	0.741	0.842	0.834	0.838	0.801	0.769	0.688	0.686
MIN	0.378	0.507	0.362	0.422	0.361	0.424	0.232	0.429	0.288	0.207	0.343	0.358	0.393
Range	0.31	0.311	0.323	0.26	0.406	0.317	0.61	0.405	0.55	0.594	0.426	0.33	0.293

Source: Author's calculation

Through the study of the relative proximity to the PIS, three best evaluated municipalities in each district were chosen. The Sample of such 39 identified municipalities (Table X) presents an independent sample for further research.

Table 2 - Structure of the best evaluated municipalities in individual districts

District	Municipality	c_i^*	District	Municipality	c_i^*	District	Municipality	c_i^*
BJ (84)	Lipova	0.378	ML (23)	Valentovce	0.361	SV (34)	Pcoline	0.288
	Sasova	0.420		Radvan nad L.	0.518		Zboj	0.393
	Resov	0.467		Svetlice	0.521		Ubla	0.441
HE (58)	Pakostov	0.507	PP (29)	Svit	0.424	SL (44)	Vislanka	0.207
	Vitazovce	0.516		Vernar	0.471		Nizne Ruzbachy	0.335
	Ruska Poruba	0.568		Vysoké Tatry	0.477		Jarabina	0.362
KK (38)	Osturna	0.362	PO (91)	Bertotovce	0.232	SP (43)	Tisinec	0.343
	Spis. Stara Ves	0.473		Rokycany	0.256		Breznicka	0.345
	Spis. Hanusovce	0.482		Bajerov	0.279		Mikova	0.362
LE (33)	Brutovce	0.422	SB (43)	Hanigovce	0.426	SK (68)	Giraltovce	0.358
	Pongracovce	0.429		Lutina	0.468		Okruhle	0.361
	Nizne Repase	0.442		Bajerovce	0.590		Micakovce	0.369
Overall number of municipalities subjected to the application of the TOPSIS technique - 656						VT (68)	Vavrinec	0.393
							Cabov	0.426
							Matiaska	0.451

c_i^* - relative proximity to the PIS

Source: Author's calculation

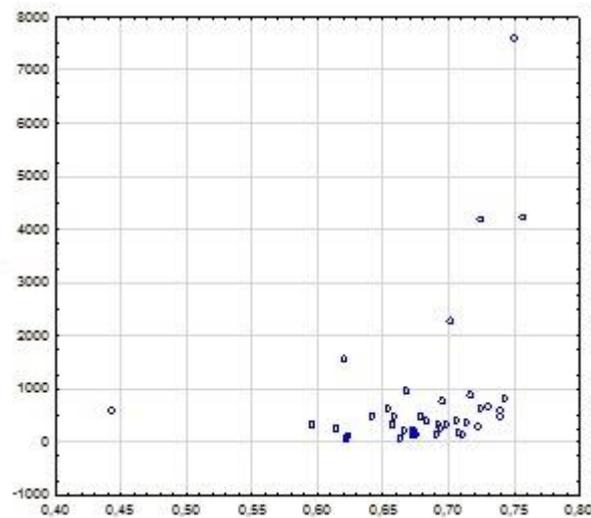
Similarly to the previous research done on individual districts, the TOPSIS technique has been applied to the sample of the best evaluated municipalities. In the next step, municipalities were ranked according to c_i and the best evaluated municipality has become Pcoline from the Snina district. The relative proximity to the PIS of the last municipality was 0.757. On the basis of this ranking order, 10 best evaluated municipalities according to set criteria are presented in the Table X; it is possible to observe the independence of the evaluation from the district of the municipality (the first 9 municipalities are from different districts).

Table 3 - Overall ranking of municipalities

	Municipality	District	c_i^*
1.	Pcoline	SV	0.442
2.	Osturna	KK	0.596
3.	Vislanka	SL	0.614
4.	Lipova	BJ	0.621
5.	Vavrinec	VT	0.621
6.	Pongracovce	LE	0.624
7.	Lutina	SB	0.642
8.	Nizne Ruzbachy	SL	0.654
9.	Vitazovce	HE	0.657
10.	Pakostov	HE	0.658

Source: Author's calculation

In the final step, the correlation between the acquired results of municipalities in a group evaluated on the basis of the Kendall - Stuart tau-c characteristics was researched.

**Figure 5:** Graphic description of the correlation of the result X number of residents

On the level of significance ($p \leq 0.05$), there was confirmed a medium correlation of 0.336 through the Kendall-Stuart tau-c characteristics in the sample of the best evaluated municipalities from individual districts.

Conclusion

The municipalities' economy is being subjected to a more thorough inspection; and in the scope of the Slovak Republic, there is not a legislation that would be complexly devoted to this issue. This paper presents the TOPSIS technique as an alternative to the evaluation of the municipalities' economy based on selected criteria. This MCDM method rises as a suitable instrument for comparison of the municipalities' economy and offers a space for a more complex evaluation of their activities. On the sample of municipalities from the Prešov Self-Governing Region (661 municipalities), the TOPSIS technique is applied in two stages – on the level of individual districts and on the level of the best evaluated municipalities. The independent partial result is the demonstration of a medium correlation between the size of the municipality (according to the number of residents) and results acquired.

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CUSTOMER ACCEPTANCE OF ELECTRONIC BANKING: EVIDENCE FROM SLOVAKIA

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Abstract:

The electronic banking and its various forms became the most important distribution channel of banking services in retail banking sector. Several studies worldwide investigate the acceptance of electronic banking among customers based on various factors and attributes. The most of the studies in this area use the Technology Acceptance Model for investigating customer acceptance of electronic banking forms. The paper employs this model with some adjustments with aim to investigate the electronic banking acceptance in conditions of Slovak retail banking market. The data were gathered by survey conducted among Slovak retail banking customers. The hypotheses formed on the basis of model were tested by the factor analysis of gathered data. The results show influence of perceived usefulness, the amount information about electronic banking and perceived enjoyment on customer acceptance of electronic banking. Perceived ease of use and security and safety were not identified as statistically significant factors of electronic banking acceptance. The results of the study correspond with the results of other studies conducted in many countries worldwide.

Keywords: electronic banking, acceptance, technology acceptance model, internet banking,

JEL Classification: G29

1. Introduction

Rapid development in area of information and communication technologies in recent decades led to multiple innovations in ways of providing banking services. The one of the top innovations is the electronic banking (in its various forms e.g. internet banking, mobile banking etc.), which developed into the most important distribution channel in retail banking. Claessens *et al.* (2002) identified that electronic banking and finance bring many benefits, such as cost reduction in financial services provision and allow simultaneous service for mass of clients.

The clients appreciate electronic banking because it is virtually unlimitedly available, more comfortable and faster and it lowers the need for personal visits of bank branches. Bucko and Mihók (2008) stated that distrust in new technologies might be barrier to expansion of electronic banking and its any new form. Bálint *et al.* (2011) identified solution of electronic identity important prerequisite of building trust in electronic banking and e-commerce generally. Hawkins and Sato (2004) indicated that the question of trust in electronic banking and finance must be addressed by providers of financial services to cover all technical and non-technical aspects of trust building. Simpson (2002) stated that there are also problems with creating, updating and enforcing sound security policy and procedures on the banks' side. Dandapani (2004) noted that despite of information in media about rare cases of misuse of electronic banking, the usage of web based financial service is still increasing. Dráb (2011) showed that question of trust and reputation building is important also in economic relations in electronic environment, such as electronic markets.

So the potential users of electronic banking perceive both positive and negative aspects of electronic banking usage. The availability of information about electronic banking might influences clients of banking, when they chose to start use electronic banking. New users seek the advantages of availability, usefulness and speed of electronic banking service and on the other hand they fear of possible violation of safety and security of e-banking use. All these aspects might affect decisions of potential users to adopt particular form of electronic banking. The question of acceptance of electronic banking in Slovak conditions will be the area addressed in this article. The Slovak e-banking retail market has gone through the banks' privatization process at the turn of the millennium with advantage of quite early introduction of first electronic banking forms. It happened thanks to the new foreign owners of banks, who implemented electronic banking virtually at the same time as at their home countries (Austria, Germany, Italy etc.) with developed banking markets. Therefore

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Slovak bank clients have the opportunity to use electronic banking for relatively long period and it is interesting to investigate, how they accept it.

