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Financial Literacy of University Students – the Czech and Slovak Experience

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Abstract

Financial literacy is one of the key components of education for living in a modern society. In this article, we present the results of our research into the current state of financial literacy among university students from two European countries. Our research was conducted in the form of a questionnaire survey. In the first part of the questionnaire we investigated selected personal characteristics of respondents and the second part was devoted to knowledge in different areas of financial literacy. The knowledge questions were focused mainly on respondents' competence in specific practical situations. The obtained data were processed by statistical analysis, including the dependencies between the results of the knowledge part and the self-reflexive assessment in the first part of the questionnaire. This analysis revealed several noteworthy findings.

Keywords: Financial literacy; questionnaire survey; statistical tests;

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1. Introduction

We live in the modern world and modern society of the 21st century. It is one of the characteristic features of life in such a world that we are exposed to rapid and dynamic changes. Nearly everyone is aware of the impact of modern technology but people also need to understand that almost daily their lives are becoming more closely linked to complex financial markets. Financial literacy is, therefore, one of the key competencies whose importance grows every day. We use debit or credit cards for routine purchases; we make decisions on savings; we plan the best investment to capitalize our funds in the short or long term. Life brings the need to choose the right financial instruments to provide for ourselves and our close relatives. The world around us, and not only the financial world, demands new skills to hold up in life. “In the time of globalization, internetisation, social networks, information spreading and new way communication ability to make something new, creative, efficient and unique is a key factor of success” (Soviar & Vodak, 2012). Following the OECD (OECD, 2012), we can say, that “Skills have become the global currency of 21-st century.”

In our personal and professional life, we use a whole range of skills that need constant upkeep. This places great demands on the quality of the education system and particularly high demands and expectations on higher education. “University education is characterized by systematic and balanced work, the absorption of a large volume of knowledge, facts, and data, respect for the condition that the structure of knowledge must be meaningful and applicable in practice” (Author, 2015). “They are not just institutions of higher education and research granting titles but they together educate responsible people with excellent knowledge able to solve questions and problems globally and share their knowledge that the wider community can benefit from” (Tokarcikova, Kucharcikova & Durisova, 2015). A university education offers students a large range of skills relevant to their future careers. Alongside the specific skills and key competencies of each profession, the importance of financial literacy is increasing all the time, and university graduates are no exception. In spite of this, the average level of financial literacy of Slovaks (62%) has not changed much since 2012 and many Slovaks still have a problem with orientation in elementary financial terminology. A specific feature of Eastern European countries is that even 28 years ago, the population did not live a consumer lifestyle and low financial literacy is a consequence. The younger generation has to learn from a blank slate how to deal with the different forms of mortgages and the general easy availability of credit, which can easily lead them to exceed their debt capacity, and suffer consequences as severe as the foreclosure of their property. Even in more economically developed countries, governments are wrestling with the problems caused by low financial literacy. In this context, the education system, as a whole, faces a major challenge: to increase the financial literacy of the young generation through financial education.

In our article, we focus on the financial literacy of university students, since university education is one of the key elements in preparation for full engagement with modern society. This paper presents the results of our research into the current state of financial literacy among university students in two European countries. The survey was conducted in faculties with similar study programs including management, computer science, and other technical fields.

2. Literature Survey

The importance of financial literacy arises from the need to respond to the increased complexity of the financial world. The complexity of this relationship means that there are many perspectives from which authors can explore financial literacy. Some authors derive the significance and importance as well as the proper definition of the financial literacy also from need to tackle the impact of modern IT

on financial products and services, which are becoming increasingly (Boshara, Gannon, Mandell, Phillips & Sass, 2010; Lusardi & Mitchell 2007; Van Rooij, Lusardi, & Alessie, 2012). Mandell defined financial literacy as “the ability to evaluate the new and complex financial instruments and make informed judgments about both: choices of instruments and extent of use that would be in their own best long-run interests” (Mandell, 2007). Remund says that financial literacy “is a measure of the degree to which one understands key financial concepts and possesses the ability and confidence to manage personal finances through appropriate short-term decision-making and sound, long-range financial planning, while mindful of life events and changing economic conditions.” (Remund, 2010).

