The Knowledge and Skills That Are Essential to Make Financial Decisions: First Results From PISA 2012

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Using a multilevel analysis with data from PISA 2012, we find that the differences in financial literacy of 15-year-old students are explained by both individual and school characteristics. This paper finds that the financial education is positively related to students' financial literacy scores when it is taught as a cross-curricular subject and as part of business or economics courses, and to a lesser extent as part of mathematics and as an extracurricular activity. Also, math and reading abilities, and holding a bank account and a prepaid debit card, contribute positively to the development of financial literacy, while financial unfamiliarity contributes negatively.

Keywords: PISA 2012, financial literacy, multilevel analysis, the teaching of financial education

JEL classification: I 21, G 10

1. Introduction

Today's financial world is highly complex as compared with that of previous generations. Twenty-five years ago, knowing how to maintain a checking and savings account at a local financial institution was sufficient for many citizens in developed countries. Today's consumers, however, must be able to differentiate among a wide range of products, services, and providers of financial products in order to manage their personal finances successfully. In an era of credit expansion, debt is now an integral part of social life for young adults (Demirgüç-Kunt et al., 2015; Houle, 2014). Accordingly, they need a more comprehensive understanding of basic economic concepts, such as compound interest or the effect of inflation on asset yield, than was afforded to the previous generation.

In recent years, interest in the financial education of citizens as a key skill and the measurement of economic and financial literacy of individuals have

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become increasingly important (OECD/INFE, 2010). An ordinary family must decide how to balance its budget, whether to buy a home, how to finance the education of children, and how to ensure an income for retirement. Individuals and households have always been responsible for managing their finances, but in recent years several factors have contributed to raising awareness about the growing importance of financial education for citizens' welfare. On the one hand, demographic changes along with reductions in state aid systems are leading to significant tensions for the financial sustainability of public pension systems (OECD/INFE, 2010), causing great concern. This has led to a shift of risk from governments to individuals and greater individual responsibility for financing social and health care needs. On the other hand, the current economic crisis has shown that many families are very vulnerable to business cycles, and improving the financial education of citizens could aid them in making decisions with greater foresight and measuring the risk and performance of financial and real assets. Financial illiteracy played a key role in the worldwide financial crisis and contributed to some other important social problems. While efforts by people in government and the private sector to increase the level of financial literacy have been laudable, continued work is needed on this important problem (Dinwoodie, 2010).

What explains the differential financial literacy performance across economies? Although a priori it might be thought that countries with higher GDP could have better results, the results of PISA 2012 show that this is not the case. For example, while the United States has the highest per capita GDP, financial literacy is just mediocre compared to countries with lower economic growth.

The results obtained by 15-year-old students in the assessment of finances for life may be determined by numerous factors related to personal family context, as well as variables related to the teaching–learning process (teacher preparation, assessment system, etc.), especially those related to financial education and students' experience with monetary affairs. But the variability of results may also be attributable to the characteristics of the schools, such as the degree of autonomy, mechanisms for the selection of students, or the human and material resources at their disposal.

Taking advantage of the data on financial literacy provided for the first time in PISA 2012, this paper analyzes the factors – at the student and the school level – associated with student financial literacy. To the best of our knowledge, this is the first research paper that uses the data for all countries participating in the PISA test to explain the scores in financial competency.

The specific objective of this work is to verify the effects of students' experiences with monetary affairs and the teaching of financial education in schools on their development of economic and financial skills, controlling for individual variables, such as socioeconomic status, mathematical and reading

abilities, or migrant status, and other school variables, such as school autonomy, competition between schools, or school climate. The main novelty of this paper with respect to the existing articles is the inclusion in the analysis of variables related to students' experiences with monetary matters, such as having a bank account or a debit card, as factors explaining the financial competence of young people. This paper uses a multilevel analysis method, because it is appropriate in view of the nested structure of the data (level 1: students; level 2: schools).

The paper is structured as follows. In the next section, we present a literature review. In the third section, the methodology for analyzing the data is presented. Given the hierarchical structure of the data set, which includes individual and school variables (level 1 and level 2, respectively), the use of multilevel modeling is required. Using this econometric methodology, the analysis focuses on how certain sociodemographic characteristics, the different ways of delivering financial education in schools, variables concerning their experiences with monetary matters, and variables related to their schools influence the performance of 15-year-old students in the OECD assessment of finances for life. In the fourth section we present data and variables, and the main results are analyzed in the fifth section. The study concludes with a section of conclusions and recommendations on educational policy.

