



Munich Personal RePEc Archive

How Risk Aversion and Financial Literacy Shape Young Adults' Investment Preferences

Stoian, Andreea and Vintila, Nicoleta and Iorgulescu, Filip and Cepoi, Cosmin Octavian and Dina Manolache, Aurora

Department of Finance, CEFIMO, Faculty of Finance and Banking, The Bucharest University of Economic Studies, Bucharest, Romania, Department of Finance, CEFIMO, Faculty of Finance and Banking, The Bucharest University of Economic Studies, Bucharest, Romania, Department of Finance, CEFIMO, Faculty of Finance and Banking, The Bucharest University of Economic Studies, Bucharest, Romania, Department of Money and Banking, CEFIMO, Faculty of Finance and Banking, The Bucharest University of Economic Studies, Bucharest, Romania, Doctoral School of Finance, The Bucharest University of Economic Studies, Bucharest, Romania

August 2021

Online at <https://mpra.ub.uni-muenchen.de/109755/>
MPRA Paper No. 109755, posted 20 Sep 2021 05:32 UTC

How Risk Aversion and Financial Literacy Shape Young Adults' Investment Preferences

Andreea STOIAN^{♥*} Nicoleta VINTILĂ^{*} Filip IORGULESCU^{*} Cosmin Octavian CEPOI[♠]
Aurora Elena DINA (MANOLACHE)[♦]

Abstract

This study investigates the relationship between risk aversion, financial literacy, and investment preferences of young adults in higher education in Romania. For this purpose, we conducted a survey that measured the basic, advanced and overall financial literacy, risk aversion, and parental financial behaviours. We had 479 respondents and a similar number of useable surveys. Resorting to OLS and IV econometric methods, we show that financial literacy, regardless of its level, contributes to reducing risk aversion quantified by the risk premium. Moreover, positive financial behaviours of parents also decrease the risk aversion. This finding is invalid in the case of a self-assessed risk tolerance. We also found that young adults' investment preferences are influenced by the self-assessed risk tolerance and not by the risk aversion. However, financial literacy increases the probability of young adults to select bonds or funds as investment options, but does not have a statistically significant influence on the selection of stocks, which is mainly driven by the self-assessed risk profile as well as bank deposits.

Keywords: financial literacy, risk aversion, risk premium, investment choices, survey methods

JEL Classification: G11, G41, G53, C83

1. Introduction

An important number of studies (e.g., van Rooij, Lusardi and Alessie, 2011; Almenberg and Dreber, 2015) identified financial education and risk aversion as important factors for the decision-making process on stock market participation. The literature suggests that individuals with lower financial education, as evaluated through various financial literacy measures, are less likely to invest in stocks, while individuals with a higher risk tolerance are more inclined to participate in the stock market. For instance, Li, Li and Wei (2020) investigated the effects of financial literacy on Chinese households' portfolio choices and returns and revealed that basic and advanced financial literacy exert a significant influence on the capital allocation to risky assets. Thus, the preference for risky assets increases with the level of financial knowledge and superior financially literate participants tend to compare between

[♥] Corresponding author: andreea.stoian@fin.ase.ro

^{*}Department of Finance, CEFIMO, Faculty of Finance and Banking, The Bucharest University of Economic Studies, Bucharest, Romania

[♠]Department of Money and Banking, CEFIMO, Faculty of Finance and Banking, The Bucharest University of Economic Studies, Bucharest, Romania

[♦]Doctoral School of Finance, The Bucharest University of Economic Studies, Bucharest, Romania

financial instruments when making an investment decision. In addition, a higher level of financial literacy leads to better investment returns for younger and well-educated families, while older and less educated families obtain smaller returns for their investments.

Since risk aversion is widely recognized as a key concept when discussing investment decisions, a large body of literature documents the most common determinants of individual differences in attitudes toward risk: wealth (or income), age, gender, height and parental background. A summary of the main findings of these studies shows that: wealthier persons are more willing to take risks; women are more risk averse than men; an increase in age leads to a decrease of the willingness to take risks; taller individuals have a larger risk appetite; and parents' education (a stronger influence in the case of high-school graduated mothers) contributes to a decrease in their offspring's risk aversion (e.g., Dohmen et al., 2011). Hryshko, Luengo-Prado and Sørensen (2010) further analysed how parents' education and financial habits influence the risk aversion of their children. They concluded that children of well-educated parents exhibit a lower risk aversion because they acquire financial knowledge and skills directly from their parents. They also showed the existence of a direct relationship between parents' risk aversion and children's risk aversion and pointed out that most adults can be less averse to risk if, for instance, their parents guided them toward a leadership career.

Numerous studies emphasized the gender gap as an important factor which impacts investment choices in risky assets (Jianakoplos and Bernasek, 1998; Donkers, Melenberg and Van Soest, 2001) and showed that women are more risk-averse than men (Dohmen et al., 2011; Halko et al., 2012), but also because women are less financially educated than men (van Rooij et al., 2011; Bollen and Posavac, 2018). This aspect has been subsequently documented in the literature and financial education emerged as a significant predictor of risk aversion, which mitigates the impact of other determinants, including the gender gap. For example, a series of studies examining mutual fund investors (Dwyer et al., 2002), finance professors at US universities (Hibbert et al., 2013), and trading experts (Cueva et al., 2019) highlighted that the gender gap in risk taking is significantly weakened once controlling for financial literacy and investment knowledge. Moreover, apart from the financial knowledge itself, the confidence in the financial knowledge that individuals have also emerged as a significant predictor of risk aversion (Cupák, Fessler and Schneebaum, 2020).

