

# Socio-demografske determinante financijske pismenosti građana Republike Hrvatske

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 Preliminary Communication

## SOCIO DEMOGRAPHIC DETERMINANTS OF FINANCIAL LITERACY OF THE CITIZENS OF THE REPUBLIC OF CROATIA\*\*\*\*

*Scientific purpose of this paper is empirical assessment of financial literacy (FL) of individuals by examining relationship between FL and socio-demographic characteristics of the Croatian citizens. Research results could serve as a basis for development and improvement of personal finance strategies and national financial policy measures with special attention put on education. Empirical model has been tested by using binary logistic regression; four fundamental survey questions have been defined, set as dependent variables while six socio-demographic characteristics of respondents have been set as independent variables. Research results show that age, level of education and income levels statistically significantly influence FL.*

*Keywords: financial literacy, personal finance, socio-demographic characteristics, financial literacy strategy, logistic binary regression*

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## 1. Introduction

Financial literacy (FL), which is of main interest in this study, is investigated within the context of personal finance where a unit of interest is an individual or a citizen. Therefore, it is important to explain and analyze the meaning of FL, as well as socio-demographic characteristics influencing the level of FL. FL can encompass a number of different concepts among which are knowledge on financial products, knowledge of understanding the concepts of future and present value of money, impact of inflation in money valuation, knowledge on investment possibilities, understanding of securities trade etc.

For further analysis, it is important to define some basic terms, which will be discussed in this paper starting with the FL definitions. There are many FL definitions, sometimes overlapping in meanings. Hilgert, Hogarth and Beverley (2003) define FL as financial knowledge, which makes this construct quite wide in meaning. According to the National Council on Economic Education – NCEE (2005:3) FL is “familiarity with basic economic principles, knowledge about the U.S. economy, and understanding of some key economic terms”. President’s Advisory Council on Financial Literacy (PACFL, 2008) defines FL as “knowledge of basic economic and financial concepts, as well as the ability to use that knowledge and other financial skills to manage financial resources effectively for a lifetime of financial well-being”. Furthermore, according to the PACFL it is necessary to distinguish two terms – FL and financial education. Financial education is defined according to the OECD (2005:26) as “the process by which financial consumers/investors improve their understanding of financial products and concepts and, through information, instruction and/or objective advice, develop the skills and confidence to become more aware of financial risks and opportunities, to make informed choices, to know where to go for help, and to take other effective actions to improve their financial well-being”. In this paper, FL is defined according to Lusardi (2008:2) where FL is “knowledge of basic financial concepts, such as the working of interest compounding, the difference between nominal and real values, and the basics of risk diversification”. However, it is important to point out that Lusardi (2008, 2011), Lusardi and Mitchell (2007b) use the OECD definition to investigate FL. In this paper, operationalization of FL was given questioning future and present value of money compounding combined with investment questions. More on the research questions and methods is to be discussed in research results section.

Great insolvency and indebtedness of individuals are a major issue in many economies around the world in the past decade. Developing and developed countries are putting a lot of effort in investigating causes of such a great indebtedness. Significant amount of money is spent on extensive studies usually done by World

Bank, OECD, and European Commission. When analyzing Croatian example, according to the Financial Agency (2015) indebtedness of the Croatian citizens amounted to HRK 32.02 billion. Accordingly, it is possible to recognize the need of analyzing the cause of such a great indebtedness by highlighting FL issues as one possible explanation of such a situation.

Personal insolvency and indebtedness are in many policy discussions addressed as one of major tasks to be dealt through policy measures on a country level in a form of strategies and operational programs. On the European Union level, the European Commission adopted a Communication on Financial Education in 2007. Set of measures has been adopted and financed to improve financial education, as the Dolceta online resources for financial education (European Commission, 2015). In Croatia, the Croatian Institute for Financial Education was established in 2011. When discussing legal framework and FL in Croatia, the basis can be found in Consumer Strategy Policy 2007 – 2013 whose goals encompass consumer protection and FL enhancement. Furthermore, it is consequently easier to prevent personal insolvency and indebtedness rather to deal with social and economic consequences. FL education is considered to be an important instrument for treating existing insolvency due to the fact that it serves as a prevention and not a repair (Kilborn et al., 2012). Many developed countries have recognized the prevention needs and integrated FL in their education systems, starting from the level of primary education, while at the same time it is becoming widely acceptable for financial education to be used as an instrument for improving personal finance management and decreasing household indebtedness. Exploring the necessities of FL education, corresponding learning outcomes, proper structure, effectiveness and system of integration in national curriculums is extensively complex, acquires multidisciplinary approach, and goes beyond the scope of this paper. Accordingly, this paper will address only preliminary diagnosis of FL state and give further research guidelines.

