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## **PREFACE**

Dear readers,

It is my pleasure to introduce you a collection of papers from the 11th annual international scientific conference The European Financial Systems 2014 organized annually by Department of Finance of the Faculty of Economics and Administration, Masaryk University in Brno, Czech Republic. This year's conference was focused especially on the current issues related to the impacts of the financial crisis on financial and non-financial institutions, new regulation rules and procedures on financial markets, new accounting and tax challenges and trends and tendencies in banking and insurance industry.

Because the collection of papers presents the latest scientific knowledge in this area, I believe you will get a number of new insights usable both for your scientific, and educational or practical activities. I would also like to express my conviction that we meet each other in occasion of the 12th year of this conference held in 2015.

I wish you pleasant reading!

Petr Valouch

Chairman of the Program Committee

## **Session 8 „Financial Literacy and Decision Making“**

*Chair: Zuzana Brokešová (University of Economics, Bratislava)*

Maroš Mikuš „Satisfaction of the Czech bank customers“

Jana Peliová „How Do Risk Free Investment Options Change our Decisions Under Risk?“

Kristína Hudoková „Selected determinants of lifelong learning of population in the Slovak Republic“

Bohuslava Doláková „Financial Literacy of Masaryk University Students in "Financial Literacy" Course"

Zsuzsanna Eszter Tóth „Using modern quality management tools to improve finance and business university courses“

Zuzana Brokešová, Erika Pastoráková „The importance of financial literacy in consumer´s optimal choice of insurance“

Tomáš Ondruška „Overconfidence as a Cognitive Bias and Its Implications for Insurance Industry“

Martin Svoboda „ Financial Literacy of Masaryk University Students with focus on Socially Disadvantaged Citizens“

# Satisfaction of the Czech bank customers

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**Abstract:** *The aim of the article was to quantify and compare the overall level of satisfaction of the Czech banking customers, the most important factors of satisfaction and dissatisfaction of these customers and number of used banking products and banks in 2014 compared to 2012. Research on the satisfaction of retail customers in the Czech Republic was conducted through a questionnaire survey in 2012 on a sample of 323 respondents, and in 2014 on a sample of 292 survey participants. The research results are evaluated through Pearson statistics. Our research confirmed that the Czech Republic remains on a relatively low position with satisfying its bank customers with provided services. The main reason for satisfaction was the ability to use electronic banking and most important reason for dissatisfaction were high priced products and services. Number of banking products used by the Czech banking clients did not change significantly.*

*Keywords: commercial bank, bank customer's satisfaction, satisfaction factors, factors of dissatisfaction, Cross-selling index.*

*JEL codes: G21*

## 1 Introduction

Customer satisfaction is an important factor in the performance and competitiveness of banks. When analyzing the attributes of the banking client satisfaction, it is appropriate to be based on the specific characteristics of commercial banking (Horvátová, 2013, Chovancová, and Arendas, 2013, Cipovová, and Belás, 2012, Belás, Cipovová, Novák, and Polách, 2012, Belás, and Polách, 2011, Horvátová, 2008, Belás, 2004), which significantly affect business processes and shape attributes of bank customer satisfaction.

Banking experience proves that achieving a reasonable rate of customer satisfaction represents a challenge for the bank and it is a permanent process with varied results. Bank customers in many countries show a considerable degree of dissatisfaction and many banks admit that it's necessary to increase the level of customer care.

In this article satisfaction of the Czech bank customers with the services of commercial banks was examined, as well as the most important factors of satisfaction, respectively customer dissatisfaction and use of banking products and banks in 2014 compared to 2012.

## 2 Important factors determining bank customer satisfaction

Customer satisfaction is a complex of various aspects, which operate in a coherent manner and form attitudes of customers to the bank. In the process of forming of customer satisfaction acting the economic factors, emotional attitudes and habits of consumers. Customers' satisfaction determines their loyalty to the bank and willingness to buy the bank's products.

According to Chavan and Ahmad (2013) bank business increasingly depends on the quality of the customer service provided and overall satisfaction of the customer.

Relationship marketing has become the most critical aspect to corporate banking success.

Maddern, Maull, and Smart (2007) state, that the key elements in building customer satisfaction are employee satisfaction and service quality. In this context Gounaris and Boukis (2014) indicate, that the employee job satisfaction influences a customer's perception of quality and customer satisfaction. Many authors agree that it is the banks skilled workers with high emotional quotient are the prerequisite for building loyalty among clients. (Rostamy, 2009; Bidmead, 2007) Customers in business relationships require a high degree of acceptance of their own needs from staff and accurate service delivery. (Lages and Piercy, 2012)

According to Baumann, Elliott and Burton (2012) a combination of two factors, namely emotional connection with the bank and economic benefits should protect the bank against competition. In this context Wruuck (2013) submits, that the prices play a central role for customer satisfaction and profitability. Satisfaction with products prices does not automatically mean total and complete satisfaction, but it is one of the most important preconditions. On the other hand Chen, Liu, Sheu and Yang (2012) argue that people rarely try to get the best services; instead they seek only for a fair services and a consistent treatment. In their presented study, the significant direct correlation between a customer satisfaction and the fair approach has been proved.

According to Mandahachitara and Poolthang (2011) customer's loyalty is very important, because getting new customers also brings additional costs and vice versa with the duration of customer relationship profitability of this relationship grows as well. Effective tool for building true loyalty can be e.g. friendly approach to clients, availability of banking products and services, intensive communication and activities in the field of Corporate social responsibility.

On the contrary, Frearing and Minor (2013) in their study indicate, that in the relationship with the customer there are phenomena that extend beyond loyalty. The most outstanding is the effort to remain faithful. Despite the fact that the customer exposed to daily offers from competition develops a conscious effort to remain as there is a complete trust to the product from the client's side. The second phenomenon is the social ties obtained during use or consumption of the product. (although this second factor was not confirmed as a follow-up research on the concept of satisfaction-loyalty). The conclusion of this study is also surprising finding that high levels of satisfaction and loyalty is not only associated with longtime customers. The highest levels of these factors were declared by respondents in the early years of the relationship, means after one year of contract. This also means that financial institutions may induce high levels of customer satisfaction, loyalty and effort to remain with them for over more timely stages of mutual relationship.

The hot topic is the analysis of the satisfaction of banks' customers in context of online banking. According to Liébana-Cabanillas, Munoz-Leiva and Rejón-Guardia (2013) electronic banking has become an essential service to secure clients' loyalty by ensuring greater customer satisfaction and building stronger ties with them. Yang, Lu and Chau (2013) report, that online channel service quality enhances service quality in the offline channel. In this context Genser, Leeflang and Skiera (2012) indicate that online use improves customer profitability by increasing customer revenue and decreasing cost to serve. Authors found out that online customers conduct 2.50 more transactions per month than do their offline counterparts and their customer profitability improves by 0.28 EUR per month.

### **3 Objectives, Methodology and Data**

The aim of this article was to quantify and compare the overall level of satisfaction of the Czech banking customers, the most important factors of satisfaction and dissatisfaction of these customers and number of used banking products and banks in 2014 compared to 2012.

*Research on the satisfaction of retail customers in the Czech Republic was conducted through a questionnaire survey in 2012 and then in 2014.*

In our research, five scientific hypotheses were set. When establishing quantitative criteria estimation techniques were used.

H1: The overall level of satisfaction of bank customers in the Czech Republic in 2014 compared to 2012 has not changed and is now less than 65%.

H2: Czech clients are the mostly satisfied with the availability of banking products and services through electronic banking. Electronic banking is still the most important factor of satisfaction for Czech customers. More than 60% of Czech clients are satisfied with this factor.

H3: The most important factor of dissatisfaction of the Czech customers are high priced banking products and services. The rate of dissatisfaction of Czech clients in regards to prices is higher than 50%.

H4: The average value of CSI has increased by at least 10% in the last two years.

H5: Average number of banks being used by clients in the Czech Republic increased by at least 10% in the last two years.

Within the questionnaire survey in 2012, in the Czech Republic a total of 323 respondents was approached, of which 37% were men and 63% were women. Age structure of respondents was as follows: 32% were aged less than 30 years, 50% of them were 30-50 years old and 18% were over 50. The education level of respondents was as follows: 1% had primary education only, 62% had secondary education and 37% were university educated bank customers.

In 2014, there were received responses from 292 respondents, of which 43% were men and 57% were women. The age structure of those respondents was as follows: 38% of respondents were aged under 30 years, 43% were aged from 31 to 50 years and 19% of them were customers over 50. The education level of respondents was as follows: 3% had primary education, 52% had secondary education and 45% were university educated bank customers.

Established scientific assumptions in each table were examined through Pearson statistics. P-value less than 5% leads to the rejection of the null hypothesis. Part of the quantitative analysis is the use of indicators and descriptive statistics such as weighted arithmetical average and the percentage figures.

## 4 Results and Discussion

Table 1. presented the results of overall satisfaction of the Czech bank customers in 2014 compared to 2012.

Table 1 Overall satisfaction of bank customers in the Czech Republic (CR)

| Are you satisfied with bank products and services provided to you? | CR 2012<br>v % | CR v 2014<br>v % | p-value         |
|--|----------------|------------------|-----------------|
| 1. Yes   | 62.23          | 66.44            | <b>0.3157</b>   |
| 2. No  | 26.32          | 15.07            | <b>&lt;0.01</b> |
| 3. I don't know  | 11.45          | 18.49            | <b>0.0192</b>   |
| <b><math>\chi^2=14.8059</math></b>                                 |                |                  |                 |
| <b>p-value&lt;0.01</b>   |                |                  |                 |

The proportion of respondents satisfied with banking services can be considered to be the same as it was in 2012 (p-value=0.3157). However, the structure of the responses differs, because there was a shift of dissatisfied customers to a group of „do not know“.

On the basis of proportional test it cannot be claimed ( $p$ -value=0.6751), that this figure is less than 65%.

According to the results of our research, the overall satisfaction rate of the Czech customers is at the European average level. These results are comparable with some of the published results of the satisfaction of bank customers. For example, in the United Kingdom in 2012 the average satisfaction level of bank customers was 62%. (www.dailymail.co.uk). According to the results of research conducted by Deloitte (2012, b) in the Czech Republic, Poland and Slovakia the overall satisfaction rate is 50% and more. The overall satisfaction rate of bank customers in Slovakia in 2012 was at 61%. One reason for the relatively low satisfaction of bank customers in the Czech Republic is also a way of managing the retail staff. Managers of private banks put intense pressure on front office employees, which gets translated into an incorrect approach to clients (Belás, 2012) and the level of moral attitudes of bank employees in the sales process is relatively low (Belás, Burianová, Cipovová, and Červenka, 2013).

In Table 2 are compared the reasons for satisfaction of the Czech banking customers in 2014 compared to 2012

Table 2 Reasons for customer satisfaction in the banking sector of the Czech Republic

| <i>What satisfies you the most in the bank? (you can provide up to 3 answers)</i> | CR<br>2012<br>in % | CR<br>2014<br>in % | p-value       |
|---|--------------------|--------------------|---------------|
| 1. quick service in the branch  | 13.93              | 11.64              | <b>0.4670</b> |
| 2. the possibility of using electronic banking                                    | 74.61              | 77.74              | <b>0.4161</b> |
| 3. quality products and services  | 17.65              | 17.81              | <b>1.0000</b> |
| 4. convenient and friendly service in a branch                                    | 17.09              | 23.29              | <b>0.0620</b> |
| 5. availability of the branch   | 49.54              | 52.40              | <b>0.5299</b> |
| 6. developed network of ATMs  | 40.25              | 44.18              | <b>0.3660</b> |
| 7. other (account for free)   | <b>0</b>           | <b>5.14</b>        | <b>-</b>      |

The most significant factors of customer satisfaction in our study were the availability of banking products and services through electronic banking, branch availability and extensive network of ATMs.

Electronic banking is still the most important factor of satisfaction for Czech clients. Level of satisfaction of Czech bank customers was not significantly altered ( $p$ -value=0.4161). More than 60% of Czech customers are satisfied with this factor, what was confirmed by the value of the test criteria ( $p$ -value<0.01).

According to research conducted by Ernst & Young (2012) 78% of banks' clients in the Czech Republic control their bank accounts by using the internet. This survey indicates that despite the relatively high popularity of electronic banking more than one third of clients keeps giving priority to their personal visit to a branch, which was confirmed in our study, where only 52,40% of respondents in the Czech Republic said they were most satisfied with the availability of the branch. For comparing it could be stated, that in Slovakia this option was mentioned by 67% of respondents back in 2012. (Belás, Burianová, Cipovová, and Červenka, 2013)

According to Liébana-Cabanillas, Munoz-Leiva and Rejón-Guardia (2013) user satisfaction levels with online banking have increased in recent years, reaching more than 80%. Authors also indicate, that online banking also was favored over other channels that customer have at their disposal (55% selected the online channel as one that satisfied them the most, while 28% chose branches, 13% chose ATMs, and only 2% chose call center and mobile banking as the channel that satisfied them most.

In Table 3 are compared the reasons for dissatisfaction of banking customers in the Czech Republic in 2014 compared to those from the year 2012.

Table 3 Reasons for dissatisfaction of bank customers in the Czech Republic

| <i>What dissatisfies you the most in the bank?<br/>(you can provide up to 3 answers)</i> | CR<br>2012<br>in % | CR<br>2014<br>in % | p-value         |
|--|--------------------|--------------------|-----------------|
| 1. slow service in a branch  | 22.60              | 20.21              | <b>0.5326</b>   |
| 2. poor quality of electronic banking  | 1.86               | 4.11               | <b>0.1517</b>   |
| 3. high price of products and services   | 65.33              | 66.78              | <b>0.7677</b>   |
| 4. poor accessibility of branch  | 9.60               | 5.38               | <b>0.0770</b>   |
| 5. impersonal approach   | 13.62              | 14.73              | <b>0.7823</b>   |
| 6. low acceptance of my needs  | 13.31              | 18.15              | <b>0.1237</b>   |
| 7. other (arrogance of personnel, misuse of financial illiteracy of clients)             | <b>0</b>           | <b>16.78</b>       | <b>&lt;0.01</b> |

Structure responses in 2014 did not differ from responses in 2012. Most important factor of discontent of Czech clients are still high prices of banking products and services. The proportion of respondents who stated the discontent of high prices for banking products and services is higher than 50%, as it was truly confirmed by the value of the test criteria (p-value=0.01)

For comparison, it could be mentioned, that in Slovakia in 2012 this ground of dissatisfaction was reported by 63% of respondents. (Belás, Burianová, Cipovová, Červenka, 2013)

According to research by Ernst & Young (2012) a definite number one impulse for change of bank is the amount of bank charges. 69% of the Czech bank clients would change their main operational bank because of high costs (compared to a European average of 53%). Along with that bank clients in the Czech Republic and Slovakia consider many bank fees as absurd. For example in 2013 about 40,000 bank customers from the Czech Republic and Slovakia provided information, that the most ridiculous bank charges were account management fee to the mortgage or consumer loan. Previously customers identified the following fees as absurd: fee for early repayment of loan, fee for cash withdrawal and deposit into their own bank account, fee for excessive deposit, and fee for money withdrawal from bank's owned ATMs and charge for incoming payments. (<http://www.bankovnipoplatky.com>).

In Table 4 indicated the number of used banking products in the Czech Republic in 2012 and 2014. Data structure in Table 4 does not provide evidence that would change the number of products used for the past two years. It also confirmed our hypothesis that the average value of CSI has increased by at least 10% in the last two years. The average value of CSI as per our data is relatively low, indicating that banks in the Czech Republic have quite interesting sales opportunities.

Table 4 Number of banking products being used

| <b>How many banking products (current account, consumer credit, mortgage etc.) you are currently using?</b> | <b>1 product</b> | <b>2 products</b> | <b>3 products</b> | <b>4 products and more</b> |
|---|------------------|-------------------|-------------------|----------------------------|
| <b>Number of respondents in 2012 in %</b>   | 26.00            | 35.91             | 23.22             | 14.86                      |
| <b>Number of respondents in 2014 in %</b>   | 27.74            | 38.36             | 20.21             | 13.69                      |
| <b>p-value</b>  | 0.6940           | 0.5873            | 0.4200            | 0.7670                     |
| <b><math>\chi^2=0.1546</math></b>   |                  |                   |                   |                            |
| <b>The average value of CSI*2012=2.27 CSI*2014=2.20</b>   |                  |                   |                   |                            |

Note: \* CSI (Cross Selling Index – number of products/1 bank client)

In Table 5 indicated the number of banks being used in the Czech Republic in 2012 and 2014.

Table 5 Number of banks used in the Czech Republic

| <b>Indicate the number of banks whose products and services you use.</b> | CR          | CR          | p-value       |
|--|-------------|-------------|---------------|
|  | 2012<br>v % | 2014<br>v % |               |
| 1 bank   | 48.30       | 55.48       | <b>0.0839</b> |
| 2 banks  | 36.53       | 33.22       | <b>0.4392</b> |
| 3 and more banks   | 15.17       | 11.30       | <b>0.1968</b> |
| <b><math>\chi^2=3.7332/p\text{-value}=0.1546</math></b>                  |             |             |               |
| <b>NBI2012=1.67/NBI2014=1.56</b>   |             |             |               |

Structure of responses is not significantly different in the year 2014 compared to answers back in 2012 (p-value=0.1546). The largest growth was registered for the answer of using of one bank. This change is not significant (p-value=0.0839), however indicates that to our research in 2014 have joined relatively more respondents who indicated that they utilize services of only one bank.

## 5 Conclusions

The results of our research confirm the partial validity of the Hypothesis 1. The overall level of satisfaction of bank customers in the Czech Republic in 2014 in comparison to 2012 did not change. However, we did not find evidence that it is less than 65%.

Our research has confirmed the validity of Hypothesis 2. Electronic banking is the most important factor of satisfaction for the Czech customers. More than 60% of the Czech banking customers are satisfied with this factor.

The most important factor of dissatisfaction of the Czech clients are still high prices of banking products and services. The proportion of respondents who provided the answer of dissatisfaction with high prices of products and services is higher than 50%. The research thus confirmed the validity of Hypothesis 3.

Surprising finding was that the CSI value has decreased, thereby Hypothesis 4 was rejected. Average number of banks being used by clients has slightly fallen, as a result of this, the Hypothesis 5 had to be rejected as well.

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## References

- Baumann, CH., Elliott, G., Burton, S. (2012). Modeling customer satisfaction and loyalty: survey data versus data mining. *Journal of Services Marketing*, vol. 26, issue 3, pp.148-157.
- Belás, J., Burianová, L., Cipovová, E., Červenka, M. (2013). Customers' satisfaction as the important part of corporate social responsibility's activities in the commercial banking. *Proceedings of the 6th International Scientific Conference Finance and the performance of firms in science, education, and practice*, April 25-26, Zlín, Czech republic.
- Belás, J., Cipovová, E., Novák, P., Polách, J. (2012). Dopady použitia základného prístupu interných ratingov na finančnú výkonnosť banky. *E+M Ekonomie a Management*, 15(3): 142-155.

- Belás J., Polách, J. (2011). Economic Imbalance and Regulatory Traps in Banking Sector. *Proceedings of the 5th International Scientific Conference Finance and the performance of firms in science, education, and practice*, April 28, Zlín, Czech republic.
- Belás, J. (2004). Vybrané trendy v slovenskom bankovníctve za obdobie 2000-2003. *Ekonomický časopis*, vol. 52, no.8.
- Cipovová, E. Belás, J. (2012). Impacts of selected methods of credit risk management on bank performance. *Proceedings of the 8th European Conference on Management, Leadership and Governance*. UK: Academic Publishing International Limited, 2012, pp. 465-473.
- Bidmead, N. Bank Branches that Meet Customer Needs. *McKinsey Quarterly*. 2007. [http://www.mckinseyquarterly.com/Bank\\_branches\\_that\\_meet\\_customer\\_needs\\_2040](http://www.mckinseyquarterly.com/Bank_branches_that_meet_customer_needs_2040)
- Cabanillas-Liébana, F., Leiva-Munoz, F. and Guardia-Rejón, F. (2013). The determinants of satisfaction with e-banking. *Industrial Management & Data Systems*, vol. 113, no. 5, pp. 750-767.
- Ernst & Young. (2012). *Nová éra bankovníctví. Čeští klienti chtějí, aby banky vyšly více vstříc jejich potřebám*. Praha, Tlačová správa, 25.6.2012. [online] [cit.2012-12-10] Dostupné z: [http://www.ey.com/CZ/cs/Newsroom/News-releases/2012\\_Nova-era-bankovnictvi](http://www.ey.com/CZ/cs/Newsroom/News-releases/2012_Nova-era-bankovnictvi)
- Fraering, M., Minor, M. S. (2013). Beyond Loyalty: Customer Satisfaction, Loyalty and Fortitude. *Journal of Services Marketing*, vol. 27, no. 4, pp. 334-344.
- Genser, S., Leeflang, P., Skiera, B. (2012) Impact of online channel use on customer revenues and costs to serve: Considering product portfolios and self-selection. *International Journal of Research in Marketing*, no. 29, pp. 192-201.
- Gounaris, S., Boukis, A. (2013). The role of employee job satisfaction in strengthening customer repurchase intentions. *Journal of Services Marketing*, 27/4, pp. 322-333.
- Horvátová, E. (2013). Analysis of the problem of pro-cyclicality in the Eurozone and pro-cyclicality in Basel III. *Proceedings of the 10th International Scientific Conference on European Financial Systems*, Masaryk Univ, Telc, Czech republik, Jun 10-11, 2013.
- Horvátová, E. (2008). Capital adequacy conception of banks and investments firms in condition of European Union. *Ekonomický časopis*, vol. 56, issue 6, pp. 582-597.
- Chavan, J., Ahmad, F. (2013). Factors Affecting On Customer Satisfaction in Retail Banking: An Empirical Study, *International Journal of Business and Management Invention*, vol. 2, no. 1, pp. 55-62.
- Chen, H. G., Liu, J. Y., Sheu, T. S., Yang, M.H. (2012). The impact of financial services quality and fairness on customer satisfaction, *Managing Service Quality*, vol. 22, issue 4, pp. 399-421.
- Chovancová, E., Arendas, P. (2013). Country Risk as a Phenomenon of the Current European Debt Crisis. *Proceedings of the 10th International Scientific Conference on European Financial Systems*, Masaryk Univ, Telc, Czech republik, Jun 10-11, 2013.
- Maddern, H., Maull, R. and Smart, A. (2007). Customer satisfaction and service quality in UK financial services. *International Journal of Operations & Production Management*. vol. 27, issue 9, pp. 999-1019.
- Mandahachitara, R., Poolthang, Y. (2011). A model of customer loyalty and corporate social responsibility. *Journal of Service Marketing*, vol. 25, issue 2, pp.123-133.
- Rostamy, A. A. Toward Understanding Conflict between Customers and Employees' Perceptions and Expectations: Evidence of Iranian Bank. *Journal of Business Economics and Management*. 2009, vol. 10, no. 3, pp. 241-254.
- Wruuck, P. (2013). *Pricing in retail banking. Scope for boosting customer satisfaction & profitability*. Deutsche Bank AG: Frankfurt am Main, available at: [www.dbresearch.com](http://www.dbresearch.com), referred 14/9/2013.
- <http://www.dailymail.co.uk/news/article-2204076/Banks-urged-customers-major-high-street-chains-rank-low-satisfaction-stakes.html> [online] [cit.2012-12-18]
- <http://www.bankovnipoplatky.com> [online] [cit.2012-12-10]

# How Do Risk Free Investment Options Change our Decisions Under Risk?

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**Abstract:** *Financial decisions of investors do not essentially depend only on the amount of expected reward and it's probability but as well as on the probability and amount of potential loss. Appropriate presentation of investment options may influence investors' decisions. The article aims to test the sensitivity of perception of economic subjects to the probability and amount of potential losses in decisions under risk. We conducted a laboratory experiment with 67 students of the University of Economics in Bratislava. The results of economic experiment show that the introduction of a risk-free investment opportunity increases the attractiveness of less risky option on the one hand but on the other hand it motivates some of the risk-averse subjects to choose a risk-free alternative. While approximately same share of population of male and female subjects changed their decision after implementation of risk-free option, results support higher level of risk-aversion among female population.*

*Keywords:* decision, risk, investment

*JEL codes:* G02

## 1 Introduction

We can find questions about rationales for decision making of economic agents in Smith's Theory of moral sentiments. He realized that people are more sensitive to decrease in their wealth, as if their wealth increases. This range of problems is addressed in the area of economic research in behavioral economics. It is based on the assumption that economic agents do not behave rationally, and their decisions are often influenced by factors other than utility maximization (Leonard and Hsu, 2001, Wilkinson- Klaes, 2012). Two basic approaches to decision making are based on the theory of expected utility and prospect theory.