Besides, many researchers have documented the importance of financial education in shaping risk appetite and individuals' investment decisions. For instance, Aren and Zengin (2016) studied the link between financial literacy and individual risk tolerance, reflected through investment preferences. They observed that individuals with poor financial education are more risk averse and prefer to invest in deposits and foreign currency. Those with an intermediate level of financial knowledge are more interested in diversified portfolios. Individuals with a high level of financial literacy have an increased risk tolerance and tend to own mainly risky assets such as stocks. Their findings were confirmed by Bayar et al. (2020), who found that financial literacy and education have a positive influence on risk tolerance. Furthermore, they showed that improvements in the financial literacy of individuals through education programs are likely to raise the demand for financial products with various risk characteristics. Similar results were also obtained by Hermansson and Jonsson (2021), indicating that risk tolerance is positively correlated with financial literacy: wealthier and more educated individuals, as well as those who work full time, are less risk averse. However, they found that financial literacy has a poor effect on risk tolerance in the case of individuals with an already increased appetite for risk.

A series of studies further investigated the relationship between financial education and risk aversion among university students. For example, Insler, Compton, and Schmitt (2016) analysed the impact of personality traits and cognitive abilities on financial investment allocation decisions for students of the United States Naval Academy. They found that self-reported financial literacy and prior investment experience are positively associated with riskier decisions, irrespective of income level. Opposite to their results, Huzdik, Béres and Németh (2014) concluded that young students at the Budapest University of Applied Sciences and the University of Szeged included in their sample have an increased risk aversion, regardless of their level of economic and financial knowledge.

Summing up, while risk aversion and financial education are key factors for financial investment decisions, their influence is intertwined. Many studies showed that financial education, assessed through various indicators related to financial knowledge, financial literacy, and even financial self-confidence, is a powerful predictor for the differences in risk appetite and investment choices. Having this in mind, this paper aims to examine the relationship between financial literacy, risk aversion and investment preferences of young adults in Romania, and whether the latter can change as an effect of the former. For this purpose, we use a survey dataset collected for 479 university students. This study is part of more comprehensive research developed during August 2019 and June 2020 at the request of the Bucharest Stock Exchange (BSE). Considering the low participation of individuals in the Romanian capital market, the general purpose of this research was to reveal the role played by financial education in their transformation to become investors. Therefore, the attempt to investigate how investment preferences can form at a young age and to what extent financial literacy can shape them and mitigate the risk aversion can contribute to a better understanding of the participation in the financial markets. Students confront important and even dramatic changes in their personal development during the university studies, such as separation from families and reduced financial autonomy, and they are actively learning the skills required to achieve financial independence on their way to becoming adults. The financial behaviours they learn and the habits—both positive and negative—they form during this transitional stage are likely to persist and influence the decision they make throughout the rest of their lives (Shim et al., 2009, 2010).

We believe that the contribution of our paper is multifold. We built a novel dataset¹ on Romanian young adults' financial literacy, given the scarcity in this regard. There are only few studies investigating financial literacy in general in Romania and showed poorer scores compared to that of the OECD and G20 countries. The percentage of the correct answers to three questions examining peoples' knowledge on the compound interest rate (G20 - 42% / OECD - 48% / Romania - 41.3%), inflation (G20 - 77% / OECD - 81% / Romania - 31.8%) and risk diversification (G0 - 59% / OECD - 65% / Romania - 13.5%) proved it (Beckmann, 2013; OECD, 2016, 2017). We assessed financial literacy on three different levels, basic, advanced and overall using a mixture of questions that allowed us to cover most of the relevant aspects that can lead to a fairly clear picture on the level of financial literacy. We measured the risk aversion using two methods: an experimental method and a self-assessment method. We collected data on young adults' investment preferences. A number of studies have shown a weak participation of the Romanians in the financial market. In 2017, only 58% of Romanians had a bank account (Demirguc-Kunt, Hu and Klapper, 2019). In 2013, bank deposits were the most widespread financial product, although they represented only 31% of GDP compared to developed countries where the share was of 84%, while an insignificant percentage of Romanians invested their money in shares, bonds or mutual

¹ The dataset is available upon request.

funds (Beckmann, 2013). We also collected data on parents' financial behaviours to explain their influence on risk aversion and investment preferences along with the financial literacy. We organized the rest of the paper as follows: Section 2 describes the methods. Section 3 discusses the results. The last section draws the conclusions and highlights the main findings of this study.

2.Methods

2.1.Participants

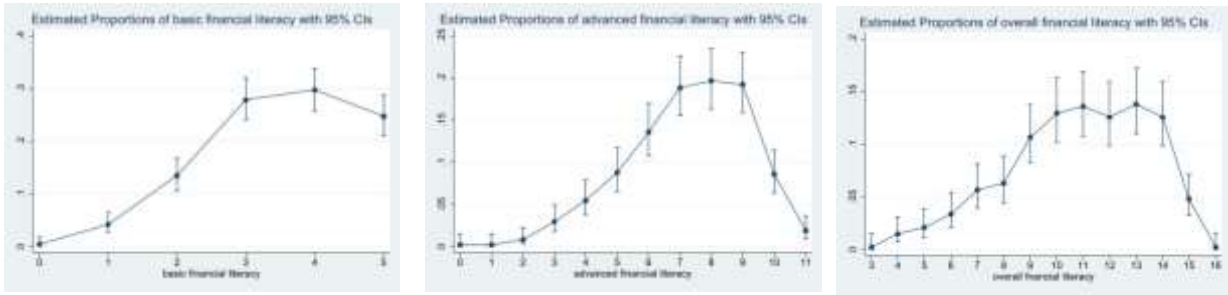
We conducted a survey during April 2020. The target group of our research was young adults, the 18-25 age group studying in higher education. We addressed the questionnaire mainly to students in finance and economics, not only because we had greater accessibility in these fields, but also because we wanted to measure the risk aversion and to analyze the level of financial literacy and investment preferences of young adults who have benefited of formal economic and financial education. However, we collected some questionnaires from young people studying social or technical sciences. Our goal was to have quite a balanced composition of the sample across the years of study with a small bias towards the 1st year students because it is an important transitional stage of their development - they are not yet financially independent, but they are learning the skills to become one (Shim et al, 2010). The respondents' pool included 479 under and post-graduate students: 148 students (31%) enrolled in the first year of studies, 93 (19%) in the second year, 129 (27%) in the final years and 109 post-graduate students (23%) enrolled in the master programs. Because of the COVID-19 pandemic lockdown, we conducted the survey online. We had 479 useable surveys to measure the financial literacy, parental financial behaviour and the self-assessed risk tolerance. Nine students did not provide answers to the risk aversion questions and, therefore, we had a number of 470 useable surveys to measure the risk aversion and to employ further the econometric methods.