The above mentioned considerations implicate the research problem and that is the lack of a model for assessment and evaluation of FL of adult individuals in the Republic of Croatia. Therefore, the object of this paper are individuals, more precisely, the assessment of their level of FL and socio-demographic characteristics which are combined in the empirical model. Empirical research encompasses four multiple binary logistic regressions related to four different survey questions, which represent the FL definition constructs.

The purpose of this research emerges from the foregoing research problem - to present theoretical and practical solutions for investigating the level of FL as well as creating a model by which relationship between FL and socio-demographic characteristics of individuals is to be tested. Consequently, research results will provide a better insight into determinants of individuals' FL as prerequisites for

the formation of high-quality personal finance strategies and financial policy measures.

Research objectives can be divided into scientific and practical. Scientific objectives refer to qualitative analysis of existing relevant literature in the field of personal finance with focus put on the FL, creation of the model for FL research and setting up of relationship between FL and socio-demographic characteristics of individuals, as well as acquisition of new knowledge and facts on the state of FL of citizens in the Republic of Croatia. Practical objectives imply development and improvement of present personal finance strategies at the country level, which also encompass FL. In 2015, Ministry of Finance of Croatia as a holder of consumer's FL developed the National strategy frame for financial literacy of consumers 2015 – 2020. Furthermore, it is important to point out that the National strategy is only a draft document and development of future action plans and concretization of FL measures is yet to be achieved.

The paper is structured in the following way. Introduction focuses on defining the main elements of the research - research problem and object of the paper, as well as purpose of the research, scientific and practical objectives. Second part gives an overview of relevant literature and recent research for the Republic of Croatia and other countries. Third and fourth parts describe methodology and present different logit models. Fifth and sixth parts of the paper provide the theoretical and practical implications and conclusion of the research as well as recommendations for further research.

## **2. Literature review**

The issue of FL at the global level has not yet been sufficiently investigated (Rooij, Lusardi and Alessie, 2007). There is a relatively small oeuvre of FL research if we consider the importance of individuals' financial decisions in overall economic activity. Few existing empirical studies highlight the issue of widespread inadequate levels of FL and claim that individuals do not possess basic knowledge of personal finance (Lusardi and Mitchell, 2006, 2007a, 2007b; NCEE, 2005; Hilgert, Hogarth and Beverly, 2003; Hilgert and Hogarth, 2002; Agnew and Szykman, 2005). Majority of empirical studies are done for developed countries, primarily for the United States, and data are usually nationally available through FL research centers (National Center for Economic Education in Washington etc.). Many studies on FL have been carried out at the institutional levels. The World Bank conducts research and makes recommendations for financial education at the national level for a particular country (Kilborn et al., 2012; Xu and Zia, 2012),

while Volume I and Volume II (2010) cover Croatia. During the FL research for the Republic of Croatia five financial segments were analyzed (banking, nonbank credit institutions, securities, insurance and private pension funds), where eight critical points were detected: laws and institutions for consumer protection, data publication and transparency, administration and maintenance of clients' accounts, privacy protection and data protection, protection practices during legal disputes, systems of guarantees and damage compensation, consumer empowerment (including programs for consumer education and FL), and issues regarding market competition in the field of financial services. It is important to highlight that the analysis is not representative since it did not include all financial services, products nor financial sector practices but it focused on the consumer protection and FL (World Bank, 2010). World Bank study (2010) highlighted the role of FL and stated its importance in maintaining the country's financial system and at that point we can identify the importance of FL analysis and introduction of financial education programs for individuals. The FL study in this paper draws on the main findings and recommendations of the World Bank for Croatia (World Bank, 2010), but also on the empirical results of Xu and Zia (2012), with certain modifications for the purposes of this paper.

Table 1 presents the FL variables found in various researches around the world representing the FL of individuals.

According to Table 1 it can be concluded that most of the studies have been conducted for developed countries, while there is still lack of research for less developed countries.

Questions Q1 – compound interest question, Q2 – inflation question, Q3 – risk diversification question represent the variables for assessing FL. These questions are answered in specially designed survey where a correct answer stands for a person with adequate FL and incorrect answer for a person with inadequate FL.

Table 1.

