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The role of financial literacy in ensuring financial inclusion of the population

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Abstract. *This work summarizes the arguments and counterarguments in the framework of the scientific debate on the issue of financial literacy. The main purpose of the research is to identify the key factors and behavioral patterns inherent in managing personal finances. Systematization of literary sources and approaches to solving the problem of insufficient level of financial literacy among different segments of the population indicates that it is necessary to promote financial education of the population, especially vulnerable segments. This concerns the issues of financial inclusion, improvement of financial education, and development of practical skills for making financial decisions. The urgency of solving this scientific problem is caused by the rapid development of financial services. The study of the problems of the theoretical foundations of financial literacy in the work is carried out in the following logical sequence: analysis of the publications, analysis of available databases, and statistical analysis. The methodological tools of the research were the Python programming language, in particular the stats model's library. The object of the research is patterns of behavior with personal finances. The article presents the results of empirical statistical analysis, which showed that the difference in financial decisions of individuals is due to age, level of education, employment, and level of family income. Financial decisions such as saving or borrowing have been found to be related to financial literacy and influence financial confidence. The study empirically confirms and theoretically proves that financial literacy is a fundamental factor in the level of financial well-being and closely correlates with financial behavior patterns. The results of the research can be useful for further scientific developments.*

Keywords: economic development, financial literacy, financial behavior, financial inclusion, personal finance.

JEL Classification: F36, G20, I20

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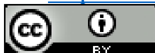
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Introduction

Low financial literacy is one of the most influential factors in vulnerability to financial fraud, the ability to detect deceptive investment schemes and use financial services to allocate personal funds.

Often people rely on risky alternatives and get into debt, which leads to a cycle of financial instability and limits opportunities for economic development. Most importantly, insufficient financial education contributes to poor use of formal financial services and other available tools for budget distribution. For example, individuals lacking financial literacy may encounter difficulties in understanding such terms as loan, interest rate, or mortgage. In addition, low financial literacy prevents people from efficient financial planning and saving which can lead to the accumulation of excessive debt, making it difficult to meet their own financial obligations and potentially leading to financial distress or even bankruptcy. Due to the small amount of savings, over-reliance on social security benefits, neglect of inflation, and rising health care costs, the risk of facing financial difficulties is very high.

Knowledge of available financial products and services empowers users to choose the options that best suit their needs. When people understand how financial tools work, they can manage their money effectively, making informed decisions, thereby protecting themselves from common mistakes such as having debts, making bad investment decisions, lacking capital for retirement, and more. Thus, understanding the financial behavior of the population plays a crucial role in economic development.

Emergencies, such as the 2008 financial crisis and the recent COVID-19 pandemic, have had profound effects on financial behavior among individuals. Economic downturns and market volatility during crises have made people more cautious about their spending and saving habits, tending to prioritize building emergency funds, reducing debt, and diversifying investments to mitigate risks and ensure financial stability. Another influential factor is the rise of technology which has led to a shift from traditional cash-based transactions to digital payment methods. With the widespread availability of information through the Internet, people are able to explore financial products, compare rates, and access educational resources, contributing to positive changes in financial behavior, including more informed financial choices and improved financial planning. With increase in financial literacy levels, demand for formal and informal financial products rises and financial inclusion enhances (Khan et al., 2022).

Moreover, the COVID-19 pandemic accelerated the adoption of remote work and digital transformation across industries, including the growth of the financial technology (fintech) sector by boosting reliance on digital payments and e-commerce. The reliability and accessibility of services provided by fintech companies have changed how people complete transactions by reducing the use of cash and enabling quick and seamless financial digital operations. Such services include online banking, mobile wallets, schemes like BNPL (buy now, pay later), platforms for peer-to-peer (P2P) lending, online banking, apps for investing, operating personal finance, etc. These tools provide real-time insights into personal finances, enabling individuals to make informed decisions and better manage their money. Financial literacy along with online banking and understanding its services are considered to drive financial inclusion, leading in turn to financial stability and economic development (Rastogi and Ragabiruntha, 2018).