Other authors (Mathew, 2007; Author, 2016; Gustman, Steinmeier, & Tabatabai, 2012) highlight the significant impact that financial literacy has on the correctness of decision-making and see it as a prerequisite for good financial decisions in personal finance. A strong positive relationship between financial literacy and wealth of households is reported in (Van Rooij, Lusardi, & Alessie 2012). “Our findings provide evidence of a strong positive association between financial literacy and net worth, even after controlling for many determinants of wealth.” Furthermore, this work found that “Financial knowledge increases the likelihood of investing in the stock market, and [is] positively related to retirement planning, and the development of a savings plan.” It may facilitate individuals’ accumulation of wealth.

Other works found that “Financial literacy was strongly related to sociodemographic characteristics and family financial sophistication. (Lusardi, Mitchell & Curto, 2012; Lusardi & Mitchell, 2011, Fornero & Monticone, 2011).” From a similar perspective, (Lusardi, Mitchell & Curto, 2010) observes that “Specifically, a college-educated male whose parents had stocks and retirement savings was about 45 percentage points more likely to know about risk diversification than a female with less than a high school education whose parents were not wealthy.”

Reed (2008), Sallie Mae (2009) presented in their work interesting results on the indebtedness of college students in the United States. Their analysis has shown a significant increase in the volume of debt from student loans and credit cards in the 22-29-year-old age group. In 2009 the US passed a law regulating the issuance of credit cards (Credit Card Accountability, Responsibility, and Disclosure - CARD) to young people under 21 (US Congress, 2009). International research confirms that financial literacy has an impact on financial behavior when deciding on loans, investing in financial markets to save for a pension and so on. (Lusardi & Tufano, 2009; Behrman, Mitchell, Soo & Brava, 2012).

Many works confirm (Mishkin, 2008; Banks & Olfeld 2008; Behrman, Mitchell, Soo & Brava, 2012, Ayers, 2012) that financial education has the effect of increasing financial literacy and that in many societies the sections of the population with the lowest levels of financial literacy include adolescents and young people, people of retirement age and women. “Around the world, financial education has become an important tool to tackle the growing complexity of financial decisions, especially in the life of the last generation.” (Lusardi & Mitchell, 2007).

For purposes of our article, we define the concept of the financially literate person in accordance with (Author, 2015) as “someone who uses their ability to make a qualified judgment on the basis of their knowledge, skills and experience to maintain balanced financial security throughout life.” This requires planning of financial flows. The result of preference of planning cash flow is more uniform consumption throughout life, depending on the stage of the life cycle.

3. Methods and Data Collection

Data was collected through a questionnaire survey. In our pilot survey, we focused on the students of two faculties with similar study programs. These study programs are focused on economics and management, informatics and other technical fields. Overall, we distributed 800 questionnaires among the students. After sorting the questionnaires and removing the questionnaires with malicious or incomplete responses, we obtained a sample of 684 questionnaires. This means that the response rate was 85.5%.

The questions in our questionnaire could be divided into two parts. The first part collected certain personal data such as gender, age, field of study, highest reached level of education and region of residence. Since we expected a dependency between financial literacy and numeracy, we also asked for respondents’ most recent marks from mathematics. Other questions in this section asked students to report on their attitudes and their prior training in financial literacy. We asked them about the form of their education in financial literacy, the way in which their knowledge was tested, the importance they attach to financial literacy, their self-appraisal of their financial literacy and the way in which they make financial decisions.

The second part of the questionnaire was designed to test the actual level of respondents’ financial literacy. This part of the questionnaire consisted of thirteen multiple-choice questions, each having four options, only one of which was correct. Each question included the option for students to say that they did not know or did not want to answer. Thematically, the questions could be divided into four categories:

- simple and compound interest,
- the time value of money and inflation perception,
- annuities and debt payments,
- basics of the investing.

