

FINANCIAL LITERACY RELATION TO ECONOMIC POLICY AND OTHER ASPECTS OF ECONOMIC LIFE

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Abstract

Financial literacy affects various aspects of economic decisions made by individuals and in total, it influences the economics and economic policies. The paper focuses on financial literacy and its relation to main measures reflecting economic policies (GDP, unemployment) in various countries worldwide and in specific regions, primarily using correlation analysis. Some focus is also given to the financial literacy correlation to e-government level in EU. In addition to discussion to observed relations, various methods of measuring the financial literacy and their applicability are discussed. The paper concludes that despite previous effort, there are some facets of financial literacy and its impact to economic life where enough data is missing. Moreover, the relation between financial literacy and digital skills and IT security skills was analyzed. Unfortunately, these quantities do not seem to be correlated enough.

Keywords

Financial Literacy, Economic Literacy, GDP per Capita, Information Technology Security Literacy, Correlation Analysis

I. Introduction

In today's world where increasingly complex economic information and data is published and highly sophisticated financial tools are available to wide public, consumers are required to make many complex and sometimes bewildering financial choices (Mitchell & Lusardi 2015). Therefore, understanding to the nature and potential risks of sophisticated investment mechanisms becomes crucial not only for researchers and specialists but primarily for ordinary people. In the light of this fact, the concept of financial literacy becomes common and various measurements of financial literacy emerged. Unfortunately, there are various approaches to such measurements producing results that can be difficult to compare. Still, the financial literacy data can be used to investigate its relation to other aspect of the specific country economic life. The goal of the study was to analyze various approaches to financial literacy measurement, to investigate its relation to selected characteristics of national economies, and to perform assessment of their applicability and fitness for its purpose. In addition, relation of financial literacy to IT security awareness and related data was analyzed.

Related publications – Financial literacy

Financial (and in broader sense economic) literacy has been addressed by an abundance of research papers in recent years. One of the earliest papers, Jappelli (2010) discovered that "PISA test scores and college attendance are positively correlated with economic literacy" from 55 countries for two decades. Moreover, they concluded that people covered by "more generous social security systems are less literate". Even much earlier, studies focusing this topic were published in the USA, e.g. Greenspan (2002). However, this was rather a journal article addressing wide public than a real economic study.

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During the years, the term of financial literacy became commonly used and more research were published focusing on the relation of financial or economic literacy to other measures including macroeconomic quantities (e.g. GDP), primarily in the second decade of the new millennium. Among them, Klapper, Lusardi & Van Oudheusden (2015) concluded that GDP per capita explains (in the sense of regression analysis) the financial literacy rate among population. Nevertheless, this was true only for 50% of the richest countries worldwide. For poorer countries, such explanation does not apply. In Klapper, Lusardi & Van Oudheusden (2015), the financial literacy was measured based the poll developed at Global Financial Literacy Excellence Center (GFLEC, see Mitchell & Lusardi 2015). The focus was given on guessing of simple and compound interest outcome and risk balance between stocks and stock funds. The benefit of this approach is given by the broad range of countries and the fact that the poll is repeated every year. On the other hand, an apparent drawback, mainly for rich countries, lies in the fact that simple questions do not distinguish well among more financial literate population. Nevertheless, it should be emphasized that even the best scoring countries do not exceed 75% which means that more than one quarter of adults in rich countries were not able do a simple interest calculation or assess the level of risk related to simple investment tools, so this survey poll is a useful tool to measure the basic financial literacy in the whole population.

More comprehensive view to financial literacy and other aspects in European Union countries has been provided by Batsaikhan & Demertzis (2018). In addition to partial confirmation of earlier finding about certain relation between GDP (per capita) and financial literacy, a fair correlation ($R^2=38\%$) between financial literacy score and savings across EU countries have been observed. Similar is true for ratio of people borrowing money from banks ($R^2=52\%$). A weak correlation ($R^2=24\%$) was observed between financial literacy and PISA math score that seems a bit surprising. Also, certain relation between financial literacy and Gini index (inequality level) at $R^2=34\%$ was observed.

