

# Financial Literacy Testing: Results of Conducted Research and Introduction of a Project

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**Abstract**—The goal of the study is to provide results of a conducted study devoted to financial literacy in the Czech Republic and to introduce a project related to financial education in the Czech Republic. Financial education has become an important part of education in the country, yet it is still neglected on the lowest level of formal education—primary schools. The project is based on investigation of financial literacy on primary schools in the Czech Republic. Consequently, the authors aim to formulate possible amendments related to this type of education. The gained dataset is intended to be used for analysis concerning financial education in the Czech Republic. With regard to used methods, the most important one is regression analysis for disclosure of predictors causing different levels of financial literacy. Furthermore, comparison of different groups is planned, for which t-tests are intended to be used. The study also employs descriptive statistics to introduce basic relationship in the data file.

**Keywords**—Czech Republic, financial education, financial literacy, primary school, regression analysis.

## I. INTRODUCTION

**F**INANCIAL literacy is a set of knowledge which is necessary to have in order to make proper decisions related to personal financial administration, financial investment and personal budget [1]. Alternatively, a financially literate person might be defined as a person having such knowledge [2].

Financial literacy is a subject of a number of literature and other sources. The content usually differs, yet most of them agree on the main division of what financial literacy consists of. Main parts of financial literacy are usually the following:

- Price literacy
- Money literacy
- Budget literacy

Each group is characterized by different set of knowledge which belongs to the particular group. Generally speaking, price literacy includes knowledge related to price mechanisms, inflation and other macroeconomic and microeconomic indicators, such as GDP, unemployment, etc. Money literacy includes knowledge related to banking products, loans, banking investments and similar ones. The last group, budget literacy, factors ability to administer own budget and issues related to personal finance, such as personal debt or investments of a family [3].

Financial literacy has become an important part of educational system around the world. It has been implemented

in curriculums of most of universities, high schools and at the same time it has also become a part of curriculums of primary schools, since financial literacy is something that needs to be developed from early years [4]. Financial education has also become a priority of many countries. In addition to this fact, the OECD (Organization for Economic Co-operation and Development) and its International Network on Financial Education (INFE) have developed tools to enable public authorities to implement national strategies related to financial education in policies of particular countries [5]. As a result of such importance, financial literacy needs to be measured and tested in order to verify that it has been taught properly and the young pupils and students have managed to familiarize with particular content related to different parts of financial literacy [6].

Despite the fact that financial literacy is taken as one subject, which means that for a citizen it is necessary to understand issues and knowledge related to all of the parts, it is usually tested and measured separately, since to measure all the parts together would be demanding and time consuming from the point of a respondent.

The importance to measure financial literacy also applies to the Czech Republic, although there are some specific aspects concerning its testing and measuring. The Ministry of Education has established a document devoted to financial education in the Czech Republic. Its name is National Strategy of Financial Education. It was announced in 2012 and it introduced several objectives to be met when it comes to creation of financial educational system in the Czech Republic across various age groups. The document, apart from targets and ways to achieve them, elaborates on fundamentals of principles related to financial education. According to the National Strategy of Financial Education, the system of education should be based on the following assumptions:

- Clearness (since it governs mainly attitudes towards young pupils teaching, meaning that all the procedures have to be clear and unambiguous)
- Practical examples which allow teachers and pupils see particular examples in practice (In other words, students are taught theoretical background which is, later on, supported by practical cases/examples)
- Generality (it is based on assumption that before approaching more advanced terms and systems, it is necessary to introduce basic terms and relationships first)
- Expert knowledge of teachers (as issues related to financial literacy are specific, it, therefore, requires well-educated people in this area) [3].

This study consists of two parts, each of which has its own

partial goals to be achieved. The first part of the study focuses on young citizens of the Czech Republic. In this part, the aim is to verify whether there is a gap in financial literacy when it comes to this target audience. The second part of the study is devoted to recently undertaken study on primary schools. The goal of this part is to reveal whether there is a gap in financial literacy on primary schools, which are taken as a baseline for financial education, since young pupils start being exposed to financial education.

## II. METHODOLOGY

When collecting the data for the study, the following restrictions were set:

- Respondents in the age between 18 and 30 years
- Respondents having their permanent residence in the Czech Republic

The final dataset consists of (after all corrections, mainly exclusion of those observations which had to be removed due to incorrect or impossible information, such as age above 30 years or number of hours working/studying exceeding 24 hours a day, etc.) 204 valid observations across various age groups (within the set group – Czech citizens in the age between 18 and 30 years).