# PREVIOUS RESEARCH RESULTS ON FINANCIAL LITERACY

| Country<br>(Year of Survey) | Q1.<br>Compound<br>interest | Q2.<br>Inflation | Q3.<br>Risk<br>divers. | Survey<br>sample | Source                                  |
|-----------------------------|-----------------------------|------------------|------------------------|------------------|-----------------------------------------|
| <b>High income</b>          |                             |                  |                        |                  |                                         |
| USA (2009)                  | 65%                         | 64%              | 52%                    | 1,488            | Lusardi and Mitchell (2011)             |
| Italy (2006)                | 40%                         | 60%              | 45%                    | 3,992            | Fornero and Monticone (2011)            |
| Germany (2009)              | 82%                         | 78%              | 62%                    | 1,059            | Bucher-Koenen and Lusardi (2011)        |
| Sweden (2010)               | 35%                         | 60%              | 68%                    | 1,302            | Almenberg and Säv-<br>Söderbergh (2011) |
| Japan (2010)                | 71%                         | 59%              | 40%                    | 5,268            | Sekita (2011)                           |
| New Zealand (2009)          | 86%                         | 81%              | 27%                    | 850              | Crossan et al. (2011)                   |
| Netherland (2010)           | 85%                         | 77%              | 52%                    | 1,324            | Alessie et al. (2011)                   |
| <b>Higher-middle income</b> |                             |                  |                        |                  |                                         |
| Russia (2009)               | 36%                         | 51%              | 13%                    | 1,366            | Klapper and Panos (2011)                |
| Romania (2010)              | 24%                         | 43%              | ...                    | 2,048            | World Bank CPFL program                 |
| Azerbaijan (2009)           | 46%                         | 46%              | ...                    | 1,207            | World Bank CPFL program                 |
| Chile (2006)                | 2%                          | 26%              | 46%                    | 13,054           | Behrman et al. (2010)                   |
| <b>Lower-middle income</b>  |                             |                  |                        |                  |                                         |
| Indonesia (2007)            | 78%                         | 61%              | 28%                    | 3,360            | Cole et al. (2010)                      |
| India (2006)                | 59%                         | 25%              | 31%                    | 1,496            | Cole et al. (2010)                      |
| North Bank and Gaza (2011)  | 51%                         | 64%              | ...                    | 2,022            | World Bank CPFL program                 |

Source: Xu, Zia, 2012.

Lusardi (2011) also analyses time value of money, inflation and tests determinants that influence FL of individuals. Rooij, Lusardi and Allesie (2007) upgrade

FL research and introduce advanced FL questions in their surveys, e.g. time value of money questions, questions regarding capital markets and stocks, return on investment calculations and questions regarding pension plans. On the other hand, the issue of education for the purposes of improving FL is dealt by Forte (2012) and the subject of interest in this paper are socio-economic characteristics (marital status, level of education and field of education).

FL studies for Croatia are still missing, which is surprising considering the growing household indebtedness in recent years. Literature review shows scarce empirical research analyzing FL of working adults in Croatia. One of the few authors addressing FL issues is Vehovec (2011). Furthermore, Garašić (2011) discusses legal definitions of personal insolvency and marginally mentions FL. By analyzing other relevant studies for Croatia, it can be concluded that there is no other empirical research. The institute GfK - Gesellschaft für Konsumforschung in 2011, which analyzed saving habits of Croatian citizens, conducted FL research for the Republic of Croatia from the perspective of consumers. One of the first steps in exploring FL in Croatia could also be seen in this paper. Concerning the research sample of 259 respondents in this paper it can be stated that the research is significant since some larger countries (Table 1) like the United States, Germany and Sweden record studies on sample sizes of approximately 1,000 respondents. More on sample size, representativeness and limitations will be explained in the following chapters. As FL definitions differ, so do the measuring systems and research methods. Various authors use different test methods – self-assessment tests, performance tests, which are knowledge based, content domains including savings, investment and debt (Hung, Parker and Yoong, 2009). This paper uses performance test defined with the set of questions testing specific knowledge.

### 3. Methodology

This paper presents the empirical results on FL for Croatia. The research sample consists of primary data – population of working adults ranging from 18 years or older to 69 years (according to the classification of Croatian Bureau for Statistics), which amounts to 2,931,563 citizens (Croatian Bureau for Statistics, 2011). When testing representativeness of the sample, a sample size of 246 respondents at the reliability level of 95%, 5% error level and proportion of 0.2 is sufficient. Furthermore, sample size of 259 respondents is sufficient to prove reliability of statistical testing in this paper, whereas geographical representativeness is not completely satisfactory since respondents are limited to certain areas.

Data collection method was a structured questionnaire, electronically available from 20<sup>th</sup> November to 12<sup>th</sup> December 2014 where a sample of 259 individ-

uals (n=259) of various age groups and geographical affiliation were surveyed. Moreover, it is possible to detect a limitation of this paper when discussing sample size and formation since questionnaires were directly sent to respondents' email addresses and a link to the questionnaire was open for individuals to access on social networks. At this point, it can be recommended conducting a future research, which would include questionnaires sent by post wherein certain groups of individuals would not be omitted. Respondents were from the northern, northwestern and central Croatia and city of Rijeka, where the author was able to distribute the survey via social networks. Structured questionnaire consisted of four questions that examined the FL of respondents (dependent variables of the model) and six questions regarding socio-demographic characteristics of respondents (independent variables of the model).