According to Kumar et al. (2023), digital financial literacy improves financial capability thereby enhancing perceived well being and financial decision making. Financially literate people are more prepared for difficult financial times through wealth management strategies such as purchasing insurance and building savings and assets. However, Motonishi et al. (2021) in their article, emphasize the importance of being observant about the selection of financial instruments, as in fact, the range of available financial products is now so extensive that most of them are inappropriate or unnecessary for the average consumer. For example, buying individual shares is a common tool for investing, but at the same time, it is risky and requires professional financial knowledge to obtain a quality result.

Anshika and Singla (2021), in their systematic review, state that the level of financial literacy of entrepreneurs around the world is generally low. In addition, they discovered that financially literate entrepreneurs are more likely to have 25% higher income and 10–20% higher savings. The authors found that financial literacy improves the performance of enterprises of various sizes, especially when there is access to capital, since its lack interferes with the efficient operation of the company, thereby hindering its growth and competitiveness in the market. The authors emphasized that such factors as access to official financing, credit policy of

financial institutions, and ease of doing business in the country have a significant impact on the survival of firms.

The importance of an inclusive financial system is widely recognized in politics and is considered a priority for sustainable development by many countries. Financial inclusion means that individuals have access to financial products and services that meet their needs – transactions, payments, savings, loans, insurance, etc (The Global Findex Database, 2021). The success of ensuring financial inclusion by the state or financial institutions is linked with the ability of people to use the opportunities provided. Therefore, the study of financial literacy and behavioral patterns is necessary to achieve a high level of inclusion that drives economic development.

Literature Review

The findings consistently show that both financial and digital literacy are key factors in building inclusiveness and financial resilience (Kass-Hanna et al., 2021). Financially literate people are better at retirement planning, and financial decision-making and are indifferent to gambling (Motonishi et al., 2021). Financial inclusion in combination with online banking and financial literacy can lead to economic development, as access to basic financial services such as savings, loans, insurance, credit, etc., through financial inclusion help the poor to come out of the clutches of poverty (Tarsem Lal, 2017; Rastogi and Ragabiruntha, 2017). Financial literacy encourages electronic payment, mobile phone payment, and remittance (Mahmood, 2022). The combination of digital literacy with financial literacy creates a dual approach to improving households' long-run financial resilience. However, increasing access to digital financial services through digital literacy, without financial literacy, could be dangerous (Lo Prete, 2022). Moreover, there is a link between cognitive and emotional intelligence which determines financial behavior (Chhatwani and Mishra, 2021; Gignac et al., 2022).

Bibliometric analysis on subjects related to financial literacy was conducted in the most authoritative scientometric database Scopus. The search for the necessary materials was carried out based on the key phrase "financial literacy". Noteworthy that only English-language articles were selected, as the analysis was performed in VOSviewer software, which supports only the English language. The study showed that during 1992 - 2023, a total of 2,908 articles were published in English. In general, since 2007, there has been a gradual increase in the number of published articles related to financial literacy. In 2022, 568 articles on the topic of financial inclusion were published, which is almost 50% more than the number of publications in 2021 (Fig. 1).