2. Literature Review

2.1. The Importance of Financial Literacy for Economic–Financial Decision-Making

Following the Cambridge dictionary, financial literacy is "the ability to understand basic principles of business and finance." If we look at this definition closely, financial literacy would be the capacity to make appropriate decisions in managing personal finances. However, economic and financial decisions of individuals are influenced by behavioral characteristics such as education, income, gender, certain behavioral characteristics such as risk attitude (Bannier and Neubert, 2016; Hilgert et al., 2003), and time preferences regarding the consumption and savings of individuals. In this regard, several studies, such as Lusardi and Lopez (2016), found in the United States that socioeconomic characteristics are the strongest predictors of financial literacy. Moreover, financial literacy may be influenced by individuals' level of knowledge in economic and financial matters, since financial decisions require the ability to perform calculations, including some which are quite complex. In general, there is a link between families' economic and financial literacy and educational background. Households that are more financially literate comprise highly educated families (Atkinson and Messy, 2012; Lusardi, 2009). In this

connection, Bernheim (1998) and Berheim et al. (2001) concluded that those with more formal education are more likely to perform more sophisticated financial planning.

Financial literacy is increasingly important, and not just for investors, because a typical family has to decide how to balance its budget, buy a home, fund the children's education, and ensure an income for retirement. For example, Lusardi and Mitchell (2007a, 2007b) have shown that financial education has positive effects on the level of savings for retirement. Financial literacy is also associated with a wide range of financial decisions – not just those affecting retirement – such as participation in the stock market, portfolio diversification, and the tendency to avoid overindebtedness (Guiso and Jappelli, 2008; Lusardi and Tufano, 2009; Van Rooij et al., 2011). Brown et al. (2013) also found that individuals who received financial education are less likely to be in debt or to maintain high debt–income ratios, while Lusardi et al. (2017) have recently shown that financial knowledge is a key determinant of wealth inequality. In any case, financial ignorance is recognized as a problem for the household when it has to make economic decisions that affect present or future well-being, such as those concerning uncertain future pensions (Clark and d'Ambrosio, 2003).

However, the link between financial literacy, financial behavior, and welfare is not so clear. Ambuehl et al. (2016), for example, showed that increasing financial literacy is not enough to increase the quality of decision-making of individuals – a conclusion that was also arrived at by Friedline and West (2016). Moreover, Xiao et al. (2014) have shown that the association between earlier knowledge and later financial behavior differed according to the specific type of knowledge (subjective versus objective). Stolper and Walter (2017) assessed the literature on financial education as a means to improve financial literacy and financial behavior, suggesting that the evidence with respect to the effectiveness of the programs is rather disappointing. Fernandes et al. (2014) conducted a meta-analysis of the relationship of financial literacy and financial education to financial behavior and found that interventions to improve financial literacy explain only 0.1 % of the variance in financial behavior. The results from another meta-analysis of the literature on financial education interventions (Miller et al., 2014) indicate that financial literacy and capability interventions can have a positive influence in some areas, such as increasing savings, but not in others, such as credit default. In any case, as Hensley (2015) noted, education alone is not the single answer to improving financial capability, but an essential component, and Henley proposes that timely educational approaches should coexist with longer-term financial education programming. According to Willis (2011), the fact that research does not demonstrate a causal chain from financial education to higher financial literacy to better financial behavior to improved financial outcomes is in part due

to biases, heuristics, and other nonrational influences on financial decisions. Nevertheless, as Hospido et al. (2015) indicated, test scores are a key mediator outcome, because it is hard to think that financial literacy can have long-term benefits on economic decisions if performance in financial literacy tests does not increase.

2.2. The Contribution of the Educational System to the Development of Financial Skills

The interest of our article was, among others, to study how the educational systems of the OECD countries contributed to the development of financial competencies among their young students. Empirical studies on how specific financial literacy programs contribute to increasing students' financial knowledge have delivered mixed results (Fernandes et al., 2014; Hastings et al., 2013; Lührmann et al., 2015; Lusardi and Mitchell, 2014). In this regard, Cole et al. (2016) have found recently that state mandates requiring high school students to take personal-finance courses did not affect financial outcomes.

