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DETERMINANTS OF FINANCIAL EDUCATION IN EUROPEAN COUNTRIES

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Abstract: *A high degree of financial literacy is associated in literature with the welfare of the population, which triggers good investment decisions, discipline of personal budget planning and long-term financial objectives that bring a high degree of satisfaction with personal finances. Countries from all over the world have established national strategies to increase their financial literacy score. For instance, OECD set up a recommendation guide on financial literacy and financial education. In this article, the correlation analysis and the Principal Component Analysis is used to test if there is a relationship between financial quantitative variables and other variables related to education in thirty European countries.*

Key words: *financial literacy, financial education, welfare.*

1. Introduction and literature review

Financial literacy is defined as "a combination of financial awareness, knowledge, skills, attitude and behaviours necessary to make sound financial decisions and ultimately achieve individual financial well-being" (OECD Council, 2016). Research and measures are conducted in three areas. a. Identifying the most vulnerable categories of people and facilitating the access to financial education for them. b. Implications of indebtedness especially for young people applying for mortgages, first-time homeowners and those with low incomes. c. The saving rate for the pension considering the expected pressure on the public pension system in the EU, which will come with the demographic evolution by age categories (U. Batsaikhan and M. Demertzis, 2018). The strong impact of finance on the economy and the complexity of financial instruments make it worth investigating ways to increase the level of financial literacy. Several research made by Lusardi and Mitchell (2007, 2011) revealed that an important fraction of the population is not financially literate and does not understand the concepts of inflation and risk diversification. Cocco, J., F. Gomes, and P. Maenhout (2005) built a life cycle model of consumption and portfolio choice with non-tradable labour income and borrowing constraints. Hans-Martin van Gaudecker's (2011) research revealed that the least financially informed were unlikely to do well on diversification. Annamaria Lusardi

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& Pierre-Carl Michaud & Olivia S. Mitchell (2017) developed a life cycle model featuring financial knowledge accumulation to research how much wealth inequality can be attributable to resulting differences in financial knowledge. Their study shows that financial knowledge can be an important public policy lever. They revealed that reducing the cost of financial knowledge by providing financial education in high school could have potentially large effects on wealth accumulation and welfare. The population which has low level of financial knowledge become dependent on the generosity of the public retirement system and social benefits. In a world of uncertainty, financial education can help people better allocate their financial resources during their life.

Financial literacy is necessary for people when they need to decide how much they borrow or save to keep their monthly budget in a comfort zone, to fulfil their financial objectives.

U. Batsaikhan and M. Demertzis (2018) in Bruegel Policy Contribution No. 18, 2018 analysed financial literacy, and the inclusive growth in the European Union proved that increasing financial knowledge improves the chances for those with low income, exposure to the risk of vulnerability or social exclusion, to access the benefits of economic growth.

The degree of development of the financial system in general and of the banking system in particular is an indicator of economic growth. In an open market, the connections are strong, which makes the impact of imbalances more difficult to combat. In order to achieve the common objectives of the European Union, support is needed to fight inequities from all European institutions. For an efficient support, an open collaboration of the governments is also needed. The banking market is the key to developing a proper financial market, but this cannot be achieved without an evolution in the education of the population.

Sometimes, banks have forced consumers to switch to digitalization in order to make their costs more efficient. This also involved participating in consumer education as regards the use of digital services.

Still, in the banking market the winner will be the bank that best answers the question: which is the best strategy that complies with the rapid changes in consumer behaviour and the specific political and economic conditions in each country?

PwC Digital Consumer Research (2019) asked approximately 5,000 people about their banking, borrowing, payment and investment habits. There are three conclusions from this research about what banks should do next: a. Banks strategies must solve the issue of customer choice and convenience rather than digital versus physical. b. Need to harmonize the traditional sales targets of the staff from branches with digital sales targets. c. Demographic changes are now more rapid and have a bigger impact than technology or branch investment, and the ability to adapt branch design might be critical in developing.