In total 14 predictors have been used for the regression model. The description is included in Table I. Apart from the names and description of variables (when needed), the table also includes expected impact(s) on independent variable, which is “number of points” in terms of the regression model.

TABLE I  
 DESCRIPTION OF VARIABLES

Age	Positive impact with increasing age
Location	Positive in favor of citizens living in bigger cities (having more than 1,000 citizens)
Education	Positive impact with increasing level of education
Gender	Without any particular expectations expressed in advance
Economic field	Positive in favor of citizens working or studying in the economic sector
Mother's highest education	Positive (with increasing education)
Father's highest education	Positive (with increasing education)
Respondent's education	Positive (with increasing education)
Student	
Reading of daily press	Higher results are expected in case of those who regularly read newspaper
Financial dependency on parents	Those who are reliant on parts (with regard to finance) are expected to score less
Personal income	People with higher income are expected to be more aware of issues related to financial literacy
Income self-sufficiency	Positive result is expected in case of those who are self-sufficient in terms of personal income
Average number of hours spent working or studying	It is expected that with more hours the financial literacy will be higher

In order to reveal which of the predictors are statistically significant, the following regression model has been used – results of the model are stated in Table II.

In this model, none of the predictors have been excluded, mainly for potential impact of all of them. Consequently, those

predictors which have proved to statistically insignificant have been omitted. Both the models are stated in Tables II and III.

For the purposes of the second part of the study (testing of young pupils on primary schools), the intender predictors (variables which might have an impact on different level of financial literacy) are following:

- Gender
- Age (class)
- Study average
- Education of parents
- Occupation of parents
- Pocket money
- Whether a pupil has their own bank account
- Whether a pupils has an insurance product
- Areas of hobbies
- Inclination to active life style (sport, etc.)
- Other

Apart from the attempt to reveal which predictors might be a baseline for different level of financial literacy, the aim is also to compare various groups of pupils. When dividing them into particular groups, the following criteria are employed:

- Region
- Size of city/village a pupil comes from
- Size of class within a student studies
- Type of primary school (public, private)
- Specialization of primary school (if applicable)
- Other

## III. RESULTS

This chapter provides results of the study, and for the purposes of it, the results are divided into following sub-parts:

- Results of unrestricted regression model
- Results of restricted regression model (excluding those variables which proves to be statistically insignificant)
- Results of two particular t-tests
- Usage of the results for the study on primary schools which is recently in progress

Concerning the first sub-part (unrestricted regression model), the results are stated in Table II.

TABLE II  
 UNRESTRICTED REGRESSION MODEL

Independent variable: Number of points			
constant	1.022 (2.34)	0.6631	
Age	0.23 (0.1)	0.026	
Gender	-0.593 (0.36)	0.0977	
Location	0.958 (0.42)	0.0238	
Student	-0.106 (0.5)	0.8308	
Higher education	0.299 (0.41)	0.469	
Father's higher education	-0.017 (0.36)	0.9622	
Mother's higher education	0.602 (0.38)	0.1134	
Financial dependency on parents	0.355 (0.51)	0.4891	
Personal income (after taxes)	<0.001 (<0.01)	0.8583	
Income self-sufficiency	0.183 (0.4)	0.6515	
Economic field	3.263 (0.38)	<0.0001	
Daily press	0.399 (0.35)	0.2253	
Number of hours spent working and studying	-0.014 (0.01)	0.368	

Looking at the conducted unrestricted model, most of the variables are not statistically significant. However, considering even this one, there are some trends revealed (and confirmed by law p-values, signaling that such variables are statistically significant and, therefore, such variables have an impact on the independent variable).

Taking into consideration respondents in the age between 18 and 30 years and omitting (gradually) all insignificant variables, it brings us to the following (restricted) regression model (Table III). When deciding on whether a predictor is statistically significant, 5% significance level is taken into consideration.

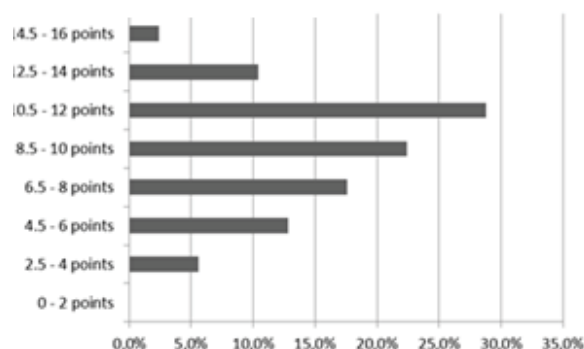
TABLE III  
 RESTRICTED REGRESSION MODEL