Research on this topic came to the attention of economists with works such as that of Bernheim (1998), who was one of the first researchers to show that most Americans lacked basic financial knowledge and numeracy. More recently, Huston (2010) argued that if individuals have poor arithmetic skills, this will influence their financial literacy. In a similar line, the findings of Cole et al. (2016) suggest that increasing math requirements would be the most effective way to improve financial outcomes. According to the authors, increased high school math instruction has a small, but meaningful, effect on financial outcomes, and improving financial skills could be achieved through improvements in mathematical knowledge and by promoting a positive attitude among students towards the subject. In fact, some schools focus their efforts on strengthening the conceptual understanding of students in key areas like math so that students are able to apply learning in different contexts, including financial literacy (OECD/INFE, 2015).

Financial education of young people, particularly in schools, has long been considered a priority. In this regard, the International Network on Financial Education (INFE), created by the OECD in 2008, developed guidelines for financial education in schools (OCDE/INFE, 2010). Although interest in financial education in schools is indeed growing, it is important to note that financial education courses are not compulsory in most countries, and not all countries and schools equally address this lack in order to prepare students for an increasingly complex financial world (OECD, 2014b). Until now, about 60 economies worldwide have implemented national strategies for the provision of financial education following the OECD/INFE policy guidelines. It is true that many national strategies include the provision of financial educa-

tion for students, but not all national strategies target young people or provide financial education in schools. There are other financial education initiatives that also cover the adult population and different delivery channels (OECD/INFE, 2015).

Financial education can be mandatory or optional and introduced in the school curriculum as a separate (standalone) subject or as a cross-curricular (specific) subject (OECD/INFE 2012a, 2012b, 2015). Many educational systems have incorporated financial education as part of their curriculum in secondary education, such as those of the Flemish Community of Belgium. However, there are several countries where financial education concepts are studied in primary education, such as the Czech Republic, China (only the city of Shanghai), or Estonia. The most common option is through a cross-curricular approach (e.g., Latvia), that is, linking financial concepts with other areas of learning and including financial concepts as a part of other subjects such as mathematics, humanities, or social sciences. Although it is less common for financial education to be taught as a separate subject (e.g., in New Zealand), some countries combine both strategies, such as Shanghai or Colombia (Cordero et al. 2016; Grifoni and Messy, 2012; OECD/INFE, 2015). But as Loibl and Fisher (2013) point out, unlike most high school courses in mathematics or science, there can be widespread national differences in the content taught in personal-finance courses, and also teachers can decide whether or not to include financial literacy content in their subjects. In the United States, some states have included financial education in their high school curricula since the mid-fifties (Tennyson and Nguyen, 2001).

The evaluation of the effectiveness of financial education courses is not easy, since both objective measures of performance and information about other comparable characteristics are required (Walstad et al., 2017). Some experimental studies have found positive effects of financial education in school and an increase in the financial knowledge of students, such as Hospido et al. (2015) for Spain. Other studies that also have found positive effects of financial education courses at the college level include Romagnoli and Trifilidis (2013) for Italy and Bruhn et al. (2013) for Brazil.

How financial education is taught in school, which goes hand in hand with school responsibility for curriculum and assessment, can be a relevant question in explaining the results in financial literacy. In this regard, Loibl and Fisher (2013) noted that despite public support for personal-finance instruction in high school, its effectiveness has not been firmly established. The reason for these inconsistent outcomes may be that the mandate to teach personal finance in high school is unfunded, vague with respect to academic department, classroom time, and materials, and not part of the core curriculum. These authors note that little is known about what content is covered in high school courses or units in personal finance and that the content varies consid-

erably by state, school district, or even high school within a school district. Walstad et al. (2016) argued that teachers sometimes have more discretion over what they teach in a personal-finance course than in such core and well-defined subjects as mathematics or science and that it is not known how content coverage and emphasis changes from teacher to teacher when a course is taught. According to these authors, the primary purpose of financial education in schools should be to improve content understanding of a broad range of financial matters that may be encountered in real life and not indoctrinate students with certain financial attitudes or behaviors. In contrast to this approach, Blue and Grootenboer (2017) highlight the importance of praxis, that is, the moral and ethical aspect of teaching by financial education practitioners.