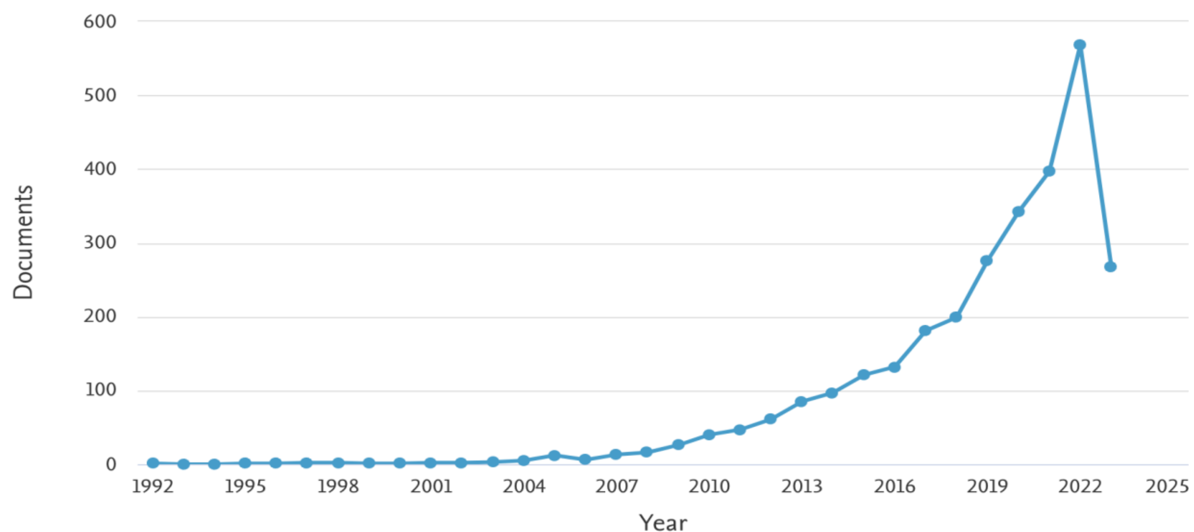

Figure 1. Number of publications by years, 1992 – 2023

Sources: Scopus

With the help of the VOSviewer v.1.6.17 software, was analyzed the nature of the connection between the phrase "financial literacy" and the most repetitive keywords from scientific articles. As a result, four clusters were obtained (Fig. 2). The largest cluster, marked in red, contains 13 keywords and includes articles devoted to main individual factors, often related to financial literacy such as education, decision-making, and financial management. The second largest cluster colored in green includes publications that explore personal finance and its ways of allocation such as investments, retirement planning, and more. Economic and crisis phenomena are the basis of the research of the yellow cluster, which unites 6 key phrases: sustainability, fintech, financial system, financial inclusion, pandemic, and covid-19. The blue cluster links 7 keywords such as financial behavior, financial well-being, and financial services, which are usually strongly related to financial literacy.

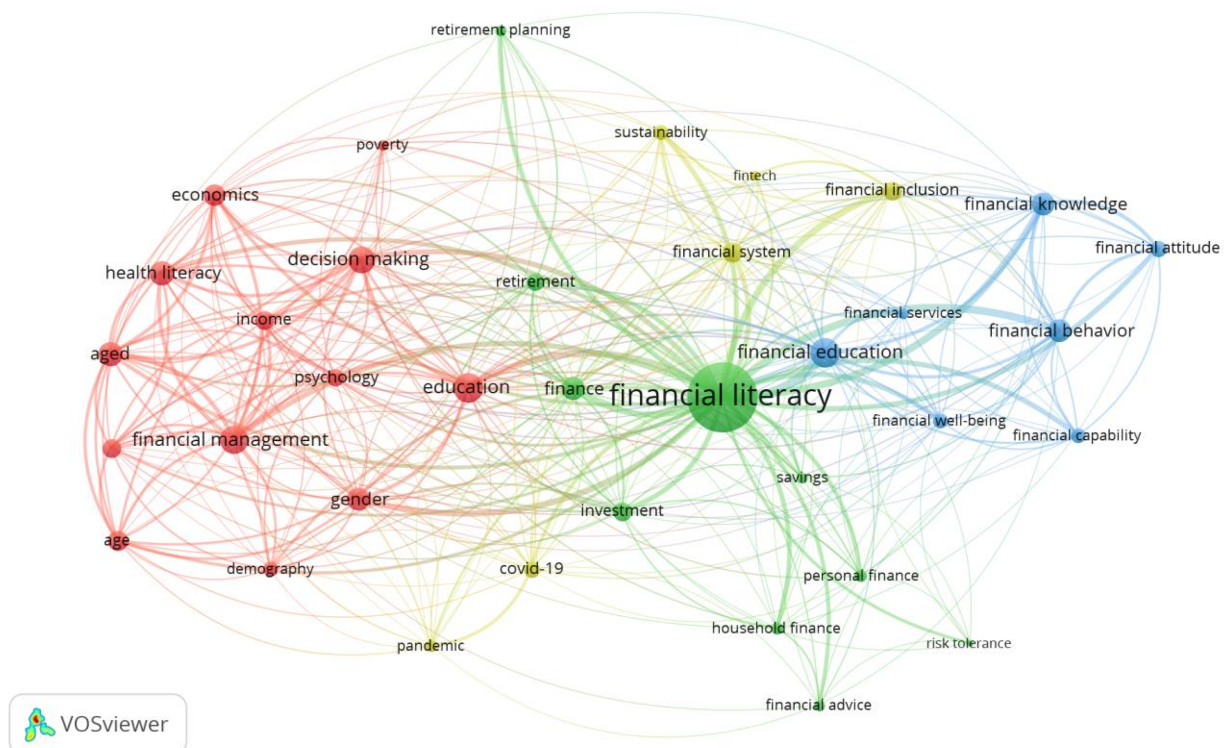

Figure 1. Visualization contextual matrix of publications indexed by the database Scopus, devoted to the study of financial literacy, 1992–2023

Sources: developed by the author based on VOSviewer

Methodology and research methods. During this study, methods such as logistic regression analysis were used. The information base of the research is The Global Findex Database, developed by The World Bank. Selected data for the analysis is from the most recent survey completed in 2021.