In our research, we conducted a study for thirty European countries, focused on variables that measured people's wealth, the share of the population that accessed basic banking products, the easy access to information in a digital age and variables related to policy education.

2. Data used

This study uses secondary data, each data and sources for it being explained bellow.

The gross domestic product (GDP) at current market prices, euro per capita, is defined by Eurostat as the value of all goods and services produced less the value of any goods or services used in their creation. Basic figures are expressed in PPS (purchasing power standards), to eliminate the differences in price levels between countries, allowing meaningful volume comparisons of GDP between countries.

The total general government expenditure in education, percentage of GDP is a value used to highlight education policy together with the variable "early leavers from education" (source: Eurostat). The indicator "early leavers from education" measures the share of the population aged 18 to 24 having attained at most lower secondary education and not involved in further education or training.

The data regarding the percentage of householders with broadband internet connection and of the people who use internet for internet banking were collected from Eurostat.

The data analysed regarding the financial inclusion comprise information published in the World Bank study called the Little Data Book on Financial Inclusion. This study offers detailed insight into how adults in more than 140 economies access accounts, make payments, save, borrow, and manage risk on each country. In our research, we used this database for variables referring to the percentage of respondents who reported saving or setting aside any money at a bank or at another type of financial institution in the past 12 months, and the percentage of respondents who reported borrowing any money from a bank or another type of financial institution in the past 12 months, age 25+, (2017).

The Financial Literacy Score (FLS) was calculated in the Gallup World Poll survey of Standards and Poor's, in 143 countries, involving more than 150.000 respondents, during 2014. A person was considered as financially literate when the respondent correctly answered at least three out of the four financial concepts selected. The S&P Global FinLit Survey is widely used. The relationship between financial knowledge and financial services suggested that, while higher financial literacy might lead to broader financial inclusion, operating an account or using credit may also deepen consumers' financial skills. We use this score in the study as it was calculated, as a percentage of the people who are financially literate in the representative sample for each analysed country.

The statistical data are for thirty European countries (27 countries from the European Union, the United Kingdom, Norway and Switzerland). We added the mean of the European Union (with UK).

3. Research Methodology and Results

Analysing the Financial Literacy Score (FLS) data in Fig. 1 we can observe that the highest is 71 and it can be found in Denmark, Sweden and Norway. The lowest score can be found in Romania, i.e. 22, the next scores is 26 in Portugal and 35 in both Bulgaria

and Cyprus. The mean of FLS in the countries studied is 50.8.

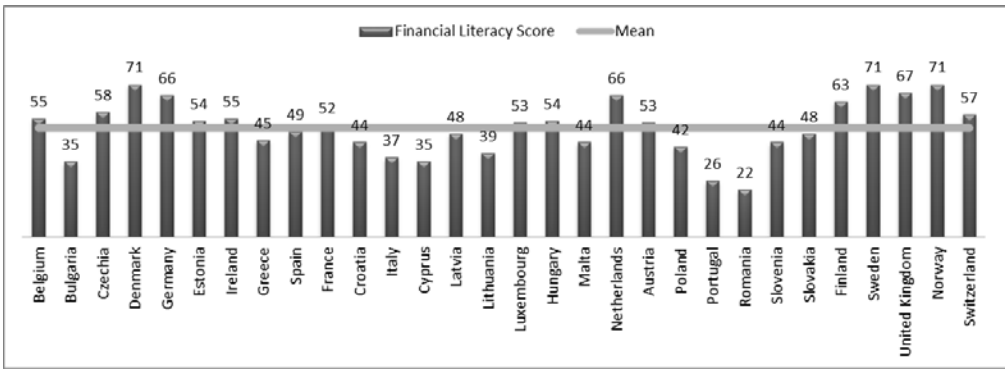

Fig. 1. *Financial Literacy Score in European countries*

Luxembourg and Switzerland have high GDP euro per capita, but with lower FLS than Norway, Sweden or Denmark. The high GDP per capita in Luxembourg is explained partially by a large number of cross-border workers who are not resident, but contribute to GDP (Eurostat statistics). Bulgaria has the lowest GDP euro per capita, but it has a higher FLS than Romania. Countries with the highest FLS have a high percentage of GDP invested in education (Denmark, Sweden). Romania has the lowest value for FLS and the second lowest GDP euro per capita. In contrast, Croatia has a low GDP per capita, but a high percentage of GDP invested in education. Also atypical is Ireland, with the fourth highest GDP euro per capita, but a low percentage of GDP invested in education by the government.