2. Literature review

Several studies worldwide investigate the acceptance of electronic banking among users based on various attributes. Some of these studies were aimed only at investigation of user adoption of specific forms of electronic banking, mainly internet banking. Majority of the studies use the Technology Acceptance Model for electronic banking. Davis (1989) based the Technology Acceptance Model (TAM) on factors of perceived usefulness, perceived ease of use and awareness of given technology. In various studies conducted was TAM further extended by some specific aspects of electronic banking. Cheng *et al.* (2006) and Qureshi *et al.* (2008) used TAM for investigating the acceptance of internet banking and their results confirmed robustness of TAM in predicting customers' intention of adoption of internet banking. Pikkarainen *et al.* (2004) observed also that web information on e-banking service also belongs to the main factors influencing its acceptance. In other studies (e.g. Teo *et al.*, 1999) also perceived enjoyment, as intrinsic motivation to use information system, is also investigated.

Others investigated security and privacy of electronic banking and its influence on acceptance among users. Qureshi *et al.* (2008) detected that almost 50% of the clients shifted from traditional banking to online banking system, while perceived usefulness and security provided by online banking were high. Geetha and Malarvizhi (2011) proved that good security and privacy level increased the acceptance of e-banking services among customers in India. Their findings also showed that customers were willing to adopt e-banking when they got provided with guidance and safety of their accounts. On the contrary, results Widjana and Rachmat (2011) and Pikkarainen (2004) showed that security does not affect the usage of e-banking service.

The impact of safety of electronic banking and its privacy was further investigated by Grabner-Kräuter and Faullant (2008) and their results confirmed influence of privacy on risk perception and customer attitudes towards internet banking as the most widespread electronic banking form. The results of Suh and Han (2002) also indicated that trust in security of internet banking has a significant impact on its acceptance. Alsajjan and Dennis (2006) detected that trust has a great influence on user willingness to use electronic payments and sensitive information in electronic banking. Alsajjan and Dennis (2010) in another study investigated managerial side of electronic banking consumer acceptance. Users' perception of electronic transactions as easy and safe is crucial for internet banking (and consequentially whole electronic banking) adoption, because it generates the trust in a particular technology. Moreover, banks should build up an innovative reputation and obtain positive word of mouth that will enhance the positive perceptions of their other potential customers. It would also improve perception of banks' trustworthiness. Furthermore, the best ways of promoting electronic banking was identified the usage of electronic media as e-mails, blogs and social networks.

Literature often addresses the acceptance of online banking or internet banking and its usage. However, the internet banking is only one of forms of electronic banking, though the most popular and widespread form. This term of internet banking is narrower than electronic banking, which includes more forms of electronic distribution of banking services and it will be the scope of the article. Studies of e-banking acceptance among customer were conducted around the world, for example in Finland (Pikkarainen *et al.*, 2004), Hong Kong (Cheng *et al.*, 2006), Australia (Sathye, 1999), United Kingdom (Howcroft *et al.*, 2002), Pakistan (Qureshi, 2008), Turkey (Polatoglu and Ekin, 2001), or India (Geetha and Malarvizhi, 2011). While, the investigation of Slovak electronic banking retail market lacks the quality and intensity of investigations in mentioned countries. This is the main reason to conduct our investigation in our study on our home market of electronic banking in Slovakia.

3. Research methodology

We decided to extend our previous research Vejačka (2013) and to include technology acceptance model factors for testing on the Slovak market. According to results of literature review we decided to develop following model of electronic banking use and include some extensions of original technology acceptance model (with factors perceived usefulness, perceived ease of use).

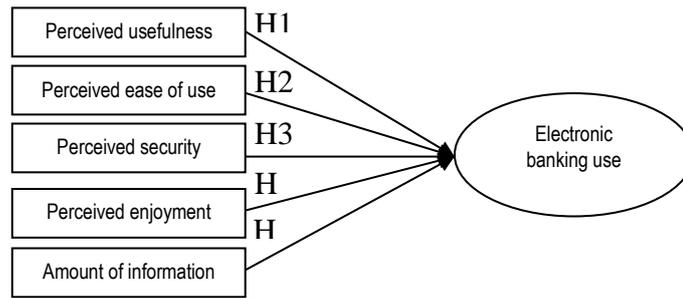


Figure 1 – The research model of electronic banking use

According to model we formulate following research hypotheses. Technology acceptance model is used and is constructed similarly to the model proposed by Davis (1989) and adjusted by many researchers, e.g. Pikkarainen *et al.* (2004), with factors of perceived usefulness, perceived ease of use, perceived security and safety, perceived enjoyment and the amount of information about electronic banking. However in our model the quality of Internet connection was not included. We decided to not include it, while Internet connection is not necessary for all forms of electronic banking. Moreover the quality of Internet connection in general significantly increased since the date of this study. Furthermore in studies Pikkarainen *et al.* (2004) and Qureshi *et al.* (2008) the quality of internet connection did not suite the model presuming, that reliable Internet connection became already common.

We construct and test following TAM hypotheses about consumer acceptance of electronic banking:

- H1. Perceived usefulness has a positive effect on consumer acceptance of electronic banking.
- H2. Perceived ease of use has a positive effect on consumer acceptance of electronic banking.
- H3. Perceived security and safety has a positive effect on consumer acceptance of electronic banking.
- H4. Perceived enjoyment has a positive effect on consumer acceptance of electronic banking.
- H5. The amount of information about electronic banking has a positive effect on consumer acceptance of electronic banking.

Further our hypotheses will be tested on our gathered data and analysed by factor, regression and correlation analysis. The data were gathered by questionnaire with two sections: demographic and basic information section and section for acquiring data for technology acceptance model testing. The questionnaire survey was conducted with aim to investigate the acceptance of electronic banking in conditions of Slovak republic. Data for the study were collected by survey conducted from November 2013 until February 2014 in Slovakia. In total 865 potential respondents were addressed of which 206 filled questionnaires, so response rate was slightly below 24 percent. Questionnaires were distributed at university classes, via social network, by email communication and in printed form with aim to acquire well distributed sample of respondents. The questions in questionnaire related to possible factors affecting the acceptance of electronic banking. Likert five point scales were used for answer options.

4. Results

In first part of questionnaire, the demographics were investigated alongside with usage of forms of electronic banking (EB) and additional banking services. The intensity of usage was also investigated. The Table 1 provides overview of basic acquired information on respondents' demographics and usage of electronic banking. Over 52 percent (108) of respondents were women. We tried to acquire a good distribution of respondents in age groups and roughly it corresponds with

age groups of Slovak population with potential of using electronic banking. From 206 answering respondents 169 indicated the usage of some electronic banking form, what means 82 percent electronic banking usage. The biggest group of respondents (over 43 percent) uses any form of electronic banking for more than two years already. Between one and two years of electronic banking usage was indicated by over 18 percent of users and shorter than one year over 20 percent of them.

Respondents also indicated forms of electronic banking they use. Only two forms of electronic banking were detected to be used by respondents: internet banking and so called smart banking (the form of electronic banking available in mobile devices as smartphones and tablets via dedicated applications developed for a particular operating system). It indicates that Slovak users accept beside the proven form of e-banking (internet banking) also a relatively new one (smart banking). Over 50 percent used only internet banking and 3 percent only smart banking. Both these forms are used by over 28 percent of respondents. Almost 18 percent does not use any form of electronic banking.

The usage of electronic banking options was further investigated. All users of electronic banking used it for gaining information about banking services provided to them (account balance, exchange rates etc.). Payment services in e-banking are used by over 94 percent of its users. Savings and investments via electronic banking forms are used by over 12 percent of users with indicated occasional use. Even less respondents used insurance services provided via e-banking. Only less than 6 percent of users indicated their use.

Table 1 – Survey demographic data and electronic banking usage results

Demographics and usage		Frequency	Percent (%)
Sex	Male	98	47.57
	Female	108	52.43
	Total	206	100.00
Age groups	<20 years	27	13.11
	20-29 years	47	22.82
	30-39 years	41	19.90
	40-49 years	36	17.48
	50-59 years	32	15.53
	>60 years	23	11.17
Usage of EB	Do not use EB	37	17.96
	Less than 6 months	25	12.14
	More than 6 months but less than 1 year	17	8.25
	1 to 2 years	38	18.45
	More than 2 years	89	43.20
Form of EB used	Internet banking	104	50.49
	Smart banking	7	3.40
	Both forms	58	28.16
	None	37	17.96

Source: own survey results

Besides electronic banking services also use of brick-and-mortar bank branches, ATMs and bank’s call centres was investigated. Over 14 percent of respondents never use classic bank branches. The most of those uses only electronic banking. About 63 percent indicated only occasional visits of bank branches. Other 23 percent go to brick-and-mortar banks more often. The cash machines are more intensively used, while only less than 5 percent of respondents indicated that they do not use ATMs at all. Over 67 percent indicated at least averagely often use of ATMs, what clues still high use of cash besides the usage of e-banking payment methods in Slovak conditions. Call centres of banking

institutions are used by 33 percent of respondents with occasional frequency. The others never use the call centres of their banks.

