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The Impact of Financial Literacy on the Choice of Financial Instruments by Private Investors in Russian Conditions

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ABSTRACT

The paper examines the impact of financial literacy, risk tolerance and expectations on the choice of financial instruments by private investors using data from the 5th wave of the All-Russian household survey on consumer finance, conducted in 2022 at the request of the Bank of Russia. This is the first time such an analysis using Russian data has been carried out. The **purpose** of this study is to determine the role of financial literacy in making individual investment decisions. The results of logit- and tobit-regression estimation show that the investments of Russian citizens in stocks, bonds and mutual funds are mainly limited by a high degree of financial risk aversion, and not by an insufficient level of financial literacy. Expectations do not affect the choice of financial instruments. The refusal of individuals with low tolerance for possible losses to invest in securities market instruments and the preference for bank deposits is a reasonable and rational decision in case of the absence of deep financial competencies. At the same time, this creates unfavorable conditions for the implementation of the long-term savings program developed by the Ministry of Finance of Russia and attracting long-term investment resources by Russian companies in the real sector of the economy in the context of closed access to global financial markets. The active acquisition of cryptocurrencies by respondents with high self-esteem of their own financial competencies, but low incomes and low financial literacy ratings, calculated on the basis of answers to test tasks, generates increased risks of not achieving financial goals. Therefore, it is necessary to pay special attention to the risks of transactions with cryptocurrencies as a part of the implementation of initiatives promoted by the Moscow State University and the Bank of Russia to improve the level of financial literacy and financial culture of Russian citizens. It is proposed to include questions that allow assessing advanced financial competencies and forming the values of variables that can act as instruments for the level of financial literacy in subsequent waves of the survey to develop the information base for further research.

Keywords: household savings; private investors; financial behavior; stock market; bank deposits; cryptocurrencies; financial literacy; risk tolerance; All-Russian household survey on consumer finance

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INTRODUCTION

In recent years, a trend has emerged towards increasing the role of securities market instruments in the organization of savings placement for Russian citizens. The introduction of a tax on interest income from deposits (given the existence of financial market instruments that allow one to avoid it with long-term ownership — individual investment accounts and mutual investment funds, along with the development of information technologies that have significantly simplified transactions with securities for private investors, has led to a partial shift of funds from bank deposits into stocks, bonds, and mutual funds.

Despite the significant losses incurred by Russian investors following the start of the special military operation and the subsequent harsh sanctions imposed by unfriendly states, interest in securities market instruments remains. By the end of 2023, the number of individuals with brokerage accounts reached 29.7 million, and the total amount of their assets amounted to 9.2 trillion rubles¹. At the same time, the most popular savings instrument for the population remains bank deposits, the volume of which

¹ Bank of Russia website. URL: https://www.cbr.ru/Collection/Collection/File/48976/review_broker_Q4_2023.pdf (accessed on 10.05.2024).

amounted to 30.5 trillion rubles as of 01.03.2024².

At the same time, the influence of financial literacy, risk appetite, and expectations regarding the prospects of the country's economic development on the choice between bank deposits and securities market instruments for individuals' savings in Russian conditions remains unexplored. The degree to which private investors base their practical decisions about where to spend their funds on a theoretical understanding of personal finance management is of particular interest. In this regard, the **purpose** of this study is to determine the role of financial literacy in making individual investment decisions using data from the fifth wave of the All-Russian Household Survey on Consumer Finances, conducted in 2022 at the request of the Bank of Russia³.

LITERATURE REVIEW

Even in countries with a long history of stock market development, not all individuals use securities and mutual funds to invest even a small share of their savings, although from a financial theory perspective, this is irrational (for example, according to the capital asset pricing model, a private investor should allocate funds between a risk-free asset and a market portfolio that includes securities traded on the stock market [1]). In foreign literature, this phenomenon is referred to as the “stock market participation puzzle” [2, p. 1070]. His explanation is linked both to objective factors — high transaction costs associated with obtaining and processing information about securities and their issuers [3], lower returns adjusted for risk compared to alternative investments [4], and poor regulation of the activities of professional participants in the financial market [5–

7], as well as to subjective factors — high risk aversion and a desire to completely eliminate the possibility of losses [2, 8], low self-assessment of financial literacy [9], and unfavorable expectations regarding the country's economic development prospects [10–12]. A special role among these factors is played by financial literacy, which A. Lusardi and O. Mitchell define as “the ability of individuals to process economic information and make informed decisions regarding financial planning, asset accumulation, debt obligations, and retirement savings” [13, p. 6].