The existence of gender differences in willingness to undertake risks has been documented in a number of large scale surveys and in incentivized experiments (Byrnes, Miller and Schafer 1999, Eckel and Grossman 2008, Croson and Gneezy 2009). These studies generally conclude that men are more willing to take risks than women are. Focusing on financial risk-taking, Charness and Gneezy (2012) reanalyze data from 15 experiments in which subjects decide on how much Money to invest into a risky asset as opposed to cash. They conclude that there is a robust gender difference with men investing more of their money into the risky asset in comparison to women. Market specific survey on insurance market done by Pastorakova et al (2013) supports previous findings on data from central Europe.

Fehr-Duda and de Gennaro (2006) used for analysis abstract and contextual environment. They stated that gender differences in risk taking may be due to differences in subjects' valuations of outcomes or due to the way probabilities are processed. Published results of their experiment indicate that men and women differ in their probability weighting schemes; however, they did not find a significant difference in the value functions. Women tend to be less sensitive to probability changes and also tend to underestimate large probabilities of gains to a higher degree than do men, i.e. women are more pessimistic in the gain domain. The combination of both effects results in significant gender differences in average probability weights in lotteries framed as investment decisions. The analysis concludes that women's relative insensitivity to probabilities combined with pessimism may indeed lead to higher risk aversion.

Such findings have an important message for real-world investment decisions. Due to increasing education levels and labor force participation of women, together with their longer lifespans relative to that of men, investment decisions of individuals, households or firms are more and more often done by women (Jianakoplos and Bernasek 1998). If women indeed are more risk-averse investors than men, this will have important implications for equilibrium portfolio allocations, wealth levels, asset prices and rates of return.

Financial decisions of investors do not essentially depend only on the amount of expected reward and its probability but as well as on the probability and amount of potential loss. The article aims to test the sensitivity of perception of economic subjects to the probability and amount of potential losses in decisions under risk.

The remaining part of the paper is structured as follows. Section 2 describes the experimental design we used and data collected. Section 3 presents the results and section 4 concludes.

## 2 Methodology and Data

To elicit the risk preferences we conducted controlled experiment using a paper-based questionnaire. We used an economic laboratory experiment conducted at the University of Economics in Bratislava. 67 subjects participated in filling out the questionnaires; all of them were master students in Finance program within Experimental economics course. Gender structure of subject pool was significantly favoring female subjects (49) to male subjects (18) copying the population structure of finance students. Subjects were answering questions anonymously and payments were hypothetical (students participation was considered for final grade). Questions presented in questionnaire are listed in Table 1. Each question was printed on separate paper and answers were collected by experimenter one by one and followed by demographic survey.

**Table 1:** Experimental questions

|   |
|---|
| <p>1. Imagine that your account is € 1,000 and you must choose one of the following investment options for your money:</p> <p>a) 30% probability of loss of € 300 and a 70% probability of profit € 500<br/> b) 10% probability of loss of € 900 and a 90% probability of profit € 389<br/> c) Random selection from a) or b) – choice does not matter</p> <p>After marking the answers turn the paper blank side up, and place it on the opposite side of the table.</p> <p>2. Imagine that your account is € 1,000 and you must choose one of the following investment options for your money:</p> <p>a) 30% probability of loss of € 300 and a 70% probability of profit € 500<br/> b) 10% probability of loss of € 900 and a 90% probability of profit € 389<br/> c) 30 € with probability 100 %</p> <p>After marking the answers turn the paper blank side up, and place it on the opposite side of the table.</p> |
|---|

Source: Excerpt from paper based laboratory experiment questionnaire.

Expected values for options a) and b) in the first question are equal. Based on the Expected Utility Theory we can calculate:

$$EV_a = 0,3 \times (-300) + 0,7 \times (500) = 260 \quad (1)$$

$$EV_b = 0,1 \times (-900) + 0,9 \times (389) = 260 \quad (2)$$

Any economic subject should be indifferent in deciding between option a) and option b). Prospect theory proved that into the decision also psychological factors are entering. In formulating this question, we therefore assumed that subjects will choose option A or B, depending on whether their risk aversion is more influenced by the probability of outcome (profit or loss), or the absolute level of potential income. For subjects that do not have preference, we introduced the option c), to limit the forced choice of subjects and to increase the explanatory power of the results.

In the second question, we replaced the indifferent c) option from the first question, by guaranteed gain of € 30. This option provides significantly lower expected value than the EV of options a) and b), but no risk of loss. This option also makes the decisions of subjects more real as people often have to choose between financial products that are more risky and have higher expected value and the options that are guaranteed with a much lower expected value. The amount of € 30 was set so that it is lower than the expected value of unguaranteed options and that the difference between risky and safe options is large enough to compensate the profit guarantee.

### 3 Results and Discussion

The data consist of 134 decisions (two decisions from each subject). Aggregate behavior is displayed graphically in Figure 1 and Figure 2 and summarized in Table 2. According to the results presented in Table 2 none of the subjects in our sample has chosen option c) in Question 1. All participating students had clear preferences and 54 of them (over 80 %) decided for option a) that has a higher probability of loss and at the same time a lower amount of possible loss.

**Table 2:** Decision made by subjects

| Option       | Question 1 |       | Question 2 |       |
|--------------|------------|-------|------------|-------|
| a)           | 54         | 80,6  | 39         | 58,21 |
| b)           | 13         | 19,4  | 18         | 26,87 |
| c)           | 0          | 0     | 10         | 14,93 |
| <b>Total</b> | 67         | 100 % | 67         | 100 % |

Source: experimental data

In Question 2 the option c) was replaced with a guaranteed gain of € 30, but this gain significantly lower profit than the risky options a) and b), € 500 and € 389. In Question 2 the majority of subjects decided for option a), but it was only 58,21 % of all students. For option c) decided 10 participants. The inclusion of safe option paradoxically increased the proportion of students who chose option b) (the option with less probability of loss, but with the higher absolute amount of loss). This trend was more noticeable in subgroup of men, when the portion was doubled (from 22,22 % in Question 1 to 44,44 % in Question 2)

Of the 10 subjects who decided for option c) in Question 2, eight of them were preferring option a) in Question 1 and two of them option b). Thus the majority of the subjects who chose option c) in Question 2 have opted for a) in Question 1. We assume that these subjects were not deciding according to the probability of loss and in this respect they considered option a) in question 1 as less risky.

**Table 3:** Decision made by male and female subjects

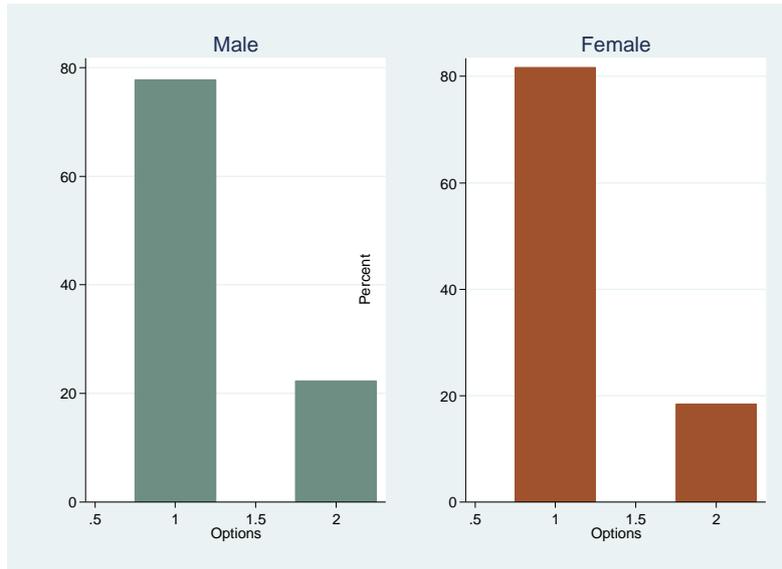
| Option       | Question 1 |       |        |       | Question 2 |       |        |       |
|--------------|------------|-------|--------|-------|------------|-------|--------|-------|
|              | Male       | %     | Female | %     | Male       | %     | Female | %     |
| a)           | 14         | 77,78 | 40     | 81,63 | 9          | 50    | 30     | 61,22 |
| b)           | 4          | 22,22 | 9      | 18,37 | 8          | 44,44 | 10     | 20,41 |
| c)           | 0          | 0     | 0      | 0     | 1          | 5,56  | 9      | 18,37 |
| <b>Total</b> | 18         | 100%  | 49     | 100 % | 18         | 100 % | 49     | 100 % |

Source: experiment data

Option a) (30 % probability of loss of € 300 and a 70 % probability of profit € 500) is perceived as less risky than option b), even though the expected values of both options are the same. On this basis, we can summarize that subjects in this case are more sensitive to the amount of potential loss than to the probability of its occurrence.

The results presented in Table 3 express that the distribution of decisions in Question 1 between male and female subject is similar (for option a) decided slightly more female (81,63 %) than male subjects (77,78 %) in the studied sample).

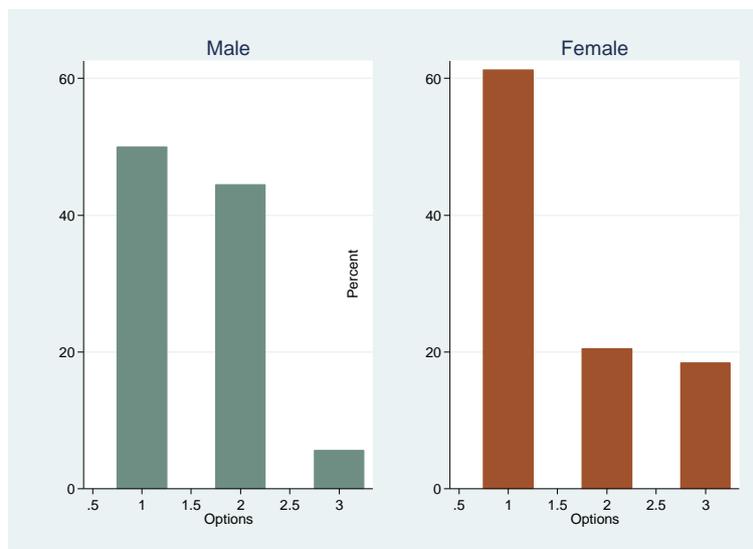
**Figure 1:** Distribution of decisions in Question 1



Source: Data from experiment; 1 = option a) 2 = option b) 3= option c)

Comparing Figure 1 and 2 we come to the interesting finding that while 9 women who chose in the second question option c), was only 7 choosing in the first question you option a) and 2 who decided for b). Within male subjects, there was a change decisions between options more often in favor to move from a) to b) (4 men) than from a) to c) (1 man).

**Figure 2:** Distribution of decisions in Question 2



Source: Data from experiment; 1 = option a) 2 = option b) 3= option c)

## 4 Conclusions

Financial decisions of investors do not essentially depend only on the amount of expected reward and its probability but as well as on the probability and amount of potential loss. The existence of gender differences in willingness to undertake risks has been documented in a number of papers, both experimental and large scale surveys. In most of the analysis females are considered to be more risk averse, e.g. Fehr-Duda and de Gennaro (2006) conclude that women's relative insensitivity to probabilities combined with pessimism may indeed lead to higher risk aversion.

Increasing education levels and participation of women in labor force, together with their longer lifespans relative to that of men, investment decisions of individuals, households or firms are more and more often done by women. Due to this fact, we analyzed in this article gender differences in decisions under risk. To simulate real world we conducted laboratory experiment.

The results of economic experiment report that the introduction of a risk-free investment opportunity increases the attractiveness of option with lower probability of loss on the one hand but on the other hand it motivates some of the risk-averse subjects to choose a risk-free alternative. While approximately same share of population of male and female subjects changed their decision after implementation of risk-free option, results support higher level of risk-aversion among female population. Introduction of risk free option increased number of male subjects deciding for option b) in Question 2. Female decided to change their decision in Question 2 in favor of safe option changing from the option with existing probability of loss (7 of them from option a) and 2 from option b)).

## References

- Byrnes, J.P., Miller, D.C., Schafer, W.D. (1999). Gender differences in risk taking: A meta-analysis, *Psychological Bulletin*, vol.125 (3), pp. 367–383.
- Charness, G., Gneezy, U. (2012). Strong Evidence for Gender Differences in Risk Taking, *Journal of Economic Behavior & Organization*, vol. 83 (1), pp. 50–58.
- Croson, R., Gneezy, U. (2009). Gender Differences in Preferences, *Journal of Economic Literature*, vol. 47 (2), pp. 448–474.
- Eckel, C. C., Grossman, P. J. (2008). Men, Women and Risk Aversion: Experimental Evidence, In: *Handbook of Experimental Economics Results*, Vol. 1, Elsevier, 2008, chapter 113, pp. 1061–1073.
- Fehr-Duda, H., de Gennaro, M. Schubert, R. (2006). Gender, Financial Risk, and Probability Weights, *Theory and Decision*, vol. 60(2-3), pp. 283-313.
- Jianakoplos, N. A. Bernasek, A. (1998). Are Women More Risk Averse?, *Economic Inquiry*, vol. 36 (4), pp. 620–630.
- Leonard, T. and Hsu, J.S.J. (2001). *Bayesian Methods*. Cambridge: Cambridge University Press.
- Pastorakova, E. et al. (2013). Rodové rozdiely vo finančnom rozhodovaní v oblasti životného poistenia na Slovensku, *Ekonomický časopis*, vol. 61(1), pp. 82-100.
- Wilkinson, N., Klaes, M. (2012). *An Introduction to Behavioral Economics*, Palgrave Macmillan.

# Selected determinants of lifelong learning of population in the Slovak Republic

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**Abstract:** *The contribution is focused on the analysis of lifelong learning and training programs aimed at the residents of the Slovak Republic. The main reason for the examination of this issue is the fact that sustainable development, competitiveness and dynamically developing economy is nowadays almost unachievable without increasing the educational level of human capital. The aim of this paper is to explore dependencies and the impact of selected determinants of lifelong learning at higher population's ability to assert themselves in the labor market. We will examine this dependency through the econometric method - regression analysis. In this paper statistical data will be used to evaluate the most probable regression model of selected determinants of lifelong learning in the Slovak Republic. The output will be the assessment of the extent of importance of selected indicators on the lifelong learning of population.*

**Keywords:** *determinants of further adult education, regression analysis, lifelong learning, Gretl*

**JEL codes:** *I20, I25, H52*

## 1 Introduction

Lifelong learning is increasingly becoming the dominant theme of education and vocational training policies in all developed industrialized countries. Increasing the educational level of human capital is necessary for achieving a sustainable development, competitiveness and dynamically developing economy. For governments, the concept of lifelong learning is an overarching policy framework which offers solutions to a number of common economic and social problems (Rubenson, 2011). Despite the fact that lifelong learning relates to all levels and forms of education, in the context of the development of the knowledge-based society, a specific interest is put on the education of the adult population. Support of further education of the adult population is perceived, in the context of global changes and their consequences such are, for example, the labor market changes, technological changes, demographic changes or economic crisis.

Education and vocational training belong among the highest political priorities of all the Member States in the European Union, not just the Slovak Republic. Obtaining the new knowledge, skills and abilities as well as their continuous updating is considered to be the assumption of personal development of all citizens and their active participation in all aspects of society through integration into the labor market. Education of the adult population is more important nowadays because we are in an era of globalization characterized by rapid changes, technological progress and integration. Learning provides to adults new knowledge and skills, which does not only improve the quality of their own lives, but also leads to the benefit of their families, community and society. Lifelong adult education also plays an important role in reducing poverty, promoting sustainable procedures in the field of environment and not least in improving the level of health and nutrition.

More than one third of the EU population in the age range between 25 and 64 years participate in formal or non-formal education or vocational training. In general, young people participate more in further education, and there are only minor differences between men and women. Non-formal education and vocational training, in contrast to formal education, is characterized by less time-intensive courses. This is probably the main reason for higher participation of adult population in non-formal education. The

majority of non-formal education and vocational training activities is related on the work of adult learners (i.e. job-related learning activities). In the Slovak Republic, in 2011 (the latest figure available from Eurostat), the proportion of job-related activities of non-formal education and vocational training was 90.5%. However, there are difficulties related to participation in further education and vocational training, such as work schedule or family responsibilities.

## 2 Methodology and Data

Our contribution is focused on the compilation of the most probable regression model of selected determinants of lifelong learning in the Slovak Republic. For examining the dependencies and impact of selected determinants of lifelong learning we have used the multiple regression model in the econometric program Gretl (*Gnu Regression, Econometrics and Time-series Library*). The analyzed data are obtained mainly from Eurostat. The period of years monitored is from 2004 to 2013. We have chosen the time series as a dataset structure in the Gretl program. When using the time series for the estimation of the regression function, it is necessary to calculate with the existence of the apparent correlation, which is caused by the identical or similar trend of the time trajectories of the non-stationary variables (Budayová, Bolek, Šupšák, 2013).

### Model Specification

The multiple regression model works with more than one explanatory variable. The general form of this model is as follows:

$$y_i = \beta_0 + \beta_1 x_{i1} + \dots + \beta_K x_{iK} \quad i=1, 2, \dots, N \quad (1)$$

where index  $i$  represents the individual observations,  
 index  $k = 1, 2, \dots, K$  represents the individual explanatory variables and  
 $\beta_0, \beta_1, \dots, \beta_K$  are the parameters to estimate (Bil, Němec, Pospíš, 2009).

To estimate the unknown model parameters we have used the estimation method *Ordinary Least Squares*, so-called OLS model. To assess the quality of the model we have used the *coefficient of determination*  $R^2$ , which shows what proportion of the variability of dependent variable we managed to explain with the considered regression dependence. Coefficient of determination  $R^2$  is defined as the ratio of *Explained Sum of Squares (ESS)* and *Total Sum of Squares (TSS)* (Lukáčik, Lukáčiková, Szomolányi, 2011):

$$R^2 = \frac{ESS}{TSS} \quad (2)$$

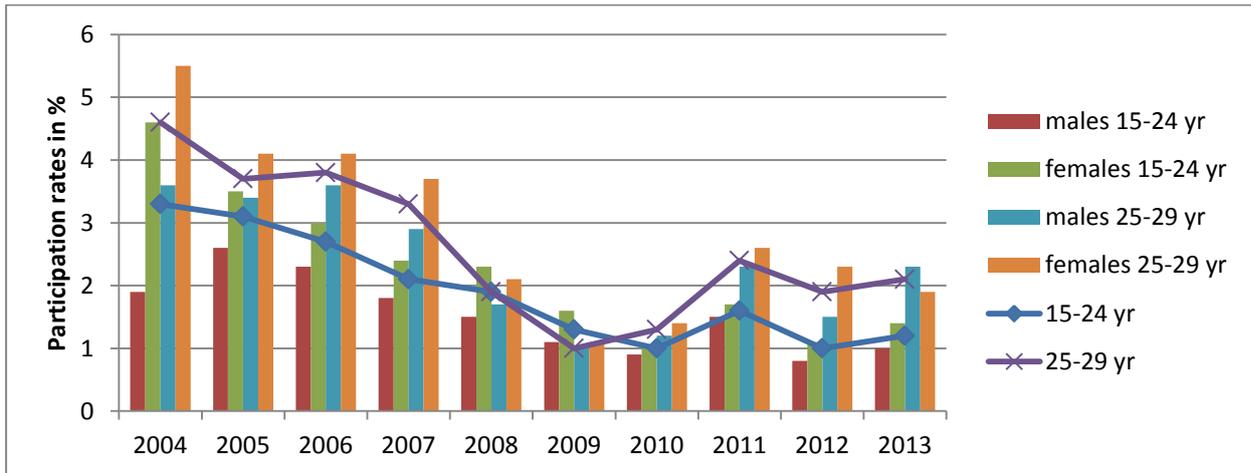
The coefficient of determination can take values between 0 (weak fit) and 1 (good fit), ( $0 \leq R^2 \leq 1$ ), respectively in percentage terms from 0% to 100%:

- value of the coefficient of determination  $R^2 = 0$ , i.e. estimated econometric model does not explain any part of the variability of selected dependent variable;
- value of the coefficient of determination  $R^2 = 1$ , i.e. estimated econometric model explains 100% of the variability of selected dependent variable (Soukiazis, 2013).