Independent variable: Number of points		
constant	1.018 (1.8)	0.5726
Age	0.246 (0.08)	0.0021
Location	0.965 (0.4)	0.0174
Mother's higher education	0.691 (0.35)	0.0465
Economic field	3.283 (0.36)	<0.0001
<b>R-squared</b>	0.384	
<b>F-test</b>	24.688 (<0.0000)	

Based on the results of the restricted regression model, the most significant predictor appears to be belonging to the economic sector, location (whether a respondent lives in a village having up to 1,000 citizens or whether a respondent comes from a city having more than 1,000 citizens). For respondents living in cities with more than 1,000 citizens, the average score is approximately about one point higher comparing to those who come from smaller cities or villages. Apart from these two predictors, there are other ones which are confirmed to have a statistically significant impact on financial literacy level. The third most important one for this model is mother's education. Father's education, however, has not proved to have a statistical impact on respondent's financial literacy level. Possible explanations and theories will be mentioned in Chapter IV (Discussion and further steps). Age seems to be also an important predictor in this model, since its p-value is lower than the significance level. The precise impact is lower (comparing to the three previous ones) – with additional age of a respondent, the average increase in the number of points in the test part is approximately 0.25.

As stated above, the goal of this investigation has also been to measure potential gaps between various groups of respondents. In this study results of two t-tests are presented. The previous regression models (neither of the two models) did not render the gender a significant predictor. Gender issue is sometimes taken into account when comparing level of financial literacy, therefore, a deeper insight in gaps between males and females is displayed in Fig. 1. For males (Fig. 1 (a)), there are more respondents scoring between 10.5 and 12 points, however, there are more females (Fig. 1 (b)) scoring between 12.5 and 14 points. For both gender, extreme values (both close to bottom and peak) are represented by very limited number of observations.

(a) Data for males



(b) Data for females

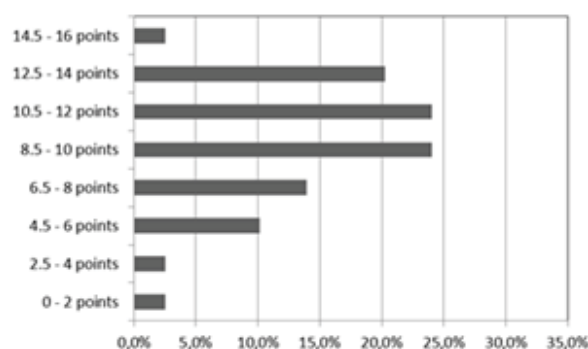


Fig. 1 Comparison of males and females

Conducting an official test (two sample t-test in this case), we obtain the results in Table IV.

TABLE IV  
 COMPARISON OF MALES AND FEMALES (T-TEST)

Name	Average value	P-value (t-test)	P-value (F-test)
Males	9.728	<b>0.3118</b>	<b>0.3153</b>
Females	9.300		

The official test does not reject the null hypothesis (which is in case of the t-test following: both groups have the same mean). The validity of the test is corroborated by p-value of F-test, which indicates that variances of both the samples are equal.

When it comes to comparison of rural and urban population, the situation is completely different, as stated in Table V.

TABLE V  
 COMPARISON OF RURAL AND URBAN POPULATION (T-TEST)

Name	Average value	P-value (t-test)	P-value (F-test)
Rural population	8.289	<b>0.0021</b>	<b>0.1065</b>
Urban population	9.799		

The difference between rural and urban population has been proved by conducting the t-test. The average number of points for rural population is 8.3, while the average number of points of urban population is close to 9.8. Taking into consideration the number of observations and the maximum number of points, this gap has proved to be statistically significant. Again, the validity of the test is confirmed by results of F-test,

which indicates that variances are monotonous.

Concerning the second part of the research (and the last bullet related to results part), which is devoted to investigation on randomly chosen primary schools in the Czech Republic, expected results and outputs are believed to help reveal discrepancies among young pupils and students. The set research questions are:

- Does the size of village in which a primary is situated have an impact on financial literacy level?
- Does the size of a class in which a student studies have an impact on financial literacy level?
- What are the most critical areas of financial literacy from the point of young pupils?
- Are there any differences in financial literacy level across various locations in the Czech Republic?
- What are the topics young students/pupils like studying?
- What are the topics young students/pupils do not like studying?
- What are the topics young students/pupils perceive as the most difficult one(s)?
- What are the topics young students/pupils perceive as the most obvious/clear one(s)?
- What young students/pupils miss on primary schools related to financial education?