The life cycle theory [14] and the capital asset pricing model [1] suggest that individuals are capable of performing complex financial calculations and possess deep competencies to operate in the financial market. A. Lusardi, T. Michaud, and O. Mitchell [15], as well as T. Jappelli and M. Padula [16], developed theoretical models of intertemporal portfolio choice, suggesting that investing in human capital in the form of increasing financial literacy allows individuals to reduce entry costs to the stock market and transaction costs associated with financial operations. These models suggest that an increase in financial literacy should lead to a higher likelihood of participation in the stock market and an increase in the share of securities market instruments in the total volume of savings. Testing the hypotheses arising from these theoretical models requires quantitative measurement of investors' financial literacy levels.

According to A. Lusardi and O. Mitchell, the fundamental financial competencies underlying saving and investment decisions include the ability to perform calculations related to compound interest, an understanding of inflation, and an awareness of the importance of diversifying investment risks [13, p. 10]. To measure these competencies, three standard questions were developed, which, with minor adjustments for national specifics, are used in surveys of consumer finances not only in the USA but

² Bank of Russia website. URL: https://www.cbr.ru/statistics/bank_sector/review/ (accessed on 10.05.2024).

³ Bank of Russia website. URL: https://www.cbr.ru/ec_research/vserossiyskoe-obsledovanie-domokhozyaystv-po-potrebitelskim-finansam/ (accessed on 10.05.2024)

also in Europe (Germany, Switzerland, the Netherlands) and Asia (China, Thailand). In most surveys, basic questions are supplemented with more complex questions that allow for an assessment of respondents' understanding of the characteristics of various financial instruments, primarily stocks, bonds, and mutual funds.

The analysis of the results of the conducted surveys shows that the level of financial literacy is quite low. More than 50% of respondents, including in the United States, make mistakes in their answers even to the simplest basic-level questions [13, 17–22]. The results of the responses to more complex advanced-level questions indicate a weak preparedness of the respondents to carry out operations in the securities market. For example, only 21% of respondents in the U.S. are aware of the inverse relationship between bond prices and interest rates [13, p. 12]. This strongly contradicts the assumptions of theoretical models that assume private investors have complete information and act rationally. Thus, a low level of financial literacy can both hinder private investors from making transactions and expose them to unwarranted risks if they choose to operate in segments of the financial market that they do not understand.

In addition to objective assessments of financial literacy, which are based on summarizing responses to questions that measure the level of financial competencies, international practice widely employs self-assessment results, where respondents determine their own level of financial literacy.

The results of empirical studies from various countries around the world indicate that the level of financial literacy significantly and positively influences both the decision-making process regarding the opening of positions in securities and mutual funds, as well as the proportion of funds allocated to stock market instruments [9, 12, 18, 21–25]. The author was unable to find studies examining similar effects using Russian data,

although the impact of financial literacy on the use of bank accounts and bank loans [26], as well as services of non-state pension funds [27] in Russian conditions has already been assessed. Research using foreign data also reveals a positive correlation between the level of financial literacy and wealth [28–30].

Alongside specialized knowledge, characterized by objective and subjective assessments of financial literacy, the level of formal education received significantly influences the use of securities market instruments, as it also helps to overcome barriers related to the need for analyzing financial information when making and implementing investment decisions [31, 32]. Important factors in the selection of financial instruments by individuals are their attitude towards risk [2, 23, 33, 34] and their expectations regarding the prospects for the country's economic development [12].

The analysis of the results of foreign studies allows us to propose the following hypotheses for testing using data from the All-Russian Household Survey on Consumer Finances:

H1: The increase in objectively measured financial literacy is accompanied by a heightened use of securities market instruments.

H2: A high subjective confidence in one's level of financial literacy is accompanied by an increased use of securities market instruments.

H3: An increase in risk appetite is accompanied by a growing role of stock market instruments and cryptocurrencies in the structure of financial assets.

H4: Pessimistic expectations regarding the prospects for the development of the Russian economy are contributing to a decrease in the share of risky assets.