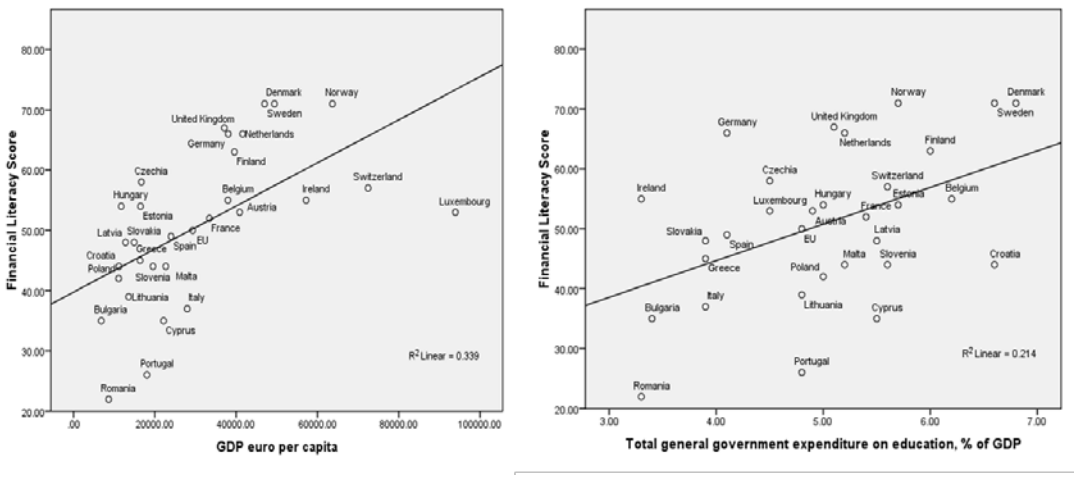

Fig. 2. *Financial Literacy Score and Total government expenditure on education/GDP euro per capita in PPS (2016)*

Source: *Standard & Poor's Ratings Services Global FinLit Survey and Eurostat*

A positive correlation between FLS and the values GDP euro per capita and the total government expenditure on education can be noticed in figure 2 below, in the correlation analysis from both graphs. When it comes to the total general government expenditure on education in 2016, % of GDP, Denmark is at the top with 6.8 %, and Romania and Ireland are at the bottom with 3.3 % (the mean is 5%).

In the graphs from Figure 2 we can see the coefficient of determination R^2 is 0.339, and 0.214, respectively, which shows a direct but still weak relationship between the variables analysed.

Analysing the access of people to broadband internet household connection (figure 3), the values vary from 97% in Luxembourg to 63% in Bulgaria. Also, the percentage of internet banking adopters varies from 4% in Bulgaria and 5% in Romania, to a maximum 91% in Norway.