Still, more sophisticated measures of financial literacy are used in some countries or regions, primarily in the European Union (EU). The latest Eurobarometer survey 525 (European union 2023a) includes (in addition to other parts like skill self-assessment) 5 financial knowledge questions. It could be surprising that even in best scoring countries (Netherlands, Denmark and Finland), only about 40% of respondents were able to respond most (4 or 5) questions correctly. In worst countries ((Romania and Portugal), less than 20% of respondents were so successful.

Other aspects of financial literacy were addressed by numerous publications as well. Among them, Pinto (2012) investigates the gender aspect of financial literacy with not surprising conclusion that female financial literacy level tends to be significantly lower in most countries. In Almenberg & Gerdes (2012), the correlation between semi-psychological factors (here, underestimating the future value called exponential growth bias) and financial literacy is demonstrated on a set of students in Sweden. The negative correlation was revealed meaning that the more significant the exponential growth bias is, the less financially literate the person is.

Related publications – IT Security education

In parallel with efforts to improve financial literacy among population in some countries, public should be motivated to improve other related skills. Frequently mentioned and investigated general information technology (IT) skills are related and important but IT security skills seem to be even more significant object of potential improvement. On one hand, it is true that people with poor IT skills would rather ignore opportunities offered by sophisticated financial tools that are frequently closely tied to mobile apps or similar IT tools. But once a person starts using e.g. security market offerings, or at least investment funds, having poor IT security awareness increases their exposition to financial risk multiple times.

IT security awareness is a skill that has been addressed recently in many publications, e.g. Jacobson & Idziorek (2012) addressing the IT security awareness in a popular form, Jin, W., & Hui, Z. (2017) from the point of view of academia teaching process, or Lysenko et al. (2024) emphasizing purely technical view, and Datt & Tewari (2021) emphasizing cloud security awareness, among others.

Despite the IT Security awareness and/or literacy seems to be quite recent concept, it could be surprising that the term of IT security literacy was coined by NIST SP 800-16 even in 1998 (see Wilson et al. 2008 that replaced the 800-16 from 1998). Nevertheless, it is true that computer and IT security awareness and literacy have been addressed frequently just in the recent decade. They are often studied together with other digital skills, though.

As an example, the EU's Eurobarometer survey that was started in 2021 and repeated bi-yearly as a part of Digital Decade project provides most detailed insight into digital skills of population in EU countries. Among more than twenty categories of skills being surveyed, results in categories Digital skills and Security skills provide a fair insight into the digital IT security awareness.

Presented research

As the previous research of related works demonstrates, there are a fair amount of data focusing on financial literacy. Sometimes, they are related to other macroeconomic measures like GDP. In parallel, some data is available reflecting IT security skills and awareness. On the other hand, still there is a significant shortage of relevant data, namely reflecting more details in financial literacy, especially with worldwide coverage. What seems even more significant, is the lack of research addressing relation of financial literacy and other important aspects of economic life and human development. Therefore, the focus of this study was to address some of those lacks and to investigate certain relations.

II. Methodology

Various publicly available datasets were investigated. Among them, those from World Bank¹, OECD² (including PISA teenage skill research), European Union (primarily Digital decade)³, and Global Financial Literacy Excellence Center (GFLEC, from Mitchell & Lusardi 2015) were selected. After preprocessing (e.g. unification of country names, number formats etc.), pairs of statistical quantities where finding a relation does make sense were identified. Unlike other studies prevalingly applying regression analysis (e.g. Batsaikhan & Demertzis 2018), correlation analysis was applied as a primary tool. This decision was based on the fact that the regression analysis requires inducing causal relation hypothesis between predictor(s) (sometimes called regressor(s)) as independent variable(s), and an outcome (dependent) variable. Such a hypothesis can be hardly verified in many datasets, so the correlation analysis was chosen as more convenient tool for the presented study.

III. Results

The first step in the study was focused on financial literacy. As previously mentioned, there are several datasets focusing on it, worldwide from GFLEC (142 countries), from World Bank (39 countries), and from EU digital decade (27 countries). Both the latter datasets represent an almost perfect subset of GFLEC countries,

Financial literacy and economic policy

First comparison investigated the relation between financial literacy and main macroeconomic measures reflecting an economic policy of the specific country, namely GDP per capita and unemployment. The results are summarized in Table 1 as follows.