2.2.Measures

2.2.1.Financial literacy

In order to measure young adults' financial literacy, we used a set of sixteen questions inspired by Lusardi and Mitchell (2014) and van Rooij, Lusardi and Alessie (2011). The first set consisted of five questions that aimed to assess basic financial literacy and test numeracy skills and concepts such as, inflation, compound interest, time value of money, and the monetary illusion effect. Another set of eleven questions evaluated respondents' advanced financial literacy and tested their knowledge on capital market issues, shares and bonds, mutual funds, and portfolio diversification. We calculated a score for each respondent represented by the number of correct answers provided to the questions. In the case of basic financial literacy, it varies between a minimum of 0 (no correct answers) and a maximum of 5 (all answers are correct), while the score of advanced financial literacy can take values between 0 (no correct answer) and 11 (all answers are correct). Thus, the score of overall financial literacy can take values between 0 and 16. Cronbach's alpha for the financial literacy composite score showed an internal consistency of 0.64. Figure 1 illustrates the distribution of basic, advanced and overall literacy scores.

Figure 1. Distribution of financial literacy scores



We can observe the largest proportions of the respondents scored three, four and five for the basic financial literacy. These represent almost 80% of the total number of the participants in the survey. The largest proportion of them (30%) scored four. In regards to the advanced financial literacy, the scores are concentrated around seven, eight and nine. The proportions of the students who achieved those scores represent almost 60% of the total number of respondents. The proportion of students corresponding to the highest advanced financial literacy scores is significantly larger than of the students who attained lower scores. The overall financial literacy is concentrated between the scores of nine and fourteen and the proportions represent almost 70% of the total number of respondents. The distribution of the proportions follow a similar pattern as for the advanced financial literacy for which the number of students who realized the highest scores drops significantly. The proportion of respondents who scored fifteen is smaller than of students who achieved seven, while a similar number of students attained, respectively the minimum (3) and the maximum (16).

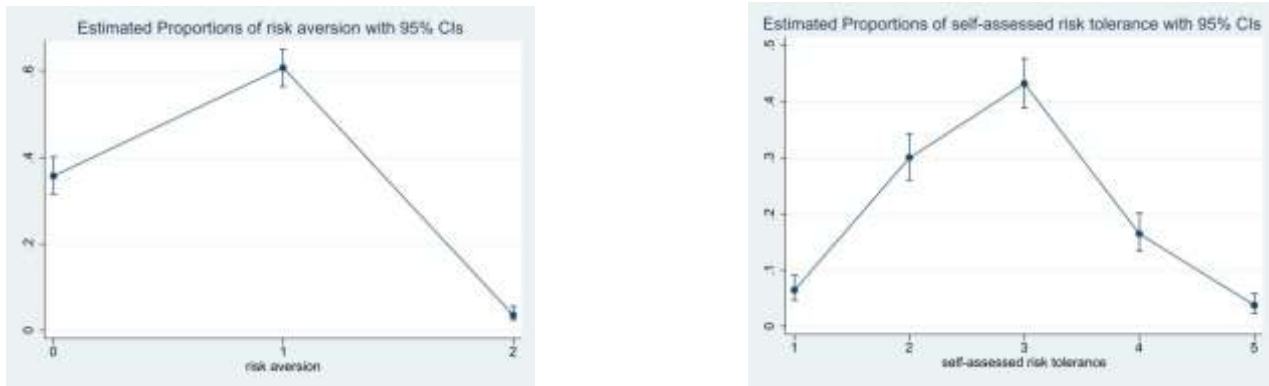
2.2.2. Risk aversion

We assessed young adults' risk aversion resorting to two methods: an experimental and a self-assessment method. Hartog, Ferrer-i-Carbonell and Jonker (2000) proposed an experimental method for measuring risk aversion that is based on the classic risk aversion quantification model introduced by Arrow (1965) and Pratt (1964), known in the literature as the Pratt-Arrow absolute risk aversion coefficient (ARA). For this purpose, we assumed the situation in which a certain amount of money (500 RON, app. 100 EUR) is provided to the respondents. They had to choose between holding this amount in cash or betting it in a lottery game where the probability of return was not established, but the gain could have been four times higher than the money invested (2000 RON, app. 400 EUR). We measured the individual risk aversion by risk premium, which is positive for the risk-averse, zero for risk-neutral, and negative for risk-loving respondents. The higher the risk premium, the higher the risk aversion. Figure 2 depicts the proportions of the risk aversion measurements where 0 stands for *risk-neutral*, 1 stands for *risk-averse* and 2 stands for *risk-lover*.

In order that young adults to self-assess their risk tolerance, we asked them what they prefer: to totally avoid or take all the risks when managing their personal finance. They had to choose from a six-point scale, which ranged from 0 (*no risk taken*) to 5 (*I am a risk lover*). The purpose of this question was to highlight the differences regarding the risk profile. People tend not to appreciate their risk appetite correctly, considering themselves to be risk lovers more than they actually are. The over-valued risk

tolerance can result in poor financial decisions. Figure 2 illustrates the proportions of the self-assessed risk tolerance.