Dependent variables of the model have been constructed in the form of questions (Q1-Q4) to which a convenient number of respondents give their answer (i):

$y_{i1} = Q1$ : refers to the question of future value of money

Assume you had HRK 100 in your savings account paying interest of 2% a year. How much money would you have in your account after 5 years? Answers: **more than HRK 102**, less than HRK 102, exactly HRK 102, I don't know.

$y_{i2} = Q2$ : refers to understanding of inflation

Interest rate on your savings is 1% yearly and the inflation in a country is 2% yearly. Would you be able to buy more or less goods with the amount from your savings account after 1 year? Answers: more than today, **less than today**, the same as today, I don't know.

$y_{i3} = Q3$ : refers to the question of present value of money

Imagine that your friend inherited HRK 10,000 today and his brother HRK 10,000 three years from now. Who got more from the inheritance? Answers: **my friend**, his brother, they are equally rich, I don't know.

$y_{i4} = Q4$ : refers to the question of future investment

If you would have money, would you invest it in some of the following forms in the future: I would invest in a bank, I would open an insurance contract, I would invest in securities, none of the above, other. Respondents could choose more than one answer. Future investment question can be related to the question of pension literacy (Vehovec, 2011).

Each of the above-mentioned variable has been encoded for the purposes of multiple binary logistic regression analysis; correct answer with code 1 and other

responses with code 0. Correct answer, i.e. 1, implied individual with adequate FL, while 0 implied a wrong answer and inadequate FL. In the case of variable  $y_{i4}$ , respondents who marked that they invest money are coded with 1, representing individuals with adequate FL, and the answer “none of the mentioned” is encoded with 0, representing individuals with inadequate FL.

Independent variables are defined as follows – age ( $X_1$ ), gender ( $X_2$ ), level of education ( $X_3$ ), field of education ( $X_4$ ), income level ( $X_5$ ), marital status ( $X_6$ ). The sample consists of 47.7% respondents in the 18-29 age range, 24% in the 29-35 age range, 15.9% in the 36-46 age range, 12.4% in the 47-65 age range. Furthermore, 38.4% of respondents are males and 61.6% are females. Respondents are by the level of education divided as follows - 19% of respondents have secondary education, 38.4% have undergraduate education, 27.1% have graduate education and 15.5% have postgraduate education. As for the level of education, 68.6% of respondents are educated in the field of social sciences, 1.9% in the field of philology, 5.4% in humanistic sciences, 4.3% in natural sciences, 15.9% in technical sciences and 3.9% in more than one education field. As for marital status, 58.9% respondents are single, 36.4% married, 3.9% divorced and 0.8% widowed. Income is the only non-categorical variable since respondents entered amounts of their monthly income in the survey.

Further on, coding of the independent variables will be given. Age ( $X_1$ ) is in the structured questionnaire defined as categorical variable encoded in the following way: 18-28 years encoded with  $X_{11}$ , 29-35 years encoded with  $X_{12}$ , 36-46 years encoded with  $X_{13}$ , 47-65 years encoded with  $X_{14}$ . Gender ( $X_2$ ) is defined as categorical variable encoded with values  $X_{21}$  for a male and  $X_{22}$  for a female. Level of education ( $X_3$ ) is also a categorical variable encoded in the following way: high school  $X_{31}$ , undergraduate study  $X_{32}$ , graduate study  $X_{33}$ , and postgraduate study  $X_{34}$ . Field of education ( $X_4$ ) is encoded in the following way: social sciences  $X_{41}$ , philology  $X_{42}$ , humanistic sciences  $X_{43}$ , natural sciences  $X_{44}$ , technical sciences  $X_{45}$ , and more areas  $X_{46}$  (for example philology and humanistic sciences, technical and natural sciences, actually any combination of two or more different fields). Income level ( $X_5$ ) is the only non-categorical variable and is therefore not coded. Marital status ( $X_6$ ) is also encoded in the following way: single  $X_{61}$ , married  $X_{62}$ , divorced  $X_{63}$ , widowed  $X_{64}$ . Independent variables of the model ( $X_1 - X_6$ ) imply six hypotheses of the paper (H1 – H6):

- H1. Age statistically significantly influences FL.*
- H2. Gender statistically significantly influences FL.*
- H3. Level of education statistically significantly influences FL.*
- H4. Field of education statistically significantly influences FL.*
- H5. Income levels statistically significantly influence FL.*
- H6. Marital status statistically significantly influences FL.*