Because we distributed the questionnaire in print, there were two final questions about the difficulty of the test. We asked respondents for their subjective impression of which of the questions seem to be the easiest and most difficult.

The essential socio-demographic characteristics of our sample are presented in Table 1. As we can see, the sample is relatively balanced in ethnic composition between Czech and Slovak students. We can observe some predominance of female respondents in the sample and a low number of respondents from other technical disciplines, but this is proportionate to the numbers of students enrolled in the given fields. Undergraduate students clearly dominate the sample, as was the primary aim of our research. The occasional postgraduate student appears, having joined the research on their own initiative.

Table 1. Socio-demographic structure of the sample

Gender	Number	Field of study	Number	Ethnicity	Number	Study level	Number
Female	263	Management	290	Slovak	381	Bachelor	578
Male	421	Informatics	252	Czech	303	Master	105
		Other technical	141			Doctoral	1

The age structure and educational attainment of respondents is set out in Table 2. The age group of 20-22-year-olds dominated in the age structure, which is in line with our focus on bachelor-level students. The total number of respondents under the age of 23 years was 594.

Table 2. Age and educational structure of the sample

Age	Number	Highest educational level achieved	Number	Type of the Secondary school	Number
19	68	High school	558	Grammar school	252
20	220	Undergraduate	118	Technical school	106
21	138	Graduate	8	Vocational school	107
22	97			Business academy	93

A crucial group by highest completed level of education were graduates of secondary schools. Regarding the type of completed secondary education, the dominant group was graduates of grammar schools. The other types of secondary schools were represented relatively uniformly.

We also collected data on prior training in financial literacy. Here we are offered a choice of four options: a separate subject, a contiguous block within another subject, small fragments in several subjects or none at all. The results are summarized in Table 3.

We consider the verification of knowledge to be an important factor influencing the outcome of education. We offered five options for answers: regularly by solving problems involving financial decision-making, regularly by written tests, sporadic testing, one comprehensive test at the end of the course, or none at all. These results also are included in Table 3.

Table 3. Forms of education and knowledge verification

Form of education	Number	Form of knowledge verification	Number
Separate subject	142	Regularly problem solving	39
Contiguous block	65	Regularly written tests	141
Fragments in several subjects	346	Sporadic testing	125
None at all	131	One comprehensive test	110
		None at all	269

The other three topics were self-evaluation questions, which also had a self-reflexive nature. In the first one, we asked how respondents would rate their own financial literacy. This time, we allowed them to choose from six options: fully financially literate, I usually make correct decisions, average, I feel some deficiency, very little and none. A summary of the responses is given in table 4. The second question was aimed at assessing how respondents perceive the importance of financial literacy. The choice was from five possibilities: vital, very important, important, of little importance and unnecessary. The last of this series of questions investigated how respondents made financial decisions. Again, they could choose from five options: I know how to decide alone, I seek advice within the family, I consult with friends, seek I specialized advice and I get advice in a bank. All the answers are summarized in Table 4.

Table 4. Results of the self-evaluation and self-reflexive questions

Self-rating of the financial literacy	Number	Assessing the importance	Number	The way of the decision making	Number
Fully literate	36	Vital	104	Decide alone	210
Mostly decide correctly	244	Very important	352	Advice within family	345
Average	232	Important	214	Consult with friends	22
Feel some deficiency	132	Little importance	14	Seek specialized advice	57
Very little	36	Unnecessary	0	Advice in a bank	50
None	4				

The remaining questions focused on the verification of competence in financial literacy. They were constructed so that answering the questions did not require respondents to perform any complex calculations. They tested respondents on problems related to financial decision making, the perception of the time factor in relation to financial flows and financial thinking.

Because of limited space, this paper cannot list all the questions from the questionnaire. However, we would like to present a couple of questions as an illustration. One question focused on the perception of the compounding period number.

Question: With increasing frequency of compounding, the effective interest rate:

- a) increases
- b) decreases
- c) does not change
- d) I do not know, I do not want to answer.

Another issue focuses on the verification of the time effect perception.