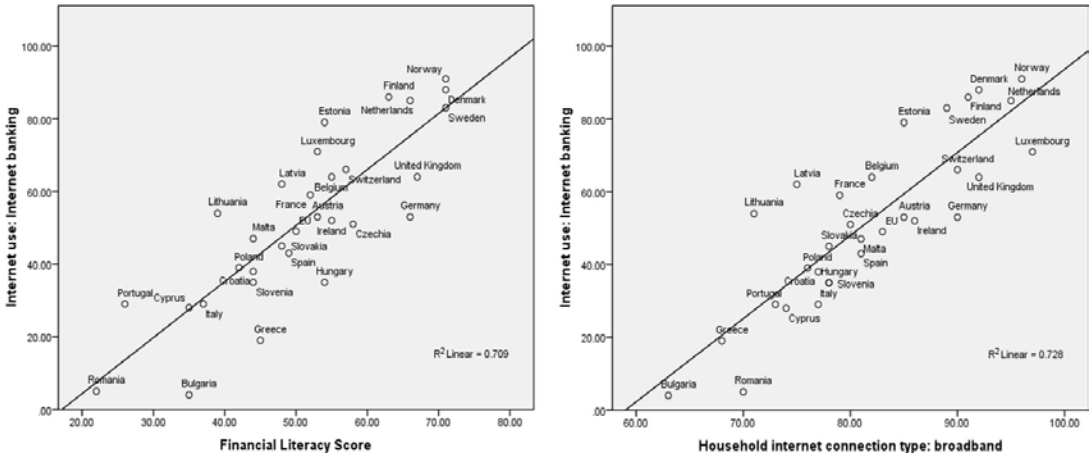

Fig. 3. *Internet banking users (% of country population) and FLS/Household internet connection (2016),*

Source*: Standard & Poor's Ratings Services Global FinLit Survey and Eurostat*

There is a high correlation between the values of household internet connection and internet banking ($R^{2=}$0.728), the values of the financial literacy score and internet banking ($R^{2=}$0.709).

Figure 4 shows the correlation between the percentage of people using internet banking and those who made an online purchase in the last 12 months, 2016 ($R^{2=}$0.647), and the correlation between the percentage of respondents who report saving and those who report borrowing money at a bank or another type of financial institution in the past 12 months, 2017(R^2=0.431).

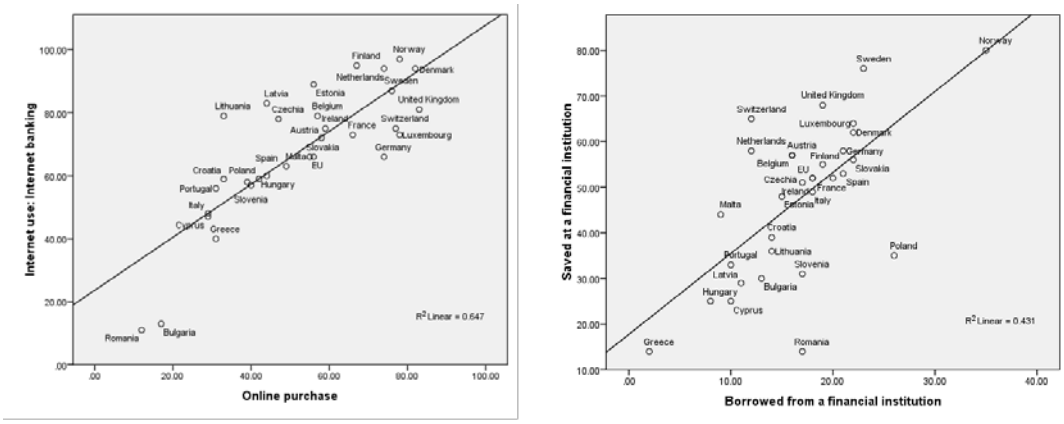

Fig. 4. *Internet banking users (% of country population vs. online purchase and Saved vs. Borrow from a financial institution*

Source*: Eurostat and World Bank, Little Data Book on Financial Inclusion*

After analysing different variables and correlations, we selected the following variables that were best outlined in a model. Afterwards, we applied the Principal Component Analysis as an extraction method to reduce the number and linear combinations of the original set of items. We excluded the variables that were strongly correlated with both components extracted to improve the model.

After this, we decided to keep in the model the variable that we can see below, in Table 1. Here, we can also see the strength of the correlation between the variables selected. In order to have this view for the variable correlation, we applied a factor analysis for all the variables we were interested in.