### Lifelong Learning Participation

In the introduction we have mentioned that mainly young people are participating in further, respectively lifelong learning. To gain a better overview, we have considered that it is necessary to give a more detailed view of the development on the amount of participants in the lifelong learning, namely the non-formal education and vocational training in the Slovak Republic for the years 2004 - 2013 (see Figure 1). The monitored group, in this case, were the adults in two age groups, namely 15-24 years and 25-29 years, simultaneously with breakdown by sex.

**Figure 1** Participation in non-formal education and training by sex and age



Source: own processing based on data from Eurostat available at [www.epp.eurostat.ec.europa.eu](http://www.epp.eurostat.ec.europa.eu)

As is apparent from *Figure 1*, there are clear signs of improvement in the reduction of differences between men and women. Participation of young adults in non-formal education and vocational training is starting to have an increasing tendency again, after a period of economic crisis.

### 3 Results and Discussion

#### OLS model with multiple selected variables

Before estimating the parameters of a linear model with multiple variables we have verified the suitability of selected variables by using a statistical correlation coefficient extent - we have done an analysis of correlation between variables.

**Table 1** Correlation Coefficients, using the observations 2004 – 2013  
5% critical value (two-tailed) = 0,6319 for n = 10

| FED_NFE | ACT           | UNE           | INAC          |         |
|---------|---------------|---------------|---------------|---------|
| 1,0000  | <b>0,9291</b> | <b>0,9239</b> | <b>0,9595</b> | FED_NFE |
|         | <b>1,0000</b> | <b>0,7820</b> | <b>0,8105</b> | ACT     |
|         |               | <b>1,0000</b> | <b>0,9021</b> | UNE     |
|         |               |               | <b>1,0000</b> | INAC    |

Source: own processing in Gretl based on data from Eurostat available at [www.epp.eurostat.ec.europa.eu](http://www.epp.eurostat.ec.europa.eu)

The highest calculated value 0,9595 of correlation coefficient between a pair of variables INAC and FED\_NFE (the explanatory note below) confirms that among these variables there is a strong direct linear correlation. The lowest calculated value of the correlation coefficient between variables UNE and ACT, equal to the value 0,7820, this shows that between the given variables there is a linear dependence (correlation), but weaker than between INAC and FED\_NFE.

Then we have specified the dependent variable FED\_NFE (overall participation in formal and non-formal education and vocational training) and independent variables:

- *ACT* - economically active population - comprises all persons of either sex who represent the labor supply for the production of economic goods and services,
- *UNE* - unemployed - the proportion of the labor force that is without work, but is available and looking for a job,
- *INAC* - inactive persons - people who are not classified as employed or unemployed are defined as inactive (<http://stats.oecd.org/glossary/>, 2014).

After that we have done a linear model estimation of parameters in the Gretl program using the *Ordinary Least Squares estimator*, so-called OLS model.

**Model 1** OLS, using observations 2004-2013 (T = 10)  
 Dependent variable: FED\_NFE  
 HAC standard errors, bandwidth 1 (Bartlett kernel)

|                    | <i>Coefficient</i> | <i>Std. Error</i>  | <i>t-ratio</i> | <i>p-value</i> |     |
|--------------------|--------------------|--------------------|----------------|----------------|-----|
| const              | 2,37193            | 0,321272           | 7,3829         | 0,00032        | *** |
| ACT                | 0,72395            | 0,0594227          | 12,1831        | 0,00002        | *** |
| UNE                | 0,718061           | 0,198928           | 3,6097         | 0,01124        | **  |
| INAC               | 0,205256           | 0,0195498          | 10,4991        | 0,00004        | *** |
| Mean dependent var | 14,65000           | S.D. dependent var |                | 1,641984       |     |
| Sum squared resid  | 0,129668           | S.E. of regression |                | 0,147008       |     |
| R-squared          | 0,994656           | Adjusted R-squared |                | 0,991984       |     |
| F(3, 6)            | 1566,167           | P-value(F)         |                | 4,54e-09       |     |
| Log-likelihood     | 7,537420           | Akaike criterion   |                | -7,074841      |     |
| Schwarz criterion  | -5,864500          | Hannan-Quinn       |                | -8,402581      |     |
| rho                | 0,484833           | Durbin-Watson      |                | 0,994101       |     |

Source: own processing in Gretl based on data from Eurostat available at [www.epp.eurostat.ec.europa.eu](http://www.epp.eurostat.ec.europa.eu)

At the beginning it is necessary to perform verification of the econometric model. Statistical verification includes testing the significance of individual parameters, testing the significance of the model as a whole, evaluation of the coefficient of determination and testing the fulfillment of linear model assumptions (eg. heteroscedasticity test, autocorrelation test, multicollinearity test). First we have tested the significance of individual parameters using the Student's *t*-statistics. We have formulated a pair of hypotheses:

$$H_0: \beta_0 = 0 \quad \text{against} \quad H_1: \beta_0 \neq 0,$$

We have found, that the calculated *t*-statistic parameter  $\beta_0$  in absolute value ( $|7,3829|$ ) is greater than the critical value  $t_{0,025}(6) = 2,44691$ , so we can reject the null hypothesis and conclude that the parameter  $\beta_0$  is on the 5% significance level statistically significant. For all other parameters, result of the comparison is the same - we reject the null hypothesis, i.e. on the 5% significance level the parameters are statistically significant:

**Table 2** Comparison of *t*-statistics and critical value

| <b>Parameter</b> | <b><i>t</i>-statistics</b> | <b>Comparison</b> | <b>Critical value</b> | <b>Result</b>                  |
|------------------|----------------------------|-------------------|-----------------------|--------------------------------|
| <b>ACT</b>       | <b> 12,1831 </b>           | <b>&gt;</b>       | <b>2,44691</b>        | <b>reject <math>H_0</math></b> |
| <b>UNE</b>       | <b> 3,6097 </b>            | <b>&gt;</b>       | <b>2,44691</b>        | <b>reject <math>H_0</math></b> |
| <b>INAC</b>      | <b> 10,4991 </b>           | <b>&gt;</b>       | <b>2,44691</b>        | <b>reject <math>H_0</math></b> |

Source: own processing; results from Gretl based on data from Eurostat available at [www.epp.eurostat.ec.europa.eu](http://www.epp.eurostat.ec.europa.eu)

Subsequently, we have tested the significance of the model as a whole using the *F*-statistics by comparing the calculated *F*-statistics with the critical value  $F_{0,05}(3,6)$ . First we have formulated a pair of hypotheses:

$$H_0: \beta_1 = \beta_2 = \beta_3 = 0 \quad \text{against} \quad H_1: \exists \beta_i \neq 0, \text{ pre } i = 1, \dots, 3$$

Thereafter, using the program Gretl, we have found the critical value of *F*-statistics at significance level  $\alpha = 0,05$  and degrees of freedom 3 and 6. The searched critical value was 4,75706. By comparing of both obtained values we have found, that the calculated *F*-statistic is greater than the critical value  $F_{0,05}(3,6)$ :

$$F = 1566,167 > 4,75706 = F_{0,05}(3,6).$$

Therefore, we can reject the null hypothesis and conclude that the model as a whole (at 5% significance level) is statistically significant. This conclusion is confirmed by the probabilistic value P-value (F), because its value of  $4,54e^{-09}$  is less than 0,05 and therefore we can reject the null hypothesis at 5% significance level.

For the reason to avoid the heteroskedasticity problem, we have used the method of the HAC estimator in *Model 1* (robust standard errors).

**Table 3** Results from White's test for heteroskedasticity

|                    | Hypotheses  | Reject $H_0$ if                              | Results from Gretl   | Result       |
|--------------------|---|--|--|--------------|
| Heteroskedasticity | $H_0: \beta_1 = \beta_2 = \beta_3 = 0$<br>(homoskedasticity)            | $TR^2 > \chi^2(p)$<br>or<br>p-value $< 0,05$ | $TR^2 = 5,455033$<br><<br>$\chi^2(6) = 12,5916$<br>and also<br>all p-values $> 0,05$ | Not rejected |
|                    | $H_1: \beta_1$ or $\beta_2$ or $\beta_3 \neq 0$<br>(heteroskedasticity) |  |  |              |

Source: own processing; results from Gretl based on data from Eurostat available at [www.epp.eurostat.ec.europa.eu](http://www.epp.eurostat.ec.europa.eu)

The high coefficient of determination  $R^2 = 0,994656$  means that the estimated econometric model explains 99,46% of the variability of the selected dependent variable. On the other hand, this high value may indicate a high multicollinearity between variables. For this reason, we have calculated the *Variance Inflation Factor (VIF)* with Gretl, which should not be greater than 10. It is given by the formula:

$$VIF = \frac{1}{(1-R_j^2)} \quad j=1, 2, 3, \dots, k \quad (3)$$

**Table 4** Detection of multicollinearity by using the Variance Inflation Factor

| Variable | VIF        | Result                  |
|----------|------------|-------------------------|
| ACT      | 3,037 < 10 | No collinearity problem |
| UNE      | 5,599 < 10 |                         |
| INAC     | 6,339 < 10 |                         |

Source: own processing; results from Gretl based on data from Eurostat available at [www.epp.eurostat.ec.europa.eu](http://www.epp.eurostat.ec.europa.eu)

**Table 5** Results from Breusch-Godfrey test for first-order autocorrelation

|  | Hypotheses   | Reject $H_0$ if                           | Results from Gretl   | Result       |
|--|--|---|--|--------------|
| Autocorrelation<br>(Rho = 0,484833 indicates positive autocorrelation) | $H_0: \beta_1, \beta_2, \beta_3 = 0$<br>(no autocorrelation) | $TR^2 > \chi^2$<br>or<br>p-value $< 0,05$ | $TR^2 = 4,808908$<br>><br>$\chi^2(1) = 3,84146$<br>or<br>all p-values $> 0,05$ | Not rejected |
|  | $H_1: \beta_1, \beta_2, \beta_3 \neq 0$<br>(autocorrelation) |   |  |              |

Source: own processing; results from Gretl based on data from Eurostat available at [www.epp.eurostat.ec.europa.eu](http://www.epp.eurostat.ec.europa.eu)

The result of *Model 1* is the following equation with basic information:

$$\hat{FED\_NFE} = 2,37 + 0,724*ACT + 0,718*UNE + 0,205*INAC$$

(0,321) (0,0594) (0,199) (0,0195)

T = 10, R-squared = 0,995  
(standard errors in parentheses)

### OLS model with two selected variables

For the dependent variable we have chosen *UNE* - unemployed - the proportion of the labor force that is without work, but is available and looking for a job. For independent variable we have chosen *UNE\_RT* - unemployment rate - represents the share of unemployed people to the economically active people (i.e. workers and unemployed). After that we have done a linear model estimation of parameters in the Gretl program using the *Ordinary Least Squares estimator*, so-called OLS model.

**Model 2** OLS, using observations 2004-2013 (T = 10)  
Dependent variable: UNE  
HAC standard errors, bandwidth 1 (Bartlett kernel)

|                    | <i>Coefficient</i> | <i>Std. Error</i>  | <i>t-ratio</i> | <i>p-value</i> |     |
|--------------------|--------------------|--------------------|----------------|----------------|-----|
| UNE_RT             | 0,14897            | 0,00992498         | 15,0096        | <0,00001       | *** |
| Mean dependent var | 2,070000           | S.D. dependent var |                | 0,459589       |     |
| Sum squared resid  | 1,501057           | S.E. of regression |                | 0,408392       |     |
| R-squared          | 0,966457           | Adjusted R-squared |                | 0,966457       |     |
| F(1, 9)            | 225,2879           | P-value(F)         |                | 1,12e-07       |     |
| Log-likelihood     | -4,707308          | Akaike criterion   |                | 11,41462       |     |
| Schwarz criterion  | 11,71720           | Hannan-Quinn       |                | 11,08268       |     |
| rho                | 0,439378           | Durbin-Watson      |                | 1,040290       |     |

Source: own processing in Gretl based on data from Eurostat available at  
[www.epp.eurostat.ec.europa.eu](http://www.epp.eurostat.ec.europa.eu)

**Table 6** Results of tests for verification of the econometric model in the program Gretl

| <b>Results of the verification tests</b> |  |
|--|--|
| <b>t-statistics</b>                      | <b>parameters are significant</b>        |
| <b>F-statistics</b>                      | <b>model as a whole is significant</b>   |
| <b>Heteroscedasticity</b>                | <b>heteroskedasticity is not present</b> |
| <b>Multicollinearity</b>                 | <b>multicollinearity is not present</b>  |
| <b>Autocorrelation</b>                   | <b>no autocorrelation</b>                |

Source: own processing; results from Gretl based on data from Eurostat available at  
[www.epp.eurostat.ec.europa.eu](http://www.epp.eurostat.ec.europa.eu)

The result of *Model 2* is the following equation with basic information:

$$\hat{UNE} = + 0,149*UNE\_RT$$

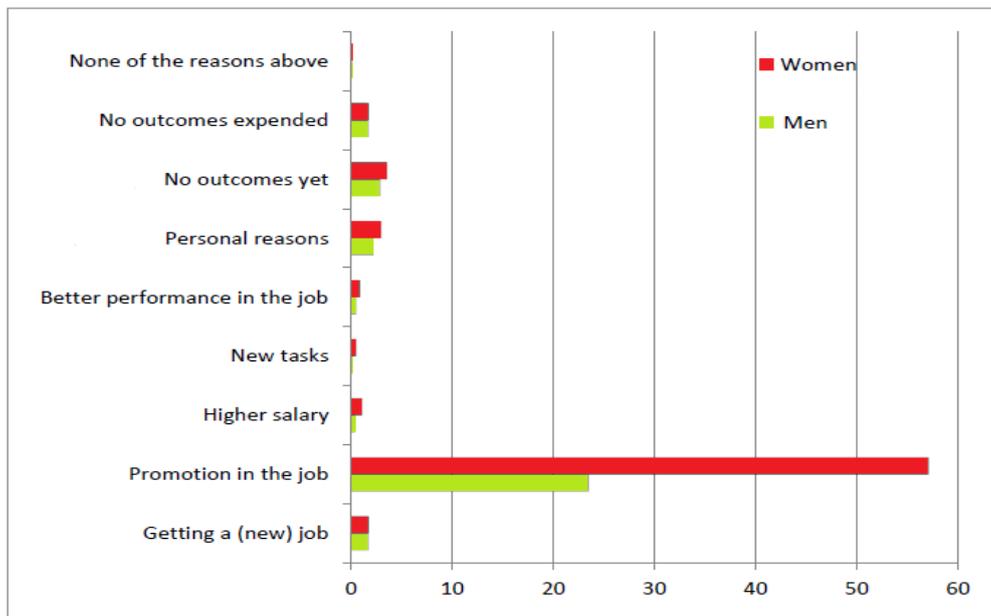
(0,00992)

T = 10, R-squared = 0,966  
(standard errors in parentheses)

### Outcomes of further education

In 2013, the Statistical Office of the Slovak Republic published a study which is focused on selected indicators about lifelong adult education. The survey was realized in the form of a questionnaire on a sample of 7472 respondents on the whole territory of Slovakia (the total rate of return was 62%, i.e. 5000 questionnaires). The reference period was 12 months - from 1.10.2011 to 15.11.2011. On the chart below we can see the results of the use of new knowledge and skills acquired through formal education.

**Figure 2** Outcomes of new skills/knowledge acquired through formal education (%)



Source: Statistical Office of SR (2013): Selected indicators about lifelong adult education in the Slovak republic

It is obvious that the greatest motivation to an individual is to engage in further learning when the individual has achieved a promotion in their job - this trend can be observed especially among women. Reasons such as better performance in the job, higher salary, personal benefits, or getting a (new) job do not reach far such level as promotion in the job. It is interesting that some respondents do not expect any outcomes from participation in further education. We assume that it can be caused by reason of involuntary participation in education, for example mandatory participation of the unemployed people in courses organized by labor offices.

#### 4 Conclusions

There are several determinants that affect the participation of adults in lifelong learning, for example the type of household (one member per household, a household with children), the highest level of education successfully completed, gender, employment status, employment rate, respectively unemployment rate, expenditures on education, etc. In our contribution, we have compiled the most probable regression model of selected determinants of lifelong learning in the Slovak Republic.

In *Model 1* we have analyzed the impact of individual independent variables and the way in which they change (in our case the adult population divided according to labor status) on the dependent variable, which was the total participation of adults in formal and non-formal education (*FED\_NFE*). The results show that if there was a unit increase in the *economically active population (ACT)*, whilst the values *UNE (unemployed people)* and *INAC (inactive persons)* unchange, the *FED\_NFE* will grow on average by 0,7240. When there was a unit increase in the *UNE*, whilst the values *ACT* and *INAC* unchange, the *FED\_NFE* will grow on average by 0,7181. When there was a unit increase in the *INAC*, whilst the values *ACT* and *UNE* unchange, the growth of the *FED\_NFE* was on average by 0,2053. From the above findings we suggest, that the inactive population does not show sufficient efforts to educational activities of the state. Therefore, it may be necessary to reconsider the state support activities focused on this population group.

In *Model 2* we have analyzed the impact of the change of one independent variable (in our case it was the unemployment rate, i.e. *UNE\_RT*) on the dependent variable, which was the unemployed people (*UNE*). The outputs show that if there was a unit increase in

the UNE\_RT, then UNE will grow on average by 0,1490. The result can be interpreted in another way, because the individual parameters are representing elasticities. Then the parameter  $\beta$  expresses, that if the unemployment rate increases by 1%, then the total number of unemployed people that are participating in lifelong learning will increase on average by 0,15%. Despite the fact, that the given parameter value is low, it indicates the efforts of the unemployed people to participate in the further education and vocational training. We can justify it by the fact, that the unemployed people want to participate in lifelong learning (during the periods of high unemployment rate) to become more attractive for employers and thereby increase their chances of getting a job.

The adult participation in formal and non-formal education and vocational training has an increasing trend. This can be a result of the wide range and availability in the form of a relatively large number of universities in Slovakia, various educational institutions, educational facilities of enterprises, private educational institutions, but it can also be a result of awareness of perspectives of better chance and the position of educated people in the labor market.

## Acknowledgments

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## References

Bil, J., Němec, D., Pospíš, M. (2009). *Gretl - uživatelská příručka*. Retrieved from: [http://www.thunova.cz/wp-content/uploads/CZU/Manual\\_gretl.pdf](http://www.thunova.cz/wp-content/uploads/CZU/Manual_gretl.pdf).

Budayová, J., Bolek, V., Šupšák, R. (2013). Analýza dopytu po finančných službách v závislosti od príjmu domácností. In *Ekonomika, financie a manažment podniku - rok 2013 : zborník vedeckých statí pri príležitosti 60. výročia založenia Fakulty podnikového manažmentu EU v Bratislave* [electronic source]. - Bratislava : Vydavateľstvo EKONÓM, p. 1-11.

EUROSTAT. (2014). *Education and Training Statistics*. Retrieved from: <http://epp.eurostat.ec.europa.eu/portal/page/portal/education/data/database>.

Lukáčik, M., Lukáčiková, A., Szomolányi, K. (2011). *Ekonometrické modelovanie v programoch EViews a Gretl*. Bratislava: EKONÓM.

OECD. (2014). *Glossary of statistical terms*. Retrieved from: <http://stats.oecd.org/glossary/>.

Rubenson, K. (2011). *Adult Learning and Education*. Oxford: Academic Press.

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

Závodná, S. (2013). *Selected indicators about lifelong adult education in the Slovak republic*. Bratislava: Statistical Office of the Slovak Republic.

# Financial Literacy of Masaryk University Students in "Financial Literacy" Course

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**Abstract:** *The aim of the contribution "Financial Literacy of Masaryk University Students in "Financial Literacy" Course" is to analyse the state of financial literacy among the students who enrolled the very new course "Financial Literacy". This course is intended to be an introduction to the components of financial literacy (literacy monetary, price and budget). My contribution focuses on the level of financial literacy in the time when students were just being enrolled into the course. My question is what level of financial literacy the students have in the time when they are getting started the course "Financial Literacy". The first part of my contribution is concentrated on the description of the basic terms and a summary of theoretical knowledge about them. In the second part I provide the research, which was conducted through a questionnaire survey. The survey was a required condition for enrolment into the course as an entrance test. And in the final part there are analysed the results of the survey based on the research question. From some reasons not all registered students enrolled or passed the course but those who passed have generally improved in their knowledge and abilities connected with financial literacy.*

*Keywords:* Financial literacy, education, personal and family budget, money

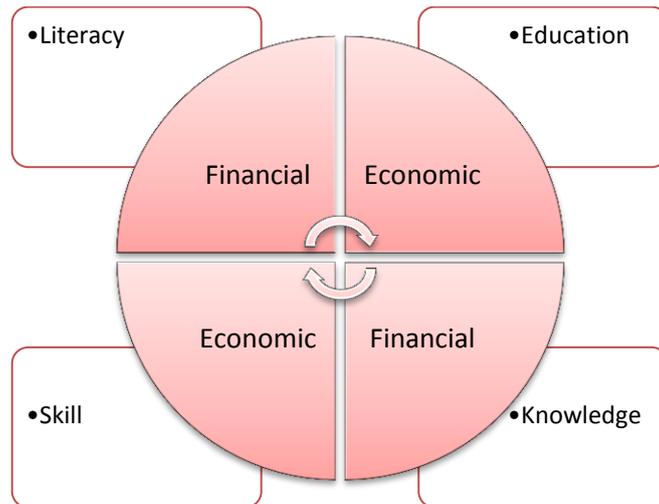
*JEL codes:* A10, A22, A23

## 1 Introduction

The term financial literacy is relatively new and the needed skills are now stressed everywhere. There are new subjects created at schools of all levels. Very important is to begin with children and teach them how to handle money. At the university level there is a special situation: young people did not have a financial literacy courses at previous educational stages and there are courses created for them too. The aim of the contribution "Financial Literacy of Masaryk University Students in "Financial Literacy" Course" is to analyse the state of financial literacy among the students who enrolled the very new course "Financial Literacy". This course is intended to be an introduction to the components of financial literacy (literacy monetary, price and budget). At the end of the course students should be able actively participate in the activities of organizations that address the issue of financial literacy. The first part of my contribution is concentrated on the description of the basic terms and a summary of theoretical knowledge about them.