Teaching methods are also relevant in explaining the results of financial education and largely depend on the teacher and the quality of educational resources, because both have to do with factors that facilitate teaching in schools, such as the availability of textbooks, library materials, and computers for teaching (Allgood et al., 2015). Loibl and Fisher (2013) highlighted the link between teacher preparation and teachers' ability to respond to the challenges of personal-finance instruction. They found that formal college preparation in personal finance is the strongest predictor for successful personal-finance instruction, while other predictors were student quality, classroom time, an interest in teaching investing, and being a teacher in business education. Mandell (2008) showed that interactive teaching methods, such as the use of stock market simulations, often have a positive influence on students' understanding of personal-finance concepts. In a comprehensive field experiment at Swiss high schools, Eisenkopf and Sulser (2016) compared the effectiveness of teaching methods in economics. They randomly assigned classes into an experimental and a conventional teaching group. Although both teaching treatments improved economic understanding considerably, the authors found that preexisting economic competencies crucially are related to learning outcomes in that more competent students seem to benefit disproportionately from classroom experiments, while weaker students lose out. Using an experimental approach, Skimmyhorn et al. (2016) also estimated the effects of two different financial education methodologies: principles-based and rules-of-thumb. The authors found that both teaching methods increased cognitive measures (i.e., actual and perceived knowledge) and noncognitive measures (i.e., self-efficacy, motivation to learn, and willingness to take risks) of financial literacy. They found few differences in the relative effectiveness of each method, although the principles methodology appeared to produce larger gains in self-efficacy, while the rules-of-thumb method appeared to reduce individuals' willingness to seek advice.

Other school-level factors that have also been considered in recent research to explain the development of knowledge and skills that are essential to make

financial decisions include school type (rural versus urban, public versus private), school selectivity, school climate, and competition between schools. Choi and Chang (2011) found that school climate had a significant effect on mathematics achievement, while Shouppe and Pate (2010) and Allen (2015) found the opposite result. Cornell et al. (2016) contributed new evidence that an authoritative school climate is conducive to students' academic success in middle and high schools, and Ramsey et al. (2016) demonstrated the importance of considering the type of informant when evaluating climate ratings within a school. As for the differences between public and private schools, Valencia-Álvarez and Valenzuela-González (2017) reported that Mexican high school students in the public system had much lower levels of applied, procedural, and conceptual financial knowledge than those in private schools. Ali et al. (2016) identified the gap between urban and rural Australian secondary school students concerning their financial literacy.

2.3. Youth Experience with Money Matters and Development of Financial Skills

Finally, the association between experience with money matters and financial products and students' performance in financial literacy has also been addressed in the literature. According to the PISA 2012 data, there is a large variation in the proportion of students with a bank account, and the framework for the use of basic financial products by 15-year-olds varies across countries. In Australia, the Flemish Community of Belgium, Estonia, France, New Zealand, and Slovenia, more than 70 % of students hold a bank account, but in Israel, Poland, and the Slovak Republic, fewer than 30 % do so (OECD, 2014b).[1] In New Zealand and Slovenia, 15-year-olds do not need the consent of their parents to legally open, hold, and operate a current or savings account. In these countries, 15-year-olds can also hold and use a prepaid card or debit card, although in New Zealand, banks can decide to restrict debit cards to people 16 years old and older.

Some works on students' direct experience in access to money and financial products have shown that one of the ways they develop financial and economic understanding is learning by doing and through personal experiences (Furnham, 1999; Otto, 2013). Christelis et al. (2015) assessed exposure to financial products and its effect on financial literacy. Their findings show that bank ac-

1 Most countries also require parents' consent to allow 15-year-olds to open and operate cash cards, prepaid cards, and debit cards. This is the case in Croatia, the Czech Republic, Estonia, Italy, and Latvia. In some countries, such as Croatia and Italy, in addition to parents' permission, there are limitations on the operations that can be carried out by the minors with these cards. In Spain, minors over 14 years may be supplementary cardholders, but the main cardholder must be a parent or legal representative.

count ownership has a positive effect on the financial literacy of 15-year-olds. In the same line, Johnson and Sherraden (2007) suggested that in order to develop financial capacity, financial education should include access to financial institutions, possibly with savings incentives.