Set hypotheses generate the basic hypothesis of the paper: scientifically based facts about socio-demographic characteristics of the respondents enable us to determine the specific characteristics, which would influence FL with the purpose to amend present (national) FL strategy and develop future FL strategy, where special attention should be put on development of FL education programs. For the purposes of empirical analysis, four models have been created on the basis of four basic research questions (Q1-Q4), where every model tests individual dependent variable ( $y_{i1}$ – $y_{i4}$ ). Testing the model by the means of multiple logistic regression is considered appropriate given the coding specificities of dependent variables with binary values 0 and 1. Furthermore, the method is best suited to answer the research questions (Q1-Q4) considering the fact that it predicts *probability* of event  $y$  occurrence with known values of  $x$  instead of predicting *values* of dependent variable  $y$  on the basis of independent variable  $x_i$  (linear regression). In this sense,  $P(y_i)$  denotes the probability of  $y_i$  event to occur, i.e. that a respondent would correctly answer the FL question. Since the relationship among variables in the logistic regression is not linear, logistic regression equation takes the following form:

$$P(Y_i) = b_0 + b_1x_1 + b_2x_2 + \dots + b_ix_i + \varepsilon_i \quad (1)$$

#### 4. Results

Analysis has been conducted by using the *Statistical Package for the Social Sciences (SPSS)*. Firstly, the significance of the model is tested and secondly, the corresponding influence of independent variables on the dependent variables is tested and conclusions are drawn on accepting or rejecting the hypotheses. It should be added that the models for testing the relationship among the described variables draw on the previous empirical research (Xu and Zia, 2012; Rooij, Lusardi and Alessie, 2007; Forte, 2012) with necessary modifications for the purposes of the research. Logistic regression as a method for hypotheses testing is chosen since dependent variables are binary and independent categorical. Validity of data is tested within the regression results, where in each separate test first table will show the significance of predicting probability of influence between variables, while second table will present the significance of every independent variable separately, as well as corresponding odds ratio (OR), denoted in tables as  $\text{Exp}(B)$ . Fits of the models will be tested using Hosmer and Lemeshow statistics. In cases where significance of the model will not be proven, H-L statistics will not be applied.

### First model testing - future value of money

In the first model, future value of money (*Q1*) is set as dependent variable and is encoded with binary values 0 and 1. If an individual answers correctly, he/she is considered financially literate and the answer is coded with value 1. If an individual answers incorrectly, he/she lacks adequate FL and the answer is coded with value 0.

Table 2 shows the significance of the model upon entering independent variables.

Table 2.

SIGNIFICANCE OF THE MODEL FOR DEPENDENT VARIABLE  $Y_i$

|                       | Chi-square | df | Sig.  |
|-----------------------|------------|----|-------|
| 1 <sup>st</sup> Model | 23,204     | 16 | 0,108 |

Source: Research results

The model is not significant (Table 2) according to the significance value of  $p=0.108$ , where the condition  $p \leq 0.05$  is not fulfilled. Therefore, it is concluded that the first model does not significantly predict the influence of independent variables to the FL of respondents.

Regression results in Table 2 suggest inability to accept any of the set hypotheses of the paper (H1 – H6) which could implicate a relationship between socio-demographic characteristics of respondents and corresponding FL in understanding the future value of money.

### Second model testing - inflation

In the second model, question on understanding the inflation (*Q2*) represents the dependent variable, which is encoded by the binary values 0 and 1. Correct answer implicates a person of adequate FL and is encoded by the binary value 1, and wrong answer is encoded with 0 and implicates inadequate FL. Table 3 shows the significance of the model upon entering independent variables.

*Table 3.*

**SIGNIFICANCE OF THE MODEL FOR DEPENDENT VARIABLE  $Y_2$**

|                       | <b>Chi-square</b> | <b>df</b> | <b>Sig.</b> |
|-----------------------|-------------------|-----------|-------------|
| 2 <sup>nd</sup> Model | 29,602            | 16        | 0,020       |

Source: Research results

The model is significant (Table 3) according to the significance value of  $p=0.020$ , where the condition  $p<0.05$  is met. In the 2<sup>nd</sup> model, binary logistic regression results implicate that there is no influence of independent variables on FL at the significant level  $p$ , therefore it is not possible to accept any of the set hypotheses in understanding the inflation.

**Third model testing - present value of money**

In the third model, the present value of money question (Q3) represents the dependent variable, which is encoded by the binary values 0 and 1. Correct answer implicates a person with adequate FL and is encoded by the binary value 1, and wrong answer is encoded with 0 and implicates inadequate FL. Table 4 shows the significance of the model upon entering independent variables.