FINANCIAL LITERACY, RISK TOLERANCE, AND EXPECTATIONS IN RUSSIAN CONDITIONS

In our research, we use data from the fifth wave of the All-Russian Household Survey on Consumer Finances, conducted in 2022 at the

request of the Bank of Russia, which involved 12 162 respondents.

Despite the active opening of brokerage accounts by Russian citizens in recent years, securities market instruments still make up a small share of the financial assets of the respondents who participated in the survey. The vast majority (60.74%) of respondents use bank deposits to place their savings. Only a few respondents invest in stocks (0.79%), bonds (0.21%), mutual funds (0.19%), and cryptocurrency (0.20%). Such a conservative approach to choosing savings instruments significantly differs not only from the situation in the country with the most developed stock market — the USA, where 53% of respondents in a similar survey invest in stocks and 8% in bonds [12], but also in China, where 10% of respondents have stocks in their portfolio and 5% have mutual funds [23], and in Thailand, where 9% of respondents have stocks or equity funds in their portfolio and 10% have bonds or bond funds [22].

The share of bank deposits in the overall structure of respondents' financial assets is 93.38%, while securities market instruments account for 5.16%, of which 3.83% are in stocks, 0.86% in bonds, and 0.47% in mutual funds. The remaining share is accounted for by precious metal accounts (0.28%) and cryptocurrencies (1.18%).

In the "financial literacy" section of the survey, questions are included that allow for the establishment of respondents' subjective perception of their financial literacy, as well as providing an objective assessment based on the results of their answers to test tasks. Only 10.67% of respondents rate their knowledge and skills in financial literacy as good or excellent, while 43.5% critically note that they are unsatisfactory or completely lacking. At the same time, 43.13% of respondents consider their knowledge and skills to be satisfactory.

As in similar foreign studies, the test questions allow for the assessment of respondents' understanding of the

algorithm for calculating compound interest and inflation. However, the key question from the perspective of A. Lusardi and O. Mitchell [13, p.10] regarding the comparative level of risks between investing in single stock and diversified mutual fund was not included in the survey conducted by the Bank of Russia, nor were advanced-level questions about the characteristics of stocks, bonds, and mutual funds (for example, about the nature of the relationship between interest rates and bond prices). At the same time, unlike foreign surveys, the Russian poll pays special attention to the respondents' awareness of the characteristics of the Russian deposit insurance system.

Based on the results of the test answers that assess the understanding of compound interest calculation techniques and the effects of inflation, it can be concluded that the level of financial literacy among Russians (65% correct answers on questions about compound interest and 57% correct answers on questions regarding the effects of inflation) is lower compared to citizens of the U.S. (76% and 81%) [12], Germany (78% and 82%) [19], Switzerland (78% and 79%) [20] and the Netherlands (77% and 85%) [18], but higher compared to citizens of China (57% and 50%) [21]. Unfortunately, other questions for testing financial literacy are not comparable to those used in foreign surveys.

To obtain an objective rating of financial literacy, we summed up the number of correct answers to questions that characterize the ability to calculate compound interest, knowledge of the effects of inflation, understanding the relationship between return and risk, knowledge of the parameters of the deposit insurance system, awareness of the key interest rate, and the ability to calculate discounts. On average, respondents answered correctly 5.4 test questions out of 9, which are taken into account when calculating the financial literacy rating, with a median value of 6.

Both subjective self-assessment and objective financial literacy ratings are higher

among respondents with higher education. With increasing age, financial literacy initially rises, but then begins to decline. The highest level of self-assessed financial literacy is demonstrated by respondents around the age of 30, which aligns with the findings of the study by O.V. Kuznetsov and co-authors [35], while the objective rating of financial literacy is shown by respondents aged 40. Unlike foreign studies, the dependence of financial literacy on gender is not observed in Russian data.

70.3% of respondents reported their complete unwillingness to take on financial risks. Only 7.3% of respondents showed a willingness to take substantial and significant risks in order to achieve higher profits.

If respondents assess the economic conditions in Russia as unfavorable over a 2-year horizon, many expect an improvement in the economic situation over a longer period (over a 5-year horizon). 38.1% of respondents consider that the prospects for the Russian economy are poor over the next 2 years, but when considering a 5-year horizon, the share of pessimist's decreases to 27.9%. And if only 13.0% of respondents consider the prospects of the Russian economy good over a 2-year horizon, then over a 5-year horizon, the share of optimists rises to 20.4%.