Financial Literacy (FG) is defined rather inconsistently; the individual subjects that are concerned with it have different definitions. Also across the Anglo-American world there is no uniform approach to the FG, the United States used the term "financial literacy," i.e. financial literacy (Roulet, 2009), while in the UK are more likely to encounter the phrase "financial capability", or rather financial competence (Atkinson, 2005). Both terms are translated into Czech in the same words (Balabán, 2011), but their meaning is slightly different. The financial competence and financial literacy are closely linked together, but they cannot be used as interchangeable terms. Financial literacy refers in particular to the knowledge, financial skills rather refers to the ability of adequately usage of these acquired skills and knowledge. The concepts (including the previously mentioned financial literacy and competence) are closely interconnected, as it is evident in Figure 1.

**Figure 1 Interpenetration of the concepts related to financial literacy**



Source: Gnan et al. (2007)

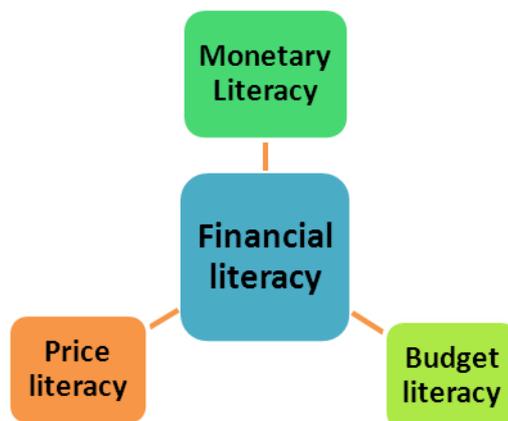
Firstly, Ministry of Finance began to deal with the financial education and financial literacy in the Czech Republic in connection with the consumer protection in the financial market. Ministry of Finance defined the financial literacy in the National Strategy for Financial Education (Ministry of Finance, 2007 updated 2010). It became the central document for financial education in the Czech Republic. Financial literacy is a set of knowledge, skills and abilities that are necessary for the citizen to financially secure his/her and his/her family in contemporary society and was active in the market of financial products and services. Financially literate citizen with the knowledge about money and prices is able to responsibly manage personal and family budget, including the management of financial assets and financial liabilities with respect to the changing situation (Ministry of Finance, 2010).

As the main motto financial literacy the Ministry states: Citizens are not financial experts, but they should be able to consider what is offered to them - the final solution is their own responsibility.

Ministry of Finance structured the financial literacy into three main components:

- Financial (monetary) literacy,
- Price literacy,
- Budget literacy.

**Figure 2** The basic scheme of financial literacy



Source: The author's own work

**Financial (monetary) literacy** skills are required to manage cash and non-cash money transactions as well as management tools for this purpose (e.g. current account, payment instruments, etc.).

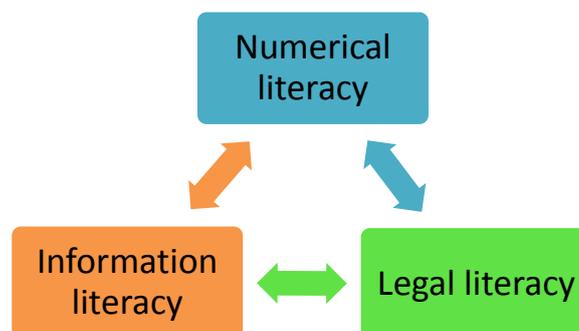
**Price literacy** skills are essential for understanding the price mechanisms and the inflation.

**Budget literacy** skills are required to manage personal / family budget (e.g., the ability to manage a budget, set financial goals and make decisions about the allocation of financial resources), and includes the ability to manage different situations in life from a financial point of view. Budget literacy includes not only general components but also two specialized components: management of financial assets (e.g. deposits, investments and insurance) and the management of financial liabilities (such as credits or leases) (Ministry of Finance, 2010).

An integral part of the financial literacy is a macroeconomic policy, i.e. focusing on the fundamental relationships between different sectors of the economy along with an understanding of basic macroeconomic indicators (such as inflation, GDP and interest rates). Necessary are also a basic awareness of the tax system and the role of taxation in society, i.e., knowledge in the field of taxation.

The financial literacy is associated with numerical literacy, which is the ability to obtain, use and interpret mathematical information and ideas in order to actively cope with the mathematical demands that the life of an adult present. It is the ability to handle numerical financial operations and work with numbers, graphs, tables, etc. in the context of real life. Very important is also information literacy, or the ability to look at the context, understand, use and evaluate relevant information and legal literacy, i.e. the orientation of the legal system knowledge of rights, obligations and opportunities (Ministry of Finance, 2010). The complementarity of the three additional literacies is illustrated on Figure 3.

**Figure 3:** Continuity of additional literacy



Source: The author's own work

## 2 Methodology and Data

The very new course "Financial Literacy" started in spring semester 2014. My contribution focuses on the level of financial literacy in the time when students were just being enrolled into the course. The course is open to all students of Masaryk University

only the fields directly associated with the programme have the preference. The presumption was that the main part of the sample would consist of relatively new students of the Faculty of Economics and Administration – people who are assumed to be interested in finance generally.

The course “Financial Literacy” requires active participation and many other duties:

- A prerequisite for the granting of credit, the active participation in seminars (seminars), manufacture of team essays, passing tests of financial literacy and cooperation in the exploration of financial literacy.
- Tests of financial literacy
  - Entrance test of financial literacy at home subject - by the end of the first week of teaching.
  - Second Final verification of financial literacy test after elf Seminar - at the latest by twelve Seminars (is.muni.cz).

Maybe so many duties to pass the course were partly a reason why some students quitted the course and are not going to pass it.

My question is what level of financial literacy the students have in the time when they are getting started the course “Financial Literacy”.

The research should answer the basic question:

How much does the course “Financial Literacy” generally help students to improve their financial literacy?

What kind of students is interested in improvement of their financial literacy?

Is it possible to anticipate how many students will quit the course and try to prevent this to happen?

In the next part I provide the research, which was conducted through a questionnaire survey. The survey was a required condition for enrolment into the course as an entrance test. Next I will analyse the final test to see how much the results changed and how much did the students improve their abilities.

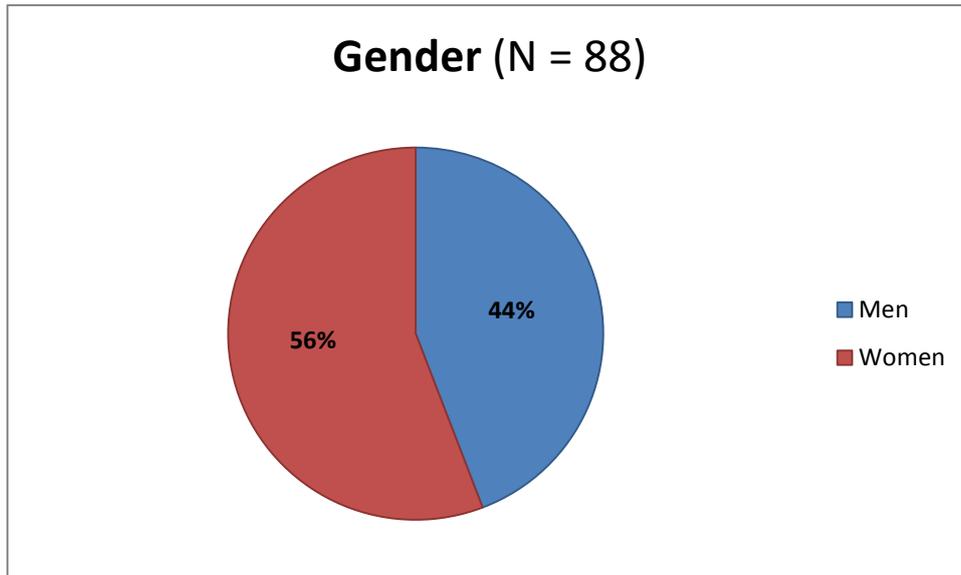
Questionnaire usually involved questions that tried to simulate the need to make a decision within the context. It was necessary to find out the real costs and benefits associated with the decision and compare them. Some questions tried the students spending decisions, which entail collecting information, planning and budgeting. There were questions associated with the different choices about the saving money – time, interest rates and inflation were crucial for the decisions. On the other side there was tested the ability to use the credit options and to diverse the risk as an investor. Specific question were connected with debit and credit cards, real impact of taxes on the prices and special knowledge related to the Czech bureaucracy (e.g. what office is responsible for disability pension). Some questions (like the tasks with the interest rate) needed to be calculated but there were other question when there were necessary to know the financial terms (like debit and credit cards different). Some questions asked the same topic but in a different way (the question changed from positive to negative) so it was easier to eliminate some “good tips”. The questions were from all of the fields mentioned at the beginning. They tested financial literacy completely: monetary, price, budget literacy and numerical, information, legal literacy too.

The demands for Entrance and Final tests were very similar, to make the comparison and potential improvement clearer. They were as same level as it was possible.

### **3 Results and Discussion**

Before the beginning of the semester spring 2014 there were 90 students interested in improvement of their financial literacy. Two of them finally decided to enrol the course, so 88 students enrolled the course. There were more women than men, but the difference was not very distinct it is clear from the Figure 4.

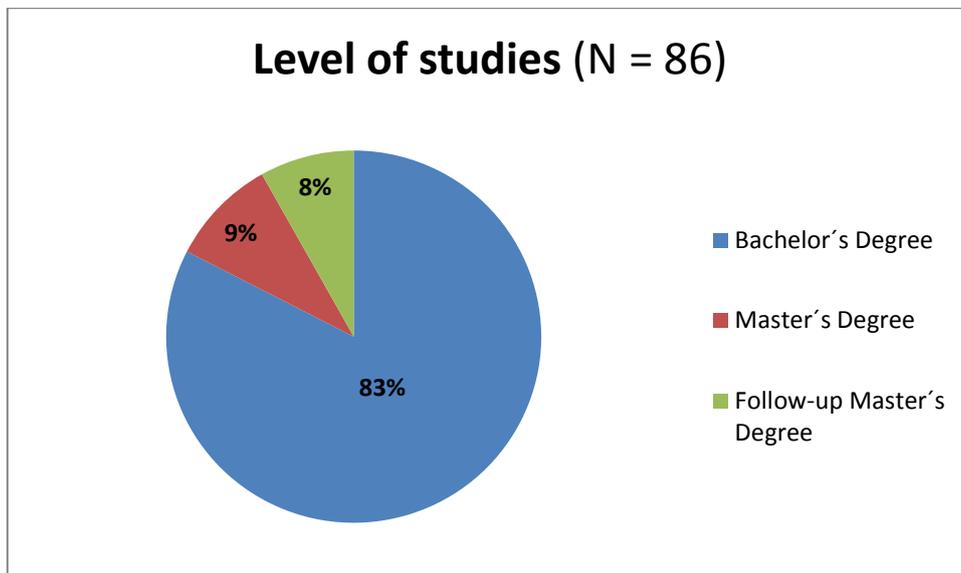
**Figure 4** Gender of enrolled students



Source: The author's own work based on survey results

Just after the enrolment 2 students definitely left their studies, so my research sample starts with 86 people (it was getting be smaller as the course was in the process). The students were mainly from the Bachelor's Degree (see Figure 5). They probably took the course as an opportunity to get some really practical information in one package.

**Figure 5** Level of studies of enrolled students

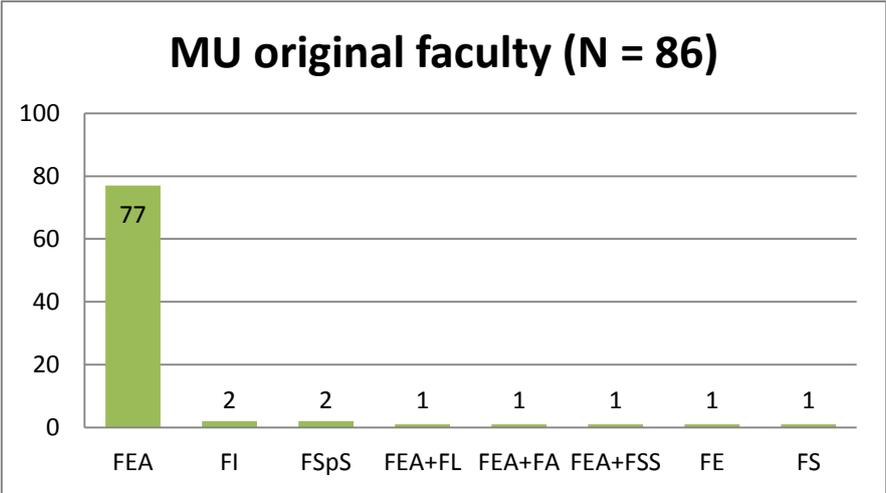


Source: The author's own work based on survey results

As it is very clear from the Figure 6 absolute majority of enrolled students were students of Faculty of Economics and Administration. In combination with previous information

about the study level it is clear that Bachelor’s students of Faculty of Economics and Administration took the chance to get the complete course which most probably was missing in their previous education (the Financial Literacy has just started to be a part of the curriculum of elementary and secondary schools so these students did not have any specialized compulsory course of financial literacy). The rest of the MU students had little interest or information about the course of Financial Literacy (the knowledge about the course among all students was not a part of the research). 2 students were from Faculty of Informatics and 2 from Faculty of Sport Studies. 3 students studied two faculties in one time, every time it was Faculty of Economics and Administration and Faculty of Law in 1 case, Faculty of Arts in 1 case and Faculty of Social Studies in 1 case. 1 student was from Faculty of Education and 1 from Faculty of Science.

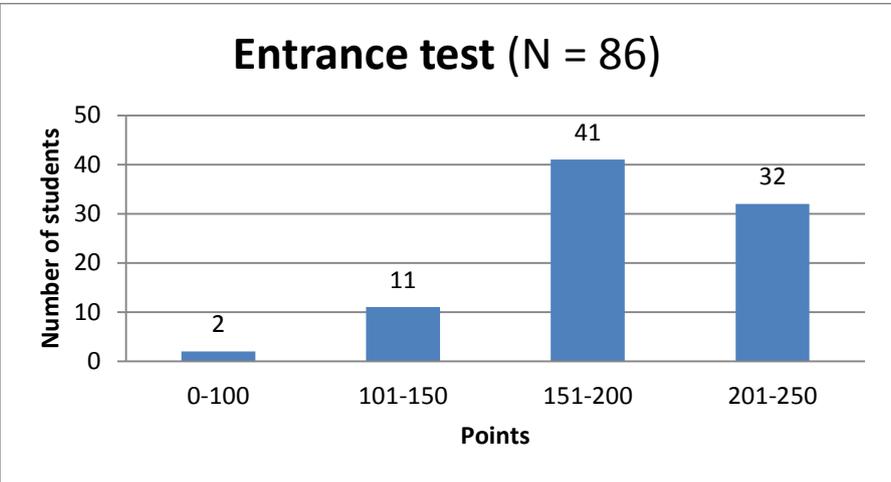
**Figure 6** Original MU departments of enrolled students



Source: The author’s own work based on survey results

Enrolled students had to pass the entrance test. The test had 276 questions each per 1 point, no negative points. It was able to enter the test as many times as it was necessary, so students did not have to fill all the questions in one time, they could have done what they want, close it and then open the test again. The received minimum was 61 points, maximum 248. In the Figure 7 there are absolute values of students and from them it is obvious there were some students with very low level of financial literacy. Most of the students belonged to the average and quite a few were already financially educated.

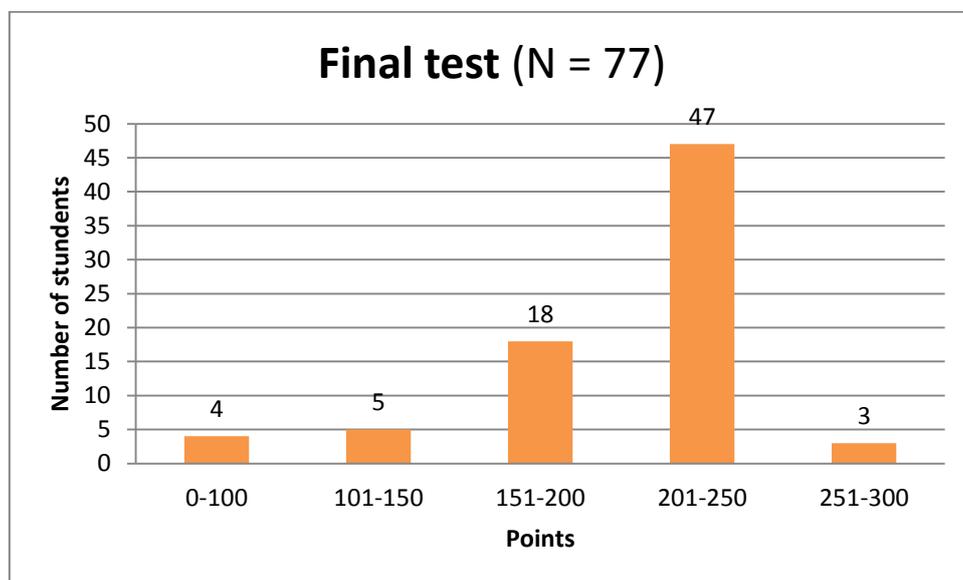
**Figure 7** Entrance test results



Source: The author's own work based on survey results

During the semester another student decided to leave the studies completely and other 8 students did not fill the final test in time (maybe they have forgotten or had other duties, but they left the research sample). In the Masaryk university there is a possibility for students who did not pass the course to request for non-repeating of the course (which is not compulsory), so the students who left the course don't have to enrol it any more in the future, just if they want. The range of obtained points was from 31 points to 259 points. The maximum was 276 points again. The students from the 0-100 points were checked and it was realised they had just very few tries for the final test, some of them just 1 – it is probable they have forgotten to finish it. As it can be seen on Figure 8 the group of 201-250 points-students grew up a lot and it is very possible it was thanks to the course – they learned the necessary things and did much better. Even 3 students received more than 251 points, so overall the class get better.

**Figure 8** Final test results



Source: The author's own work based on survey results

As follows there are analysed the results of the survey based on the research question. Generally the course "Financial Literacy" helps the students to orientate in word of finance. Overall they did the better in final test than in the entrance test. Interesting would be to directly compare individual student's comparison. The student which was the best by the entrance test remained the best from the group and got better and did the best by the final test too.

As it was mentioned before the most interested in improvement of financial literacy presented the students of Faculty of Economics and Administration. The rest of the university was included just very little. It must be taken into account that the course is very new and probably there was not much awareness about it. Maybe in next years it will be participating by the students of other faculties too. Actually, it is kind of presumption that the student of Faculty of Economics and Administration will gain the information of financial literacy just in the compulsory courses in that faculty. It would be logical to offer this course to the other faculties. But the problem of financial literacy is that it is too general and most of the lecturers just assume students already have the necessary information. It is not the student's fault because the financial literacy was not taught at the school in the past. Maybe the feeling of inadequacy satisfied the students of Faculty of Economics and Administration to enrol this course in such a big number.

The course "Financial Literacy" has a big target – to improve the financial literacy of many students. It is obvious they have to do quite a lot of work and study. The reasons why overall 13 students decided not to finally enrol or fulfil the requirements are not known but it has to be clearly stated that the course requires a lot of work to make sure just really interested students will have a place there.

#### 4 Conclusions

Very new course of the Faculty of Economics and Administration called "Financial Literacy" is kind of answer on the demand that is visible every where. Basic and secondary schools started their compulsory financial education and the university – the centre of whole knowledge has to do as much as possible to educate its own students in this field. The aim of the course is to familiarize students with the fundamentals of financial literacy. Even when it was not compulsory a lot of students registered in the course – the topic is very actual and has a direct connection to the praxis. From some reasons not all registered students enrolled or passed the course but those who passed have generally improved in their knowledge and abilities connected with financial literacy.

Majority of students enrolled in the course were the students of Faculty of Economics and Administration. Maybe there could be some bigger offer of financial literacy courses even for students of other faculties. In general, all Faculty of Economics and Administration students must gain some amount of information (financial literacy included), so the course should be more open to the other students. On the other hand who else should be an expert on financial literacy than a student of Faculty of Economics and Administration? Maybe it will take years to coordinate everything so well that all the university students will have the deep financial literacy background from the basic and secondary school that this course will be just for the other than Faculty of Economics and Administration students. The results showed that this course was beneficial nearly for every enrolled student, so it definitely has its reason.

#### Acknowledgments

Masaryk University Faculty of Economics and Administration, Department of Finance provided the data for my research by sharing the results from Entrance and Final test of "Financial Literacy" course.

#### References

- Atkinson, A. *Introducing financial capability skills - A pilot study with Fairbridge West, Bristol*, 2005. [online]. [cit. 2014-04-19]. Available from WWW: <[http://www.pfrc.bris.ac.uk/Reports/introducing\\_financial.pdf](http://www.pfrc.bris.ac.uk/Reports/introducing_financial.pdf)>.
- Balabán, Z. (2011). *Slabikář finanční gramotnosti: učebnice základních 7 modulů finanční gramotnosti*. 2<sup>nd</sup> ed. Praha: Cofet.
- Gnan, E., Silgoner, M. A., Weber, B. (2007) „Volkswirtschafts- und Finanzbildung: Konzepte, Ziele, Messung“. In *Geldpolitik & Wirtschaft*, Q3/7. Wien: OeNB. Retrieved from: [http://www.oenb.at/dms/oenb/Publikationen/Volkswirtschaft/MOP-GEWI/2007/Geldpolitik-und-Wirtschaft-Q3-07/chapters/gewi\\_2007\\_3\\_gnan\\_tcm14-67338.pdf](http://www.oenb.at/dms/oenb/Publikationen/Volkswirtschaft/MOP-GEWI/2007/Geldpolitik-und-Wirtschaft-Q3-07/chapters/gewi_2007_3_gnan_tcm14-67338.pdf).
- Masaryk University, Faculty of Economics and Administration, Financial Literacy Course, Retrieved from: [https://is.muni.cz/auth/predmety/uplny\\_vypis.pl?fakulta=1456;obdobi=6008;predmet=760701](https://is.muni.cz/auth/predmety/uplny_vypis.pl?fakulta=1456;obdobi=6008;predmet=760701).
- Ministry of Finance. (2007 updated 2010). *National Strategy for Financial Education*. Retrieved from: [http://www.mfcr.cz/cps/rde/xbcr/mfcr/Narodni\\_strategie\\_Financniho\\_vzdelavani\\_MF2010.pdf](http://www.mfcr.cz/cps/rde/xbcr/mfcr/Narodni_strategie_Financniho_vzdelavani_MF2010.pdf).
- Roulet, Marguerite. (2009). *Financial Literacy and Low-Income Noncustodial Parents*. Center for Family Policy and Practice. Retrieved from: [http://www.cffpp.org/publications/Policy\\_finance.pdf](http://www.cffpp.org/publications/Policy_finance.pdf).