Over 72 percent of e-banking users stated that they use it quite frequently and less than 28 percent users occasionally. Interesting information is that almost 41 percent of users use services of electronic banking from more than one bank, so they use services from at least two banks at the same time. Slightly fewer than 90 percent of electronic banking users never met with problems while using e-banking. Only 1 percent of users stated to encounter problems with e-banking frequently and 9 percent indicated only occasional problems.

The second part of the questionnaire survey was aimed to gather data about the possible factors affecting acceptance of electronic banking from our developed model. The questions in form of statements or variables are stated in the following table 2. As the answer options, the Likert five point scales were used. The groups of multiple questions represented each of the factors from our research model.

Table 2 – The factor analysis

Variable	Perceived usefulness	Perceived ease of use	Security and safety	Perceived enjoyment	Amount of information
Using electronic banking allows me faster access to banking services	0.812				
Using electronic banking allows me simpler access to banking services	0.806				
Using electronic banking brings me advantages	0.773				
Overall, I consider using electronic banking to be advantageous	0.795				
Using electronic banking is easy for me		0.847			
Using electronic banking is clear and understandable for me		0.824			
It is easy for me to improve my skills in using electronic banking		0.789			
Overall, I consider using electronic banking to be simple		0.818			
I have enough information about secure use of electronic banking			0.767		
I use electronic banking securely and safely			0.789		
Transferring sensitive information via electronic banking is secure			0.684		
Overall, using electronic banking is secure			0.828		
Using electronic banking is pleasant				0.797	
Using electronic banking is positive experience				0.836	
Using electronic banking is a good idea				0.720	

I have enough information about electronic banking					0.905
I have enough information about the benefits of electronic banking					0.862
Percentage of variance explained	16.781	21.354	17.705	9.293	7.817

Source: Own survey data processed by SPSS Principal Axis Factoring with varimax rotation

Analysis of data was conducted in SPSS. Perceived usefulness (PU), perceived ease of use (PEOU), perceived enjoyment (PE), security and safety and amount of information about electronic banking were object of confirmatory factor analysis using principal axis factoring with varimax rotation. This method is similar to the methods used in other studies using technology acceptance model, for example in Pikkarainen *et al.* (2004), Cheng *et al.* (2006). Only variables that fitted the model were included for analysis.

All five factors were identified with eigenvalue above 1.0. The conducted Bartlett’s test of sphericity confirmed correlation between variables and Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy showed level of common variance at 0.824, so the factor analysis was appropriate. The identified factors in Table 2 represent 72.95 percent of variable’s variance. The first factor was perceived usefulness and consisted of four variables with Cronbach’s alpha at 0.83, while acceptable value for this type of analysis is above 0.7. The second factor was perceived ease of use with four variables loaded and Cronbach’s alpha at level of 0.87. The third factor, security and safety of electronic banking, also consisted from four variables with Cronbach’s alpha at 0.92. The fourth factor was perceived enjoyment and had 3 variables with Cronbach’s alpha at 0.76. The last fifth factor was amount of information about electronic banking with two variables and Cronbach’s alpha at level of 0.82. The total reliability of the factor analysis was 0.90.

The most of variance (21.35 percent) was explained by the factor of perceived ease of use. Our factor model was used to analyse the use of electronic banking. The dependent value was the use of electronic banking services. Further the regression analysis was conducted to reveal how these factors affect the use of electronic banking.

Table 3 – Regression analysis

Regression	Standardized coefficients Beta	t	Significance
Perceived usefulness	0.261	3.541	0.003
Perceived ease of use	0.095	0.981	0.256
Security and safety	0.118	1.384	0.097
Perceived enjoyment	0.159	2.032	0.049
Amount of information	0.195	2.457	0.019
R ² = 0.098			

The Table 3 shows the results of the regression analysis. The overall model was statistically significant ($R^2=0.098$, $p<0.01$). The statistically significant variables was perceived usefulness ($t=3.54$, $p<0.01$), amount of information about electronic banking ($t=2.45$, $p<0.05$) and perceived enjoyment ($t=2.032$, $p<0.05$) are statistically significant. Furthermore security and safety is almost significant at the five percent level. To further test our hypotheses, a correlation analysis was employed. Its results indicate that perceived usefulness, perceived enjoyment and amount of information about electronic banking are positively correlated with use ($p<0.05$).

Table 4 – Correlation analysis

Correlation analysis	Use	Perceived usefulness	Perceived ease of use	Security and safety	Perceived enjoyment	Amount of information
Use Pearson correlation	1	0.302	0.117	0.158	0.189	0.209
Significance		0.001	0.216	0.092	0.047	0.022

Table 4 shows correlations of all factors with use of electronic banking. According to our data and results, perceived enjoyment, perceived usefulness and amount of information about electronic banking have a positive effect on the use of electronic banking. On the other hand, perceived ease of use and security and safety do not have statistically significant effect on the electronic banking use. So our hypotheses H1, H4 and H5 were supported, while H2 and H3 were not supported by the data.

Conclusion

The aim of our study was to investigate consumer acceptance of electronic banking in Slovakia. We employed the technology acceptance model (TAM) adjusted with new variables according to literature on electronic banking acceptance. The proposed model of electronic banking acceptance included the variables from the TAM (perceived usefulness and perceived ease of use) and three other variables referring to security and safety of electronic banking, perceived enjoyment and amount of information on electronic banking.

Our model was tested with 169 Slovak consumers using electronic banking. The number of participants of our study is comparable with other TAM studies. By a factor analysis five factors (perceived usefulness, perceived ease of use, perceived enjoyment, amount of information and security and safety) were suggested to have impact on the acceptance of electronic banking. Older studies often included the quality of the Internet connection as another factor, but with improvement of infrastructure, good and reliable connection has become standard. Further the regression analysis was performed on these factors. Its results show that perceived usefulness, the amount of information about electronic banking and perceived enjoyment are the most influential factors explaining the electronic banking use. The results correspond with other TAM studies, e.g. Davis (1989), where perceived ease of use influences the acceptance through perceived usefulness. The amount of information about electronic banking allows users to recognize the benefits the electronic banking brings. Perceived enjoyment was also statistically significant and therefore has influence on acceptance. This is in line with some of other studies like Teo *et al.* (1999) or Pikkarainen *et al.* (2004).

Influence of security and safety of electronic banking on its use was almost statistically significant. It is in contrast with some studies Pikkarainen *et al.* (2004), but it corresponds to many others, e.g. Sathye (1999), Hamlet and Strube (2000), Roboff and Charles (1998), Polatoglu and Ekin (2001), Howcroft *et al.* (2002), Black *et al.* (2002). So regarding this factor are other studies in controversy. The last factor of perceived ease of use has the weakest influence on acceptance of electronic banking among Slovak users.

Our study contributes to the technology acceptance studies by applying it on Slovak electronic banking market. It contributes to knowledge of local conditions and preferences of users. Further it suggests that perceived usefulness, amount of information and perceived enjoyment were found to affect the technology acceptance similarly to other studies, e.g. Davis (1989), Davis *et al.* (1989), Teo *et al.* (1999), Pikkarainen *et al.* (2004), while perceived ease of use is less influential.

Our study results are statistically significant, but it still has limitations of validity. The sample of our respondents was relatively lower than some other studies. Also perfect representativeness of the sample was not achieved, so generalization of the results is affected. Multiple technology acceptance model studies add various factors influencing of particular technology acceptance beside the perceived usefulness and perceived ease of use. The original technology acceptance model was extended by some studies, e.g. Venkatesh and Davis (2000). The second version of technology acceptance model was introduced and it included intentions to use a particular technology. This is the

area where our future research could be conducted. Our model could be extended by more factors and the electronic banking acceptance can be tested in the sector of enterprises.