METHODOLOGY

To test the proposed hypotheses, models of binary choice were evaluated, explaining the inclusion of various financial assets in the respondent's portfolio, as well as Tobit models, explaining the shares of different financial assets in the respondent's portfolio. Since our main interest lies in explaining the structure of financial assets of individuals, only data from respondents who reported having any financial assets (60.89% of the sample) were used in the estimation of the regression models.

To analyze the factors determining the use of various financial assets by respondents, models were estimated:

$$Pr(ai_{ki} = 1) = F(b_0 + b_1lo_i + b_2ls_i + b_3rt_i + b_4ex_i + b_5fe_i + b_6age_i + b_7he_i + b_8ln(inc_i) + e_i), \quad (1)$$

where ai_{ki} — a binary variable indicating whether financial asset k is present in the portfolio of respondent i ; lo_i — an objective assessment of the respondent's level of financial literacy based on their answers to test questions; ls_i — subjective self-assessment of financial literacy level; rt_i — the respondent's willingness to take financial risks; ex_i — the respondent's expectations regarding the prospects for the development of the Russian economy over the next 5 years; fe_i — female indicator; age_i — age; he_i — indicator of higher education availability; inc_i — annual income; F — logistic function.

Model (1) was estimated for all investments in securities market instruments (stocks, bonds, and mutual funds), as well as for investments in stocks, bonds, mutual funds, cryptocurrencies, bank deposits, and precious metal accounts.

To analyze the factors determining the shares of the respondent's investments in financial asset k , Tobit model (2)–(4) was estimated:

$$as_{ki}^* = b_0 + b_1lo_i + b_2ls_i + b_3rt_i + b_4ex_i + b_5fe_i + b_6age_i + b_7he_i + b_8ln(inc_i) + e_i; \quad (2)$$

$$as_{ki} = as_{ki}^*, \text{ if } as_{ki}^* > 0; \quad (3)$$

$$as_{ki} = 0, \text{ if } as_{ki}^* \leq 0, \quad (4)$$

where as_{ki}^* — the latent variable of the share of financial asset k in the portfolio of respondent i ; as_{ki} — the factual share of financial asset k in the portfolio of respondent i ; the other variables correspond to those used in the model (1). It was assumed that the random error e_i is normally distributed.

RESULTS

Table 1 presents the coefficients for the explanatory variables in equation (1), where the dependent variable is an indicator of the

Table 1

Estimation of the Impact of Financial Literacy on the Inclusion of Various Financial Instruments in the Portfolio

Variables	Securities market instruments	Stocks	Bonds	Mutual funds	Cryptocurrency	Deposits	Precious metal accounts
Constant	-13.213*** (2.030)	-12.828*** (2.151)	-21.103*** (4.165)	-11.405*** (4.256)	-12.502*** (3.729)	9.186* (5.177)	-3.555 (3.341)
Financial literacy rating	0.161** (0.066)	0.173** (0.075)	0.402** (0.161)	0.086 (0.127)	0.172 (0.146)	-0.043 (0.184)	0.120 (0.159)
Financial literacy self-assessment	0.075 (0.131)	0.333** (0.148)	0.002 (0.251)	-0.403 (0.271)	0.710** (0.303)	-0.101 (0.390)	0.035 (0.340)
Willingness to take risks	0.723*** (0.137)	0.671*** (0.152)	0.719*** (0.275)	0.953*** (0.263)	1.100*** (0.266)	-1.192*** (0.343)	0.645** (0.323)
Expectations of the changing economic situation	0.070 (0.137)	0.084 (0.151)	-0.141 (0.276)	0.024 (0.297)	-0.145 (0.310)	0.364 (0.431)	0.635* (0.368)
Female	0.182 (0.226)	0.219 (0.252)	0.826* (0.473)	0.626 (0.516)	-1.907** (0.772)	0.231 (0.671)	-0.084 (0.573)
Age	0.001 (0.007)	-0.008 (0.008)	-0.024 (0.017)	0.007 (0.015)	-0.026 (0.021)	-0.012 (0.021)	-0.041* (0.022)
Availability of higher education	0.962*** (0.247)	0.858*** (0.274)	1.598** (0.652)	1.340** (0.538)	-0.482 (0.563)	-1.285* (0.759)	1.504** (0.653)
Income log	0.463*** (0.150)	0.386** (0.160)	0.879*** (0.299)	0.252 (0.314)	0.280 (0.282)	0.021 (0.380)	-0.380 (0.246)
McFadden R2	0.102	0.112	0.193	0.087	0.231	0.112	0.133

Source: Author's calculations.