1 <https://data.worldbank.org/>

2 <https://data.oecd.org/>

3 https://data.europa.eu/data/datasets/s2959_99_1_sp532_eng?locale=en

Table 1 Correlation coefficients of financial literacy scores (GFLEC and World Bank) versus GDP and unemployment (n=141)

Pearson's correlation coefficients	GDP per capita	Unemployment rate
Financial literacy score (GFLEC)	0.642	-0.203
Financial literacy score (World Bank)	0.516	-0.146

Source: GFLEC, World Bank, own calculations

The results in the first column (correlation to GDP) roughly confirm the observation by Klapper & Lusardi (2020) cited above that the GDP per capita explains the financial literacy rate. Because this is true only for low-income countries, the correlation between these variables is moderately strong (0,642). The negative correlations (but very weak) between financial literacies and unemployment rate are just another reflection of the same relation taking into account that the relation between GDP and unemployment rate is weak. Several experimental country subsets were created just to verify whether the correlation will be eventually stronger, but no logical subset produced higher correlation than shown in Table 1. The only exception is the correlation between financial literacy and unemployment. Here, when only a subset of 35 EU+ (EU members plus potential candidates) countries were taken into account, the Pearson's correlation coefficient between financial literacy and unemployment rate is -0.489 indicating that the unemployment in rich countries is related to financial literacy closer than for poorer ones.

Financial literacy and e-government

As the financial literacy and consumption of IT services increases among population, another measure becomes more significant, namely what portion of interactions between citizens and the government can be done via electronic/IT tools. In this study, this is expressed as a ration of e-government services in different counties. However, such data is not available for most countries worldwide, so this part of the study was confined to EU countries (European union 2023b). The results are summarized in Table 2 below.

Table 2 Correlation coefficients of financial literacy scores (GFLEC and World Bank) versus e-government level in EU countries (n=21)

Pearson's correlation coefficients	e-government rate
Financial literacy score (GFLEC)	0.519
Financial literacy score (World Bank)	0.492

Source: GFLEC, World Bank, European Union, own calculations

As the correlation coefficient values above show, financial literacy level in the country is somehow related to the level of e-government but its relation is not strong.

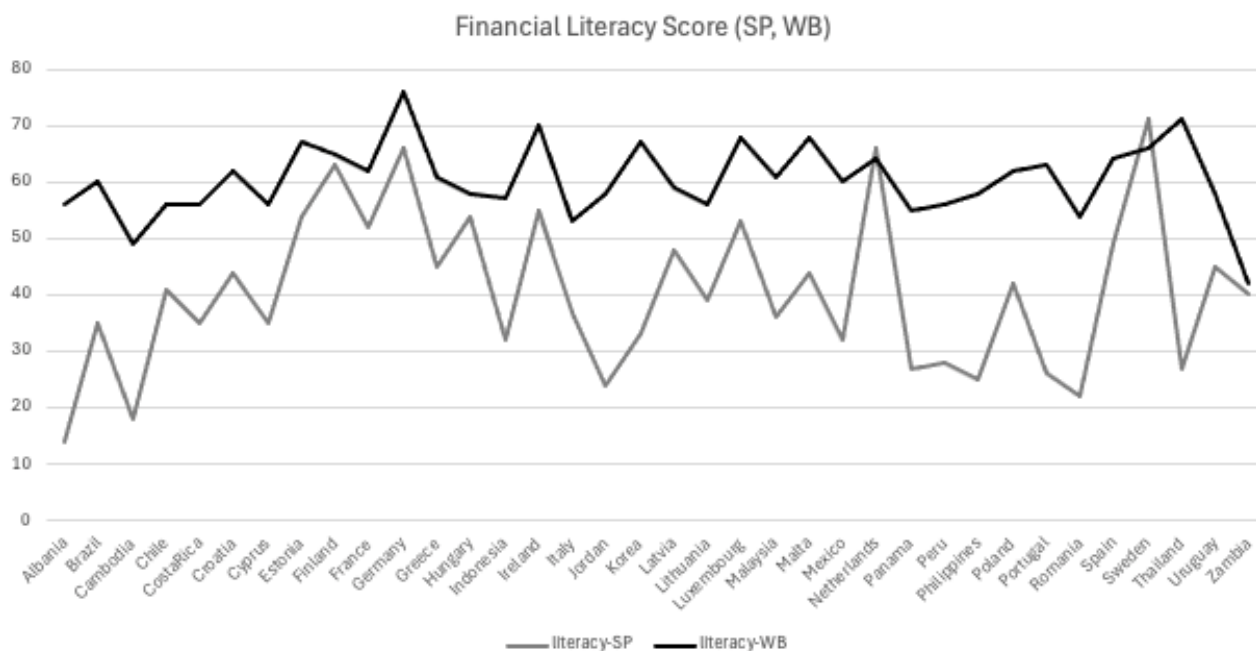
Comparison of different financial literacy methodologies