#### IV. DISCUSSION AND FURTHER STEPS

For the whole dataset, it has been revealed that the main impact on financial literacy level has the permanent residence of respondents. There are several factors which might stand behind such finding. Most universities, financial institutions and other institutions which include well-educated people are usually situated in bigger cities, which supports people (those who want to either study, or to work for such institutions) to move to such cities. At the same time, such finding should not be interpreted in the way that less smart and wise people live in villages, since financial literacy is not the only needed part of science and knowledge.

Age has proved to be an important predictor of financial literacy as well. However, the impact of this predictor is less than 0.25 points (out of 16 points), which indicates that age causes only minor difference among citizens of the Czech Republic in the age of 18 and 30 years. On the other hand, if we take into consideration the spread of age (target audience was limited from 18 to 30 years), there is a possibility that across the whole population this impact might be more significant.

The study has not revealed any gaps between males and females. Gender issues are frequently discussed in relation to financial literacy and financial education. Nevertheless, this research has not unveiled any discrepancies concerning financial literacy. One of the causes might be factoring various parts of financial literacy. In other words, there may be some differences in particular areas (both in favor of males or females), yet, taking into account financial literacy in general, no gaps have been proved.

The regression model has proven that mother's education has a significant impact on the level of financial literacy of

citizens in the Czech Republic. On the other hand, father's education has not been proven as statistical significant. Such finding might bring questions concerning parent's impact on children. One of the possible explanations why mother's education has been proved to be significant, and father's education not is that children tend to be more influenced by mother's upbringing when they are underage.

The study is planned to be proceeded in the future. One of the main targets of this study was to reveal whether there are some gaps in financial literacy, aiming at the set target audience. The introduced research is focused on pupils of primary schools, since financial education starts being developed on primary schools, when young pupils begin coming across basic issues and basic computation related to money and other parts of financial education.

When planning this research, more attention has been paid to attributes of primary schools which have pupils who are more educated (in terms of financial education) and those primary schools who suffer from a lack of educated pupils at the same area. However, it should not be omitted that "educated" in this context means that pupils are familiar with terms, computations and another knowledge related to financial literacy and financial education.

#### V. CONCLUSION

The goal of this article has been to provide results concerning a study devoted to financial literacy among young citizens of the Czech Republic (in the age between 18 and 30 years). For the purposes of the study, two regression models have been introduced-unrestricted regression model and restricted regression model. When it comes the first regression model (unrestricted model), all 14 predictors have been employed, when in the other one only those predictors which have proved to be statistically significant have been retained.

The regression analysis revealed that the most influential predictors of financial literacy level in the Czech Republic are age, location, mother's education and belonging to the economic sector. Concerning those predictors which have been proved to be statically significant, the highest impact has been measured in terms of the predictor "economic sector". For those who study or work in the economic sector, the average number of points (scored in the test part of the questionnaire) was approximately 3.28 higher on average, which is a significant difference, especially if we take into consideration the fact that the maximum number of points is 16. Moreover, the p-value of this predictor almost hits zero, which confirms its validity in the model. The second most import one (when comes to its impact on financial literacy level) is the location. It implies that people living in cities having 1,000 citizens at least tend to be more aware of issues related to financial literacy. These people scored approximately one point higher result (on average) compared to citizens from smaller cities or villages. The remaining predictors have been rendered as statistically significant as well (age and mother's education), yet their impact is lower than in case of the previous two ones.

The study also focuses on comparison of various groups, in

order to support some results revealed in the regression model and in order to specify some of the results. For this purpose, various types of t-tests have been computed. In the first t-test males and females were compared in order to unveil whether there is a gap in financial literacy level between both the groups. This expectation has not been confirmed, since the p-value of the test is higher than the significance level, implying that both the groups (males and females) tend to score similar results in the test. The second t-test was devoted to comparison of people living in bigger cities (having 1,000 citizens at least) and people living smaller cities or villages. This particular test have unveiled that there is a significant disparity between both groups. It, therefore, confirms what has been revealed in the regression model. The average value of rural population was approximately 8.3 points out of 16, while the average value of urban population close to 9.8 points.

The second part of the article has dealt with introduction of a new project whose main target to analyze level of financial literacy on primary schools in the Czech Republic. Such step is supported by the fact the financial education is a part of education which is necessary to cultivate from very early age, in order to make sure that young pupils and students have enough chances and opportunities to be exposed to such kind of education.

The project is based on thorough testing of young pupils whose visit primary schools in the Czech Republic. Furthermore, the age of such pupils is limited to pupils in the age between 10 and 15 years.

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