Question: Debt of 100 financial units matures in one year. The creditor agrees that it can be repaid in the form of two equal installments on six months and one year from now. These two installments will be:

- a) exactly 50 financial units
- b) more than 50 financial units
- c) less than 50 units of financial
- d) I do not know, I do not want to answer.

In order to analyze the influence of single factors on the results, we applied statistical tests. As the variances of the analyzed subsamples were different, we used the Welch *t*-test instead of the Student *t*-test. The testing criterion has, in this case, the form:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{s_1^2}{N_1} + \frac{s_2^2}{N_2}}}$$

where \bar{X}_1, s_1^2 and N_1 are the 1st sample mean, sample variance, and sample size, respectively, and \bar{X}_2, s_2^2 and N_2 are the 2nd sample mean, sample variance, and sample size, respectively. The associated number of degrees of freedom is then given by the formula

$$v \approx \frac{\left(\frac{s_1^2}{N_1} + \frac{s_2^2}{N_2}\right)^2}{\frac{s_1^4}{N_1^2 v_1} + \frac{s_2^4}{N_2^2 v_2}}$$

Here $v_1 = N_1 - 1$ and $v_2 = N_2 - 1$ are the degrees of freedom associated with the first and second sample variance estimate respectively. All necessary calculations were carried out in the free open source statistical tool R.

4. Results

Before we proceed to analyze the influence of various factors on the level of financial literacy, we briefly evaluate the overall results of our survey. The important question is, of course, the education. The counts of individual answers were presented in Table 3.

A finding that we consider particularly disturbing is that only a fifth of students say that they received systematic education on issues of financial literacy. It is literally alarming that about 68% of respondents reported at most only fragmentary financial education and moreover a whole fifth of them reported none at all.

There is no basis for satisfaction with the methods of the knowledge verification either. Nearly 40% of respondents were never tested in any form. What is more, less than 6% of the respondents were exposed to tests that involved solving problems related to financial decision-making. This group is numerically so small that it is not possible to obtain reliable confirmation that their competence is any better than the others'.

For the purposes of comparison with other factors, we first tested performance in relation to gender. The result is presented in the first row of the table 5. The hypotheses, that males and females reach the same level of the performance against the one side alternative, that males achieved better results has been rejected with a confidence level of 99%. It means that women seem to be more financially literate than men. This outcome could be foreseen because the male respondents' average score was less than 50%. When we calculated the other sample characteristics, it moreover showed that the median is for men only at the level of 46.15%. That is, most of them had a lower score than the overall average. In contrast, the median value for the female population is at 53.85%, so the absolute majority of women achieved above-average results.

Table 5. Results of the statistical tests for different factors that we considered to influence significantly the financial literacy

Factor	Options	Mean percentage	t-statistics	p-value
Gender	female	52,09%	3.5647	0.0001985
	male	46,94%		
Nationality	Slovak	43,00%	10,0173	2·10 ⁻¹⁶
	Czech	56,36%		
Importance	vital or very	49.92%	2.1136	0.01771
	not very	46.52%		
Self-rating of the financial literacy	fully of mostly	50.16%	1.2896	0.09885
	the other	48.33%		
Form of education	systematic training	48.71%	-0.18763	0,8513
	Non-systematic training	49.00%		
Knowledge verification	Regularly	49.78%	0.71904	0.4727
	Infrequently	48.61%		

Due to the roughly balanced number of respondents from two countries, we decided to test nationality as a criterion. The overall test results are presented in the second row of Table 5. This comparison is all the more interesting because the two countries were part of a common state until 25 years ago. It shows that with a 99.9% strength confidence level, we can reject the hypothesis that the mean percentage was the same in both countries. Conversely, respondents in the Czech Republic achieved significantly higher mean percentage 56.36%, compared with only the average success rate of 43% for respondents in Slovakia.

Next, we tested the hypothesis that the importance that individuals attach to financial literacy would have a significant impact on their knowledge score. The results are shown in the third row of Table 5. We divided the sample into two subsamples. The first subsample was made up of respondents who attach to the financial literacy vital or great importance. The second sample comprised respondents who considered financial literacy only important or having little importance. The test confirmed the rejection of the hypothesis that two samples have the same average score at a confidence level exceeding 98%.