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THE ROLE OF EUROPEAN UNION FUNDS IN LOCAL INVESTMENT POLICY: EVIDENCE FROM ŁÓDZKIE REGION

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Abstract:

Effective investment policy executed by local governments improves the standard of living for residents and stimulates socio-economic development of a commune. After joining the European Union (EU) in 2004, Polish local governments (as well as all other accessing countries) gained a new source of financing for the development of local infrastructure. The article focuses on the role of EU structural among other sources of financing communes' investment policy. We explore this issue within a case study of one of the Polish regions. The results confirm that EU structural funds have become an important source of external funding for local investments in Łódzkie voivodships, supporting mainly the development of environment protection and transport infrastructure. However, the role of these funds in investment policy realization is limited due to the stiff competition among local governments in applying for funds and specific procedures of obtaining such donations. The research also shows that the availability of EU funds significantly influences decisions of local leaders on investment policy implementation.

Keywords: local investment policy, EU funds, infrastructure, EU cohesion policy

JEL Classification: H72,H76, ,E22,F35, R58

1. Introduction

In Poland, local government was reactivated in 1990 following a 40-year break. It carries out the essential part of the public tasks, providing basic operational services for citizens as well as ensuring socio-economic development, inter alia executing investment policy. Effective activity of local governments in this area creates conditions for increasing competitiveness and improves quantity and quality of municipal services.

In the sector of local government, a unit's expenditure always determines the sources of its financing. The scope and nature of income of the communes' budgets govern their ability to fulfill their tasks that include undertaking investments that foster local development. Subsidies and grants transfer from the central budget, providing communes with a stable source of income. However, at the same time, such funds make local governments dependent on central administration, which decides on the amount of and deadlines for investing transferred money as well as on the types of expenditure it is to cover. On the other hand, the level of their own income depends on socio-economic conditions, such as the wealth of inhabitants and firms localized in the given commune. This significantly limits the realization of investments of less developed units. Therefore, external sources of funding, not related to central budget transfers, may play a significant role in investment policy of Polish communes. Since 2004, when Poland became a member of the EU, local governments gained an additional tool supporting their investment activities. The cohesion policy funds constitute one of the most favorable sources of funding for investments by providing local governments with the opportunity to receive a non-repayable grant up to 85% of the investment's value. The opportunities and limitations related to EU structural funds assigned to local governments for development-related projects are the subject of many recent studies conducted in EU new member states (Bragăru 2011, Tatar 2010, Latvieta 2010, Swianiewicz 2013). The authors stress that local governments perceive structural funds as one of the most important instruments in their activities focused on socio-economic development.

The aim of this paper is to explore the role, scope and limits of use of EU structural funds in local investment policy in one of the Polish regions, namely: Łódzkie Voivodship. The text centers on three main issues. First, we investigate the scale and scope of use of EU funds aimed at supporting local governments' investments. Then, we try to answer the question of what role the EU aid plays among other non-repayable sources of financing local investments. Finally, we explore in what way EU funds may influence commune investment policy.

The paper is organized as follows: first, we concentrate on analyzing selected aspects of legal regulations (and their amendments) regarding investment expenditure financing in Poland between 1990 and present day. Afterwards, sources of financing of investments available for local governments are identified, and advantages and disadvantages of use of these sources are briefly discussed. Finally, an analysis of the scope, role and limits of the use of EU funds by local governments in Łódzkie region is presented.

The results of our study shows that EU structural funds have become an important source of external funding for local investments in Łódzkie voivodships, covering on average 10% of communes' investments expenditure during the 2007-2013 period. Mainly, they support projects related to protection of natural environment and transport infrastructure development. Although the EU funds constitute favorable sources of funding for investments, their role as a tool supporting the realization of investment policy is limited. These limitations are determined by a high level of competition between communes, which apply for grants and a specific area and time, with which the implemented investments must comply. Other conclusions from the case study are related to the influence of the availability of EU funds on local decision makers' actions within the implementation of investment policy.

2. Infrastructure investments as an element of impact on local and regional development

Within the last two decades, the position of local government in Poland has been restored. First, in 1990, the National Congress (Sejm) reactivated communes (*gminy*), then, in 1999, voivodships and poviats (*powiaty*) were restored. Gradually, the scope of tasks assigned to local-government units has been extended with the amount of funding being adjusted accordingly. Consequently, in 2010, local-government units in Poland received income four times higher than in 1991.

The subject of local and regional development repeatedly tackled in economic literature is very extensive and complex. However, there is a common consensus of opinions that the concept of development should be always associated with desirable and positive quantitative, qualitative and structural transformations of characteristics inherent to a given territorial unit (cf. Kundera & Szmyt 2008, Wlazlak 2010). The development of market economy and the decentralization of the public finance sector resulted in placing responsibility for local development and for stimulating and shaping economic growth mainly on the local and regional authorities. Since self-government was reactivated in Poland, local-government units have been more and more strongly participating in the conscious shaping of conditions for economic development in a local and regional space.

Presently, in the days of rapidly emerging theories of local development, local-government units are expected to be a driving force of local development representing the interests of local communities to the greatest possible extent. Satisfying current needs is no longer the only interest in this regard; currently, the interests of local communities involve creating and maintaining growth in the whole set of utility values and production forces of the local system.

The goals related to social and economic development may be achieved twofold:

- the use of direct impact tools – *i.e.* their own direct actions (investment projects undertaken by local governments) contributing to a change in almost all economic and social structures of the local system;
- the use of indirect impact tools – *i.e.* planning, supporting, coordinating and controlling actions of an indirect nature within the whole system of local economy (Patzalek, 2010).

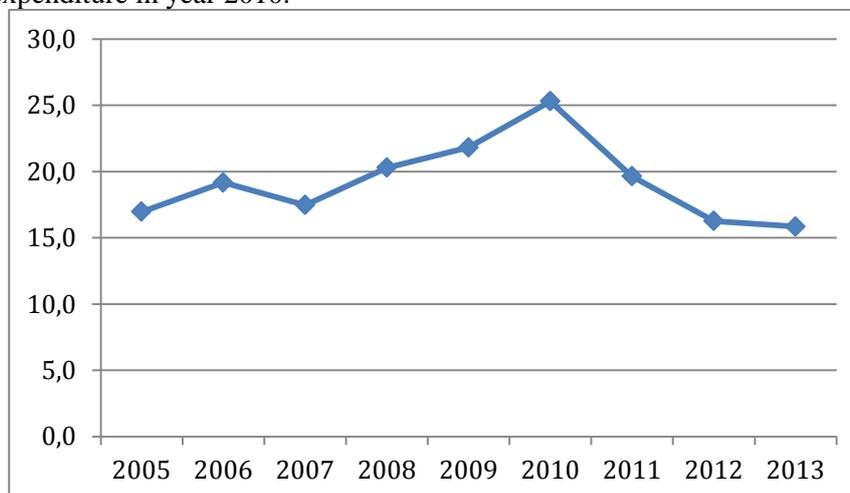
In practice, it is difficult to establish the significance of specific tools and their role in local development. However, the importance of direct actions, among which investments play a special part, cannot be underestimated. Communal investments are indispensable to improve the standard of living for residents. Moreover, they provide an appropriate level of environmental protection in communes and stimulate economic development by creating investment-friendly conditions in the form of so-called external benefits encouraging them to locate manufacturing plants and service and trade companies within their territories. Developed municipal infrastructure also increases the attractiveness of communes as perceived by tourists and constitutes a factor that may have a crucial impact on deciding which destination to choose. The role of public investments in local and regional development was a subject of many studies conducted by economists and geographers. Generally, a

good endowment of public infrastructure significantly contributes to a productivity rise in the private sector and to economic growth (cf. Aschauer 1989, Munnell 1990a, 1990b; Berndt and Hansson 1992; Nadiri and Mamuneas 1994, Väililä *et al.* 2005). Of course, the influence of local government's investments on the socio-economic development depends on a variety of factors and only a part of investments will trigger growth. Moreover, numerous studies have demonstrated that public investments are more often the result of political considerations than a response to social welfare or economic efficiency needs (Yamano and Ohkawara 2000; Johansson 2003; Castells and Solé-Ollé 2005; Cadot *et al.* 2006). This is especially valid for investments financed from non-refundable sources (such as EU structural funds). There are several recent studies suggesting that a part of EU co-funded projects implemented in Poland are irrational from an economic point of view or that they do not effect on growth (Gorzela 2013, 2014, Misiąg *et al.* 2013, Wojtowicz 2014, Wojtowicz and Kupiec 2012). Given the scope of this text, we leave this issue as a separate – though very important – area of research, concentrating instead on opportunities that EU funds create to support reasonable local investments.

3. Investment tasks of local-government units

Polish local governments' tasks are indicated in the Regulation on Municipal Self-government from 1990. The legislator followed the principle that local governments as the basic unit in administrative structure and being "closest" to citizens should perform different types of tasks more effectively than any other administrative unit.