Note: ***, **, * – the coefficient is statistically significant at the level of 1, 5 and 10%, respectively. Standard errors are given in parentheses.

presence of the corresponding financial asset for the respondent.

The results of the estimations show that an increase in the financial literacy rating, based on responses to test questions, enhances the tendency of respondents to include securities market instruments — bonds and stocks — in their portfolios. Moreover, this effect is more pronounced for bonds, meaning that financially literate investors in Russian conditions perceive bonds as an instrument with an optimal balance between return and risk. In the equation for bank deposits, the coefficient for the variable of financial literacy rating is negative, which indicates the rationality of the financial behavior of Russian citizens. *Those who lack a deep understanding of the functioning of financial markets make a reasonable choice in favor of the most conservative instrument.*

When including the variable of the objective financial literacy rating in the equation, the effect of subjective self-assessment of financial literacy on the decision to include securities market instruments in the portfolio is statistically insignificant. However, this effect is revealed in relation to specific financial instruments — stocks and cryptocurrencies. The effect of increased interest among financially literate respondents in including mutual funds that provide broad investment diversification in their portfolio, as discovered in the data from China [23], is not observed in the Russian data.

As expected, respondents who are not willing to take financial risks choose the most conservative instrument — bank deposits. A high willingness to take risks encourages respondents to include alternative financial instruments in their portfolio — stocks, bonds, mutual funds, cryptocurrencies, and precious metal accounts.

Table 2

Estimation of the Impact of Financial Literacy on the Share of Various Financial Instruments in the Portfolio

Variables	Stock Securities market instruments	Stocks	Bonds	Mutual funds	Cryptocurrency	Deposits	Precious metal accounts
Constant	-7.025*** (1.221)	-6.559*** (1.227)	-4.015*** (0.998)	-6.347** (2.468)	-7.210*** (2.399)	1.062*** (0.020)	-3.137* (1.647)
Financial literacy rating	0.071** (0.034)	0.074** (0.036)	0.072** (0.030)	0.022 (0.061)	0.086 (0.080)	-0.001 (0.001)	0.061 (0.069)
Financial literacy self-assessment	0.045 (0.069)	0.167** (0.074)	-0.015 (0.045)	-0.216 (0.142)	0.394** (0.184)	-0.003** (0.001)	0.015 (0.141)
Willingness to take risks	0.414*** (0.087)	0.344*** (0.088)	0.149*** (0.056)	0.518*** (0.181)	0.612*** (0.190)	-0.013*** (0.002)	0.209 (0.154)
Expectations of the changing economic situation	0.016 (0.074)	0.027 (0.075)	-0.004 (0.049)	-0.003 (0.147)	-0.007 (0.155)	-0.002 (0.002)	0.261 (0.160)
Female	0.033 (0.120)	0.054 (0.124)	0.107 (0.086)	0.282 (0.253)	-0.871** (0.383)	0.001 (0.003)	-0.030 (0.238)
Age	0.001 (0.004)	-0.002 (0.004)	-0.004 (0.003)	0.005 (0.007)	-0.011 (0.010)	0.000 (0.000)	-0.016* (0.009)
Availability of higher education	0.520*** (0.134)	0.435*** (0.135)	0.286** (0.113)	0.619** (0.288)	-0.235 (0.285)	-0.011*** (0.003)	0.552* (0.290)
Income log	0.205*** (0.078)	0.166** (0.076)	0.155*** (0.056)	0.112 (0.155)	0.115 (0.141)	-0.003 (0.002)	-0.088 (0.430)

Source: Author's calculations.

Note: ***, **, * – the coefficient is statistically significant at the level of 1, 5 and 10%, respectively. Standard errors are given in parentheses.

Thus, the risk profile aligns quite well with the asset choices made by the respondents, indicating the rationality of their financial behavior.