# Using modern quality management tools to improve finance and business university courses

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**Abstract:** *The Institute of Business of the Budapest University of Technology and Economics is one of the largest financial and business higher education centers in Hungary both in terms of total student numbers and the number of undergraduate and graduate majors and courses. In this paper we report a project aimed at improving some of the core undergraduate finance and business courses. The specialty of this project is that the opinion of students is taken into consideration in a way that not only the given course but the whole survey and feedback process can be improved. Self-organizing maps (a hexagonal topologic structure with 5x5 neurons with the survey results considered as 22 dimensional vectors containing 11 importance and performance pairs) and statistical techniques were used to analyze the survey results. After processing the first evaluation questionnaires we have used problem solving techniques with active involvement of the students in order to lay the foundation for long-term course improvement actions and to identify the factors considered to be important by the students coupled with low actual performance. Based on the results obtained by using the developed questionnaire and feedback tool it is going to be used in all the undergraduate and postgraduate courses of the institute in order to provide education for our students that they also consider useful and important for their future jobs so their general financial literacy and business knowledge is improved. An important byproduct of the whole process is that students realize that their opinion is taken into consideration and that they are customers of the financial and business education of the institute. Furthermore as being an active part of such a quality improvement process students get familiar with the use and importance of modern quality management tools.*

*Keywords: higher education, student satisfaction, PDCA, quality improvement actions, self-organizing map*

*JEL codes: I21, I23, C10, C45*

## 1 Introduction

The issue of quality in higher education has received increasing attention in the last decade in Hungary. Hungarian higher education has become a mass-market service which can be described by an increasing number of students and by an increasing number and diversity of institutions. In Hungary, the need to measure the quality of teaching at university level has become a hot topic recently. Students are now generally recognized as the principal stakeholders of higher education. Student feedback of some sort is usually collected by most institutions, though, there is little standardization in how this kind of feedback is collected and what is done with it. There is still little understanding of how to use and how to act upon the collected data.

At the Budapest University of Technology and Economics (BUTE) students' feedbacks have been collected institutionally in several forms. Firstly, underclassmen have been asked about the motivations of their chosen career and about their social status since 1999. Secondly, graduates have provided details about starting their career since 1997. In the third form of measurements active students have been asked to evaluate each and every course they have attended during the semester since 1999. Formal measurement of course quality at BUTE is conducted through course evaluations completed by students at the end of a term. It is found to be useful to pinpoint the strengths of courses and

identify areas of improvement in order to understand the factors that contribute to student satisfaction.

Based on the existing course evaluation questionnaire our aim was to get more detailed picture about some of the finance and business courses lectured by our institute as a pilot project. In the second phase of our research brainstorming sessions were organized with the involvement of students so as to understand the problems highlighted by the questionnaire. Finally, cause and effect diagrams were constructed in order to reveal the root causes of the problems. As quality actions must derive from student concerns we ended up with an improvement action plan.

## **2 Measuring student satisfaction at BUTE**

During our research we followed the steps of a TQM based course evaluation process proposed by Venkatraman (2007) aligned with the steps of the PDCA cycle representing continuous improvement (see Tóth et al., 2013). With the objective of understanding students' perceptions about the quality of educational service, we surveyed students on five of our finance and business courses in 2011, using a survey that was built for this particular purpose. The survey consists of a questionnaire of 11 questions (see Figure 1). Students were asked to express their opinions in two dimensions, namely, scoring the importance and the performance related to each question using an ordinal scale from 1 to 6. The performance dimension of a question reflects how much the students are satisfied with the educational performance in the particular field addressed, while the importance category is used to express how much they find important this particular topic similarly to Hernádi and Ormos (2012a and 2012b). The measurement was repeated with the same questionnaire in 2012 in the case of the Business Statistics course. The two-dimensional survey approach is built on the consideration that topics having higher importance scores should have higher performance values as students rightly expect higher service level in the areas which they consider more important. Figure 2 shows the total sum of importance scores and the total sum of performance scores for each question. Taking the five analyzed finance and business courses together into consideration, the biggest disconnects between the importance and performance dimensions are in the areas addressed by Question 5, 8, 9, 10 and 11 (see Figure 1).

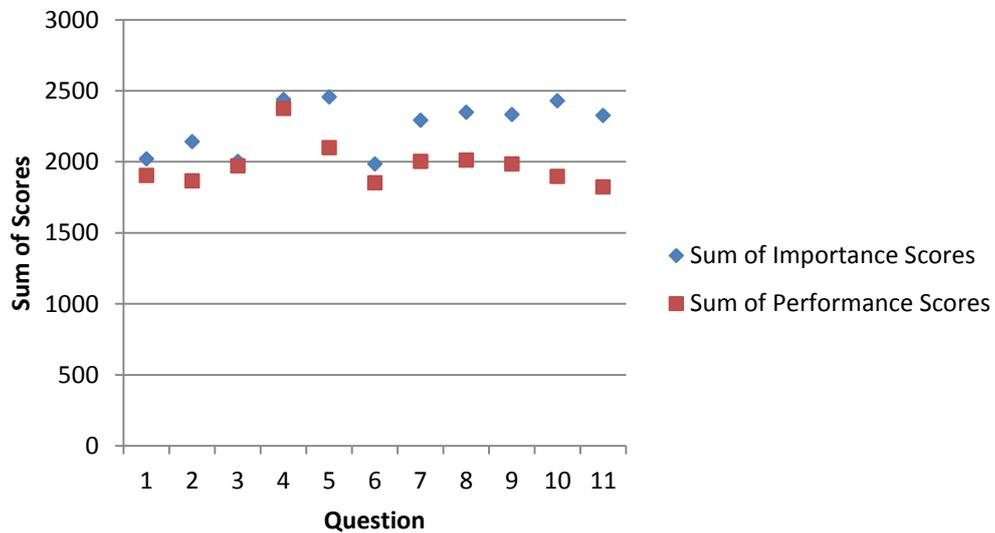
### **Self-organizing maps**

A self-organizing map (SOM) with 5x5 neurons in a hexagonal topologic structure was trained with the survey results which can be considered as 22 dimensional vectors containing 11 importance and performance pairs. SOM in Figure 3 represents the input space by 25 typical vectors learnt by the neurons. The self-organizing property of the map means that any two representative vectors with small distance between them are located on the grid close to each other. Coloring of the map reflects the similarities between representative vectors. The abbreviation of the corresponding subject name such as BC1-BC5 (for the five analyzed finance and business courses) was associated to each input vector. The most frequently appearing subject name abbreviation of input vectors represented by each vector (neuron) in the grid is also shown in the map. It can be seen from Figure 3 that subjects form clusters in the input space, that is, there is certain homogeneity of students' answers for the same subject, while the answer vectors between different subjects are considerably dissimilar.

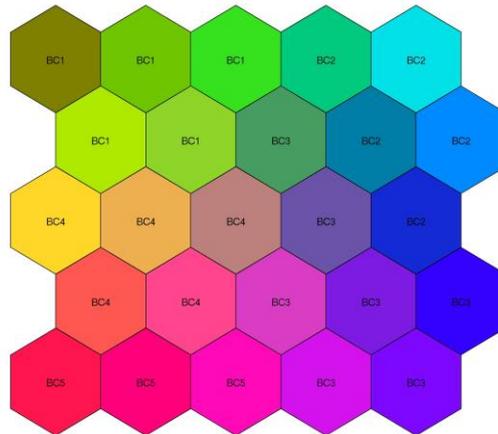
**Figure 1** Survey questionnaire

| Importance (1: Not important at all, 6: Very important) |   |   |   |   |   | Question  | Performance (1: Minimum, 6: Maximum) |   |   |   |   |   |
|---|---|---|---|---|---|---|--------------------------------------|---|---|---|---|---|
| 1   | 2 | 3 | 4 | 5 | 6 | 1. How much do you find the topic highlighted in title of subject needful to establish your management and business knowledge?  | 1                                    | 2 | 3 | 4 | 5 | 6 |
| 1   | 2 | 3 | 4 | 5 | 6 | 2. How much do you feel so that the subject – considering the time frame given to the course – discussed the related sub-topics at appropriate level with appropriate importance? | 1                                    | 2 | 3 | 4 | 5 | 6 |
| 1   | 2 | 3 | 4 | 5 | 6 | 3. In general, how much do you find the subject recommendable and fitting to the syllabus?  | 1                                    | 2 | 3 | 4 | 5 | 6 |
| 1   | 2 | 3 | 4 | 5 | 6 | 4. How much did the academic (lecturer) seem well-prepared?   | 1                                    | 2 | 3 | 4 | 5 | 6 |
| 1   | 2 | 3 | 4 | 5 | 6 | 5. How much did you find the teacher’s lectures understandable and logical?   | 1                                    | 2 | 3 | 4 | 5 | 6 |
| 1   | 2 | 3 | 4 | 5 | 6 | 6. How much did you feel – considering the nature of subject – the teacher being vivid and thrilling?   | 1                                    | 2 | 3 | 4 | 5 | 6 |
| 1   | 2 | 3 | 4 | 5 | 6 | 7. How much did you find the supplementary materials and teaching aids prepared by the lecturer appropriately comprehensive and substantial?                                      | 1                                    | 2 | 3 | 4 | 5 | 6 |
| 1   | 2 | 3 | 4 | 5 | 6 | 8. How much did you feel the supplementary materials and teaching aids prepared by the lecturers well structured and easy to follow?  | 1                                    | 2 | 3 | 4 | 5 | 6 |
| 1   | 2 | 3 | 4 | 5 | 6 | 9. How much did the supplementary materials and teaching aids prepared by the lecturers help you following the lectures, making notes, and learning the subject?                  | 1                                    | 2 | 3 | 4 | 5 | 6 |
| 1   | 2 | 3 | 4 | 5 | 6 | 10. How much were the examining circumstances correct and fair?   | 1                                    | 2 | 3 | 4 | 5 | 6 |
| 1   | 2 | 3 | 4 | 5 | 6 | 11. How much did you find the lecturer’s examining method suitable to measure your real knowledge?  | 1                                    | 2 | 3 | 4 | 5 | 6 |

**Figure 2** Total scores of importance and performance questions

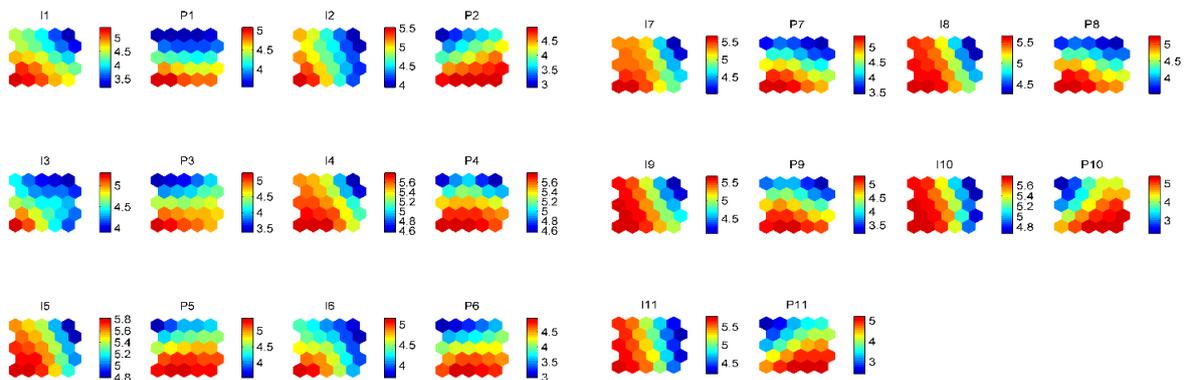


**Figure 3** Self-organizing map with similarity coloring



Importance (I1-I11) and performance (P1-P11) components of the representative vectors are visualized in Figure 4. These figures together with the SOM in Figure 3 serve well for preliminary study purposes as some relations between the answer components can be easily identified by using them. For example, the five neurons in the upper-left corner of the SOM in Figure 3 belong to the Business Statistics course (see as BC1 in Figure 3), and we can see from the component planes that in case of question 11 the importance values of these neurons are high (red and orange colored), while their performance values are low (blue colored). It suggests that there is a considerably large disconnection between the importance and performance values for question 11 in case of this special course. A number of similar 'quick analyses' becomes possible based on the shown component planes. The conclusions that can be drawn from the component planes are in line with the ones which can be made based on statistical analyses.

**Figure 4** Importance and performance components of the representative vectors



### Brainstorming and cause and effect analysis

Based on the five identified questions deriving from the evaluation of the survey questionnaire three questions were raised for the brainstorming session:

- How do you think the lecturer could develop the comprehension and logical structure of his/her classes? (Q5)
- What ideas come to your mind regarding the notes and educational supplementary material? (Q8, Q9)
- What would be the best exam system and conditions that could be used to assess realistically and fairly the students' knowledge about a given subject? (Q10, Q11)

Six groups of students were asked to brainstorm as many ideas as they could to answer the three brainstorming questions. The two groups involved, each of which consisted of 7 to 9 students, collected their answers separately from their own brainstorming sessions. After combining and harmonizing the answers for the three questions, they were divided into four categories according to the type of skill needed to be developed by the lecturer, namely human, pedagogical, technical skills and subject knowledge.

The ideas emerging from the first brainstorming question listed mainly the pedagogical/didactical preparedness and methods used by lecturers as problems. The inaccurate didactical, education technological and methodological knowledge of lecturers is mainly due to their lack of teaching qualifications and inappropriate teaching techniques. The intensification of this knowledge would be an important aspect while improving the quality of business courses. The development of pedagogical skills could also contribute to resolve some noted problems concerning human skills (see Gyökér and Finna, 2013). The second brainstorming question fostered ideas in connection with technical skills. Some of the deficiencies could be solved by developing the computer skills of lecturers. The other group of ideas (video records, audio books) would require a more significant financial investment from the university. Based on students' feedbacks lecturers should improve their presentation skills and put greater emphasis on demonstrating practical examples and case studies. The third brainstorming question addresses the issue of student performance evaluation. The performance can be measured in several ways see e.g. Ormos and Urbán (2012 and 2013). Most of the ideas can be associated with pedagogical and technical skills. Students require more strictness at exams and consistent sanctions for cheating. Students would need written, richly explained evaluations, more practical examples, more consultations, trial exams, etc. They also want more precise and more thorough evaluations (Bedzsula and Bérces, 2012, Tóth et al., 2013).

After the brainstorming session, cause and effects analyses were conducted with the participation of students by constructing Ishikawa diagrams trying to find the root causes of the aforementioned problems. The questions of the Ishikawa analysis were the following:

1. Why don't students find the lectures comprehensible? (see Figure 5)
2. What is the reason for the fact that the students are dissatisfied with the notes and written supplementary teaching material?
3. What is the reason for the fact that the students often don't find exams appropriate?

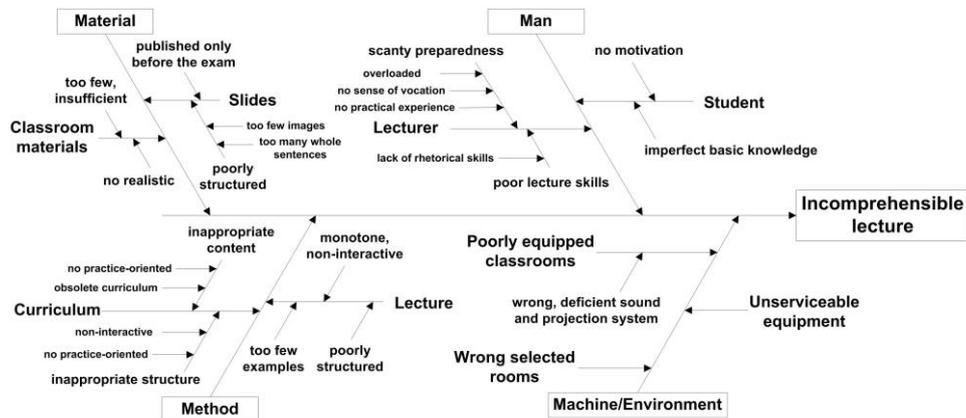
The two diagrams per question, which were created based on the three questions for the six groups have been combined and the results were illustrated by fishbone diagrams which have confirmed the conclusions of the brainstorming session. They demonstrate the causal relationships and the key problems concerning the three brainstorming questions in order to identify the most effective and important improvement actions (see Figure 5 as an example). Analyzing the cause and effect relationships it is conspicuous that the three fields addressed by the questions are strongly interrelated as some causes appear in more diagrams that allows us to conclude that there are a number of problems raised by the students which can be solved easily either by the lecturer or by the department responsible for the courses (Bedzsula and Bérces, 2012).

### **Survey results from 2011 – Business Statistics course**

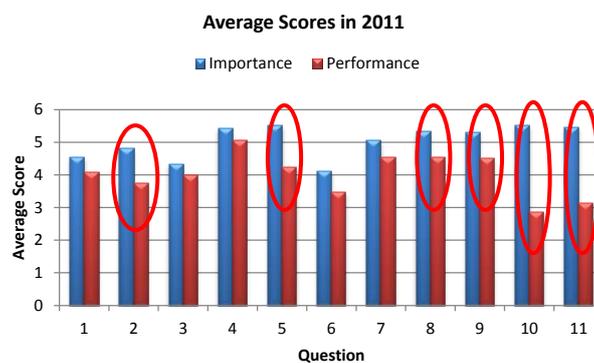
**Chyba! Nenalezen zdroj odkazů.** 6 shows a considerable gap between the averages of importance and performance scores in case of several questions. The conclusion that there is a lack of expected strong positive correlation between the average scores of the two survey dimensions is also supported by the correlation coefficient of 0.1328 calculated for averages of importance and performance scores. Based on these initial results, we focused on the questions with the largest gaps between averages of their importance and performance scores.

Based on the ideas of the brainstorming session and on the survey results of Business Statistics in 2011, we constructed a cause and effect matrix with the involvement of a group of Business Statistics students in order to set immediate goals.

**Figure 5** Ishikawa diagram for Question 1 of cause and effect analysis



**Figure 6** Averages of importance and performance scores in 2011



### Actions defined

Based on the initial statistical analyses of survey data from 2011 and on the results of brainstorming and the cause and effect matrix, the following actions were defined and implemented on the Business Statistics course in 2012 in the spirit of continuous improvement.

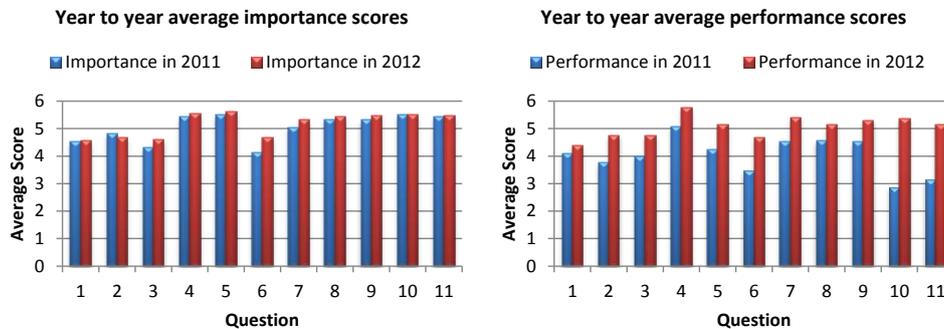
- Lecturers took part in the Lecturers' program organized by the Institute of Continuing Engineers Education at BUTE in order to improve their pedagogical skills (related survey questions: 5, 8, 9, 10, 11);
- Regular consultations emphasizing the most important theoretical topics were held one day before each midterm exam (related survey questions: 10, 11);
- Additional, comprehensive consultation materials were prepared for each consultation. The consultation materials were made available for students in presentation slides (related survey questions: 8, 9, 10, 11);
- Well-defined theoretical topics with outlines of required answers were prepared for each midterm exam consultation (related survey questions: 8, 9, 10, 11);
- The typical calculation exercises required in the midterm exams were summarized and overviewed during the consultations (related survey questions: 5, 8, 9);
- The weights of different sub-topics in the midterm exams were deliberately harmonized with the time spent on discussing and lecturing the corresponding sub-topic (related survey questions: 2);
- The entire course was taught by one lecturer instead of two or three lecturers teaching dedicated blocks of the course (related survey questions: 2, 8, 9).



## Impact of improvement actions

After implementation of the improvement actions discussed above, we conducted the same survey at the end of the Business Statistics course in 2012 to see how the actions taken had acted upon students' satisfaction. Figure 7 shows the average scores for each survey question in 2011 and 2012.

**Figure 7** Average scores in 2011 and 2012



The importance and performance scores can be considered as random variables, and so their averages can be taken as point estimates of their expected values. The graphs in **Chyba! Nenalezen zdroj odkazů.7** suggest two hypotheses. On the one hand, we may assume that the gaps between expected values of importance and performance scores significantly decreased from 2011 to 2012 especially in the case of questions to which the actions taken are related. On the other hand, the average importance scores suggest that there was no significant change in the means of importance scores, that is, students' opinion about importance of topics addressed by survey questions did not change significantly.

The hypotheses that means of importance scores did not change significantly were tested in case of each survey question. Each  $H_0$  hypothesis was tested by applying the two samples z-test as an approximate statistical test at significance level of 0.05. The results of conducted tests are summarized in **Chyba! Nenalezen zdroj odkazů.1**. The change from 2011 to 2012 in students' opinion about the importance of topics addressed by survey questions is statistically insignificant; the only one exception is question 6.