Expenditure incurred by communes while performing their own commissioned tasks may be divided into current expenditure (on average, accounting for approximately 75% of total expenditure in communes) and investment expenditure. Investments should serve the whole community of a given municipality, and they can concern, for example, transport infrastructure, environmental protection, social issues, education, culture and tourism, etc. They may consider modernization investments (restoration and improvement of over-used infrastructure) as well as development investments (focused on creation of new infrastructure) (Ginsbert-Gebert 1977). As for the share of investments expenditures in local governments' budgets, it varied in the last decade in achieving the maximum 25% of total expenditure in year 2010.



Source: own calculation on BDL GUS database

Figure 1 - The average share of investments expenditures in local governments' total expenditure (NUTS5 and NUTS4)

A characteristic feature of investments carried out by local-government units is that mostly these are specific infrastructural investments, namely:

- expanding infrastructure used for the most part to render public utility services (e.g. road infrastructure), which either does not provide any future income or generate income, however, on the level similar to costs related to the operation of constructed facilities,
- an increase in infrastructural investment expenditure will cause in the future growth in current expenditure on operation, which is seldom covered by revenues,

- the development of infrastructure not only improves living conditions for residents but also is conducive to the growth of economic activities, which even though it creates opportunities for local government to gain higher own income in the future, it also constitutes an indirect impact and distance in time.

Moreover, the specificity of municipal investments is related not only to their material scope and capital intensity, but also mainly to a relatively long cycle of implementing those tasks, where, as a rule, a one-year period is exceeded.

3. Sources of financing local governments' investments in Poland

The scope and nature of income in the budgets of communes determine the ability to undertake investment projects. However, because, generally, the level of their own income is insufficient to finance the tasks being carried out, an efficient mechanism for the external funding of the budget is necessary. External funds, through subsidies and grants, provide communes with stable and efficient sources of income; however, at the same time such funds make them dependent on government administration that has an influence on the subject of investments and the amount of and timeline for allocating this income (cf. Smoleń 2006, Rudzka-Lorentz&Sierak 2007, Sierak&Górniak 2011).

The sources of funding for investments implemented by local-government units may be divided into a few categories, explained below:

Own funds, which include funds from current income – tax and non-tax sources– as well as municipal assets. Own funds include also Polish public funds that local-government units receive as part of general subsidies or earmarked grants. Own income increased by subsidies is the most natural source of leveraging investment funds by communes. Own income is shaped within the law by the authorities of communes, while the amount of proceeds due to subsidies depends mainly on factors that extend beyond the communes' control. Yet, this does not diminish the communes' freedom to decide on methods of spending; however, this may hinder investment planning in the long term. It should be emphasized that the amount of income from those sources mostly depends on factors outside the authority of local government – i.e. location of a commune (suburban, close to metropolitan areas, etc.), its natural resources (including those determining its tourist attractiveness) and the level of infrastructural development and industrial structure, which are closely connected to so-called long term processes (cf. Braudel 1999, Hryniewicz 2004, Zarycki 2002, Gorzelak 2007). Earmarked grants as opposed to subsidies are allocated to specific goals, thus they cannot be considered as a tool giving autonomy in carrying out the investment policy (Hanusz *et al.* 2009).

Repayable funds are among the following instruments available to local governments: preferential loans, commercial credits obtained from banks, as well as, and increasingly more often used, municipal bonds. Preferential loans are the most convenient repayable source of funding from the point of view of investing communes, mainly due to the fact that they guarantee attractive financial conditions, as compared to bank credits, and long repayment periods (approximately 10 – 15 years). Preferential loans are granted by, inter alia, the European Investment Bank that finances up to 50% of project's costs, mainly in the form of a long-term investment loan (advantages of such loans include low interest rates, about 5% per annum, and a long crediting period, even up to 20 years); the European Bank for Reconstruction and Development that finances up to 75% of project's costs and the Nordic Investment Bank that extends funds for the long-term financing of projects aim at improving the natural environment in three strategic sectors: air protection, water protection and waste management. A new source of funding for local-government investments, not very common in Poland, is the initiative of the European Commission and the European Investment Bank, established in cooperation with the Council of Europe Development Bank- JESSICA (Dąbrowski 2014). This initiative provides funding for urban revitalization projects not in the form of grants, but as repayable instruments, i.e. loans, guarantees and equity. Thanks to the initiative, it is possible to carry out projects that could not have had the chance to obtain funds under market conditions, primarily due to the specificity of revitalization projects, i.e. relatively low profitability of investments, a high performance risk and the presence of a social component often treated as a secondary aspect in the evaluation of projects carried out by commercial banks (Piotrowski *et al.* 2011). JESSICA was implemented only in five voivodships in Poland.

Another source of leveraging capital for investments, relatively popular with Polish communes, includes credits incurred on commercial terms. Local governments are currently perceived as interesting and reliable customers, thus credits are more and more readily available. Advantages of using such a tool of investment funding include the possibility to shape the provisions of a credit agreement in a relatively flexible manner (e.g. credit repayment adjusted to budget means) and certainty that funds will be received on the drawdown day (Misterek 2007). However, many, especially smaller, local governments or those with worse financial standing cannot afford to undertake such liabilities, particularly, if we take into account that, as a result of financial crisis, credit costs have considerably increased – both handling charges and bank mark-up.

Moreover, due to high interest rate-related financial costs, commercial credits should not be considered as a basic source of funding for investments but as a supplement to funds from preferential loans or grants, which require its own contribution to be secured.

The issue of securities is yet another method of incurring debts to obtain capital. Bonds may be issued if they provide the opportunity to receive funds cheaper than in the case of bank credits, and if preferential loans are not available. Municipal bonds as a method for funding investment expenditure are becoming increasingly popular among local governments. According to Fitch Rating Poland (FRP) in 2012, the value of municipal bonds market calculated year-to-year rose by 8.8 % and reached the level of almost 4 billion euros.

Nevertheless, the share of municipal bonds in the whole non-treasury securities market is still minor and accounts only for approximately 13.54% (FRP 2013). An advantage of this instrument is that bonds issued usually in several increments do not cause much problems with repayment later on – it is easier to repay a relatively low amount several times during the year than the whole sum of debt at one time. Local government officers often emphasize that municipal bonds have the advantage over bank credits due to the fact that the former does not require collateral.

Although funding of investments from repayable sources may be convenient, it should be stressed that it is an element of local governments' budget expenditure that in the long term is actually covered exclusively by the income of local-government units. The repayment of funds obtained externally must be financed with income, precisely, with the surplus of income over current expenditure necessary to be financed with earned income.

EU funds have become an important instrument providing the opportunity to finance a significant part of municipal investments in the form of non-repayable support. Polish local governments can use them for over a decade; however, only since joining the European Union they have become a commonly used source of obtaining funds for projects implemented by communes. Grants may cover up to 85% of a project's eligible costs. The EU funds that support investments of local-government units are implemented in Poland within several operational programs; however, most funds obtained by communes are those from the Regional Operational Programs (somewhat over half of the value of grants for local governments). In terms of value, the Infrastructure and Environment Operational Program is significant, providing over one-fourth of all EU funds for local governments. Definitely, the largest are investments implemented within the Development of Eastern Poland Program addressed to the five poorest Polish voivodships of the so-called "Eastern Wall", followed by the Infrastructure and Environment Operational Program. On the whole, local governments are implementing 41 large projects, the value of which exceeds PLN 200 million (50 million euro). Twenty-eight of them are financed within the Infrastructure and Environment Operational Program, five within the Development of Eastern Poland Operational Program, and eight within Regional Operational Programs (analysis of KSI database 08.2014).

Local governments obtain a major part of the amount allocated to carry out those programs in order to finance transport infrastructure (construction and modernization of roads), environmental protection (water supply and sewerage systems, waste water treatment plants), development of tourism and culture, and social infrastructure (schools, swimming pools, hospitals, community centers).

The use of this source of financing investments by local governments was noted even before the 2007-2013 EU funds implementation period had begun. The proportion of investment expenditure co-financed by the EU to all investments carried out by local-government units fluctuates from 23% to almost 35% in rural communes (Swianiewicz 2007). The share of EU grants in total income of

local governments amounted to 7.5% in the case of communes, 6.0% in the case of poviats, and 9.0% in cities with poviat right in 2012.