3. Methodology: Multilevel modeling[2]

The multilevel regression model is known in the research literature under a variety of names, such as "random coefficient model," "variance component model," and "hierarchical linear model" (Hox, 2002). Regardless of how they are referred to, these models all assume that there is a hierarchical data set. A typical example data structure (from education) is pupils within schools; for example, pupils (level 1) are nested within schools (level 2).[3] Additional levels can be added; for example, pupils can be nested within schools, which in turn are nested within local education authorities. In this case, two observations chosen randomly from within this particular source are not independent, and it is important to model the dependence. In fact, statistical models that use individual-level data to look at the relationship between educational outcomes and students' sociodemographic variables, but that make no allowance for the effects of the educational institution attended, may be considered unsatisfactory for two reasons. First, significance tests are often biased and overoptimistic. Second, if institutional effects are ignored, the model fails to offer insights into the influence of the institution attended on the education process (Goldstein, 1997). Multilevel models, however, explicitly incorporate institutional effects into the relationship between individuals' outcomes and students' sociodemographic variables.

Let us first consider a simple model in the context of education production where y_{ij} is a level-1 outcome measure of the ith individual in the jth level-2 unit, $i = 1,2,\ldots,N$ (N is the total sample size), and $j = 1,2,\ldots,J$ (J is the number of level-2 units). Let y_{ij} denote the educational achievement of the ith student in the jth school; then the model (the empty or null model)

$$y_{ij} = \beta_j + e_{ij} = \beta_0 + u_j + e_{ij} \quad (1)$$

indicates that an individual's academic performance can be divided into a school-specific contribution (β_j) and a deviation (e_{ij}) from the school's contribution. The school-specific contribution (β_j) is further broken down into a mean value across all schools (β_0) and a deviation from the mean (u_j).

2 Only a brief overview of multilevel modeling will be presented here, and the interested reader is referred to Goldstein (1995) for additional details and extensions.

3 Typically, the lowest level (in our example, students) is known as level 1 and the higher level (in this example, schools) is known as level 2.

These u_j are often referred to as *effects* (here they are school effects) and will be discussed in more detail below.

Some points need to be noted. First, the schools are assumed to be a random sample from the population of schools. The u_j, which are therefore distributed among schools, are normally distributed with mean zero and variance σ_u^2. The student residuals (e_{ij}) are also normally distributed, with mean zero and variance σ_e^2. Specific software is available to estimate the unknown parameters $(\beta_0, \sigma_u^2, \sigma_e^2)$.[4] Each school's estimated effect $\hat{u}_j$ has a sampling error; hence the confidence intervals can also be computed.

What multilevel modeling does is take into account the different levels in a hierarchical sample by separating the variance attributable to these different levels. Here we have the variance *partitioned* into two components: σ_u^2 is the between-schools variance, and σ_e^2 is the residual variation between pupils. We introduce the variance partition coefficient (VPC) term to represent the percentage variance explained by the higher level (school). Hence

$$\text{VPC} = \frac{\sigma_u^2}{\sigma_e^2 + \sigma_u^2}. \tag{2}$$

The empty model specified before is a fundamental two-level multilevel model, which provides important preliminary information about within-group and between-group variations in the outcome measure under study.

Once the VPC has been tested to be statistically significant, explanatory variables are included in the model. For the sake of simplicity, we start with a two-level multilevel model that includes only two level-1 explanatory variables. For example, the best predictor of the performance of a student is likely to be his/her SES (x_{ij}). The model therefore becomes (the random intercept model)

$$y_{ij} = \beta_0 + \beta_1 x_{ij} + u_j + e_{ij}. \tag{3}$$

In this model, the slope of the relationship between y_{ij} and x_{ij} remains constant, while the intercept varies between schools. Thus, β_0 and β_1 are fixed quantities and u_j and e_{ij} are the random part of the model. Clearly, any number of explanatory variables could be added to this model.

However, an important objective in multilevel modeling is to identify and explain cross-level interactions. If the relationship between a level-1 explanatory variable and a dependent variable varies significantly across groups, we need to identify which variables explain the variation in this relationship. Let us consider a model that allows the slope of the relationship between y_{ij} and

4 Multilevel modeling is now the accepted statistical technique for handling such data and is widely available in computer software packages (e.g., Stata or SAS).

x_{ij} to vary among schools as well as the intercept (cross-level interactions). This is written as (the random slope model or random coefficient model)

$$\begin{aligned} y_{ij} &= \beta_0 + \beta_1 x_{ij} + u_j + e_{ij}, \\ \beta_{1j} &= \beta_1 + v_j. \end{aligned} \tag{4}$$