We also verified the objectivity of the respondents' self-assessment. The results can be found in the fourth row of Table 5. In the first group, we included individuals who assessed themselves as being fully financially literate or making the right decision in most situations. In the second group were the individuals who assessed themselves as average or below-average. The test showed that it is not possible to reject the hypothesis that the two groups achieved the same average score. It shows that respondents may have an unhealthily exaggerated sense of their own competence. This is a factor that could hold back efforts to improve their skills.

We hypothesized that the form and extent of education in financial literacy would have a significant impact on the resulting level of financial literacy. For comparison, we created two groups of respondents. The first group was for respondents who had received systematic training. We included in it those who declared that financial literacy was covered by a separate subject or a contiguous block within another subject. The second category, which represented those who had not received

systematic training, that is, those who reported only fragments within other subjects or none at all. The results summarized in the fifth row of table 5 show that the hypotheses that both groups achieved the same average score cannot be rejected.

The previous result was reinforced by our assessment of the impact of knowledge verification on overall financial literacy. For this purpose, we again divided the sample into two disjoint subsets. In the first group were those who responded that their knowledge was tested regularly either by solving financial decision problems or by written tests. The second group then included those whose skills were tested infrequently or not at all. Again, it was found that the null hypothesis that the two groups would achieve the same average score could not be rejected. We see that in the last row of Table 5.

Table 6. Results of the t-test for linear regression modelling the relationship between numeracy and financial literacy

Coefficients	Estimate	Std. error	t-value	p-value
Intercept	0,4544	0.017396	26.120	$2 \cdot 10^{-16}$
β coefficient	0.0102	0,004671	2.185	0.0292

Financial literacy is often correlated with numeracy. Therefore, we also tested this dependence. Although the correlation coefficient 0.08 is not too high, we conducted a t-test. The complete results of the test are shown in table 6. As the p-value is much less than 0.05, we reject the null hypothesis that the regression coefficient $\beta = 0$. Hence, there is a significant relationship between the variables in the linear regression model of the data set.

Table 7. Results of the comparisons of financial literacy between different fields of study

Field of study	Mean percentage	t-statistics	p-value
Management	54,09%	4.8249	$9 \cdot 10^{-7}$
Informatics	46,67%		
Management	54,09%	6,5365	$2 \cdot 10^{-10}$
Other technical fields	42,36%		
Informatics	46.67%		
Other technical fields	42.36%	2.4931	0.00661

Finally, we examined the question of whether there are some differences in financial literacy between fields of study. The overall results are summarized in table 7. When we tested the hypothesis of identical average percentage, so for all three possible pairs of fields of study, we can reject the hypothesis at a confidence level exceeding 99%. It turned out that the management students achieved the highest levels of financial literacy. Their average score was just over 54%. In second place were informatics students with an average score of 46.67% and the last third place belongs to students in other technical fields, with an average score as low as 42.36%.

5. Conclusions

Our statistical analysis of the results of the questionnaire survey revealed some important findings. Firstly, the overall state of financial literacy of the university students should be considered unsatisfactory because the average score of the whole sample was less than 50%. A slightly more encouraging finding is the fact that management students achieved significantly better results than

students in technical fields. This is especially important because the financial health of the business sector will also depend on their capability to make the best decisions. At the same time, this confirms that students' personal financial knowledge can benefit from the financial education that is an organic part of the management curriculum. This result corresponds with the findings of (Mishkin, 2008; Banks & Oldfield, 2008 ; Behrman , Mitchell , Soo , Brava & Ayers, 2012).

When the results are compared by nationality, they show better results for Czech students. This advantage arises partly from the fact that the Czech Republic has implemented a national financial literacy strategy (Opletalova, 2015, p.1177, Table 1). Although our survey suggested that the form of financial education and knowledge verification did not significantly affect the results, it is plausible that the systematic character and especially the continuity of financial education may have a positive impact.

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