Figure 2. Risk profile assessments



For the sample of 470 respondents, the results on the risk aversion showed that 62% of the students are risk averse, 34% are risk neutral, and only 4% have an appetite for risk. For the entire sample of 479 respondents, the results showed that 37% of the students indicated very low or low risk tolerance (they scored one and two on the scale) and only 20% of the students indicated high and very high-risk tolerance (they scored four and five on the scale). We also noted a significant percentage (43%) of those who scored three (middle of the measurement scale since none of the respondents scored zero). The results revealed differences in the young adults' risk profile. On the one hand, the results of the experimental method showed that most respondents have a low risk appetite and that risk aversion dominates. In contrast, the self-assessment method showed higher risk tolerance. This confirms the hypothesis that people tend overestimate their risk tolerance and consider themselves more risk lovers than they actually are.

2.2.3. Parental financial behaviours

Shim et al (2010) underlined the important role played by parents in the process by which children learn about money and develop financial management behaviour. They also emphasized that although parents, work experience and financial education can predict young adults' current financial learning, behaviour and attitude, the role played by parents is significantly greater than the role played by work and financial education. For that reason, we assessed parental financial behaviour to examine the extent to which these habits can exert influence on young adults' risk aversion and further on their investment preferences. We followed the approach proposed by Shim et al (2010), but adjusted it according to the purposes of our research.

We measured parental financial behaviour by asking the students' perception of their parents' financial habits they observed. We asked them to indicate on a five-point scale from 1 (*never*) to 5 (*always*) the extent to which they observed their parents engaged in five positive financial behaviours: planning household budget, tracking household expenses, spending within the budget, saving money regularly and investing for long-term financial goals. Cronbach's alpha was 0.77. Based on the scores gave by the respondents to

each question, we then constructed a composite index as the sum of the standardized scores for each behaviour. The parental financial behaviour index takes values from 0 (minimum) to 5 (maximum), indicating a range of financial habits from negative to positive.

2.3. Study design

The focus of our analysis is to identify if financial literacy significantly decreases the risk aversion and influences young adults' investment preferences. First, we analyse the relationship between financial literacy and risk aversion. Eq. (1) describes the model we employ:

$$Risk\ profile_i = \alpha + \beta \cdot Financial\ literacy_i + \gamma \cdot Parental_i + \varepsilon_i \quad (1)$$

In Eq. (1), *Risk profile* is the dependent variable and it is measured as risk aversion by using the risk premium and as self-assessed risk tolerance. *Financial literacy* is the explanatory variable of interest and it represents the basic, advanced and overall financial literacy. *Parental* is the variable that control for the parents observed financial behaviours and is measured by the parental financial behaviour index described in the previous section. α , β and γ are coefficients to be estimated and ε_i is the error term.

In the first step of the analysis, we estimate Eq. (1) with a standard OLS method. To account for some potential endogeneity problems, we use as robustness checks instrumental variable regressions (IV) with three distinct estimators namely, 2SLS, LIML, and GMM. We instrument financial literacy in all its forms using variables that explain the level of literacy, which do not correlate with the dependent variable or with the control variable.

Finally, to capture the impact exerted by risk profile and financial literacy on young adults' investment preferences, we run a PROBIT regression with the following specification:

$$Choice_i = \alpha_0 + \alpha_1 \cdot Risk\ profile_i + \alpha_2 \cdot Financial\ literacy_i + \alpha_3 \cdot Parental_i + \varepsilon' \quad (2)$$

In Eq. (2) *Choice* is a dummy variable that takes values of 1 if a respondent selected a specific financial product from the list provided and 0 otherwise. We use different specifications for the dependent variable, such as investment in stocks, bonds, funds and bank deposits that are associated with different risk levels. α_0 , α_1 , α_2 , α_3 are coefficients to be estimated and ε' is the error term.

3. Results and discussions

In this section, we summarize the empirical results. Table 1 reports the estimates of Eq. (1), which investigates the connection between the risk premium and financial literacy while controlling for parental financial behaviours. Because of a high correlation between basic, advanced and overall financial literacy, we estimated different regressions for each financial literacy level. Table 1 reports the results for OLS along with the IV estimators. For the IV regressions, we instrumented the financial literacy variables using the same set of instruments and making sure that these variables do not correlate with the risk premium or with the parental financial behaviour index (see the correlation matrix in the Appendix). The list of instruments comprises variables, such as: high school graduation grade – measures young adults'

general literacy before the university studies; employment status – captures young adults’ work experience; source of financial information – students were asked to select among three different sources: textbooks, social media (TV, internet, forums, etc.) and family and peers; household income – we used five income brackets that reflect households’ income distribution in Romania; parents’ education – we used a dummy variable that takes value of 2 if both parents have university studies, 1 if only one parent has university studies, and 0 otherwise.

Table 1. Eq. (1) estimates – OLS and IV regressions – Risk premium

| Explanatory variables | OLS | 2SLS | LIML | GMM | OLS | 2SLS | LIML | GMM | OLS | 2SLS | LIML | GMM |
|-----------------------|-----------|------------|----------|------------|-----------|------------|------------|------------|----------|-----------|------------|------------|
| Basic | -9.388*** | -14.976* | -15.144* | -13.575 | | | | | | | | |
| Advanced | | | | | -3.844*** | -9.729** | -9.852* | -9.367* | | | | |
| Overall | | | | | | | | | -3.79*** | -5.994* | -6.034* | -5.632** |
| Parental | -5.679* | -5.546 | -5.543* | -4.932 | -5.822* | -5.76* | -5.759* | -4.984 | -5.755* | -5.673* | -5.673 | -4.905* |
| Constant | 87.057*** | 106.608*** | 107.2*** | 101.543*** | 81.907*** | 124.561*** | 125.455*** | 121.013*** | 94.87*** | 118.53*** | 118.959*** | 113.893*** |
| R-squared | 0.026 | 0.018 | 0.018 | 0.021 | 0.016 | . | . | . | 0.024 | 0.017 | 0.017 | 0.019 |
| Obs. | 470 | 468 | 468 | 468 | 470 | 468 | 468 | 468 | 470 | 468 | 468 | 468 |

*** p<.01, ** p<.05, * p<.1. We estimated bootstrapped errors.

The results show the significant and negative relationship between financial literacy and risk premium, i.e., a positive connection between financial literacy and risk appetite, which is consistent with previous findings reported in the literature (Bucher-Koenen and Ziegelmeier, 2014; Van Rooij, Lusardi and Alessie 2011). Financial literacy mitigates the risk aversion and young adults’ appetite for riskier financial choices can amplify. If we were to compare between financial literacy levels, we will note that basic financial literacy has the greatest impact in reducing risk aversion, although the GMM estimator indicates no significant impact. The results show that the marginal effect of adding more financial knowledge of the advanced concepts is smaller than of the basic literacy. Acquiring both basic and advanced financial skills and knowledge, although it contributes to the decrease in the risk premium, exerts a smaller influence on risk aversion than of the basic or advanced financial literacy and the impact is quite similar with that of the parental financial behaviour.