Thus, the overall mean slope for the population of schools is β_1, and each school can deviate from this by v_j. The terms u_j and v_j follow a multivariate normal distribution (here it is bivariate normal because there are just two random variables at level 2) with a mean equal to zero. The variance of u_j measures the variation across the schools' lines in their intercepts and is denoted by $\text{var}(u_j) = \sigma_u^2$; the variance of v_j measures the variation across the schools' lines in their slopes and is denoted by $\text{var}(v_j) = \sigma_v^2$; and the covariance between u_j and v_j measures the covariance between the school-level intercept and slope and is denoted by $\text{cov}(u_j, v_j) = \sigma_{u,v}$. Students' performance varies from their summary line by the amount e_{ij}. In this model, β_0 and β_1 are fixed quantities, and v_j, u_j, and e_{ij} are random coefficients.

4. Data and Variables

In 2012, the OECD assessed students on financial literacy across 18 countries for the first time as part of the Programme for International Student Assessment (PISA) – the first international survey of its kind. Some 29,000 students in 13 OECD member countries (Australia, the Flemish Community of Belgium [F. C. Belgium hereafter], the Czech Republic, Estonia, France, Israel, Italy, New Zealand, Poland, Slovakia, Slovenia, Spain, and the United States) and 5 partner countries and economies (Colombia, Croatia, Latvia, the Russian Federation, and Shanghai), representing around nine million 15-year-olds, participated in the survey. PISA carries out reliable and valid tests for measuring student achievement in personal finance at a point in time and for making valid comparisons over time. Some examples of items used in the financial literacy assessment for PISA 2012 can be seen in annex 1 (OECD/INFE, 2011; OECD, 2012a). PISA 2012 asked students and school principals (and, in some countries, parents) to answer questions about the learning environment, the organization of schools, and the social and economic contexts in which learning takes place. Information based on reports from school principals has been weighted so that it reflects the number of 15-year-olds enrolled in each school.

The PISA 2012 financial literacy test assessed the knowledge and skills of teenagers in dealing with financial issues. The four main content areas of the PISA test were money and transactions, planning and managing finances, risk and reward, and financial landscape. The PISA assessment also includes infor-

mation on financial education practices and strategies across different countries. The data set collects additional information on students' socioeconomic background; experience with and access to financial services, such as holding a bank account or a prepaid debit card or knowledge/ignorance of a bank account or a prepaid credit card; student attitudes; and mathematical and reading abilities. The selection of schools and students is kept as inclusive as possible to ensure that the sample of students comes from a broad range of backgrounds and abilities.

4.1. Dependent Variable

The dependent variable (or response variable) in our econometric exercise is the score for each student in the financial literacy assessment. The mean score among OECD countries is 500 points with a standard deviation of 100 points.[5] This competency refers to the "knowledge and understanding of financial concepts and risks, and the skills, motivation, and confidence to apply such knowledge and understanding in order to make effective decisions across a range of financial contexts, to improve the financial well-being of individuals and society, and to enable participation in economic life" (OECD, 2013, p. 144).

Table 1 shows how performance in financial literacy varies. Students in Shanghai score the highest in financial literacy, on average, with a mean score of 603 points, which is 103 points above the OECD average. On average, students in Australia, F. C. Belgium, the Czech Republic, Estonia, New Zealand, and Poland also score higher than the OECD average. In the United States, 15-year-old students overall performed around the average of students in other countries. The score for Spain (484) is below the OECD average, along with Colombia (379), Italy (466), and Slovakia (470). As Lusardi (2015) pointed out, the fact that students in advanced economies do not score higher than students in less rich countries underscores the importance of having a well-functioning educational system. Thus, the mean scores of the Czech Republic, Estonia, and Poland are higher than those of France, Italy, or the United States, all of which have higher per capita GDP than the former countries (OECD, 2014a).

4.2. Explanatory Variables

The explanatory variables considered in our analysis are shown in table 2. The first group of explanatory variables corresponds to level 1. In particular,

5 Students' scores were calculated using an imputation methodology usually referred to as plausible values (PVs). PVs are a selection of likely proficiencies for students who attained each score. A full description of the scoring method can be found in chapter 9 of the PISA 2012 Technical Report (OECD, 2014c).