Financial literacy has attracted loads of attention among scholars and has given them the impetus to develop new methods for assessing and measuring financial literacy. For example, Lusardi and Mitchell (2008), to assess the level of financial literacy have developed a questionnaire based on the three universal concepts: numeracy as it relates to the capacity to do interest rate calculations and understand interest compounding; understanding of inflation; and understanding of risk diversification (Lusardi 2019). Being financially literate suggests not only an understanding of the financial terms but also the ability to earn, save and multiply money. The decisions made on a daily basis when managing money depend on one`s financial education and shape their financial future.

We assume that financially literate people will make decisions that positively affect one's confidence in personal finances. To test the hypothesis, and identify significant factors, we completed a statistical analysis by constructing a logistic regression model. Logistic regression is used to predict the probability of a binary outcome variable based on predictor variables. In the present analysis, we predict if people are worried about

their finances (Y=1) or not (Y=0) based on the definition of variables listed in Table 1. Logistic regression fits the model:

$$log(p/(1-p)) = \beta_0 + \beta_1 X_1 + \ldots + \beta_n X_n \quad (1)$$

where p represents the probability of the binary outcome; $log()$ denotes the probability of being worried about personal finances; X_n the predictor variables described in Table 1; β_n are the coefficients associated with the predictor variables.

The Global Findex Database has served as the primary reference for information regarding how adults worldwide use financial services, encompassing various aspects like payments, savings, borrowing, managing unexpected expenses or income loss, and handling financial risks.

After careful examination of the data included in the database and exploratory analysis, we selected a sample of 5,000 observations among respondents who have an account. The dependent variable is binary and shows if the respondent is financially worried about paying off bills. The selection of the dependent variable is based on the hypothesis that a lack of financial literacy leads to poor decision-making consequently provoking anxieties regarding the financial situation in the household. Thus, the absence of worry is interpreted as an indication of financial literacy. Independent variables are listed below in Table 1.

Table 1. Independent variables

Variable		Definition
female	X_1	Gender
age	X_2	Respondent age
educ	X_3	Respondent education level
inc_q	X_4	Within-economy household income quintile
emp_in	X_5	Respondent is in workforce
fin4	X_6	Used a debit card
fin8b	X_7	Paid credit card balances in full
fin9	X_8	Made any deposit into the account
fin10	X_9	Withdrew from the account
fin10b	X_{10}	Used account to store money
fin24	X_{11}	Main source of emergency funds in 30 days
fin24a	X_{12}	Difficulty of emergency funds in 30 days
saved	X_{13}	Saved in the past year
borrowed	X_{14}	Borrowed in the past year
anydigpayment	X_{15}	Made or received a digital payment
internetaccess	X_{16}	Internet access

Source: Compiled by the authors based on (The Global Findex Database, 2021).

Each of the depicted variables reflects behavioral patterns that can be interpreted as a lack of financial literacy. For instance, making deposits into the account or savings in the past year, and using an account to store money, testify to the ability to save money and create a financial safety net. Information about digital payments, Internet access, and the usage of debit cards can point to the use of more advanced financial services.

Results

According to the logistic regression results, financial worries depend on age, education level, employment, level of household income within-economy, source, and difficulty of accessing funds in case of emergency, saving or borrowing during the past year, and paying their utility bills. Despite evidence of a gender gap in financial literacy (Tinghög et al., 2021; Lusardi, 2019), the results obtained during our analysis, regarding our hypothesis, show that there is no correlation between gender and financial literacy. Meanwhile, the model suggests the presence of a relationship between age, level of education, employment, and level of household income, which was observed in previous research.