Unlike in the U.S., in Russia, there is no statistically significant relationship between expectations regarding the country's economic development prospects and decisions to include various financial instruments in the portfolio. It is possible that this is due to the fact that the composition of the respondents' portfolios was primarily determined by decisions made before the start of the special military operation and the subsequent harsh sanctions imposed by unfriendly states. Additionally, the changes in asset structure were influenced not only by expectations regarding the prospects for economic development in the coming years but also by assessments of the justification for the scale of the decline in Russian securities prices in February-March 2022.

There are no significant differences in the financial behavior of Russian men and women, although women tend to include bonds in their portfolios slightly more and cryptocurrencies slightly less. Contrary to expectations, no connection was found between the age factor and decisions regarding the inclusion of various financial instruments in the portfolio, including when testing the quadratic dependence of financial decisions on age.

Respondents with higher education are more likely to open positions in securities market instruments, including mutual funds. As expected, the likelihood of including stocks and bonds in the portfolio is higher among respondents with high incomes.

The factors considered in choosing financial instruments a similar impact on the shares of various financial assets in investors' portfolios (Table 2). Respondents who rate their own level

of financial literacy highly are characterized by a lower proportion of savings placed in bank deposits and a higher proportion of savings invested in cryptocurrencies and stocks. As expected, respondents who are not inclined to take financial risks place almost all of their savings in bank deposits, while respondents with a high tolerance for financial risks actively utilize securities market instruments and cryptocurrencies.

In response to expectations, forecasts regarding changes in the economic situation in Russia do not play a statistically significant role in determining the structure of respondents' financial assets, although one might have expected a higher share of stocks in the asset structure of optimists and a higher share of precious metal accounts in gold in the asset structure of pessimists. This may be explained by the fact that some pessimists use bars and investment coins for gold investments instead of precious metal accounts, the data on which is not presented in the survey by the Bank of Russia. Among stock investors, there is a significant proportion of those who consider that Russian stocks are undervalued even in the context of the anticipated deterioration of the economic situation in Russia.

At the same time, socio-demographic variables influence the structure of the respondents' financial assets. Women are less likely than men to invest in cryptocurrencies. Individuals with higher education are more likely to allocate a larger share of their savings to securities market instruments by reducing the share of savings placed in bank deposits. High-income individuals are actively investing in the stock market.

CONCLUSION

Data from the Bank of Russia indicates that the level of financial literacy among Russians, although lower than in the U.S., Germany, Switzerland, and the Netherlands, is higher than in China. The investments of Russian citizens in securities market instruments are primarily limited not by a lack of financial literacy, but

by a high degree of aversion to financial risks. In the absence of deep financial competencies, the refusal of individuals characterized by low tolerance for potential losses to invest in securities market instruments and their preference for bank deposits is a completely rational and justified decision. At the same time, this creates unfavorable conditions for the implementation of the long-term savings program developed by the Ministry of Finance of Russia and for attracting long-term investment resources by Russian companies in the real sector of the economy amid the closure of access to global financial markets.

At the same time, the active acquisition of cryptocurrencies by individuals with a high self-assessment of their financial competencies, but with low incomes and financial literacy ratings based on test responses, as well as a lack of higher education, creates increased risks of not achieving financial goals due to potential declines in cryptocurrency values and account freezes by cryptocurrency exchanges. This also reduces the share of savings used for investment to support the development of the Russian economy. Therefore, within the framework of the initiatives promoted by Lomonosov Moscow State University and the Bank of Russia to enhance the financial literacy and financial culture of Russian citizens, it is essential to pay special attention to the risks associated with cryptocurrency transactions.

Further research on the impact of financial literacy on the choice of financial instruments by Russian citizens requires an expansion of the representation in the sample of respondents engaged in securities market operations, as well as adjustments to the composition of the survey questions. To ensure comparability with the results of international surveys in subsequent waves, it makes sense to adjust and supplement the set of questions posed to respondents (for example, to include a question on understanding the benefits of diversifying investment risks in the block of questions assessing financial literacy, as well as advanced-level questions, and to consider

the fund's profile by investment object when collecting data on investments in mutual funds). To address potential issues related to the endogeneity of financial literacy, it would be beneficial to include questions in the survey

whose answers could be used as instrumental variables (for example, regarding whether respondents were taught financial planning by their parents during childhood and whether they had a bank account before the age of 18).

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