**Table 1** Z-values and p-values of tests on equality of importance score means and on equality of performance scores in 2011 and 2012

| Question | z-value (imp.) | p-value (imp.) | z-value (perf.) | p-value (perf.) |
|----------|----------------|----------------|-----------------|-----------------|
| 1        | 0.1450         | 0.8847         | -1.7961         | 0.0362          |
| 2        | 0.8825         | 0.3775         | -6.0247         | 0.0000          |
| 3        | 1.5193         | 0.1287         | -4.4889         | 0.0000          |
| 4        | 0.9639         | 0.3351         | -5.2995         | 0.0000          |
| 5        | 1.0094         | 0.3128         | -5.7277         | 0.0000          |
| 6        | 3.1319         | 0.0017         | -6.9768         | 0.0000          |
| 7        | 1.9122         | 0.0559         | -6.3250         | 0.0000          |
| 8        | 0.8230         | 0.4105         | -4.1052         | 0.0000          |
| 9        | 1.2154         | 0.2242         | -4.6541         | 0.0000          |
| 10       | 0.1811         | 0.8563         | -14.6876        | 0.0000          |
| 11       | 0.1534         | 0.8781         | -11.8384        | 0.0000          |

From the year-to-year average performance scores visible in **Chyba! Nenalezen zdroj odkazů.7**, we may assume that there was a significant increase from 2011 to 2012 in mean of performance score for each question. Similarly to the testing of importance scores, the results of statistical tests regarding performance scores are also summarized in **Chyba! Nenalezen zdroj odkazů.1**. Each p-value in Table 1 is less than 0.05 and so for each survey question the null-hypothesis is rejected and the alternative hypothesis is

accepted at significance level of 0.05. It means that the mean of performance score for each survey question increased significantly from 2011 to 2012.

The correlation coefficient between the average importance and performance score for 2012 is 0.8669. The same correlation coefficient for 2011 was 0.1328, that is, the stochastic relationship between the importance and performance categories is much stronger in 2012 than in 2011.

In the light of our continuous improvement philosophy and following the Plan-Do-Check-Act cycle of course evaluation, the following actions are considered as having the potential to improve the educational performance of the Business Statistics course in the future. The entire curriculum is large and comprehensive. We need to review the structure of the curriculum and the lecture notes to ensure that the consecutive topics are in a logical and consistent order so that there is no topic which requires knowledge that is introduced later on. Calculation exercises are part of the lectures. Based on feedback from students and their representatives, it would be definitely more effective if the calculation exercises were discussed in smaller groups within seminars. Defining optional project exercises based on cases from different companies would challenge the students to solve some real-life problems using the tools and techniques learnt during the course. These changes are to come in the forthcoming term, now that we are in the phase of revising the whole course based on the aforementioned ideas. The applied pedagogical methods need a thorough reviewing in the long run as the brainstorming sessions highlighted these skills as urgent issues.

#### 4 Conclusions

This kind of questionnaire structure and the validation of the presented dual approach would not only highlight the areas that need to be improved, but also students' involvement in improvement actions could have more aspects. The results may have implications for management responsible for resource allocations to various areas of the university services and infrastructure. Our aim is to make the necessary steps towards long term improvements and analyze regularly whether the actions have solved the most critical problems. This approach ensures that the voice of students is fully integrated into quality improvement efforts and contributes to a better understanding of the students' requirements. Moreover, students contribute actively to the improvement of courses by acquiring the knowledge necessary for the application of modern quality management tools at the same time.

#### References

- Bedzsula, B., Bérces, R. (2012). A hallgatói vélemények gyűjtése, elemzése és azok felhasználási lehetőségei a BME egyes kurzusai minőségfejlesztése érdekében. In: Topár, J., ed., *A műszaki menedzsment aktuális kérdései*. Budapest: Műszaki Könyvkiadó, pp. 153-169.
- Gyökér, I., Finna, H. (2013). Humán tőke és nemzetközi karrierrek. *Virtuális Intézet Közép Európa Kutatására Közleményei*, vol.22(3), pp. 205-215.
- Hernádi, P., Ormos, M. (2012a). Capital Structure and Its Choice in Central and Eastern Europe. *Acta Oeconomica*, vol.62(2) pp. 229-263.
- Hernádi, P., Ormos, M. (2012b). What Managers Think of Capital Structure and How They Act: Evidence from Central and Eastern Europe. *Baltic Journal Of Economics*, vol.12(2) pp. 47-72.
- Ormos, M., Urbán, A. (2013). Performance analysis of log-optimal portfolio strategies with transaction costs. *Quantitative Finance*, vol.13(10) pp. 1587-1597.
- Tóth, Zs. E., Jónás, T., Bérces, R., Bedzsula, B. (2013). Course evaluation by importance-performance analysis and improving actions at the Budapest University of Technology and Economics. *International Journal of Quality and Service Sciences*, vol.5(1), pp. 66-86.
- Urbán, A., Ormos, M. (2012). Performance Analysis of Equally Weighted Portfolios: USA and Hungary. *Acta Polytechnica Hungarica*, vol.9:(2) pp. 155-168.

Venkatraman, S. (2007). A framework for implementing TQM in higher education programs. *Quality Assurance in Higher Education*, vol.15(1), pp. 92-112.

# Market Structure and Performance of the Life Insurance Industry in the Slovak Republic

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**Abstract:** *Life insurance industry represents an integral part of the financial market in all developed economies. In the Slovak Republic, its importance began to increase during the first decade of new millennium, when the life insurance exceeded the non-life insurance measured by the amount of gross written premium. This newly elicited demand also flew into the changes on the supply side of life insurance and the structure of the Slovak insurance market varied significantly during this period. It has developed from monopolistic market with one dominant insurance company and few very small ones to competitive market with 19 insurance companies offering life insurance operated on the market in 2012. However, have these changes also affected the performance of the industry? And do lower concentration evoke higher performance? As from the well-performing life insurance industry benefits consumers, producers and whole economic system alike, understand these tendencies is particularly important. The aim of the paper is to answer these questions through the analysis of the data from Slovak life insurance industry.*

*Keywords:* life insurance, industry performance, market structure

*JEL codes:* G22, L10, L25

## 1 Introduction

Life insurance industry represents an integral part of the financial market in all developed economies. For example in 2012, life insurance penetration was 3.57% in North America and 4.58% in Western Europe (Swiss Re, 2013). However in the Slovak Republic, insurance penetration continues to be far below from the desired benchmark, when this ratio represented only 1.26% in 2012 (Swiss Re, 2013). The difference in the performance of Slovak life insurance market is evident. However, due to the enhanced growth in the amount of written premiums of the industry, this indicator slowly converges to the level of life insurance penetration in western European countries. Faulkner (2002) sees the reason for this development in continuous raise of the wealth among the population on the one side as well as cultural and social development and convergence of Slovak Republic to developed countries on the other side.

The importance of life insurance started to grow slowly after the origin of Slovak Republic in 1993. While non-life insurance dominated among Slovak population for more than decade, since 1995 and during the first decade of new millennium the role of life insurance has started increasing faster and more dynamically. After all, the life insurance consumption exceeded the non-life insurance measured by the amount of gross written premium in 2008 for a first time. This increased interest and newly elicited demand also flew into the changes on the supply side of life insurance. The structure of the Slovak insurance market varied significantly during this period. From the starting point, when only 6 life insurance companies (as a life insurance company, we consider all insurance companies that offer life insurance products on the market) operated on this market in 1993, to 19 insurance companies offering life insurance products in 2012. Market structure was developed from monopolistic market with the one dominant insurance company and few very small in 1993 to medium concentrated and competitive market in 2012. However, have these significant changes also affected the performance of the industry? And does lower concentration evoke higher performance?

The main aim of the paper is to reveal the presence of a link between the development of market structure and market performance in Slovak republic during the period 1993 - 2012. Based on the Structure Conduct Performance paradigm, we suggest a statically significant relationship between these two variables.

The remainder of the paper is organized as follows. In the first section, we provide the basic theoretical background and a literature review of the Structure Conduct Performance and results of previous research. In the second part, we discuss the methodology used and the data. The next two sections cover the main results, their analysis and the resulting conclusions.

## 2 Literature review

The Structure Conduct Performance (SCP) hypothesis explains performance via conduct market structure (Mason, 1939; Bain, 1951). Seminal work in this area is done by Bain (1951), who expects that concentrated markets encouraged oligopolistic behaviour among the competitors. Further research supports his assumptions about the existence of relation between market structure and market performance. However, direction of this relation lacks consensus and varies across the literature.

Empirical investigation of SCP paradigm was mainly implemented on the banking system data (e.g. Smirlock, 1985; Goldberg and Rai, 1996; Berger and Hannan, 1998; Maudos, 1998) and there is only a few studies, which analyse insurance industry data (e.g. Cummins, Denenberg, and Scheel, 1972; Weiss, 1974; Jung, 1987; Carroll, 1993; Chidambaran et al., 1997; Bajtelsmit and Bouzouita, 1998; Choi and Weiss, 2005; Pope and Ma, 2008; Bikker, 2012). Only one of them, Cummins et al. (1972), focuses on life insurance industry at our knowledge. In addition, banking studies are primarily focused on individual companies, while majority of the insurance studies use country aggregated data (Carroll, 1993; Bajtelsmit and Bouzouita, 1998; Chidambaran et al., 1997). Results of these studies are ambiguous. For example, Bajtelsmit and Bouzouita (1998) focus on automobile insurance and their results show positive and significant relation between market performance and market concentration. According to Weiss (1974) and Choi and Weiss (2005), collusive behaviour should be more frequently observed in highly concentrated market, since only a relatively small number of firms must agree to collude. Therefore, higher concentrated market may causes higher prices as well as higher profits and performance (Ellickson, 2014). On contrary, Cummins et al. (1972) find also statistical significant but invers relation between market concentration and market performance. According to their analysis of the U.S. life insurance market, these variables are inversely related, which indicates a positive relationship between market concentration and profitability. However, these results are weaker in comparison to banks and non-life insurers.

## 3 Methodology and Data

In the research, we focus on the verification of the SCP hypothesis in Slovak life insurance industry during the period from 1993 to 2012. We use a linear regression model on a country level with robust standard errors. Data are log-log transformed for interpretation as elasticity.

Model specification is as follows:

$$\text{Profit\_life}_t = \beta_0 + \beta_1 \text{HHI\_life} + \beta_2 \text{GWP\_life} + \varepsilon_t \quad (1)$$

where  $t$  refers to time,  $t \in (1, 2, \dots, 20)$ ,  $\varepsilon_t$  refers to unobservable random disturbance and  $\beta_0, \beta_1, \beta_2$  are regression coefficients of key explanatory variables used to evaluate SCP hypothesis. We use underwriting profit in life insurance industry in Slovak Republic ( $\text{Profit\_life}_t$ ) as a dependent variable. In our analysis, it represents an indicator of market performance, while underwriting profit is a profit that insurance companies obtain from direct insurance services, i.e. earned premium remaining after deduction of paid claims

and administrative costs linked to life insurance. By this profit, we can approximate real profit from life insurance products in Slovak insurance market while these values are adjusted from non-direct insurance operations of insurance companies. As for log transformation, positive values are required and this assumption is not fully applicable to all values, we have to add a constant to all observations. Life insurance market concentration approximated by the Herfindahl-Hirschman index (HHI\_life) represents an explanatory variable. Herfindahl-Hirschman index is a sum of squared market shares of firms, where increased value of index represents increased market concentration as well. According to the U.S. Department of Justice, market with a result of less than 1,000 to be a competitive marketplace while a result of 1,800 or greater indicated highly concentrated marketplace (Rhoades, 1993). In the estimation, we also incorporate a control variable for market growth - growth of Gross Written Premium ( $gGWP\_life = (GWP\_life_t - GWP\_life_{t-1}) / GWP\_life_{t-1}$ ). However, the role of market growth varies based on the barriers to entry (Choi and Weiss, 2005). When the barriers to market entry are low the market growth entices new insurers to enter the market. But on the other hand, when the barriers to market entry are significantly high then the growth of market evoke increasing in profitability of insurance companies.

As SCP hypothesis predicts, simultaneous cause-and-effect relationship between market structure and market performance (Choi and Weiss, 2005), Augmented Durbin-Wu-Hausman (DWH) test are conducted for the Equation (1) to determine whether the suspect variables are endogenous. In the time series sample, we rejected presence of unit root by Augmented Dickey-Fuller test ( $p < 0.001$ ). Serial correlation in regressions were rejected by Durbin-Watson statistic ( $p > 0.05$ ).

Dataset is obtained from the database of the National Bank of Slovakia and descriptive statistics are shown in Table 1.

**Table 1** Descriptive statistics

| <b>Variable</b>    | <b>Obs.</b> | <b>Mean</b> | <b>St. Dev</b> | <b>Min</b> | <b>Max</b> |
|--------------------|-------------|-------------|----------------|------------|------------|
| <b>Profit_life</b> | 20          | 162 173.1   | 150 363.7      | -23 927.15 | 581 774.8  |
| <b>HHI_life</b>    | 20          | 2 858.97    | 2 196.598      | 1 231.266  | 7 271.633  |
| <b>gGWP_life</b>   | 19          | 1.172472    | 0.1516657      | 0.9359061  | 1.551661   |

Source: Authors' own calculations

## 4 Results and Discussion

The life insurance industry has developed dynamically in the Slovak Republic during the analyzed period, which was driven mainly by socio-economic, law and institutional changes. Step by step with these changes arose the integration efforts of Slovak Republic into international organizations like OECD, NATO and the European Union. Necessary harmonization of the legislation and integrated financial services supervisions had a major impact on the changes that occurred in the private insurance industry. Since 1995, the role of life insurance has started increasing faster and more dynamically. Changes in needs of population started to turn mainly property and liability coverage oriented insurance market on to market offering wide variety of life insurance products.

Improving life insurance industry performance also motivated new insurance companies for enter to the market. Market benefited not only by the entry of new specialized foreign companies that brought new know-how and labor opportunities but also by the increased competition between new and established companies. Efficiency and competition on the life insurance sector are important not only for companies but also for households to keep premiums low and innovation and quality high (Bikker, 2012). Those changes did not result only in the increased number of insurance companies but in overall benefits in supply as well as demand for life insurance products. Attractiveness of the life insurance had increased especially during the years 2006 and 2011, when clients could use tax advantage of life insurance. Entrant insurance companies offering life insurance products brought also new types of policies for consumers with wider coverage and services that were usual in developed economies. Majority of these "new" companies were subsidiary

firms of international companies with foreign capital. Turning point in the Slovak insurance industry was the merge of the dominant insurance company Slovenská poisťovňa, a.s. (with life insurance market share 28,32% in 2002 followed by Kooperativa poisťovňa, a.s. with 11,86%) and Allianz poisťovňa, a.s.(with life insurance market share 5,43% in 2002) in 2003. The life insurance market share of new merged Allianz – Slovenská poisťovňa, a.s. was 30,08% in 2003. But its market share in life insurance was decreasing during the following years and nearly equalized the share around 20% with the Kooperativa poisťovňa, a.s. in 2012. However, half of the life insurance market according to gross written premium was controlled by three insurance companies.

Main indicators of life insurance market development as gross written premium, share of life insurance, insurance penetration and density are shown in reduced form of four years periods in Table 2. Chosen period is illustrated by not only growing numbers of entities offering life insurance products but also by the increase in the gross written premium, share of life insurance, insurance penetration and density.

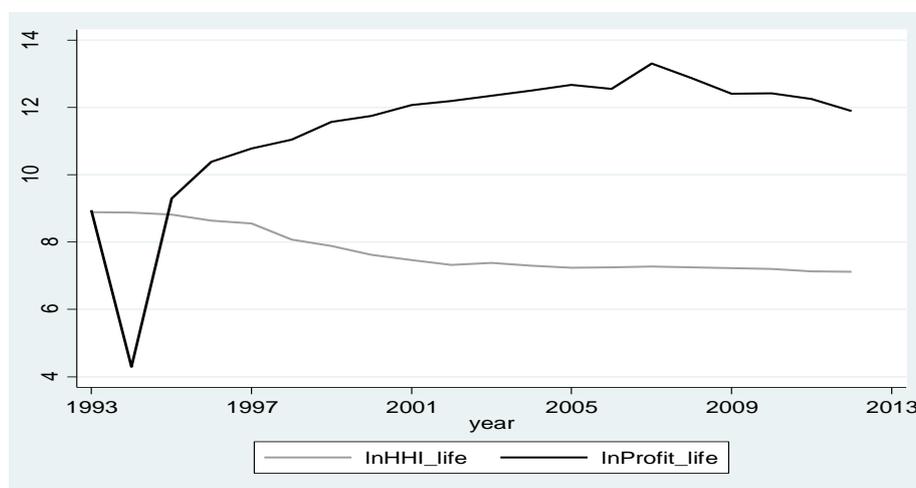
**Table 2** Indicators of life insurance industry in the Slovak Republic

| Variable   | 1993   | 1997   | 2001   | 2005   | 2009    | 2012    |
|--|--------|--------|--------|--------|---------|---------|
| <b>Gross Written Premium (millions EUR)</b>                                    | 65.43  | 156.79 | 457.41 | 731,33 | 1 062.1 | 1 165.6 |
| <b>Share of Life Insurance (%)</b>   | 23.47  | 26.94  | 42.90  | 42.50  | 52.39   | 55.13   |
| <b>Insurance Penetration (%)</b>   | 0.38   | 0.51   | 0.94   | 1.85   | 1.69    | 1.63    |
| <b>Insurance Density (EUR)</b>   | 1.28   | 29.13  | 85.02  | 135.75 | 196.02  | 215.55  |
| <b>Market share of foreign life insurance companies in the domestic market</b> | N/A    | 25.14  | 55.95  | 92.43  | 91.56   | 90.20   |
| <b>Underwriting Profit (thousands EUR)</b>                                     | -16.23 | 24.18  | 151.88 | 295.89 | 221.38  | 122.31  |
| <b>Herfindahl-Hirschman index</b>  | 7272   | 5199   | 1739   | 1391   | 1377    | 1231    |
| <b>Number of life insurance companies</b>                                      | 6      | 22     | 22     | 21     | 17      | 19      |

Source: National Bank of Slovakia, OECD

From the Table 2, it is evident that during the analyzed period, the gross written premium in life insurance industry has increased by almost eighteen times. Also the share of the life insurance on the whole industry has risen from less than quarter in 1993 to more than 55% in 2012. Market performance measured as underwriting profit of life insurance industry has increased, while life insurance market concentration measured by Herfindahl-Hirschman index has decreased (see Figure 1).

**Figure 1** Market performance and market concentration



Source: Authors' own calculations

Regressions results supported results of Figure 1. In table 3, we can see inverse relation between market performance and market structure. Due to identified endogeneity, with respect to the concentration variables and gross written premium growth in Equation (1) by Augmented Durbin-Wu-Hausman (DWH) test, we decided beside the Ordinary least square regression (OLS regression) conduct also Instrumental variables (2SLS) regression. In this model, we assumed that market concentration in life insurance industry (ln\_HHI) is in relation with the amount of gross written premium in life insurance industry (lnGWP\_life) and the year change of absolute value of life insurance companies (lnIC\_life). We decided to implement this variable mainly due to fact that traditional SCP hypothesis omits the possibility of insurance companies to entry the market (Choi and Weiss, 2005). However, due to the observed development in Slovak Republic, the number of insurance companies varies during this period. The industry has also witnessed tremendous growth in the number of life insurance entities, mainly between 1993 and 1996, when their number more than doubled.

**Table 3** Regression results

| <b>lnProfit_life</b>  | <b>OLS Regression</b>      | <b>Instrumental variables (2SLS) regression</b> |
|-----------------------|----------------------------|---|
| <b>lnHHI_life</b>     | -2.743438**<br>(0.9283807) | -2.713257***<br>(0.8076294)                     |
| <b>lnGWP_life</b>     | 4.683789<br>(1.463963)     | 1.405165<br>(1.436591)                          |
| <b>Constant</b>       | 32.31828***<br>(6.752665)  | 32.09582***<br>(5.870782)                       |
| <b>R-squared</b>      | 0.6603                     | 0.6602  |
| <b>Prob &gt; chi2</b> | 0.0282                     | 0.0031  |

Note: \*\* and \*\*\* denote significance at the 5% and 1% level, respectively. Regarding the Instrumental variables (2SLS) regression: Instrumented: ln\_HHI\_life, Instruments: lnGWP\_life, lnIC\_life

Source: Authors' own calculations

In general, similar results were obtained by OLS regression as well as Instrumental variables (2SLS) regression. Both models show that with decreasing market concentration increases profit, which supports the results of Cummins et al. (1972). Our results also support empirical evidence of Zhang and Zhu (2005) and Sliwinski et al. (2013) that monopolistic insurance markets are less developed than competitive and also the level of performance of the market is significantly lower. Therefore, the social and economic transformations, the break-up of monopolies and growing competition in the Slovak Republic have contributed to the increase of life insurance industry performance.

## 5 Conclusions

The paper examines the relationships among market structure and performance of Slovak life insurance industry over the period 1993–2012. We performed OLS regression and Instrumental variables (2SLS) regression to identify the statistically significant relation between the development of market structure and market performance. Both models proved that decreasing market concentration increases profit, which supports previous results of Cummins et al. (1972). In addition, our results support empirical evidence of Zhang and Zhu (2005) and Sliwinski et al. (2013) that monopolistic insurance markets are less developed than competitive and likewise the level of performance of the industry is significantly lower. Improving of the Slovak life insurance industry performance caused several changes in the market. As the positive changes in life insurance industry during the analyzed period, we consider: increased market share and gross written premium; growth in the number of insurance entities and increased competitiveness; wider coverage and services; and better performance. On the other hand, changing conditions caused also the negative consequences on the market performance linked primarily with fusions and acquisitions. These increase the market

concentration, which according to our results may lead to the decrease of market performance and affects life insurance companies as well as their clients. Regulation authorities, therefore, should be very careful with the mergers and acquisitions permission in the area of life insurance.

It is important to note that while in the manufacturing industry, the benefits of merger and acquisition transactions lie primarily on the acquisition of know-how as well as on mutual research and development to reduce costs (Péliová and Kováč, 2009), in case of life insurance companies and other financial institutions mergers and acquisitions are on the front burden the enhance of a market position and gain of the potential of the clients. This is the reason why the interest of the regulators should be concerned on the fusions and acquisitions and moreover our results are confirming that the monopolistic markets cause less efficiency and performance from which neither insurance companies nor clients benefit. For the better performance of the insurance industry, as the significant part of the economy, is necessary to focus on the effects of the fusions and acquisitions to the market structure.