Table 2. The results for logistic regression

Variable	coef (β_i)	std err	z	P > |z|	[0.025	0.975]
Intercept	4.8842	0.547	8.930	0.000	3.812	5.956
female	-0.0894	0.064	-1.392	0.164	-0.215	0.036
age	-0.0064	0.002	-2.687	0.007	-0.011	-0.002
educ	-0.2003	0.053	-3.789	0.000	-0.304	-0.097
inc_q	-0.2003	0.027	-7.314	0.000	-0.254	-0.147
emp_in	-0.3835	0.089	-4.287	0.000	-0.559	-0.208
fin4	0.0102	0.079	0.129	0.897	-0.145	0.166
fin8b	0.1193	0.062	1.933	0.053	-0.002	0.240
fin9	0.0650	0.104	0.627	0.531	-0.138	0.268
fin10	0.0265	0.101	0.262	0.793	-0.171	0.224
fin10b	0.1358	0.076	1.797	0.072	-0.012	0.284
fin24	0.0745	0.025	3.038	0.002	0.026	0.123
fin24a	-1.0669	0.050	-21.184	0.000	-1.166	-0.968
saved	-0.3695	0.077	-4.795	0.000	- 0.521	- 0.218
borrowed	0.3183	0.141	2.261	0.024	0.042	0.594
anydigpayment	-0.2646	0.273	-0.969	0.332	- 0.799	0.270
internetaccess	0.1134	0.128	0.884	0.377	-0.138	0.365

Source: Developed by the author.

According to the result of the analysis presented in Table 2, the model looks as follows:

$$log(p/(1-p)) = 4.884 - 0.006\,X2 - 0.200\,X3 - 0.200\,X4 - 0.384\,X5 + 0.075\,X11 - 1.067\,X12 - 0.370\,X13 + 0.318\,X14 \quad (2)$$

The coefficient associated with the "age" predictor variable was found to be -0.2 ($p < 0.05$), indicating a statistically significant negative relationship. This suggests that for each one-unit increase in the level of education, the log odds of the binary outcome decrease by 0.2 units. In practical terms, this implies that individuals who completed tertiary education or more have a lower likelihood of experiencing worries regarding their financial situation. The same explanation implies the "income" and "employment" predictor variables, indicating a statistically significant negative relationship. Thus, higher-income individuals and those who are in the workforce, tend to have a lower likelihood of experiencing the binary outcome. Both the source of emergency funds and the difficulty in accessing it in 30 days are related to the worries regarding finance. However, the variable which describes the difficulty of accessing emergency funds has a negative coefficient estimate, equal to -1.067 with p-value < 0.5, suggesting a negative association with the dependent variable, namely people who have easy access to the funds in case of an emergency, do not worry about personal finances as much as those who experience difficulties. Another factor that has a significant negative association is savings as opposed to variables showing if the participant has borrowed in the past year. Yet, the variable showing if the credit card balances were paid in full, which can signify debts, has no relationship with the dependent variable.

It is worth mentioning that variables representing digital payments, Internet access, using an account for depositing, storing money, or withdrawing from the account, did not show a significant relationship with the presence of concern regarding finance. Hence, according to the hypothesis, it does not correlate with the quality of financial decision-making.

Conclusion

Financial literacy is a vital knowledge that impacts money-related decisions. The bibliometric analysis confirmed the trend of growing interest in the researched issue. Overall, the model has provided valuable insights into the direction and strength of the relationships between the predictor variables and the concerns about finances, allowing us to understand some relationships between financial behavior patterns and financial literacy. The results obtained after analysis can be interpreted in correspondence to the definition of being

financially literate: understanding basic financial operations, and being able to earn, save and multiply money. However, it turned out that the patterns in behavior with money have a more significant relationship with financial literacy rather than the quality of financial decision-making. Namely, pointing out the importance of considering such behavior as making savings or borrowing money, when estimating individuals' financial literacy levels.

Author Contributions: Conceptualization, I.D.; methodology, K.P., I.D.; software, T.P.; validation, I.D.; formal analysis, K.P.; investigation, K.P., I.D.; resources, T.P.; data curation, I.D.; writing-original draft preparation, T.P.; writing-review and editing, I.D.; visualization, T.P., K.P.; supervision, I.D.; project administration, I.D.; funding acquisition, T.P.

Conflicts of Interest: Authors declare no conflict of interest.

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