We also report statistically significant results indicating that parents’ positive observed financial behaviours contribute to a decrease in the risk premium, and, thus, an increase in the young adults’ risk appetite. The size of the coefficients is quite similar across all models we estimated, which suggests that the improvement in the financial literacy level does not affect the influence exerted by parents’ financial habits. The more positive financial habits young adults observe in their parents, the more decreases their risk aversion.

Moving forward, we examine the relationship between the self-assessed risk tolerance, financial literacy and parents’ observed financial behaviours using the same estimation techniques as previously discussed. Table 2 reports the results for OLS along with the IV estimators. For the IV regressions, we instrumented the financial literacy using the same list of instruments as before.

Table 2. Eq. (1) estimates – OLS and IV regressions – Self-assessed risk tolerance

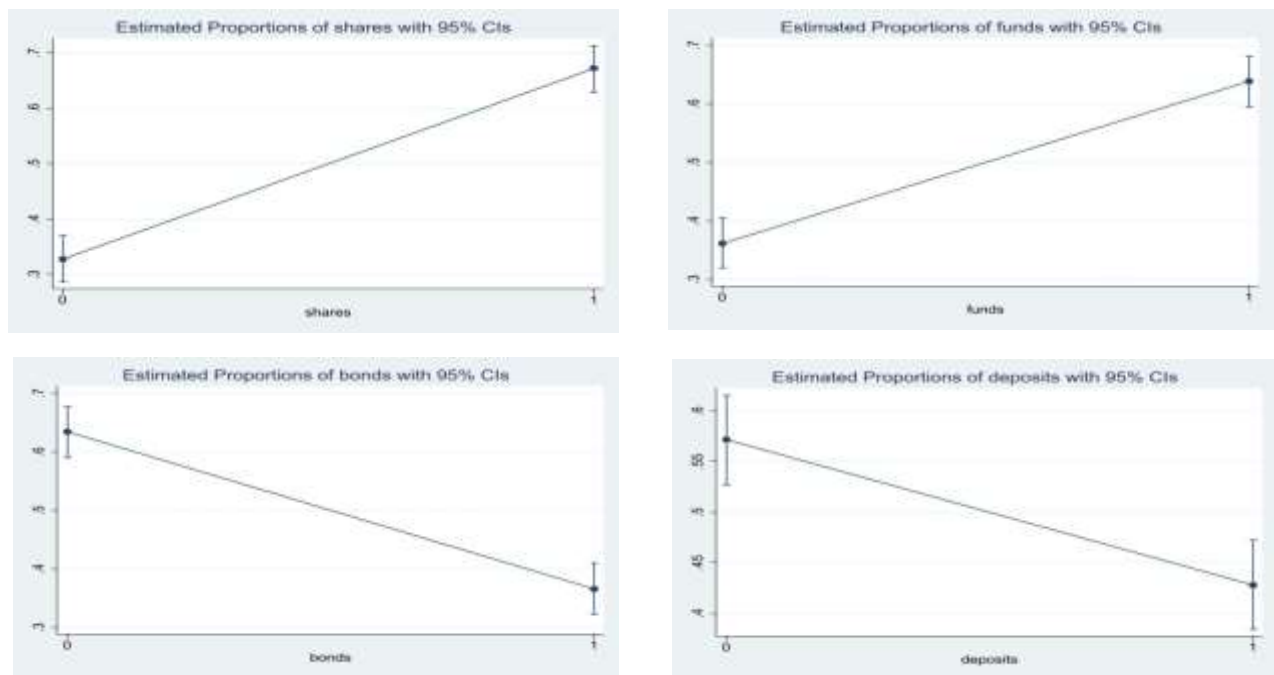
| Explanatory variables | OLS | 2SLS | LIML | GMM | OLS | 2SLS | LIML | GMM | OLS | 2SLS | LIML | GMM |
|-----------------------|----------|----------|----------|----------|---------|----------|----------|----------|----------|----------|----------|----------|
| Basic | .01 | .177 | .22 | .169 | | | | | | | | |
| Advanced | | | | | .035 | .12 | .144* | .115 | | | | |
| Overall | | | | | | | | | .02 | .073* | .083 | .069 |
| Parental | -.004 | -.008 | -.009 | .002 | -.004 | -.007 | -.007 | 0 | -.004 | -.007 | -.008 | 0 |
| Constant | 2.786*** | 2.202*** | 2.052*** | 2.203*** | 2.57*** | 1.957*** | 1.785*** | 1.978*** | 2.601*** | 2.046*** | 1.939*** | 2.062*** |
| R-squared | 0.000 | . | . | . | 0.005 | . | . | . | 0.004 | . | . | . |
| Obs. | 479 | 477 | 477 | 477 | 479 | 477 | 477 | 477 | 479 | 477 | 477 | 477 |

*** p<.01, ** p<.05, * p<.1. We estimated bootstrapped errors.

Observing the estimates across all econometric specifications, we can state that financial literacy and the self-assessed risk tolerance do not significantly correlate. Nor do parents’ financial habits exert any significant influence on young adults’ self- assessed risk tolerance. These results suggest that young adults ignored both their financial knowledge and parental financial behaviours and based their evaluation mainly on what they thought or felt their risk tolerance is. We acknowledge the existence of other factors that determine people risk tolerance besides financial literacy and parental financial behaviour. We summarized some of them in the first section of our paper. Nevertheless, examining the determinants in more detail is beyond the purpose of this study.