Mixed projects. Polish local governments may also implement investment projects in cooperation with the private sector. However, due to the problems derived from imprecise and, in a significant part, unfavorable regulations for local governments identified in many experts' reports and scientific articles (Herbst and Jagusztyn-Krynicky 2013, Zyśko 2012, Herbst and Zaremba 2011), it cannot be assumed as a popular way to implement communes' investments. Up until 2014, only 72⁴² self-governments decided to realize projects within such a scheme.

Even less popular forms of funding of local governments' investments are so-called 'hybrid' projects, which combine public and private capital with EU grants. In the 2007-2013 period, only 18⁴³ such projects were implemented. Even though these kinds of ventures are recommended by many economic experts as the most effective ones, local governments' representatives often stress the high risk of such ventures, which is related to a variety of "traps" hidden in hybrid investment regulations.

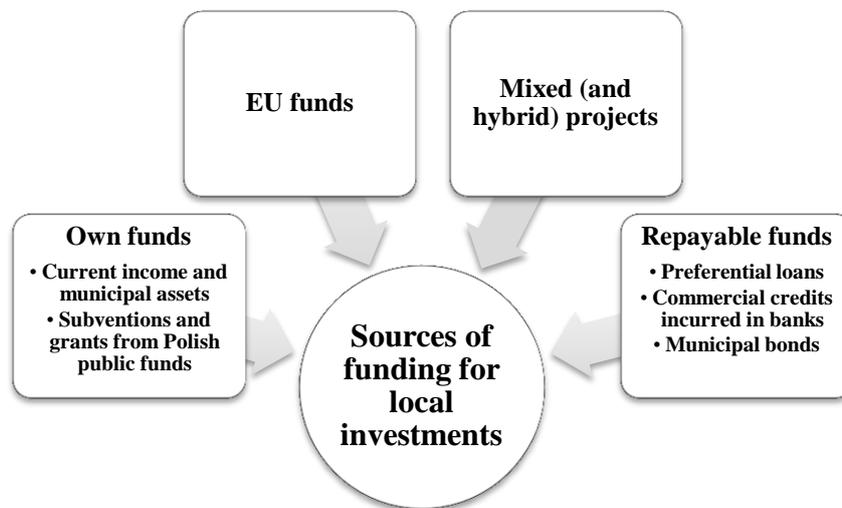


Figure 2 - Sources of funding for investments of local-government units in Poland

4. Scale and scope, role and limitation in the use of European Union funds in financing communal investments in the Łódzkie Voivodship

In the present study we introduced the mixed methods research approach to create a case study of use of EU funds in realization of communes' investment policy in the region. Secondary data analyses⁴⁴ were supplemented by the results of personal in-depth interviews conducted with the representatives of selected local-government units in this region in the period of April-July 2013. Our choice of NUTS4 and NUTS5 leaders for interviews based on the information-oriented selection rule maximizes the utility of information from a small sample of 20 cases (cf. Flyvbjerg 2006). We expected to meet different points of view from representatives of communes, whose characteristics vary. The following criteria of selection were taken into account: type of commune (rural, urban-rural, cities), level of own income per capita (relatively low, relatively high, and average) and localization (peripheral/non-peripheral in the region). Semi-structured interviews included questions on the role, limitation, and influence of the use of EU structural funds on different aspects of investment policy. In the presented analysis, materials collected within research conducted on the complementarity of projects implemented within the Regional Operational Program were also used⁴⁵.

⁴² http://www.bazapp.gov.pl/project_base/ 05.08.2014

⁴³ http://www.ppp.gov.pl/Laczenie/strony/Baza_projektow_hybrydowych.aspx 06.07.2014

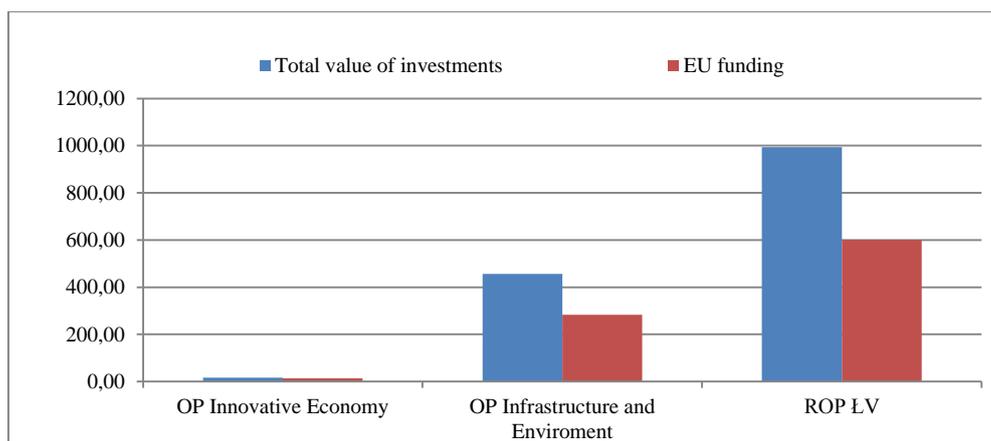
⁴⁴ We overviewed official reports and expertises in the matter. Own studies (statistical analyses of the use EU funds by local governments) based on Information National System (Krajowy System Informacji – KSI) database and BDL GUS data.

⁴⁵ Kupiec T., Wojtowicz D., Kościelecki P., 2011, Ocena komplementarności wewnętrznej i zewnętrznej Regionalnego Programu Operacyjnego Województwa Łódzkiego, Badanie ewaluacyjne współfinansowane

The final report on evaluation commissioned by the Marshal's Office of the Łódzkie Voivodship (2011) shows that investment expenditure in the region has been regularly increasing – in the years 2003-2008, they almost tripled. Prior to 2006, investment expenditure per resident in the Łódzkie remained at a level below average for Poland; however, in recent years, investment processes have intensified and investment expenditure per resident has exceeded the national average. The authors of the report emphasize that since 2004, the situation of the local-government sector has diametrically changed and been affected by several factors: receiving an increased share in proceeds due to income taxes and an improvement in the economic situation (and ensuing income higher than in previous years) as well as the availability of funds from operational programs supported by financial means from the European Union. Those factors have contributed to the strong stimulation of investment activities undertaken by local governments. In 2008, income from the EU accounted for almost 15% of income in the voivodship, approximately 3% of income in communes and 2% of income in poviats. In the years 2004-2008, local-government units allocated almost PLN 1.5 billion, slightly over 4% of all their expenditure, to tasks co-financed from the European Union's budget (Mackiewicz *et al.* 2010).

Our analysis of the KSI database shows that local governments (NUTS 4 and NUTS 5) have met a total of 557 investment projects or other projects closely related to the planned or realized investments (plans, documentation) obtaining a total of almost PLN 535 million in EU grants available under the cohesion policy. In the period 2007-2013, within Infrastructure and Environment Operational Program, Innovative Economy Operational Program and Regional Operational Program of Łódzkie Voivodship, a total number of 125 communes (rural, urban-rural and urban) out of 177 communes acquired grants for the implementation of 416 investment projects. The largest local governments (cities and some rural urban communes) implement even several dozen of investments co-financed by EU structural funds. The biggest beneficiary is the city of Łódź, which was granted funds for 27 investment projects. All 21 poviats existing in the Łódzkie region have been implementing at least one investment co-financed by EU funds. However, it must be kept in mind that the communes that have not benefited from the funds available under the cohesion policy represent mainly small rural communities. The vast majority of these communes implement their investments with the use of EU common agricultural policy.

The largest investments co-financed by EU structural funds in Łódzkie Voivodship include projects that concern urban transport infrastructure development (e.g. expansion and modernization of one of the tram routes in Łódź), road infrastructure development, environmental protection (water and sewage networks) and investments in sport, recreation and tourism infrastructure (e.g. sports hall in Łódź, thermal-bath complex in Uniejów).