The main limitation of our paper is the aggregated character of used dataset, where the results are based on very few observations. Therefore, our current results about the presence of relation between market structure and market performance development are not robust. However in the further research, we would like to confirm our results by extended model based on individual companies' data and incorporation of the analysis of efficiency changes role in this relation. In addition, deeper analysis of endogeneity among analyze variables will be in the area of our further interest.

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## **References**

- Bain, J. S. (1951). Relation of Profit-Rate to Industry Concentration: American Manufacturing, 1936-1940. *Quarterly Journal of Economics*, vol. 65(3), pp. 293-324.
- Bajtelsmit, V. L., Bouzouita, R. (1998). Market Structure and Performance in Private Passenger Automobile Insurance. *Journal of Risk and Insurance*, vol. 65(3), pp. 503-514.
- Berger, A. N., Hannan, T. H. (1998). The Efficiency Cost of Market Power in the Banking Industry: A Test of the "Quiet Life" and Related Hypotheses. *Review of Economics and Statistics*, vol. 80(3), pp. 454-465.
- Bikker, J.A. (2012). Performance of the life insurance industry under pressure: efficiency, competition and consolidation, *De Nederlandsche Bank Discussion Paper Series*, vol. 12-19.
- Carroll, A. M. (1993). An Empirical Investigation of the Structure and Performance of the Private Workers' Compensation Market. *Journal of Risk and Insurance*, vol. 60(2), pp. 185-207.
- Chidambaran, N. K., Pugel, T. A., Saunders, A. (1997). An Investigation of the Performance of the U.S. Property-Liability Insurance Industry. *Journal of Risk and Insurance*, vol. 64(2), pp. 371-381.
- Choi, B. P., Weiss, M. A. (2005). An Empirical Investigation of Market Structure, Efficiency, and Performance in Property-Liability Insurance. *Journal of Risk and Insurance*, vol. 72(4), pp. 635-673.

- Cummins, J. D., Denenberg, H. S., Scheel, W. C. (1972). Concentration in the U.S. Life Insurance Industry. *Journal of Risk and Insurance*, vol. 39(2), pp. 177-199.
- Ellickson, P. B. (2014). Market Structure and Performance, forthcoming in the International Encyclopedia of the Social and Behavioral Sciences, vol. 2.
- Faulkner, J. (2002). Culture and corruption – The development of insurance in post-communist countries. In *24th UK Insurance Economists Conference*. Nottingham, UK: Nottingham University Business School.
- Goldberg, L. G., Rai, A. (1996). The Structure-Performance Relationship for European Banking. *Journal of Banking and Finance*, vol. 20(4), pp. 745-771.
- Jung, B. D. (1987). Market Structure, Conduct, and Performance of the U. S. Property and Liability Insurance Industry: A Theoretical and Empirical Examination, *Ph.D. Dissertation*. University of Texas at Austin.
- Mason, E. S. (1939). Price and Production Policies of Large-Scale Enterprise. *American Economic Review*, vol. 29(1), pp. 61-74.
- Maudos, J. (1998). Market Structure and Performance in Spanish Banking Using a Direct Measure of Efficiency. *Applied Financial Economics*, vol. 8(2), pp. 191-200.
- NBS. (2014). Štatistika poisťovní a penzijných fondov. Retrieved from: <http://www.nbs.sk/sk/statisticke-udaje/statistika-poisťovni-a-penzijnych-fondov>.
- OECD. (2014). Insurance Indicators. Retrieved from: <http://stats.oecd.org/Index.aspx?QueryId=25437#>.
- Péliová, J., Kováč, U. (2009). Verejná ekonomika a ekonomická sloboda. *Ekonomický časopis*, vol. 57(6), pp. 600-602.
- Pope, N., Ma, Y. L. (2008). The market structure–performance relationship in the international insurance sector. *Journal of Risk and Insurance*, vol. 75(4), pp. 947-966.
- Rhoades, S. A. (1993). The Herfindahl-Hirschman Index. *Federal Reserve Bulletin*, vol. 79(3), pp. 188-189.
- Sliwinski, A., Michalski, T., Roszkiewicz, M. (2013). Demand for Life Insurance - An Empirical Analysis in the Case of Poland. *The Geneva Papers on Risk and Insurance: Issues and Practice*, vol. 38(1), pp. 62-87.
- Smirlock, M. (1985). Evidence on the (Non) Relationship between Concentration and Profitability in Banking. *Journal of Money, Credit, and Banking*, vol. 17(1), pp. 69-83.
- Swiss Re (2013). *Sigma 3/2013: World insurance in 2012*. Retrieved from: [http://media.swissre.com/documents/sigma3\\_2013\\_en.pdf](http://media.swissre.com/documents/sigma3_2013_en.pdf).
- Weiss, L. W. (1974). The Concentration-Profits Relationship and Antitrust. In: Goldschmid, H. J., Mann, H. M., Weston, J. F., eds., *Industrial Concentration: The New Learning*. Boston, US: Little, Brown, pp. 184-233.
- Zhang, C., Zhu, N. (2005). Determinants of the Development of Insurance in China Under the Globalization, Working paper. Retrieved from: [http://www.cerdi.org/uploads/sfCmsContent/html/200/Zhang\\_31.pdf](http://www.cerdi.org/uploads/sfCmsContent/html/200/Zhang_31.pdf).

# Overconfidence as a Cognitive Bias and Its Implications for Insurance Industry

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**Abstract:** *The behavior of individuals is influenced by many biases that cause their deviation from the rationality. One of them, discussed extensively in the financial industry is cognitive bias - overconfidence. It is a firmly established feature of an individual behavior in the psychological point of view. On the other hand in the economics it is extensively explained by inefficient market outcomes connected to a biased sense of self-confidence. In short, the bias is shown for numerous real-world situations and cause changes in consumers' behavior. However, what are implications of overconfidence for the insurance sector? Are there significant differences in the presence of the overconfidence between men and women? Our results based on the survey of 870 respondents show that we cannot confirm the presence of the overconfidence in the overall sample. However, we found the reason of this situation - significant difference between men and women and their perceived and actual financial literacy. While in group of men we confirmed presence of the overconfidence, in the group of women, we found out the opposite effect - underrate. Paper also provides implications of these phenomena in the insurance market.*

*Keywords: bias, consumer, financial literacy, insurance, overconfidence*

*JEL codes: D03, G22*

## 1 Introduction

The behavior and decision-making of individuals in insurance matters is often influenced by biases. One of them is the overconfidence. The term refers to a systematic error of judgment made by individuals when they assess the correctness of their responses to questions relating to intellectual or perceptual problems (Pallier et al., 2002, p. 258). It is a cognitive deviation from rationality, which rises in individuals' minds unfounded belief in their own knowledge, intuition and judgment (Baláž, 2009). In the behavior of the individuals is the subjective confidence in their judgments reliably greater than its objective accuracy.

Overconfidence is associated with two phenomena - the illusion of knowledge and illusion of control. The illusion of knowledge is closely connected to the fact that more information reduces accuracy and increases confidence of individuals (Hall et al., 2007). Individuals mistakenly deluding that the more information they have, the more they will also know about some issue. Although there is not currently a problem for individuals to obtain some information, it should be noted that in the case of complex decisions (such as the decision-making of insurance policy) the presence of the illusion of knowledge may have negative consequences. Individuals may have enough information about a certain insurance product, but even the number of identified information cannot substitute their own experience and other skills that can improve their judgment. Similarly, it is not certain whether the person is able to correctly understand and process obtained information. On the other hand there is the illusion of control that describes the tendency for individuals to behave as if they might have some control when in fact they have none (Langer, 1975). This phenomenon is undoubtedly associated with insurance since the insurance industry inherently handles with uncertain events and so the awareness of its presence is important. Individuals influenced by the illusion of control may underestimate their insurance protection against some events. Also their conviction about knowing more than others is enhanced. Individuals as the result of this illusion dive into some risky

activities that may unfold against them. Overconfidence can cause that individuals do not buy insurance protection or if they buy it is with insufficient coverage that do not reflect their real needs.

Therefore the main aim of this paper is to verify the presence of overconfidence on the sample of survey respondents with respect to gender perspective and to suggest recommendations how to eliminate its negative impact on the insurance industry. We expect the presence of the overconfidence in our research sample (Cordell et al., 2011; Matsumoto et al., 2013) and also we assume that the extent of the overconfidence will be higher in case of men (Barber & Odean, 2001).

The paper is divided into four chapters. The remaining chapters include the description of used methodology and data; result of our analysis with discussion of practical applications of our findings; and conclusion.

## **2 Methodology and Data**

Data were obtained via survey questionnaire about consumers of insurance products and their attitudes towards insurance. Survey was conducted in electronic and paper form. We used this method to investigate the presence of overconfidence in the insurance market. The research sample consisted of citizens of the Slovak Republic in the age structure from 18 to 61. Data collection was carried out in two periods, first from 1<sup>st</sup> June 2013 to 31<sup>st</sup> July 2013 and the second from 15<sup>th</sup> November 2013 to 15<sup>th</sup> December 2013. Overall, the survey involved 1 044 respondents, from which we obtained 870 random respondents who represent the distribution of the Slovak population by gender and age according to the Statistical Office of the Slovak Republic. Sample consists of 438 men (50,34%) and 432 women (49,66%) and age groups were represented as follows: 15,10% respondents from 18 to 24 years; 38,00% from 25 to 39 years and 46,90% respondents from 40 to 61 years.

Since the survey was designed broadly, for the identification of the overconfidence in behavior of respondents we used their declared financial literacy. We were interested in respondents' knowledge of the world of finance. They could assess themselves whether they are very well, good or bad financially versed. We provided in survey also description of each of these three levels of financial literacy for the better understanding. Answers to this question are the basis for respondents' self-evaluation of the financial literacy.

One part of survey consisted of a questions that we used as a proxy to review the knowledge of insurance issues. Specifically, for that purpose we used two questions (statements), and respondents should decide whether they are true or false. We used answers to following questions: "If I pay an insurance premium regularly, in the case of occurrence of the insured damage, insurance company will always pay me the full amount of loss" and "I do not consider the increase in the amount of damage incurred during the insured accident with "small" amount as wrong" as the proxy for a real financial literacy. The correct answer to both questions is "no", because in the first case, the insured person have to take into account also deductible, or decreased value of the property covered by insurance policy. In the second case, the unjustified increase of damage is dishonest act, in many countries classified as an insurance fraud.

The number of correct answers to these questions represent for us a dummy variable for the actual degree of financial literacy, and on the basis of those answers, an individual could earn a maximum of 2 (very good) and the minimum 0 points (bad). Again, we get three-point range, which is the starting point for us to determine the actual level of financial literacy, similarly to their self-classification. Based on these two observations, we determined the difference in the level of their own financial literacy (perceived) and literacy based on our test (actual). We were able to quantify the difference due to the numerical coding of these categories (coding in IBM SPSS: 0 for very good; 1 for good; and 2 for bad) as the difference between own, perceived level and the actual, calculated level. This difference can only take whole number values in the range from -2 to 2, which

means that for value -2 respondent overestimated his financial literacy by 2 levels and demonstrated his overconfidence, and vice versa in case of the value of 2.

We tested the presence of overconfidence in our research sample by Student's T-test. T-test compares sample means by calculating Student's t and displays the two-tailed probability of the difference between the means (Field, 2009). Student's T-test can be used to test the null hypotheses, which claims that the mean of a sample is equal to the assigned constant (Rimarčík, 2000). The T-test help us answer the question whether, on a random sample the mean of a sample is equal to the chosen constant, respectively, whether it is larger or smaller than the selected number. Indeed, if the P-value is less than the chosen significance level (usually 5 %, respectively 0.05), the null hypothesis is rejected and we accept the alternative one. This means that the difference between a specified constant and the calculated average of the sample is too large to be just the result of random selection and therefore it is statistically significant.

The survey data were analyzed by the IBM SPSS Statistics program. However, we focused not only on the whole sample but we also examined gender differences in the presence of the overconfidence between men and women. The results of our analysis are discussed in the following chapter.

### 3 Results and Discussion

Overconfidence is without any doubt the phenomenon that affects not only consumers but also the insurers and other market subjects. That is the reason why the research in this area is necessary. Awareness of the overconfidence may be beneficial for both sides of insurance market - demand as well as supply. We use T-test to test assumptions that respondents in the research sample are overconfident. Statistics of the one-sample test are below in Table 1.

**Table 1** One-Sample Statistics - Change in financial literacy (level)

|              | <b>N</b> | <b>Mean</b> | <b>Std. Deviation</b> | <b>Std. Error Mean</b> |
|--------------|----------|-------------|-----------------------|------------------------|
| <b>Both</b>  | 870      | -,04        | ,890                  | ,030                   |
| <b>Women</b> | 432      | ,09         | ,889                  | ,043                   |
| <b>Men</b>   | 438      | -,16        | ,874                  | ,042                   |

Source: own calculations

The descriptive table displays the sample size, mean, standard deviation, and standard error for each of the three samples (women, men, both). The sample means disperse around the 0 (0 means that there is not big difference between actual and perceived financial literacy) by what appears to be a small amount of variation. But we can see that there is different sign of the mean between men and women. The test statistic Table 2 shows the results of the one-sample T-test.

**Table 2** One-Sample Test - Change in financial literacy (level)

| <b>Test Value = 0</b> |          |           |                        |                        |  |              |
|-----------------------|----------|-----------|------------------------|------------------------|--|--------------|
|                       | <b>t</b> | <b>df</b> | <b>Sig. (2-tailed)</b> | <b>Mean Difference</b> | <b>95% Confidence Interval of Difference</b> |              |
|                       |          |           |                        |                        | <b>Lower</b>                                 | <b>Upper</b> |
| <b>Both</b>           | -1,258   | 869       | ,209                   | -,038                  | -,10   | ,02          |
| <b>Women</b>          | 2,056    | 431       | ,040                   | ,088                   | ,00  | ,17          |
| <b>Men</b>            | -3,883   | 437       | ,000                   | -,162                  | -,24   | -,08         |

Source: own calculations

The t column displays the observed t statistic for each sample, which is calculated as the ratio of the mean difference divided by the standard error of the sample mean. The column labeled Sig. (2-tailed) displays a probability from the t distribution with appropriate degrees of freedom (df). The value listed is the probability of obtaining an absolute value greater than or equal to the observed t statistic, if the difference between the sample mean and the test value is purely random. The Mean Difference is obtained by subtracting the test value (0 in our case) from each sample mean. The 95% Confidence Interval of the Difference provides an estimate of the boundaries between which the true mean difference lies in 95% of all possible random samples of respondents. Following the results of the one-sample test we cannot confirm the presence of the overconfidence in the overall sample. More importantly, we found the reason of this situation. There is significant difference between men and women and their perceived and actual financial literacy. While in one group we confirmed presence of the overconfidence, in the second one we found out the opposite effect.

Since the confidence interval of men lies entirely below 0.0 (their actual knowledge of insurance related issues is worse than they declared), men overestimated their financial knowledge and in their behavior is present overconfidence. Similarly, because confidence intervals of women lie entirely above 0.0; we can conclude that their difference in perceived and actual financial literacy is significantly higher than 0 on the average. This means that there is not argument to conclude that the overconfidence is present in behavior of women. However, the positive sign mean that women underrated their financial literacy, what is worth noticing. Cause of the underestimation of their own experience and knowledge of the financial issues may lie in their smaller participation in investing as well as engagement in financial markets. The financial world is often (wrongly) considered as a male affair. Also in matters of finance men tend to feel greater competence (Prince, 1993). As a result of simultaneous overconfidence of men and underestimation of women experience, we failed to prove the effect of overconfidence in the overall sample of respondents.

What are the implications of our findings for insurance industry? We can view these implications in two perspectives, from the insurers' point of view on the one side and consumers on the other. We can discuss consumer related issues first. It is well-known fact that the level of financial literacy in Slovak republic is very low (Pastoráková, 2012). However, taking this fact into account, individuals (men in our sample) tend to overestimate their knowledge and experience, what is characterized by the excessive degree of their confidence in knowledge of financial matters. Insurance market is represented by the large group of "non-professional" consumers, characterized by a lack of correct information. Moreover due their low levels of financial literacy and presence of the overconfidence in their behavior, they are easily influenced and also vulnerable. They often underrate the process of insurance policy purchase and do not use service of financial advisers. Alternatively, when potential clients use help of financial advisers, they often do not ask questions about issues that they do not know or they are not sure about them. There are few motives for this kind of behavior. Consumers pretend their knowledge and do not want to ask question to deflate their ego, respectively they are indifferent to their financial issues or they do not want to show their weak points. This may lead to loss of trust in insurance services in future because consumers' expectations of the insurance were biased. After all whole insurance industry suffers by this loss of trust and it is very hard to restore trust in industry. On the other hand we also need to take into account different gender perspective in the show of overconfidence. Several papers confirmed that the men's overconfidence is higher in men related issues (Deaux & Emswiller, 1974; Beyer & Bowden, 1997; Brokešová, 2013). Important decisions about purchase of the insurance policy should men and women discuss together. The effect of the overconfidence of men and the effect of underrating financial literacy of women may be reduced by their mutual dissemination of knowledge and their considered decision. Women are more patient in the information seeking, use consultation, and in the end they compare findings. Authors Barber and Odean (2001) bring the advice that men and

women should make their decision in financial issues together to eliminate negative decisions.

The overconfidence is not only matter of consumers. Insurers should also realize their responsibility in bad decisions of consumers due their overconfidence. The crucial roles in this problem hold financial advisors. However, the placed demands on the quality of financial advisors are often insufficient (Pastoráková, 2006). Financial advisors should concentrate their effort not only into volume of the sale but they should also provide sufficient and comprehensible information to potential clients. We consider as appropriate to ask random questions by financial advisors (agents/brokers) related to subject of the selling process to ensure that consumer understands insurance terms and conditions. This could help potential clients to understand complicated insurance products and to avoid hesitation to ask questions. Mainly because the occurrence of the overconfidence is higher in the more complex tasks (Fischhoff, et al., 1977), as insurance undoubtedly is. Insurers should also raise public awareness of some kind of insurance products because of the illusion of control, which is one of the aspects of the overconfidence. This is necessary mostly in case of small probability events and in the private pension products due to unsustainable state schemes. Beyond all the insurance companies should also participate on the education of the public and their potential consumers to increase financial literacy.

#### **4 Conclusions**

The overconfidence bias is a solidly established feature in behavior of individuals and their decision making. This phenomenon affects not only consumers, but also the insurers and other market subjects. Main aim of the paper was to verify the presence of overconfidence on the sample of survey respondents with respect to gender perspective and to suggest recommendations how to eliminate its negative impact on the insurance industry. Using actual and perceived financial literacy as well as the Student's T-test we tested the appearance of the overconfidence bias in the sample of 870 respondents. Our results show that we cannot confirm the presence of the overconfidence in the overall sample. However, we found the reason of this situation - significant difference between men and women and their perceived and actual financial literacy. While in group of men we confirmed presence of the overconfidence, in the group of women, we found out the opposite effect - underrate.

We can view implications for insurance industry of our findings in two perspectives, from the insurers' point of view on the one side and consumers on the other. Due low levels of financial literacy and presence of the overconfidence in consumers' behavior, they are easily influenced and also vulnerable. They often underrate the process of insurance policy purchase and do not use service of financial advisers. Important decisions about purchasing the insurance policy should men and women discuss together because of different confidence in their financial literacy. The effect of the overconfidence of men and the effect of underrating financial literacy of women may be reduced by their mutual dissemination of knowledge and their considered decision. On the other hand, insurers should also realize their responsibility in bad decisions of consumers due their overconfidence, when the essential roles in this problem hold financial advisors. Insurance companies should also participate in the education of the public and their potential consumers to increase financial literacy. These are the key elements to build the trust in relationships in the insurance market.

#### **References**

- Baláž, V. (2009). *Riziko a neistota: úvod do behaviorálnej ekonómie a financií*. Bratislava: VEDA.
- Barber, B. M., Odean, T. (2001). Boys Will Be Boys: Gender, Overconfidence, and Common Stock Investment. *Quarterly Journal Of Economics*, vol. 116(1), pp. 261-292.

- Beyer, S. - Bowden, E. M. (1997). Gender Differences in Self-Perceptions: Convergent Evidence from Three Measures of Accuracy and Bias. *Personality and Social Psychology Bulletin*, vol. 23(2), pp. 157-172.
- Brokešová, Z. (2013). Gender Differences in Financial Decisions. In *GV-CONF 2013: proceedings in Global Virtual Conference*. Zilina: EDIS, pp. 119-122.
- Cordell, D. M., Smith, R., Terry, A. (2011). Overconfidence in Financial Planners. *Financial Services Review*, vol. 20(4), pp. 253-263.
- Deaux, K., Emswiller, T. (1974). Explanations of Successful Performance on Sex-linked Tasks: What Is Skill for the Male Is Luck for the Female. *Journal of Personality and Social Psychology*, vol. 29(1), pp. 80-85.
- Field, A. (2009). *Discovering Statistics Using SPSS*. London: SAGE Publications Ltd.
- Fischhoff, B., Slovic, P., Lichtenstein, S. (1977). Knowing with Certainty: The Appropriateness of Extreme Confidence. *Journal of Experimental Psychology: Human Perception and Performance*, vol. 3(4), pp. 552-564.
- Hall, C. C., Ariss, L., Todorov, A. (2007). The Illusion of Knowledge: When More Information Reduces Accuracy and Increases Confidence. *Organizational Behavior and Human Decision Processes*, vol. 103(2), pp. 277-290.
- Langer, E. J. (1975). The Illusion of Control. *Journal of Personality and Social Psychology*, vol. 32(2), pp. 311-328.
- Matsumoto, A. S., Fernandes, J. B., Chagas, P. C., Oliveira, N. B. (2013). Overconfidence in Individual and Group Investment Decisions. *Journal of International Finance & Economics*, vol. 13(1), pp. 109-114.
- Pallier, G. et al. (2002). The Role of Individual Differences in the Accuracy of Confidence Judgments. *The Journal of General Psychology*, vol. 129(3), pp. 257-299.
- Pastoráková, E. (2006). Javové podoby globalizácie na poistnom trhu v Slovenskej republike. *Ekonomický časopis*, vol. 54(8), pp. 785-802.
- Pastoráková, E. (2012). Finančná gramotnosť a finančné vzdelávanie v oblasti poisťovníctva. *BIATEC*, vol. 20(1), pp. 14-16.
- Prince, M. (1993). Women, Men, and Money Styles. *Journal of Economic Psychology*, vol. 14(1), pp. 175-182.
- Rimarčík, M. (2000). Jednovzorkový Studentov t-test. Retrieved from: <http://rimarcik.com/navigator/t1.html>.