In addition to linear specifications, we employ a probit regression approach to assess the impact exerted by financial literacy and risk profile on young adults’ investment preferences by estimating Eq. (2). Figure 3 depicts the proportions of young adults’ investment preferences.

Figure 3. Young adults’ investment preferences



0 = no selection; 1 = selection

We can see that the proportions of students expressing their preference for: stocks - 67%; investment funds – 63%; bonds - 37%; bank deposits – 43%. First, we examine the connection between investment preferences and risk profile measured by the two methods. Table 3 reports the results of the probit regressions having different investment choices as a dependent variable.

Table 3. Probit regression – investment preferences and risk profile

| Explanatory variables | Stocks | Stocks | Funds | Funds | Bonds | Bonds | Deposits | Deposits |
|------------------------------|----------|----------|----------|--------|-----------|-----------|-----------|----------|
| Risk premium | 0.001 | | -0.001 | | -0.001 | | 0.000 | |
| Self-assessed risk tolerance | | 0.204*** | | 0.121* | | 0.068 | | -0.166** |
| Constant | 0.434*** | -0.119 | 0.393*** | 0.017 | -0.301*** | -0.537*** | -0.187*** | 0.284* |
| Pseudo r-squared | 0.002 | 0.016 | 0.001 | 0.006 | 0.003 | 0.002 | 0.000 | 0.011 |
| Obs | 470 | 479 | 470 | 479 | 470 | 479 | 470 | 479 |

*** p<.01, ** p<.05, * p<.1. We estimated bootstrapped errors.

An important fact that our estimates reveal is that the selection of financial products is closely connected with the self-assessed risk tolerance and not with the risk aversion. The coefficients show a stronger positive connection between risk tolerance and the preference to invest in stocks, funds, and a significant negative correlation with the bank deposits. We failed to identify a significant relationship between the risk profile and the preference to invest in bonds. Taking into account the different levels of risk associated with the selected financial products from low – bank deposits to high – stocks, the signs of the coefficients indicate a correct selection. However, having in mind that the survey showed a discrepancy between the risk aversion measured by the experimental method and the self-assessed risk tolerance, the question that naturally arises is to what extent financial literacy can reduce the errors generated by an overestimated self-assessed risk tolerance in the investment decision-making. If young adults make their investment choices based on what they think their risk profile is, even if intuitively is correct, they could engage in much riskier investments than they can afford or tolerate. Therefore, we explored further the influence of financial literacy on young adults' investment preferences along with the self-assessed risk profiles. We must note that taking into consideration that we did not find a statistically significant relationship between the self-assessed risk tolerance and the financial literacy we included both variables in the same regression. We also controlled for the parental financial behaviour. Table 4 summarizes the estimates of the probit regression described by Eq. (2).

Table 4. Probit regression – investment preferences, self- assessed risk tolerance and financial literacy

| Explanatory variables | Stocks | Stocks | Stocks | Funds | Funds | Funds | Bonds | Bonds | Bonds | Deposits | Deposits | Deposits |
|------------------------------|---------|----------|----------|----------|-----------|-----------|-----------|-----------|-----------|----------|----------|----------|
| Self-assessed risk tolerance | 0.202** | 0.198*** | 0.198*** | 0.12* | 0.095 | 0.101 | 0.072 | 0.04 | 0.049 | -0.166** | -0.162** | -0.163** |
| Basic | 0.081 | | | 0.2*** | | | 0.357*** | | | | | -0.021 |
| Advanced | | 0.04 | | | 0.161*** | | | 0.247*** | | -0.026 | | |
| Overall | | | 0.037* | | | 0.124*** | | | 0.207*** | | -0.029 | |
| Parental | -0.098* | -0.097* | -0.098* | 0.029 | 0.032 | 0.03 | -0.04 | -0.045 | -0.045 | -0.004 | -0.004 | -0.004 |
| Constant | -0.131 | -0.125 | -0.227 | -0.762** | -1.149*** | -1.335*** | -1.742*** | -2.174*** | -2.666*** | 0.385 | 0.495 | 0.507 |
| Pseudo r-squared | 0.025 | 0.024 | 0.026 | 0.030 | 0.050 | 0.055 | 0.070 | 0.092 | 0.115 | 0.011 | 0.012 | 0.012 |
| Obs | 479 | 479 | 479 | 479 | 479 | 479 | 479 | 479 | 479 | 479 | 479 | 479 |

*** p<.01, ** p<.05, * p<.1. We estimated bootstrapped errors.

We can observe that the self-assessed risk profile and parents' observed financial habits drive young adults' preference for stocks and that the basic or advanced financial literacy do not influence the latter. Only the overall literacy exerts an impact on stocks preference at a significance level of 10%, but the marginal effect is smaller than of the risk tolerance or parental financial behaviour. The effect is positive in the sense that a higher risk tolerance of young adults leads to an increased probability they will prefer stocks as investment options. On the other hand, parents' observed financial habits have an opposite effect. The results show that the more positive financial habits parents have, the more reduced is the likelihood that young adults will prefer to invest in shares. In a way, this result is surprising given previous estimates that showed the positive impact of parental financial behavior on risk appetite. We expected a positive correlation with young adults' preference for stocks considering that more positive financial habits students observed in parents, the more they are stimulated to make riskier investment choices. Nevertheless, based on these results we can infer that the respondents who selected stocks made their choice in opposition to what they observed as negative or positive financial habits in their parents. If the predominant financial behavior of parents is negative then the respondents will be more likely to prefer stocks. If young adults observe more positive financial habits then their preference for this financial asset will tend to decrease. The impact is of the same magnitude irrespective what the level of financial literacy or the risk tolerance are, but it is almost half of the size of the effect exerted by the self-assessed risk tolerance. We failed to detect any significant impact of the parental financial behaviour on young adults' preference for the investment funds, bonds or bank deposits.