Source: own study on basis of the KSI database (08.2014)

Figure 3 - Self-governments' (NUTS 4 and NUTS 5) investments co-financed by EU structural funds in Łódzkie Voivodship in 2007-2013 (mln euro)

Table 1 - Self-governments' investments co-financed by EU structural funds in Łódzkie Voivodeship (estimation in mln euro)⁴⁶

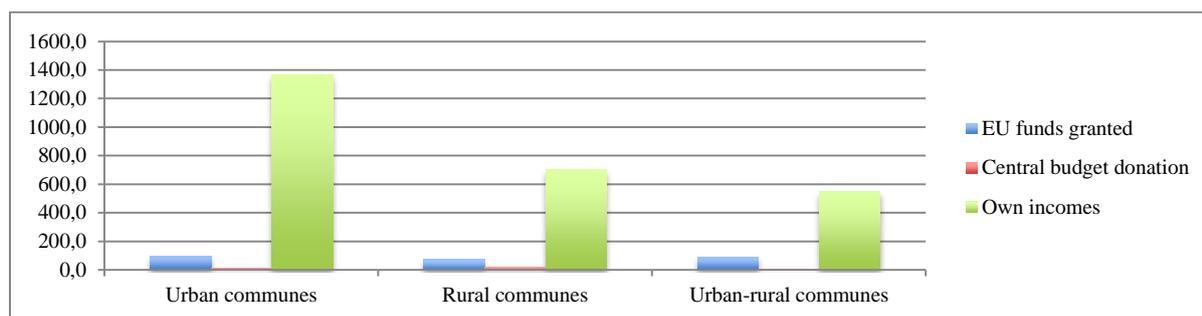
Investment area	Total value of investments under operational programs co-financed under EU cohesion policy	EU funding
Advanced support for enterprises (including investments in infrastructure of investment areas)	22.56	8.14
Telecommunication infrastructure	34.99	27.50
Transport infrastructure and municipal transport	177.90	123.19
Energy effectiveness	25.42	18.16
Protection of the natural environment	429.99	280.30
Culture and tourism	129.95	54.27
Revitalization	74.71	46.43
Social infrastructure	40.77	29.02

Source: own study on basis of the KSI database (08.2014)

4.1. European Union funds among other (non repayable) sources of financing of local investments

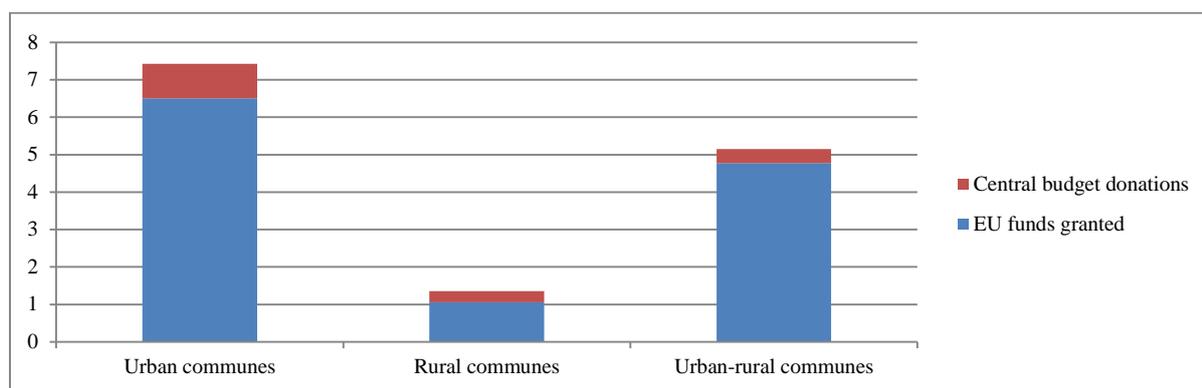
Within the study, we calculated the share of different sources of financing communes' investments in the 2007-2013 period. Unsurprisingly, most of investments costs are covered within communes' own income. EU funds on average stated almost 10% of all investments expenditure in the studied period. This source of financing seems to take on a more important role for middle size, urban-rural type of communes (14% of investment expenditures) than for urban (7%) and rural (9%) communes. However, two facts must be kept in mind: the first is that in our analysis, we excluded the biggest cities with powiat right (Łódź, Skierniewice and Piotrków Trybunalski), and the second is that we concentrated on cohesion policy funds. The latter means that in the presented calculations we do not consider remarkable funds under Common Agriculture Policy, which rural communes gained for their investments in the last years (cf. Wojtowicz, Kupiec 2012). Additionally, the study shows the marginal role of central budget donations in local governments' investment expenditures.

⁴⁶ Analyses based on categorisation provided in Annex II of Commission Regulation (EC) No 1828/2006 of 8 December 2006 setting out rules for the implementation of Council Regulation (EC) No 1083/2006 laying down general provisions on the European Regional Development Fund, the European Social Fund and the Cohesion Fund and of Regulation (EC) No 1080/2006 of the European Parliament and of the Council on the European Regional Development Fund.



Source: own study on basis of the KSI and BDL GUS databases

Figure 4 - Sources of financing communes' investments in 2007-2013 (estimation in mln euro)



Source: own study on basis of the KSI and BDL GUS databases

Figure 5 - The average value of EU funds and central budget donations granted to commune for local investments in 2007-2013 (in mln euro)

As EU funds constitute the opportunity to receive a non-repayable grant up to 85% of the investment's value, one could expect that they play a significant role in realization of investment policy independently from local governments' wealth. Within the study, we tested a hypothesis that the value of EU funds gained by communes does not depend on their own per capita income. The regression analysis showed the opposite: there is a positive – however quite weak – correlation between EU funds used by communes and the value of their own per capita income. A similar (although stronger) correlation was found in the case of communes' total own income (excluding central budget investments donation (CBID)). This may suggest that communes benefit from EU funds on the rational calculation of their financial capacity. They are more likely to realize investments that they actually can afford.

Table 2 –Results of correlation analyses

	EU funds granted for investments
Own income per capita (excluding CBID)	+0.31***
Own income (excluding CBID)	+0.56***

Note: *** Significant correlation, $p < 0.001$.

4.2. In what way might European Union funds influence communes' investment policy?

In this section, the results of qualitative research aimed at the identification of role and potential areas of influence of the availability of EU funds on decisions taking under investment

policy are presented. Generally, all local governments' representatives interviewed within the study stressed that EU funds create a great opportunity and play a significant role in the realization of investment policy. One of the studied communes, Uniejów, is a perspicuous example of a local community that took advantage of the opportunity created by EU funds to foster investments. This medium size, urban-rural commune of 7000 inhabitants in 2011 and 2012 was ranked first among all Polish local governments in terms of the share of investments in total value of communes' expenditures (amounted respectively 72.0% and 68.2%) (RIO Reports 2011, 2012). This resulted from the leaders' strategic decision to intensify the investment policy with the maximum use of EU funds. Uniejów was granted several donations for realization of the integrated, relatively large scale project: "Uniejów thermal baths - Regional Branded Product of Spa Tourism", which comprised investments in the bathing complex and the restoration of the historic caste. It must be mentioned that it was not the only investment project implemented in this commune during the 2007-2013 period with the use of EU funds. As our respondent stressed, such intensive investment policy would be impossible if EU funds had not been available.

Although interviewers agreed on the potential opportunities and benefits created by EU funds, they often mentioned that this instrument is fairly limited and should be treated as an "extra" and "choppy" rather than a steady source of financing communes' investment policy. A problem of uncertainty of provision in the case of EU grants, which derived from high interest and hence high competitiveness within local governments for this kind of funding, was mentioned in several interviews. Despite the fact that project documents are correctly prepared and applications are put on the so-called ranking list, subsidies are granted as long as allocated funds are not depleted, thus there are enough of them to co-finance only some projects. This results in a common misconception that EU funds cannot be regarded as a way of attaining a commune's investment plans.

"In the case of our commune, we do not have a great investment potential as we are no city of Łódź and our budget, as I would say, is miserable. Therefore, those funds create chances for us to move forward, to carry out some investments. (...) This is not about documents as I guess all local governments have already learnt how to prepare applications. The thing is that there is too little money and everyone wants, just as we do, to receive funding. This is a bit like a lottery".
[Representative of small size, rural, peripheral commune]

On the other hand, some views expressed by respondents indicate that the potential opportunity provided by EU funds may be perceived as a limitation to carry out the sound and strategically planned investment policy. The analysis of interviewers' opinions indicates that there is significant dependence on the decisions' concern for investment policy on the availability of EU funds. Formal guidelines identifying for what kind of projects a donation may be granted influence the scope of communes' investments. In extreme cases, the availability of EU funds may even lead to preparation and realization of a project that had not been previously planned for implementation. Local leaders try to make their investment "fit" specific requirements as operational programs allow funding projects in certain areas and at certain times (when applications are accepted). It may be assumed that the emergence of the structural funds has contributed to a change in the way of thinking about problems related to the development of strategic local government and planned investments. In respondents' opinions, many local governments focus on seeking available EU funding for the investments and once such a "source" has been found, they start to think about what needs to be done in their commune in the given area. Hence, the availability of external funds starts to shape decisions made under local governments' investment policy. Yet, theories of strategic management suggest a different way to a long-term success - first, one should identify needs by preparing a current and actual development strategy and a reliable long-term investment plan, and only then seek sources of funding for investment plans.