Table 1

Factor analysis. Correlation Matrix

		Saved at a financial institution	Borrowed from a financial institution	GDP euro per capita	Internet connection type	governement expenditure on education	Early leavers from education, 2016
Correlation	Saved at a financial institution	**1.000**	.656	.734	.851	.347	-.162
	Borrowed from a financial institution	.656	**1.000**	.409	.511	.123	-.069
	GDP euro per capita	.734	.409	**1.000**	.813	.192	-.276
	Household broadband internet connection	.851	.511	.813	**1.000**	.399	-.200
	Total general governement expenditure on education, % of GDP	.347	.123	.192	.399	**1.000**	-.361
	Early leavers from education, 2016	-.162	-.069	-.276	-.200	-.361	**1.000**

a. Determinant = .031

Table 1 shows the correlation between some of the variables. We should also observe Pearson's correlation coefficients. The value "Saved at a financial institution" has a very strong direct correlation with "Household internet connection" (r=0.851) and a strong correlation with the values "Borrowed from a financial institution" (r=0.656) and "GDP euro per capita" (r=0.734). Sig. (1-tailed) is also significant (0.000). We can also see a weak correlation with the total general government expenditure on education (0.341) and a very weak negative Pearson's coefficient for early leavers from the education variable (-0.162). A very strong direct correlation can be observed between the GDP euro per capita and the household internet connection (0.813). There is a moderate correlation between the variable "Borrowed from a financial institution" and "Household internet connection" (0.511), GDP euro per capita (0.409).

The total general government expenditure on education, (% of GDP), has a weak correlation with the GDP euro per capita (0.192) and with the values from "Borrowed from a financial institution" (0.123).

The variable "Early livers from education" has weak or very weak correlations with all other analysed variables. We see that it is the only variable that has negative coefficients.

The measure of the sampling adequacy from KMO and Bartlett's test is 0.701, a value is considered good. The significance level is zero.

Total variance explained Table 2

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Com-ponent	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.241	54.024	54.024	3.241	54.024	54.024	2.950	49.159	49.159
2	1.179	19.646	73.670	73.670	1.179	19.646	1.471	24.512	73.670
3	.689	11.480	85.150						
4	.610	10.173	95.323						
5	.165	2.750	98.074						
6	.116	1.926	100.000						

We applied the Principal Component Analysis as an extraction method to reduce the number and linear combinations of the original set of items. We have two components with eigenvalues greater than 1.

In Table 2 we can observe that the first two variables explain 73.67% of the total variance. The first component explains 54.024% and the second 19.646% from the total variance.

In Figure 5 we can see the graph of eigenvalues, two components having values over 1. We used the Rotation Method: Varimax with Kaiser normalizing to obtain the rotated solution for components; with this method, the variables extracted remain uncorrelated.

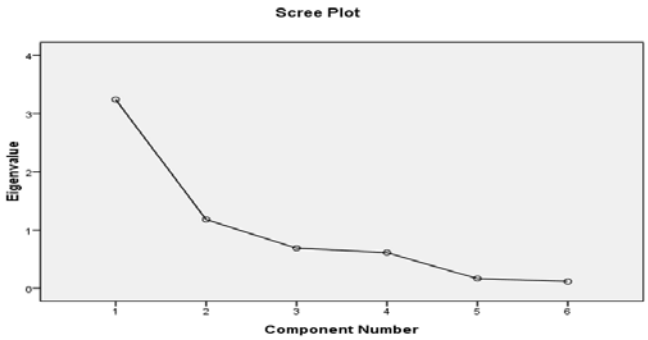

Fig.5. *Eigenvalue of the component number. Scree Plot of Factor analysis*

In Figure 6 we present the results of the rotated solution; we highlight how variables are correlated with the components.