*Table 4.*

**SIGNIFICANCE OF THE MODEL FOR DEPENDENT VARIABLE  $Y_3$**

|                       | <b>Chi-square</b> | <b>df</b> | <b>Sig.</b> |
|-----------------------|-------------------|-----------|-------------|
| 3 <sup>rd</sup> Model | 43,097            | 16        | 0,000       |

Source: Research results

With significance of  $p=0.000$  it can be concluded that the model is significant. Table 5 gives an overview of binary logistic regression results and significance levels of independent variables. Only significant independent variables are presented.

Table 5.

## THIRD BINARY REGRESSION RESULTS

|                     | B      | S.E.  | Wald  | df | Sig.  | Exp(B) | 95% C.I. for EXP(B) |       |
|---------------------|--------|-------|-------|----|-------|--------|---------------------|-------|
|                     |        |       |       |    |       |        | Lower               | Upper |
| Age                 |        |       | 9,888 | 3  | 0,02  |        |                     |       |
| 18-28               | -1,912 | 0,735 | 6,769 | 1  | 0,009 | 0,148  | 0,035               | 0,624 |
| 29-35               | -0,727 | 0,692 | 1,105 | 1  | 0,293 | 0,483  | 0,125               | 1,875 |
| 36-46               | -0,393 | 0,746 | 0,277 | 1  | 0,599 | 0,675  | 0,156               | 2,916 |
| Level of edu.       |        |       | 0,831 | 3  | 0,042 |        |                     |       |
| High school         | 0,449  | 0,534 | 0,707 | 1  | 0,041 | 1,567  | 0,55                | 4,463 |
| Undergraduate study | 0,406  | 0,741 | 0,301 | 1  | 0,003 | 1,501  | 0,352               | 6,41  |
| Graduate study      | 0,139  | 0,493 | 0,08  | 1  | 0,018 | 1,149  | 0,438               | 3,019 |

Source: Research results

According to the binary logistic regression results from Table 5 corresponding formula is constructed and conclusions can be drawn.

$$P(Y_3) = 19,681 - 1,912X_{11} + 0,449X_{31} + 0,406X_{32} + 0,139X_{33} + \varepsilon_i \quad (2)$$

Independent variable age (in average) significantly influences FL at the  $p=0.020$  by which the hypothesis H1 can be accepted stating that age significantly influences FL. The greatest significance of age is within the age group 18 – 28 years (Age 1) with  $p=0.009$ . OR (odds ratio), in tables denoted as Exp(B), indicates that probability of adequate FL measured by present value of money is significantly higher within the respondents of age group 18 – 28 years. With controlling other variables, the model indicates that respondents of the mentioned age group are 0.148 times more likely to have adequate FL. Furthermore, level of education (all levels in average) significantly influences FL at the  $p=0.042$  by which the hypothesis H3 can be accepted stating that level of education significantly influences FL. The significance factors for levels of education are as follows: high school with  $p=0.041$  (level 1), undergraduate study with  $p=0.003$  (level 2), graduate study with  $p=0.018$  (level 3). OR indicates that the probability of adequate FL measured

by present value of money increases with education level. With controlling other variables, the model indicates that respondents who have higher level of education are almost 2 times more likely to have adequate FL. Similar conclusions can be found in Xu and Zia (2012) proving the influence of levels of education on FL. Hosmer and Lemeshow test shows significance at  $p=0.189$  ( $X^2(8) = 11.223$ ), which means that the model presents a good fit, whereas the model predicts values not significantly different from observations.

#### Fourth model testing - future investment

In the fourth model, future investments question (Q4) represents the dependent variable, which is encoded by the binary values 0 and 1. Person with adequate FL is the one who holds any type of investment and is encoded by the binary value 1, and if no investment is chosen the answer is encoded with 0 and implicates inadequate FL.

Table 6 shows the significance of the model upon entering independent variables.

Table 6.

#### SIGNIFICANCE OF THE MODEL FOR DEPENDENT VARIABLE $Y_4$

|                       | Chi-square | df | Sig.  |
|-----------------------|------------|----|-------|
| 4 <sup>th</sup> Model | 54,278     | 16 | 0,000 |

Source: Research results

According to the sig. level of 0.000 the fourth model is significant. Furthermore, Table 7 shows the binary logistic regression results. Only significant independent variables are presented.

Table 7.