"I'm not sure if you can say that funds give us autonomy in investing. On the one hand, yes, as these are no earmarked grants, we decide on our own what we want to do and how. On the other hand, however, when you look at it, we make our decisions dependent on what they give money on - we know, for example, that this year they provide funds for roads - then we prepare a road project, if on tourism, then a tourism-related one. This, I guess, limits our autonomy. (...) However, if (EU) funds were not available at all, then we would plan to do a quarter of what we are doing now".
[Representative of medium size, urban-rural, non-peripheral commune]

Another area of (negative) impact of the availability of EU funds on communes' investment policy may concern attitudes observed among some representatives of the studied authorities. Their opinions may suggest that a broad stream of EU funds made local-government officers and decision-makers "lazy" as far as using or seeking other non-budgetary money is concerned.

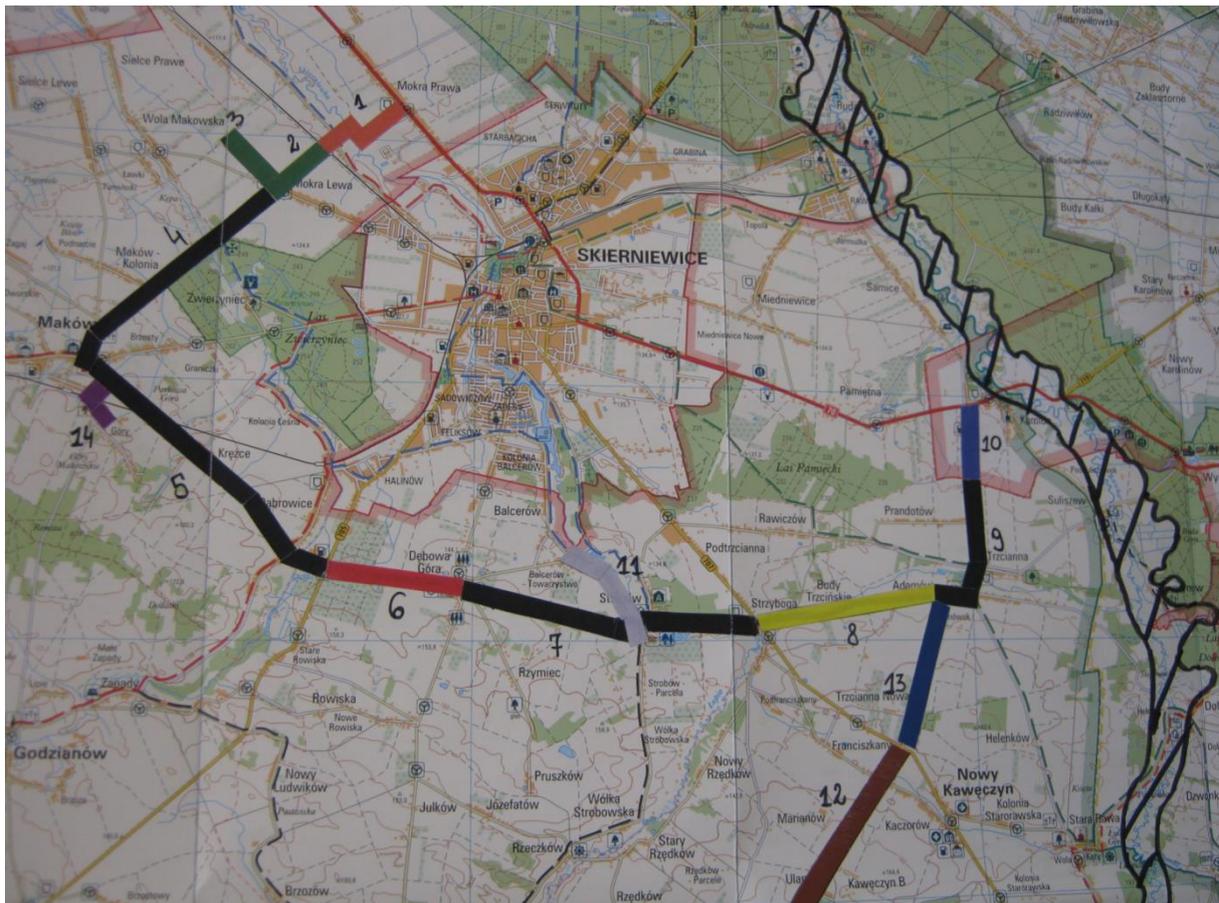
"I will be able to tell you something about next investments when we find out what they will figure out after 2013. For the time being, we have some plans but it is obvious that we won't do anything until they make new funds available. So at the moment we're waiting". [*Representative of small size, rural, peripheral commune*]

The above-indicated impact on commune authorities' attitudes should be contrasted with another phenomenon observed during qualitative research. Some of the representatives of local governments (mainly larger ones) indicated with their opinions that the EU funds can become a catalyst for undertaking investments financed from other than EU funds sources. On one hand, the failure to receive a grant may stimulate them to seek other sources for planned investments. On the other hand, investments carried out with the contribution of EU funds are often supplemented by projects financed from other available sources (i.a. own income, central budget donation).

"The thing is that we applied for grants for 5 investment projects and only one succeeded. (...) Then, we started to think what to do next with those projects that were actually ready but failed to obtain co-funding. This was so discouraging. So we tried to figure out what source could be used for financing. We took up a credit for one project and now we are preparing to apply for those Norwegian funds". [*Representative of large size, urban, non-peripheral commune*]

"I have to admit that people complain a lot about funds, about the Regional Operational Program, but in fact, if they were not available, then Poland would not be as it is now. (...) It's obvious that not all at one is possible; that we won't get money for everything we have planned. But in such a case we do something with the use of own funds, or a grant or we take up a loan and investments are moving forward. I would say that this is not the only method of investing. It is wrong what some communes do when they stake everything on one roll of the dice – "either we get the money or we do nothing". You should always look for some alternatives." [*Representative of medium size, urban-rural, non-peripheral commune*]

A clear example of such an indirect impact of EU funds on triggering local infrastructure investments was found in one of the analyzed communes. In the case of Skierniewice, the opportunity to receive an EU grant has influenced the stimulation of activities undertaken by this local government's leaders as far as seeking other sources of funding is concerned. To establish a functional traffic route operating as a traffic bypass for the town, it was necessary to redevelop several road sections, for which the authorities had been seeking different sources of funding. Interestingly enough, the management of one of the sections fell outside the authority of the project's beneficiary – the Skierniewice Poviát. However, the authorities of the neighboring poviát were contacted and undertook the redevelopment with the use of their own funds of the last section of the route joining it with the national road No. 70 in Kamion. In that way, different road sections were modernized with the support of funds from different sources: nine road sections were redeveloped as part of the project within the Regional Operational Program of the Łódzkie Voivodship, two sections within the National Plan of Local Roads Improvement funds, and three others with own income of Skierniewice Commune, Skierniewice Poviát and Żyrardów Poviát. Such solutions enabled the town to create a uniform and functional transport infrastructure: a bypass going around the town and provide an alternative route for through traffic.



Source: materials collected within the case study

Figure 4 - Sources of funding for road projects creating a ring road of Skierniewice

Conclusions

Local governments' investments are one of the elements supporting processes of social and economic development. In Poland, for several years (up to year 2010), a constant increase in investment expenditure of local-government units as well as a change in the share of investment expenditure in current expenditure of those units has been observed. Basically, local investments are funded with earned income; however, local-government units may use other sources of funding, i.e. credits, loans, issue of debt securities and (seldom) public-private partnership or non-repayable funds from foreign sources. Undoubtedly, Poland's membership in the European Union has provided communes with access to a broad stream of financial means from the funds assigned under cohesion policy.

In Łódzkie voivodship, local governments use the EU funds mostly to invest in environment and transport infrastructure. Although the amount of EU funds remarkably exceeds transfers from other non-repayable sources, which are central budget transfers, the main source of financing local investment remains own income. Moreover, the role EU funds in supporting investment policy has significant limitations, determined by a high completion within communes in obtaining grants and a specific requirement with which the implemented investments must comply. The availability of funds may also have a twofold influence on the local-government authorities' attitudes towards investment policy. On the one hand, this may cause passivity in seeking alternative forms of funding of local-government budgets; on the other hand, this may appear to be a factor stimulating and advancing investments implemented with the use of other sources. Few researched cases in Łódzkie region showed that EU funds may appear to be a catalyst for financing a greater number of infrastructure investments. To determine the scale and generality of identified phenomenon further quantitative studies should be undertaken.

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