When it comes to the preferences for the investment funds and bonds, financial literacy at all levels has a significant positive impact at 1%. Financial literacy prevails over the risk profile and financial behaviours of parents. The more literate young adults are, the higher the probability they could choose to invest in funds or bonds. However, the basic literacy exerts a greater influence on investment funds and bond selection in comparison with the advanced and overall financial literacy. Adding more advanced concepts to the financial knowledge will have a smaller impact on young adults' preferences for these financial assets. Self-assessed risk tolerance and parental financial behaviour do not have a significant influence on young adults' preference for funds and bonds.

The self-assessed risk tolerance is the sole factor influencing the selection of bank deposits. The correlation is negative and suggests the higher the risk appetite of young adults is, the smaller their inclination towards deposits is. The effect is of a same size irrespective of what financial literacy level is. The financial literacy or parental financial behaviours have no impact on young adults' preference for bank deposits.

4. Conclusions

The aim of this paper was to investigate the relationship between risk aversion, financial literacy and investment preferences of young adults aged 18 to 23 in Romania in order to understand better the individuals' participation in the capital market and the extent to which financial education can contribute to their transformation into investors. For this purpose, we conducted an online survey during April 2020 among students in higher education. A number of 479 students participated in the study and we had a similar number of useable surveys for most of the aspects we investigated. We targeted young adults who were studying finance and economics at the time when this research was made, not only because of the easier access to data about them, but also because we wanted a sample of young adults who benefited from financial and economic education.

We contributed to the enhancement of the literature in this field by building a novel dataset assessing young adults' financial literacy in Romania given the existing scarcity of data in this regard. We measured financial literacy at three distinct levels: basic, advanced and overall by combining different sets of questions. We evaluated young adults risk profiles resorting to an experimental method and to a self-assessment method. We also collected data on parents' financial behaviours and on young adults' investment preferences.

The major findings of our paper are that financial literacy can shape young adults' risk aversion and their investment preferences and that being more educated can help them make much better informed financial decision in the future. Nevertheless, our research also revealed some interesting nuances of these findings. Thus, we showed that basic financial literacy has the greatest influence in decreasing young adults' risk aversion compared to that of the advanced or overall financial literacy. The marginal effect of the latter in making young adults more risk lovers is significantly smaller. Parental financial behaviour exerts a robust positive influence on students' risk aversion across all econometric specifications. Its size is similar regardless of the level of financial literacy.

When it comes to self-assessed risk tolerance, we found that neither financial literacy nor parental financial behaviours significantly influence it. Young adults mainly evaluate their risk profile based on what they think or feel what their risk tolerance is. However, the investment preferences of young adults are strongly correlated with the self-assessed risk tolerance and not with the risk aversion which was measured resorting an experimental method. Respondents' preference for stocks is mainly determined by the self-assessed risk tolerance and financial literacy plays no significant role. The selection of the investment funds or bond are determined by the financial literacy and having good numerical skills and knowledge of basic concepts such inflation, interest rate, time value of money exert a more significant influence in shaping young adults preferences for these financial products. Adding more advanced financial concepts can still positively influence the selection, but the marginal effect is smaller than in the case of basic financial literacy. In the end, self-assessed risk tolerance drives young adults' preference

for bank deposits and the relationship is negative. Although they correlate well their risk tolerance with the level of risk of each financial product, the existing discrepancies between the proportions of the respondents who indicated higher risk tolerance and those indicating lower risk aversions showed some estimation errors in the assessment of the risk profile. These results made us think that if young adults take their investment decisions based on the overestimated self-assessed risk tolerance, they will engage in the future in much riskier investments than they can afford or tolerate.

Acknowledgments

This research was funded by the Bucharest University of Economic Studies through the grant awarded for the project PI – 2019 – EDUFIN – 1836/30.07.2019 requested by the Bucharest Stock Exchange.

References

- Almenberg, J. and Dreber, A., 2015. Gender, stock market participation and financial literacy. *Economics Letters*, 137, pp. 140–142.
- Aren S. and Zengin A.N., 2016. Influence of financial literacy and risk perception on choice of investment. *Procedia-Social and Behavioral Sciences*, 235, pp. 656-663.
- Arrow, K.J., 1965. Aspects of the theory of risk-bearing. Yrjö Jahnssonin Säätiö lectures.
- Bayar, Y., Sezgin, H. F., Öztürk, O.F. and Sasmaz, M.U., 2020. Financial Literacy and Financial Risk Tolerance of Individual Investors: Multinomial Logistic Regression Approach. *SAGE Open Journals*, 10(3) pp.1-11.
- Beckmann, E., 2013. Financial Literacy and Household Savings in Romania. *Numeracy, Advancing Education. Quantitative Literacy*, 6(2): Article 9.
- Bollen, N.P. and Posavac, S., 2018. Gender, risk tolerance, and false consensus in asset allocation recommendations. *Journal of Banking & Finance*, 87, pp. 304–317.
- Bucher-Koenen, T. and Ziegelmeyer, M., 2014. Once Burned, Twice Shy? Financial Literacy and Wealth Losses during the Financial Crisis. *Review of Finance*, 18 (6), pp. 2215-2246.
- Cueva C., Iturbe-Ormaetxe I., Ponti G. and Tomás J., 2019. Boys will still be boys: Gender differences in trading activity are not due to differences in (over) confidence. *Journal of Economic Behavior & Organization*, 160 (2019), pp. 100-120.
- Cupák A., Fessler P. and Schneebaum A., 2020. Gender differences in risky asset behavior: The importance of self-confidence and financial literacy. *Finance Research Letters*. Available at: <https://doi.org/10.1016/j.frl.2020.101880>.
- Demirguc-Kunt, A., Hu, B. and Klapper, L., 2019. Financial Inclusion in the Europe and Central Asia Region: Recent Trends and a Research Agenda. Policy Research Working Paper 8830, The World Bank.
- Dohmen, T., Falk, A., Huffman, D., Sunde, U., Schupp, J. and Wagner, G.G., 2011. Individual risk attitudes: Measurement, determinants, and behavioral consequences. *Journal of European Economic*