## FOURTH BINARY LOGISTIC REGRESSION RESULTS

|              | B       | S.E.      | Wald   | df | Sig.  | Exp(B) | 95% C.I. for EXP(B) |       |
|--------------|---------|-----------|--------|----|-------|--------|---------------------|-------|
|              |         |           |        |    |       |        | Lower               | Upper |
| Income_level | 0,000   | 0,000     | 14,335 | 1  | 0,000 | 1      | 1                   | 1,001 |
| Age          |         |           | 11,26  | 3  | 0,01  |        |                     |       |
| 18-28        | -1,332  | 1,132     | 1,384  | 1  | 0,039 | 0,264  | 0,029               | 2,428 |
| 29-35        | -2,762  | 1,111     | 6,175  | 1  | 0,013 | 0,063  | 0,007               | 0,558 |
| 36-46        | -2,531  | 1,174     | 4,648  | 1  | 0,031 | 1,007  | 1,007               | 0,795 |
| Constant     | -16,462 | 26132,131 | 0      | 1  | 0,999 | 1E+08  |                     |       |

Source: Research results

According to the binary logistic regression results from Table 7 corresponding formula is constructed and conclusions can be drawn.

$$P(Y_4) = 16,462 - 1,332X_{11} - 2,762X_{12} - 2,531X_{13} + \varepsilon_i \quad (3)$$

According to the Table 7, independent variable age (in average) significantly influences FL at the  $p=0.010$ , age 1 (18 – 28 years) with  $p=0.039$ , age 2 (29 – 35 years) with  $p=0.013$ , age 3 (36 – 46 years) with  $p=0.031$ . OR indicates that the probability of adequate FL measured by future investment is significantly higher within the respondents of age groups 18 – 28 years, 29 – 35 years and 36 – 46 years. With controlling other variables, the model indicates that respondents of age group 1 are 0.264 times more likely to have adequate FL, age group 2 are 0.063 times more likely and age group 3 are 1.007 time more likely to have adequate FL level.

Income level is significant at the  $p=0.000$  level. OR indicates that the probability of adequate FL measured by future investment increases with the income levels. With controlling other variables, the model indicates that respondents who have higher income levels are 1 time more likely to have adequate FL. Moreover, Hosmer and Lemeshow test shows significance at  $p=0.850$  ( $X^2(8) = 4.074$ ), which means that the model presents a good fit, whereas the model predicts values not significantly different from observations. Test results of the model implicate acceptance of the hypothesis H1 and H5, which means that age significantly influences

FL, as well as income, while other hypotheses can be rejected due to inability of confirmation. Similar conclusions can be found in Xu and Zia (2012) and Lusardi and Mitchell (2007b) where individuals with higher income levels have a tendency to answer FL questions more correctly compared to low income individuals, where correct answer implicates FL. Positive relationship between income and FL was also proven by Fornero and Monticone (2010).

## 5. Discussion

This part of the paper analyses and summarizes empirical results of the research. Empirical part of the research includes development of four models created on the basis of four basic research questions developed in the structured questionnaire. The mentioned questions have later been turned in dependent variables. On the other hand, descriptive data derived from the structured questionnaire have been turned into independent variables. Binary logistic regression was chosen to test the model since the variables were categorical - independent variables and binary - dependent variables. According to the previous research (Xu and Zia, 2012), with modifications where required, four dependent variables were formed, i.e. FL questions: Q1 – future value of money question, Q2 – inflation question, Q3 – present value of money question, Q4 – future investment question. Correct answers implied adequate levels of FL while wrong answers indicated inadequate levels of FL. According to existing research (Xu and Zia, 2012; Rooij, Lusardi and Alessie, 2007; Forte, 2012), with necessary modifications, dependent and independent variables of the model were developed (age, gender, levels of education, field of education, income level and marital status).

Research results, upon third and fourth model testing, i.e. present value of money question and future investment questions, implicate that age significantly influences FL. Significance levels of independent variables, based on which the hypothesis H1 is accepted presupposes significant influence of age on FL defined by the present value of money question (Q3), are as follows: age with  $p=0.020$  (in average), age 1 (18 – 28 years) with  $p=0.09$ . For the question (Q4) or future investment, the following independent variables are significant: age with  $p=0.01$  (in average), age 1 (18 – 28 years) with  $p=0.039$  and  $OR=0.264$ , age 2 (29 – 35 years) with  $p=0.013$  and  $OR=0.063$ , age 3 (36 – 46 years) with  $p=0.031$  and  $OR=1.007$ . On the basis of descriptive statistics it is indicative that very large number of respondents (77%) in the 18-28 age range answered correctly to the question Q3, 93.25% of respondents in the 29-35 age range, 92% of respondents in the 36-46 age range and even 97% of respondents in the 47–65 age range answered correctly to the question Q3. Accordingly, the conclusion could be drawn that FL increases

with age, but as sample mainly consists of respondents of the 18–28 age range, it should be taken with caution. Statistical analysis did not confirm statistically significant relationship between variables gender, marital status and field of education with the level of FL (measured with questions Q1–Q4).

By testing the third model, where FL is defined with the present value of money question (Q3) it was confirmed that level of education significantly influences FL, therefore hypothesis H3 can be accepted. Significance indicators of levels of education is as follows: high school with  $p=0.041$  and  $OR=1.567$ , undergraduate study with  $p=0.003$  and  $OR=1.501$  and graduate study with  $p=0.018$  and  $OR=1.149$ . Influence of independent variable field of education has not been confirmed for any of the dependent variables, therefore hypothesis H4 presupposing that field of education significantly influences FL is rejected.