At this point, a question about the comparability of various techniques how to measure the financial literacy becomes an issue. As shown in Figure 1, there are significant differences in financial literacy scores for most countries.

There are three methodologies investigated, the GFLEC based on 5 questions, World Bank financial behavior survey, and apparently more complex EU methodology. Putting aside efforts to compare the level of difficulty and respondent selection issues, just a simple compassion has been made based on correlation analysis. The result is shown in Table 3 below.

For the sake of comparability, the three EU digital decade partial scores (ratios of respondents with 4-5, 2-3, and 0-1 correct answers, respectively) were combined int a single score as a weighted score with weights 0.8, 0.2 and -0.3). The weights were chosen rather as an expert guess but subsequent sensitivity analysis demonstrated that the results (correlation coefficients in Table 3) were not affected significantly by the weight selection.

Figure 1 World Bank financial literacy in comparison to GFLEC score for selected countries 2015



Source: GFLEC, World Bank, own calculations

Table 3 Correlation matrix of the three financial literacy methodologies (GFLEC, World Bank, EU Digital decade)

Pearson's correlation coefficients	GFLEC	WB	EU
Financial literacy score (GFLEC)	1	0.668	0.795
Financial literacy score (World Bank)	0.668	1	0.532
EU Digital Decade	0.795	0.532	1

Source: GFLEC, World Bank, European Union, own calculations

It seems apparent that while GFLEC and EU financial literacy scores correlate well (almost 0.8) and they can be considered comparable, the remaining poorer correlations are not so low, in fact. Bearing in mind differing set of respondents, the correlation between World Bank and GFLEC scores are still reasonably high. On the contrary, the correlation of World Bank financial behavior score to the EU scores do not seem sufficiently high. Anyway, finding the causes, i.e. whether the questions in the surveys address slightly different skills, would require further and deeper investigation that is beyond the scope of this study.

Digital and IT Security skills and their relation to financial literacy

Based on the EUs digital decade project, the scores for Digital skills and (digital) Security skills were compared to financial literacy scores. The result is shown in Table 4.

Table 4 Correlation coefficients of EU financial literacy scores versus Digital skill and Security skill scores in EU countries (n=27)

Pearson's correlation coefficients	Financial literacy score
Digital skill score	0.650
Security (digital) skill score	0.611

Source: European Union, own calculations

It is apparent that there is a relation between both Digital skills score and (digital) Security skill score to financial literacy but the relation is not strong enough (as it should be).

As an ultimate comparison, the measurement of both Digital skill score and Security score from 2021 and 2023 were compared. While in 2021, the correlation between Digital skills and Security skills was quite strong (0.8), in 2023 it dropped slightly to 0.78.

IV. Conclusion

As demonstrated above, the financial literacy, despite addressed by many studies, offers a lot of open issues. The relation between the country overall financial welfare (expressed by GDP and unemployment) and financial literacy of the population exists. On the contrary, among rich EU countries, the relation between financial literacy and the national level of e-government services is not clear. What could be a bit surprising, is that unemployment rate in rich countries is related to financial literacy closer than for poorer countries. In addition to those results, also significant differences among results produced by different financial literacy methodologies were observed. Ultimately, a weak correlation between both digital skill and digital security skill scores to financial literacy score was identified that seem to be alarming in the light of findings reflecting recent changes in financial market (see George 2024).

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