- Association, 9(3), pp. 522-550.
- Donkers, B., Melenberg, B., and Van Soest, A., 2001. Estimating Risk Attitudes Using Lotteries: A Large Sample Approach. *Journal of Risk and Uncertainty*, 22(2), pp. 165-195.
- Dwyer, P.D., Gilkeson, J.H. and List, J.A., 2002. Gender differences in revealed risk taking: Evidence from mutual fund investors. *Economics Letters*, 76, pp. 151–158.
- Halko, M.-L., Kaustia, M. and Alanko, E., 2012. The gender effect in risky asset holdings. *Journal of Economic Behavior Organization*, 83, pp. 66–81.
- Hartog, J., Ferrer-i-Carbonell, A. and Jonker, N., 2000. On a Simple Survey Measure of Individual Risk Aversion. CESifo Working Paper Series, 363, CESifo Group Munich
- Hermansson, C. and Jonsson, S., 2021. The impact of financial literacy and financial interest on risk tolerance. *Journal of Behavioral and Experimental Finance*. 29. ISSN 2214-6350 Available at: <https://doi.org/10.1016/j.jbef.2020.100450>.
(<https://www.sciencedirect.com/science/article/pii/S2214635020303798>).
- Hibbert A.M., Lawrence E.R. and Prakash A.J., 2013. Does knowledge of finance mitigate the gender difference in financial risk-aversion?. *Global Finance Journal*, 24(2), pp. 140-152.
- Hryshko, D., Luengo-Prado, Jose, M. and Sørensen, B. E., 2010. Childhood Determinants of Risk Aversion: The Long Shadow of Compulsory Education. *Quantitative Economics*, 2, pp. 37-72.
- Huzdik, K., Béres, D. and Németh, E., 2014. An Empirical Study of Financial Literacy versus Risk Tolerance Among Higher Education Students. *Public Finance Quarterly*, State Audit Office of Hungary, 59(4), pp. 444-456.
- Inslar, M., Compton, J. and Schmitt, P., 2016. The investment decisions of young adults under relaxed borrowing constraints. *Journal of Behavioral and Experimental Economics*, 64, pp. 106-121.
- Jianakoplos, N.A. and Bernasek, A., 1998. Are women more risk averse. *Economic Inquiry*, 36 (4), pp. 620–630.
- Li, J., Li, Q. and Wei, X., 2020. Financial literacy, household portfolio choice and investment return. *Pacific-Basin Finance Journal*, 62, ISSN 0927-538X, Available at: <https://doi.org/10.1016/j.pacfin.2020.101370>.
(<https://www.sciencedirect.com/science/article/pii/S0927538X20301128>)
- Lusardi, A. and Mitchell, O., 2014. The Economic Importance of Financial Literacy: Theory and Evidence. *Journal of Economic Literature*, 52(1), pp. 1–40.
- OECD, 2017. G20/OECD INFE report on adult financial literacy in G20 countries, <https://www.oecd.org/finance/g20-oecd-infe-report-adult-financial-literacy-in-g20-countries.htm>
- OECD, 2016. OECD/INFE International Survey of Adult Financial Literacy Competencies. OECD, Paris, www.oecd.org/finance/OECD-INFE-International-Survey-of-Adult-Financial-Literacy-Competencies.pdf
- Pratt, J.W., 1964. Risk Aversion in the Small and in the Large. *Econometrica*, 32(1), pp.122-136.
- Shim S., Barber, B. L., Card, N. A., Xiao, J. J., and Serido, J I., 2010. Financial Socialization of First-year College Students: The Roles of Parents, Work, and Education. *Journal of Youth and Adolescence*, 39(12), pp. 1457-1470.
- van Rooij, M., Lusardi, A. and Alessie, R., 2011. Financial literacy and stock market participation. *Journal of Financial Economics*, 101 (2), pp. 449–472.

Appendix: Correlation matrix

| Variables | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
|-----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| (1) | 1 | | | | | | | | | | |
| (2) | -0.055 | 1 | | | | | | | | | |
| (3) | -0.039 | -0.014 | 1 | | | | | | | | |
| (4) | -0.05 | 0.021 | 0.019 | 1 | | | | | | | |
| (5) | -0.138* | 0.012 | 0.192* | 0.196* | 1 | | | | | | |
| (6) | -0.096* | 0.074 | 0.154* | 0.213* | 0.435* | 1 | | | | | |
| (7) | -0.129* | 0.059 | 0.195* | 0.241* | 0.750* | 0.922* | 1 | | | | |
| (8) | 0.016 | -0.058 | 0.059 | 0.04 | -0.112* | -0.072 | -0.101* | 1 | | | |
| (9) | -0.047 | 0.101* | 0.011 | 0.063 | 0.102* | 0.134* | 0.142* | -0.011 | 1 | | |
| (10) | -0.084* | -0.004 | 0.034 | -0.054 | 0.02 | 0.01 | 0.016 | 0.016 | 0.064 | 1 | |
| (11) | 0.013 | 0.138* | 0.075 | 0.046 | 0.095* | 0.101* | 0.115* | 0.054 | 0.371* | 0.018 | 1 |

(1) = risk premium, (2) = self-assessed risk tolerance, (3) = high school graduation grade, (4) = employment status (yes/no), (5) = overall financial literacy, (6) = basic financial literacy, (7) = advanced financial literacy, (8) = source of financial information (textbooks, social media, family and peers) (9) = household income, (10) = parental financial behaviour index, (11) = parents' education.

* $p < .01$, $p < .05$, $p < .1$