By testing the fourth model, where FL is defined with the future investment question (Q4) it was confirmed that income level significantly influences FL, therefore hypothesis H5 can be accepted. Significance of the variable income level is  $p=0.000$  and  $OR=1$ . Furthermore, no influence of independent variable marital status was confirmed on any of the dependent variables, therefore hypothesis H6 was rejected presupposing that marital status significantly influences FL.

Scientific purposes of the paper are well supported with the abovementioned models and practical purposes can be drawn on corresponding basis. According to the research results, FL increases with age, therefore it would be highly significant to introduce FL subjects in secondary schools – especially noneconomic, but also in primary schools with subjects covering basics of finances for children. Furthermore, other noneconomic faculties could also offer elective courses offering some basic topics covering personal finance, which would increase FL of individuals in their adult age. The National strategy frame can find some grounds for operative programs here. Despite the fast growing personal indebtedness in Croatia, some concrete actions and lifelong learning programs covering FL are still lacking from the governmental level. Since FL is correlated with higher levels of income and level of education, it would be beneficial for individuals to attend FL courses offered by higher education institutions, institutes and/or Croatian Employment Service. Level of education is extremely significant also for the labor market (Bečić, 2014) and for economic system of a country. There are some positive trends, but still inadequate, in promoting financial education where Croatian institute for financial education was established whose goals include financial education of individuals and SMEs. The institute conducts workshops for secondary school students financed by the Ministry of economy of Croatia and issues period brochures for broader public (Vrbošić and Princi Grgat, 2014). These are the trends that should be introduced and promoted by the Croatian government at a faster pace considering the economic situation and growing indebtedness of individuals.

Recommendations for further research include larger sampling of individuals of all ages, levels of education and geographical affiliation at a uniform level, which would eliminate detected shortcoming of the paper and would give clearer picture of influence of various socio-demographic characteristics on the FL. In addition, set of questions could be extended and divided into lower-level FL and higher-level FL measured by complexity of questions.

## 6. Conclusion

This paper makes the contribution to the primary research of FL of working adults in Croatia. For the purposes of research one integrative model has been formed consisting of four dependent variables (four models) and six independent variables. Dependent variables stand for research questions: *Q1* – future value of money question, *Q2* – inflation question, *Q3* – present value of money question, *Q4* – future investment question. Correct answer to a question (*Q1-Q4*) has been coded with 1 meaning that a person possesses adequate FL, and incorrect answer is coded with 0 meaning that a person possesses inadequate FL.

In every of the four models the influence of independent variables ( $X_1-X_6$ ) to the dependent variables ( $y_1-y_4$ ) has been tested. Independent variables are age, gender, level of education, field of education, income level and marital status. Besides income, all other independent variables are categorical and encoded with values from 1 to 6, depending on the number of offered categories for each variable. The results imply that age, level of education and income levels statistically significantly influence FL. Age and level of education influence FL defined by the present value of money question (*Q3*,  $y_3$ ), while age and income levels influence FL defined with the future investment question (*Q4*,  $y_4$ ). Relationship between other dependent and independent variables has not been proven. Therefore, hypotheses *H1*, *H3* and *H5* are accepted and hypotheses *H2*, *H4* and *H6* are rejected. Consequently, the basic hypothesis of the paper is accepted according to which the scientifically based facts about socio-demographic characteristics of the respondents enable us to determine the specific determinants, which would influence FL.

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#### SOCIO-DEMOGRAFSKE DETERMINANTE FINANCIJSKE PISMENOSTI GRAĐANA REPUBLIKE HRVATSKE

##### Sažetak

Svrha rada je empirijska analiza financijske pismenosti pojedinaca istraživanjem odnosa između financijske pismenosti i socio-demografskih obilježja građana Republike Hrvatske. Rezultati istraživanja mogu poslužiti kao osnova za razvoj i poboljšanje strategija osobnih financija i nacionalnih mjera financijske politike s posebnim naglaskom na obrazovanje. Empirijski model rada testiran je pomoću binarne logističke regresije. Utvrđena su četiri temeljena istraživačka pitanja, a u modelu čine zavisne varijable, dok šest socio-ekonomskih obilježja ispitanika predstavljaju nezavisne varijable. Rezultati istraživanja dovode do zaključka da starost, razina obrazovanja i razine dohotka statistički signifikantno utječu na financijsku pismenost.

Ključne riječi: financijska pismenost, osobne financije, socio-demografske karakteristike, strategija financijske pismenosti, logistička binarna regresija