Table 1

Average Scores of 15-Year-Old Students on the PISA 2012 Financial Literacy Assessment, by Country

Countries	Scores	Observations
Shanghai-China	603.38	1197
Flemish Community (Belgium)	541.10	1093
Estonia	529.06	1088
Australia	526.05	3293
New Zealand	519.98	957
Czech Republic	513.19	1207
Poland	510.13	1054
Latvia	500.60	970
United States	491.60	1133
Russian Federation	486.27	1187
France	486.26	1068
Spain	484.25	1108
Slovenia	484.10	1312
Croatia	480.30	1145
Israel	476.46	1006
Slovak Republic	470.45	1055
Italy	466.33	7068
Colombia	378.66	2100

Note: The figures shown in the table have been obtained taking into account the corresponding weights. In bold, countries and economies with statistically significant scores above the OECD average-13. In italics, countries, and economies with statistically significant scores below the OECD average-13. In Latvia and the USA, financial literacy scores are not statistically significantly different from the OECD average-13. Source: Authors' calculations using the PISA 2012 data set.

Table 2

Description of the Explanatory Variables

Student variables (level 1)	
Age	Student's age.
Gender	A dichotomous variable that takes the value 1 for girls and 0 for boys.
Index of economic, social, and cultural status	In PISA, the economic, social, and cultural status of the students is considered a combination of several contextual factors, which are summarized in a single index called ESCS (economic, social, and cultural status). This index is constructed from certain indicators that capture the educational level of the students' parents and their professional occupations, as well as technological, cultural, and educational resources available at home.
Grade repetition	It takes the value 1 if the student had repeated a grade of at least one level and the value of 0 if not.
Mathematical literacy performance	The PISA 2012 score in mathematics.
Reading literacy performance	The PISA 2012 score in reading.

Immigration status	The student's immigration status has been incorporated into our econometric estimation as a set of dummy variables: *native, second-generation immigrant*, and *first-generation immigrant.*
General versus vocational education	It takes the value 1 if the student attends general academic education and 0 if the student attends technical/vocational education.
Upper versus lower education	It takes the value 1 if the student attends upper secondary education and 0 if he/she attends lower secondary education.
Bank account	Holding a bank account has been incorporated into our econometric estimation as a set of dummy variables: *he/she holds a bank account, he/she does not have a bank account*, and *he/she does not know what a bank account is.*
Prepaid debit card	Holding a prepaid debit card has been incorporated into our econometric estimation as a set of dummy variables: *he/she holds a prepaid debit card, he/she does not have a prepaid debit card*, *and he/she does not know what a prepaid debit card is.*
School variables (level 2)	
Quality of educational resources	The index of the school's educational resources was calculated from principals' perceptions of possible factors that hindered teaching at their schools, such as shortage of science laboratory equipment, textbooks, library materials, and computers for teaching. Higher values of this index indicate a higher quality of educational resources.
School responsibility for curriculum and assessment	An index of the relative level of responsibility of school staff in issues relating to curriculum and assessment was computed from the school principal's report regarding who had responsibility for four aspects of curriculum and assessment, namely "Establishing student assessment policies", "Choosing which textbooks are used", "Determining course content", and "Deciding which courses are offered". Higher values indicate higher levels of school responsibility in this area.
Morale of the teaching staff	This index captures the enthusiasm with which teachers work, morale and pride in belonging to the school, and the valuation made of academic performance.
School climate	Index about student-related factors affecting school climate, such as students skipping classes, students lacking respect for teachers, disruption of classes by students, etc. Higher values of the index correspond to better school climate.
Class size	The average class size.
School type	A dichotomous variable that takes the value 1 if it is a public school and 0 otherwise.
Rural school	A dichotomous variable that takes the value 1 if the school is located in a population of fewer than 3,000 inhabitants.
Competition between schools	A dichotomous variable that takes the value 1 if there is competition between schools (there is more than one school to choose from) and 0 otherwise (monopoly).