	Component	
	1	2
Saved at a financial institution	.927	.178
Household broadband internet connection	.889	.278
GDP euro per capita	.820	.232
Borrowed from a financial institution	.765	-.092
Early leavers from education, 2016	-.041	-.835
Total general government expenditure on education, % of GDP	.198	.776

Fig. 6. *Rotated Component Matrix. Extraction Method: PCA.*

Considering the solution, we can see that Component 1 has a positive very strong (>0.8) linear correlation with the variables “Saved at a financial institution”, “Household internet connection”, “GDP euro per capita” and a strong correlation (0.765) with “Borrowed from a financial institution”. We can see that Component 2 that was extracted has a very strong negative correlation with the variable “Early leavers from education” and a strong, positive correlation with “Government expenditure on education”, % of GDP. We can say that Component 1 is characterized by variables of financial and digital attitudes (savings, borrowings, GDP, IC), and for Component 2 we have values related to education (leavers from education, expenses on education).

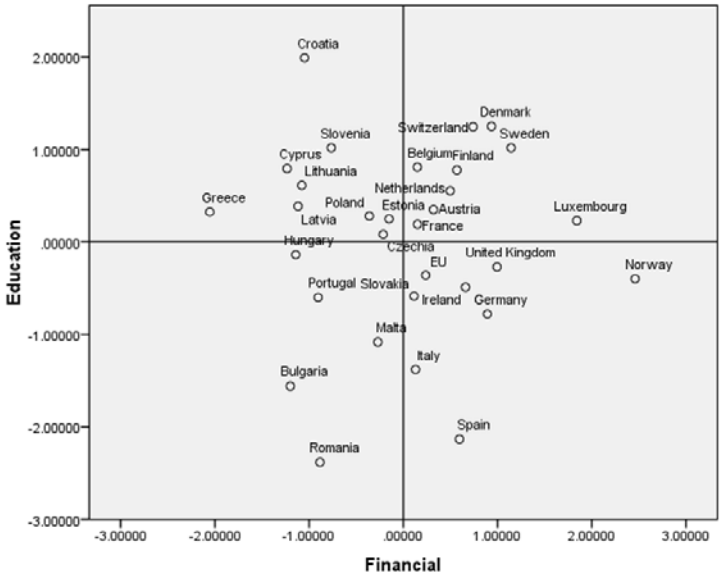

Fig. 7. *Component Plot and European countries on the graph of regression factor score for the components extracted*

Observing the Component Plot from Figure 7, we can notice the countries after using the regression analysis for the extracted factors. We can see a matrix with four frameworks of countries. One group is represented by the countries with negative deviation from the intersection of the two components. Here, Romania and Bulgaria stand apart; the other countries are closer to the average. Romania is located at more than 2 points deviations less than the average of the countries considered for the Education component. Another group of countries is more compact with a negative deviation from the component that we called Financial and positive deviation from, the second called Education. In this framework, Greece and Croatia stand apart. Greece has two deviations in the financial components less than the average of the countries considered, a fact that can be explained by the crisis of external debt in 2016, and Croatia has a high education policy led by the government (high percentage of GDP spent on education, lowest percentage of early leavers from education out of the thirty analysed country). The first framework countries recorded positive deviations from the average for both components: Financial and Education. Denmark and Sweden have one deviation to the average for both components. The fourth framework contains countries with positive deviation for the "Financial" component and a negative deviation from the values related to the "Education" component. Spain has more than two negative deviations from the average in "Education", and Norway more than two positive deviations in the "Financial" component.

4. Conclusions

According to the analysis, to enhance the financial literacy score and increase financial

knowledge, we need more efficient public policy tools to increase and preserve the people's saving behaviour, to focus on education and encourage digital abilities of the people.

For the next step of the analysis it is relevant to see how FLS has evolved in time for the countries, which country policy was more efficient. Croatia has the highest value for component 2, with the biggest % of GDP invested by the government in education, but with FLS 44, below the average 50 in 2016. Internet banking use has increased in Croatia from 38% in 2016 to 46% in 2019. Meanwhile, the internet banking in Romania increased from 5% (average is 51%) only to 8%. In Romania, the percentage of people having an account decreased, while the total expenditure in education made by the government was the lowest from all analysed countries (3.3% in 2016, 2.8% in 2017, and 3.2% in 2018). An increase in the financial trading should be done only with a proper financial education.

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