# Financial Literacy of Masaryk University Students with focus on socially disadvantages citizens

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**Abstract:** *The aim of this paper is to analyze the current level of financial literacy of Masaryk University (MU) students. The empirical survey was conducted among students of the Faculty of Economics and Administration MU. It included both full-time and combined-study students who enrolled in the courses "Basic Finance", taught in the Bachelor study program, and "Financial investment", which is offered to university students in the master's degree study program. The questionnaire survey was conducted within the Citi Foundation program and it was based on the project of "Empirical verification of university students' literacy", whose aim was to test the financial literacy of individual respondents, i.e. university students. The sub-objective was to identify suitable students who are skilled enough to disseminate voluntarily financial literacy within their communities and will focus primarily on socially disadvantaged citizens. For this reason, the initial questionnaire survey was modified to incorporate questions that can be closely connected with this group of socially disadvantaged citizens. The paper also addresses the issue of possible specific requirements and different approaches of financial literacy to a group of socially disadvantaged citizens. The first part focuses on the summary of theoretical knowledge, definitions and description of the basic concepts. The second part includes the research, which was conducted in the form of a questionnaire survey. The final part analyzes the results of the research.*

**Keywords:** *Financial Literacy, University Students, Personal Budget, Money, Education, Socially disadvantages citizens,*

**JEL codes:** *A10, A22, I23*

## 1 Introduction

People of the Czech Republic, as well as nationals of other countries in the world, still lack a sufficient level of financial literacy (Ministry of Finance 2010). This is true both for the knowledge and attitudes or behavior. Besides the projects and programs of financial education, which, however, still have a limited range with respect to the number of inhabitants, many people can regard a request for advice from their immediate neighborhood as a quick solution (Roulet 2009). Nevertheless, it is assumed that these natural advisors will themselves have sufficient financial literacy and will be able and willing to help. Given the fact that recent research in the Czech Republic and abroad shows that financial literacy increases with education attainment (CNB 2010), it can be assumed that university students or graduates can be a suitable group of people possessing a higher level of financial literacy and the ability to provide correct advice.

Universities can offer the opportunity to engage their students in the process of financial education of adults. University students were identified as suitable carriers and disseminators of financial literacy as well as instructors of financial education in the society (Atkinson 2005). As a large group present in all regions of the Czech Republic they can provide a nationwide reach. Long-term sustainability is guaranteed through the annual arrival of new students at universities. They are independent, respected and trustworthy people, which is an important fact for disseminating financial education in disadvantaged and vulnerable communities.

In their studies students receive financial education and skills needed for further dissemination. They will subsequently present financial education independently or in

collaboration with non-profit organizations. Hence, students will be given the opportunity to develop their knowledge and experience, and the opportunity to participate in volunteer activities. At the same time they will learn responsibility towards the society and they will also get to know its reverse side. The program should therefore encourage a further development of the civil society and responsible behavior throughout the Czech population.

## **2 Methodology and Data**

Research by The University of Economics (Hradil, Křížek and Dvořák, 2012) showed that this target group possesses higher financial literacy than the adult 18+ population (MFČR 2010), but still with some deficits. The second major finding of the VŠE research is the fact that 62% of university students or graduates believe that they would be able to advise on personal finance. The ability to advise grows with the real financial literacy; respondents' answers suggest that those who understand finance relatively better would rather help their neighborhood. Therefore it implies that it is appropriate for universities to teach courses that (1) strengthen the financial literacy of students and (2) equip them with the knowledge and skills necessary to effectively strengthen the financial literacy of others.

The survey was based on the structure of the "Empirical verification of university students' literacy" project; the Faculty of Economics and Administration participated in this structure through the Institute for Financial Market. The questionnaire was modified by experts on financial literacy (Lusardi, Olivia and Vilsa, 2010) in order to find the level of financial literacy at our faculty, and also for the subsequent selection of students who are willing to engage in the dissemination of financial literacy among the socially disadvantaged people of the Czech Republic.

The modification of the original questionnaire was as follows:

- The original questionnaire comprising 70 questions testing financial literacy in the monetary, numerical, pricing, budgetary, information and legal areas was expanded by 28 questions that explicitly focused on the issue of specific requirements and different approaches to financial literacy of the socially disadvantaged citizens.
- These 28 questions included 3 questions, which are the subject of international comparisons. These are the questions on interest rates, portfolio diversification and inflation (Lusardi 2009).

We wanted to verify whether the students are really equipped with the knowledge of the issues concerning specific claims and different approaches to financial literacy of the socially disadvantaged citizens so that they themselves would be able to effectively strengthen their financial literacy. By incorporating 3 questions of international comparisons we can expect that these questions will be among the easier ones and students will have no problem to answer them correctly.

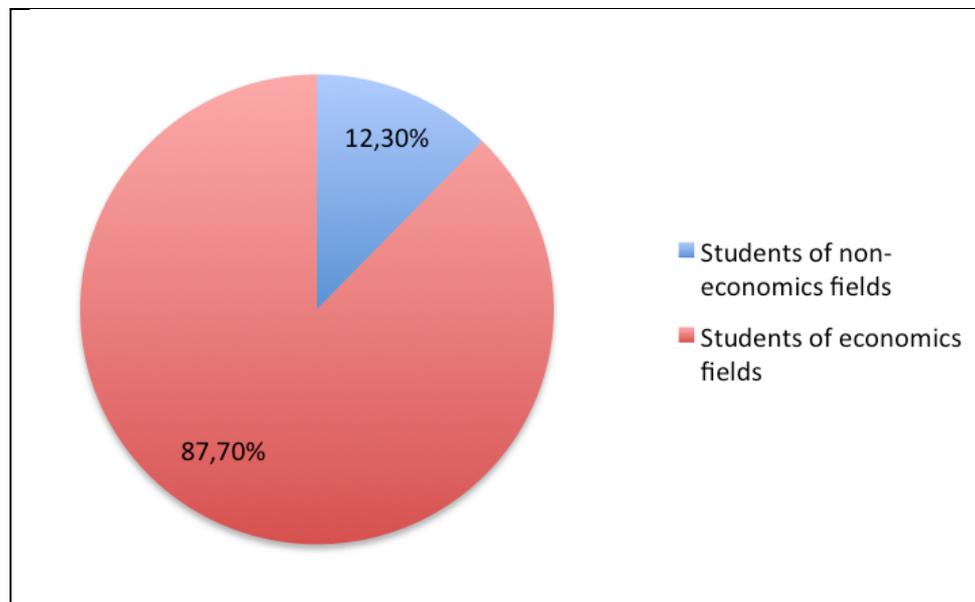
The survey of financial literacy included first-year students of the Bachelor's degree study program attending the course Basic Finance, third-year students of the Bachelor's degree study program attending the course Financial Markets, and first-year students of the Master's degree follow-up study program attending the course Financial Investment. Students of both forms of study, i.e. combined and full-time, were invited to participate (Masarykova Univerzita 2013). Overall, the survey conducted in 2013 included 918 students.

## **3 Results and Discussion**

The total of 918 survey respondents included 473 women (51.5%) and 445 men (48.5%). The selected sample of respondents was well (almost ideally) diversified from a gender perspective. It was determined beforehand that the analysis will refrain from monitoring gender differences. It is assumed that knowledge of men and women are at the same level.

The survey included a relatively high percentage (12.3%) of respondents studying non-economic fields, which is shown in the Figure 1.

**Figure 1** The ratio of students of economic and non-economic fields



Source: own calculations

It should be noted that most of the students studied the Financial and Insurance Mathematics program or the Mathematics and Economics program at the Faculty of Science MU. Given the fact that the students of these programs took several courses at the Faculty of Economics and Administration and their study programs are very close to finance, it was decided not to differentiate between students of economic and non-economic fields.

The conducted analysis also includes students of the joint inter-faculty bachelor's degree program "Finance and Law", offered by the Faculty of Economics and Administration and the Faculty of Law MU, and treats them as students of an economic field. The main guarantor of this study program is the Faculty of Economics and Administration; therefore, the students are treated as studying an economic field (Svoboda, Krajíček and Doláková 2013). Taking into account this as well as other specifics, the ratio of students in non-economic fields would exceed 20%, so we can speak of a significant representation of students from other faculties of Masaryk University.

The Faculty of Economics and Administration offers a wide range of degree Bachelor's, Master's programmes. In order to reflect the dynamics of social and occupational reality, the offer of studies provided by the faculty is diversified to a great extent. There are two forms of studies available at the faculty. Apart from the traditional full-time mode of studies, there is a form of studies designed to meet the needs of those with a more busy schedule – the combined mode of studies. The combined form of studies is based on a combination of direct teaching in blocks of lessons (mostly taking place during weekends) and self-studies enhanced by the use of the latest information technologies and teaching methods.

Full-time students accounted for more than three-quarters of the number (77.1%) while students of the combined form of study were in the minority and their numbers reached one quarter (22.9%). The exact structure of the monitored students based on their form of study is presented in the following Table 1.

**Table 1** Students structure according the mode and the subjects of studies

| <b>Respondents according the mode of studies</b>         | <b>Full-time</b> | <b>Combined</b> | <b>Total</b> |
|--|------------------|-----------------|--------------|
| <b>Bachelor's programmes</b>                             | 655              | 194             | 849          |
| <b>Master's programmes</b>                               | 53               | 16              | 69           |
| <b>Total</b>   | 708              | 210             | 918          |
| <b>Respondents according the mode of studies (%)</b>     | Full-time        | Combined        | Total        |
| <b>Bachelor's programmes</b>                             | 92,5             | 92,4            | 92,5         |
| <b>Master's programmes</b>                               | 7,5              | 7,6             | 7,5          |
| <b>Total</b>   | 100,0            | 100,0           | 100,0        |
| <b>Respondents according the subjects:</b>               | N                | %               |              |
| <b>Financial markets (Bachelor's program. combined)</b>  | 53               | 5,8             |              |
| <b>Basics of finance (Bachelor's program. combined)</b>  | 141              | 15,4            |              |
| <b>Financial investing (Master's program. combined)</b>  | 16               | 1,7             |              |
| <b>Basics of finance (Bachelor's program. full-time)</b> | 329              | 35,8            |              |
| <b>Financial markets (Bachelor's program. full-time)</b> | 326              | 35,5            |              |
| <b>Financial investing (Master's program. full-time)</b> | 53               | 5,8             |              |
| <b>Total</b>   | 918              | 100             |              |

Source: own calculations based on results of study

From following analyses were excluded students that entered the test, answered only a few – or even no – questions and saved the test with zero point gain. Such students were in the test altogether 41.

Students could get as many as 18 points from knowledge-based questions that explicitly focused on the issue of specific requirements and different approaches to financial literacy of socially disadvantaged citizens; each correctly answered question was rated 1 point and if there were more variants of correct answers to one question, we assigned an aliquot proportion of one point.

The number of points obtained is presented in Table 2.

**Table 2** Total points

|             |    |        |
|-------------|----|--------|
| Mean        |    | 8,4635 |
| Median      |    | 8,1667 |
| Mode        |    | 7,17   |
| Percentiles | 25 | 6,0000 |
|             | 50 | 8,1667 |
|             | 75 | 11,000 |

Note: Mean – arithmetic average

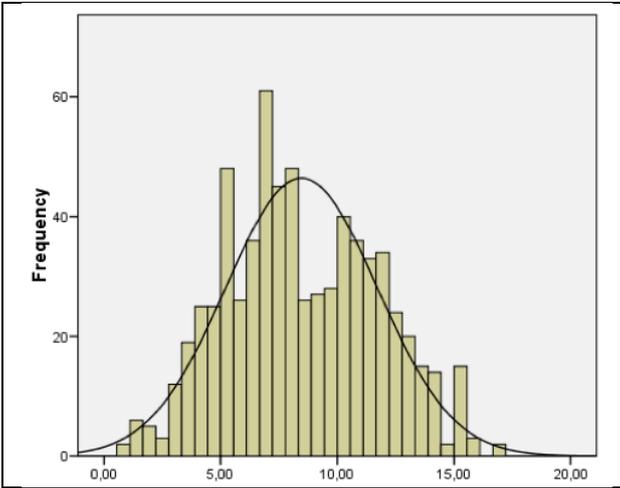
Median – the value that divides the sample into 2 equal halves

Mode – the most frequently occurring value

Percentiles – who is better than 25% of people scored 6 points; who is better than 50% of people scored 8.1667 points; who is better than 75% of people scored 11 points

Histogram presented in the Figure 2 shows data distribution using a bar chart. The height of columns (y-axis) represents the frequency of scoring a certain number of points. The x-axis shows the number of points.

**Figure 2 Histogram**



A detailed segmentation of the average scores was conducted within analyzing the data files.

The results show that a higher score was reached by women, university graduates, and people at the Master’s level of education in the combined form of study. People who are willing to participate in financial education reached in average the highest score (9 points).

**Table 3 Willingness to participate in financial education**

| Score - quartile | lowest quartile | low quartile | higher quartile | highest quartile | Total |
|------------------|-----------------|--------------|-----------------|------------------|-------|
| yes              | 20.5            | 21.8         | 25.7            | 28.8             | 24.1  |
| no               | 18.7            | 15.1         | 11.4            | 13.8             | 14.7  |
| maybe            | 49.4            | 53.1         | 56.9            | 53.1             | 53.1  |
| I don't know     | 11.4            | 10.1         | 6.0             | 4.4              | 8.0   |
| Total            | 100             | 100          | 100             | 100              | 100   |

The results in the Table 3 shows that People who are willing to participate in financial education reached in average the highest scores. These people belong to the highest quartile – they reached a higher score than 75% of the others. Overall, the question was answered positively by 24.1% of the respondents; the option “maybe” was chosen by 53.1% of them.

The following Table 4 shows ten easiest and ten hardest questions. The questionnaire was structured into the following 19 sub-areas. The structure was: Introductory general issues (questions 1-3), Quiz questions (questions 4-10), Payment (in domestic and foreign currency) (questions 11-16), Pricing (questions 17-21), Inflation - the overall macroeconomic situation (questions 22-25), Management households (questions 26-30), Debts and debtors (questions 31-34), Surplus funds - investments (questions 35-38),

APR-annual percentage rate of charge (questions 39-41), Interest rates (questions 42-46), Credit products - mortgages (questions 47-48), Insurance (questions 49-52), Deposit insurance (questions 53-55), Where to go to complain (questions 56-59), Contract, arbitration clauses, bills, contractual penalties (questions 60-62), Loss of credit cards (questions 63-64), Socio-demographic questions (questions 65-70). A separate segment consisted of 28 questions focused on the issues of socio-disadvantaged citizens (questions 71-98).

The results indicate that four out of the five most difficult questions were from the field focusing on the issue of specific requirements and different approaches to financial literacy of socially disadvantaged citizens. These results are presented in Table 4.

**Table 4** Complexity of questions

| <b>EASIEST</b>          |  |     |
|-------------------------|--|-----|
| <b>vo31</b>             | Imagine, that you take a loan and after some months of regular repayment you lose your job and thus regular income. What will you do?  | 836 |
| <b>vo64</b>             | What is the first thing to do, if credit card is stolen?   | 823 |
| <b>vo50</b>             | Novaks have in their property (flat) electronics in the value of some tens of thousands and worry, that their new flat could be robbed. Which insurance contract should they sign? | 813 |
| <b>vo97</b>             | Assume that you have entered \$100 on your account, which bears 2% annually. How much money are you going to have on this account in five years?                                   | 794 |
| <b>vo98</b>             | Imagine that the interest rate on your account is 1% annually and inflation was 2 %in given year. How much can you buy with the money from your account after one year?            | 787 |
| <b>vo23</b>             | If current inflation grew, what would happen to the money saved in bank?   | 742 |
| <b>vo45</b>             | Debit card is payment card.  | 742 |
| <b>vo36</b>             | What is true about risk, rate of profit and liquidity?   | 733 |
| <b>vo63</b>             | If your payment card is stolen, what risk are you exposed to?  | 719 |
| <b>vo81</b>             | General rate of unemployment in Czech republic is higher for:  | 714 |
| <b>vo29</b>             | Employee working in Czech republic can lower his tax base by:  | 197 |
| <b>vo20</b>             | By comparing of prices in stone shops and internet shops:  | 170 |
| <b>vo12</b>             | What is not the advantage of payment system PayPal?  | 137 |
| <b>vo30</b>             | What are current taxes and contributions for social and health insurance for employees, entrepreneurs and firms?   | 126 |
| <b>vo25</b>             | What is the relationship of central state authority?   | 116 |
| <b>vo73</b>             | How many personal bankruptcies were approximately declared in the Czech Republic in 2011?  | 116 |
| <b>vo38</b>             | For investor who never bought securities and now for the first time wants to buy for example shares of ČEZ, a.s. at the Stock Exchange Praha, applies:                             | 98  |
| <b>vo74</b>             | How many executions were approximately ordered by the courts in the Czech Republic in 2012?  | 87  |
| <b>vo79</b>             | In case of forced sales of chattels Czech law does not exclude from the enforcement:   | 52  |
| <b>vo82</b>             | When determining the eligibility for certain kinds of social benefits, such as childbirth allowances or child benefits, the relevant indicator is:                                 | 46  |
| <b>MOST COMPLICATED</b> |  |     |

On the contrary, further results indicate that two of the three added questions, used for international comparisons, occurred among the five easiest questions. Particularly, these were questions on the issue of interest rates and inflation.

The questionnaire was evaluated as medium till very difficult (total 86,8% of people answered like that). Only 0.7% of respondents considered the questionnaire to be very simple and 3.4% of the respondents evaluated the questionnaire as very difficult. The results shows the following Table 5.

**Table 5** Difficulty of the questionnaire

| <b>What is the difficulty of the questionnaire according to you?</b> | <b>%</b> |
|--|----------|
| <b>Very simple</b>   | 0,7      |
| <b>Moderately difficult</b>  | 9,9      |
| <b>Medium difficult</b>  | 52,9     |
| <b>Difficult</b>   | 30,5     |
| <b>Very difficult</b>  | 3,4      |
| <b>Don ´ t know</b>  | 2,6      |
| <b>Total</b>   | 100      |

#### **4 Conclusions**

Although research conducted in the past showed that university students have higher financial literacy than the adult population, their financial literacy still may have some deficits or limits. The fact that 62% of university students or graduates believe that they would be able to advise on personal finance can be problematic if we thoroughly deal with the issue of possible specific requirements and different approaches of financial literacy to the group of socially disadvantaged people.

The following conclusions can be drawn from the analysis of the questionnaire survey, which included in the issue of socially disadvantaged people:

- Socially disadvantaged people deal with more complex problems that go beyond the area of personal finance, which the students themselves sometimes perceive too narrowly.
- Students who are willing to participate in financial education reached in average the highest score.
- Questions focused on the issue of specific requirements and different approaches to financial literacy of socially disadvantaged people were among the most complex ones.

The presented results could be analyzed more thoroughly in the future, for example in terms of gender differences, more significant differentiation of economic and non-economic fields, or students of full-time and combined study programs.

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#### **References**

Atkinson, A. (2005). *Introducing financial capability skills - A pilot study with Fairbridge West*, Bristol, [http://www.pfrc.bris.ac.uk/Reports/introducing\\_financial.pdf](http://www.pfrc.bris.ac.uk/Reports/introducing_financial.pdf)

ČNB (2010) [http://www.cnb.cz/miranda2/export/sites/www.cnb.cz/cs/\\_spotrebite/financni\\_gramotnost/mereni\\_fg\\_tk\\_20101213/financni\\_gramotnost\\_20101213\\_stemmar\\_k.pdf](http://www.cnb.cz/miranda2/export/sites/www.cnb.cz/cs/_spotrebite/financni_gramotnost/mereni_fg_tk_20101213/financni_gramotnost_20101213_stemmar_k.pdf)

Hradil, D., Křížek, T. and Dvořák, P.: *Empirické ověření gramotnosti studentů vysokých škol* (2012), akademický výzkumný projekt, IGA 27/2012, IG102032, Praha.

Lusardi, A. (2009) *U.S. Household savings behavior: the role of financial literacy, information and financial education programs*. In Foote, C., Goette, L. and Meier, S.(eds), *Policymaking Insights from Behavioral Economics*. Federal Reserve Bank of Boston. pp. 109–149.

Lusardi, A., Olivia S. M. and Vilsa C. (2010) *Financial Literacy Among the Young*. In *Journal of Consumer Affairs*. 44(2), pp 358-380.

Masarykova Univerzita, Ekonomicko-správní fakulta, (2013). *Finanční gramotnost*, Brno. ISBN 978-80-210-6365-5

MFČR (2010). *Národní strategie finančního vzdělávání*. Dostupné na WWW: [http://www.mfcr.cz/cps/rde/xbcr/mfcr/Narodni\\_strategie\\_Financniho\\_vzdelavani\\_MF2010.pdf](http://www.mfcr.cz/cps/rde/xbcr/mfcr/Narodni_strategie_Financniho_vzdelavani_MF2010.pdf)

Roulet, M., (2009). *Financial Literacy and Low-Income Noncustodial Parents*. Center for Family Policy and Practice. June 2009. [cit. 2013-02-19]. Retrieved from WWW: [http://www.cffpp.org/publications/Policy\\_finance.pdf](http://www.cffpp.org/publications/Policy_finance.pdf)

Svoboda, M., Krajíček, J. a Doláková, B. (2013). *Bank Management and Financial Literacy*. In Ing. Miroslav Čulík, Ph.D. *Finanční řízení podniků a finančních institucí*. 1. vyd. Ostrava: VŠB-Technická univerzita Ostrava, Ekonomická fakulta, katedra financí, 2013. s. 882 - 890, 9 s. ISBN 978-80-248-3172-5

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