School selectivity	Index of academic school selectivity. As in previous cycles, school principals were asked about admission policies at their school, including placement tests and recommendation by feeder schools. In PISA 2012, this index is calculated from the frequencies with which two factors (students' academic performance and recommendations of their feeder schools) were considered for admission of students in their current schools: (1) the two factors were never considered; (2) at least one factor was considered sometimes, but not always; and (3) at least one factor was always considered.
Financial education taught as a separate subject	Financial education (FE) taught as a separate subject has been incorporated into the econometric estimation as a set of dummy variables: *FE not taught as a separate subject; FE taught as a separate subject 1–19 hours a year; FE taught as a separate subject 20 or more hours a year.*
Financial education taught as a cross-curricular subject	Financial education taught as a cross-curricular subject has been incorporated into the econometric estimation as a set of dummy variables: *FE not taught as a cross-curricular subject, FE taught as a cross-curricular subject 1–19 hours a year*, and *FE taught as a cross-curricular subject 20 or more hours a year.*
Financial education taught as part of business or economics courses	Financial education taught as part of business or economics courses has been incorporated into the econometric estimation as a set of dummy variables: *FE not taught as part of business or economics courses, FE taught as part of business or economics courses 1–19 hours a year*, and *FE taught as part of business or economics courses 20 or more hours a year.*
Financial education taught as part of mathematics	Financial education taught as part of mathematics has been incorporated into the econometric estimation as a set of dummy variables: *FE not taught as part of mathematics; FE taught as part of mathematics 1–19 hours a year; FE taught as part of mathematics 20 or more hours a year.*
Financial education taught as part of other social sciences and/or literature	Financial education taught as part of other social sciences and humanities subjects and/or literature/language has been incorporated into the econometric estimation as a set of dummy variables: *FE not taught as part of other social sciences and/or literature, FE taught as part of other social sciences and/or literature 1–19 hours a year*, and *FE taught as part of other social sciences and/or literature 20 or more hours a year.*
Financial education available as an extracurricular activity	Financial education available as an extracurricular activity has been incorporated into the econometric estimation as a set of dummy variables: *FE is not available as an extracurricular activity, FE is available as an extracurricular activity 1–19 hours a year*, and *FE is available as an extracurricular activity 20 or more hours a year.*
Financial education taught as part of class teachers' lessons	Financial education taught as part of class teachers' lessons has been incorporated into the econometric estimation as a set of dummy variables: *FE is not taught as part of class teachers' lessons, FE taught as part of class teachers' lessons 1–19 hours a year*, and *FE taught as part of class teachers' lessons 20 or more hours a year.*

Note: In italics, the labels of the variables as shown in tables 4 and 8 of results. N.B. All indices in PISA are scaled so that they have mean 0 and standard deviation 1 for OECD countries. See OECD (2014c) for more details.

we have considered mathematical literacy performance, reading literacy performance, and some sociodemographic characteristics of the students: specifically, age; gender; economic, social, and cultural status; grade repetition; immigrant status; general versus vocational education; and upper secondary education versus lower secondary education (see annex 2 for more details on these two variables). Information about experiences in money and financial matters of 15-year-old students was collected in an additional questionnaire in PISA 2012. In all countries, there was a significant proportion of missing observations for answers to specific questions about experiences, attitudes, and behaviors related to money. This lack of response is explained, at least in part, by the sampling design: half of the questions relating to students' experiences with money matters were answered only by half of the sample, while the other half were answered by the other half of the sample. As a result of the large number of missing values, it has only been possible to include in the analysis two groups of dummy variables (bank account and prepaid debit card), each of them with three categories, as shown in table 2.

The second group of explanatory variables corresponds to level 2. These school-level explanatory variables were also shown in table 2. The first subgroup of them were variables related to the availability of financial education in schools. We wanted to test whether the teaching of financial education as a separate subject, as a cross-curricular subject, as part of business or economics courses, as part of mathematics, as part of other social sciences and humanities subjects, available as an extracurricular activity, or available as part of a class teacher's lesson were all related to performance in financial literacy. The second subgroup of school variables was introduced as control variables to test whether there was a direct school effect on financial literacy. On the one hand, we included class size, school type, rural school, and competition between schools. On the other hand, we took into account five indices developed by PISA related to the school principals' perceptions of factors that may be related to the performance of students – in particular, quality of educational resources, school responsibility for curriculum and assessment, morale of the teaching staff, school climate, and school selectivity. The table in appendix 3 reports the descriptive statistics of the variables incorporated in the econometric analysis.

5. Results

In this section, we present the results of the estimation of the multilevel models. The empty model provides important preliminary information about within-school and between-school variations in the outcome measure under study. Once VPC has been tested to be statistically significant, the explana-

tory variables at the school and student levels described in the previous section are included in the multilevel regression. The random slope model allows the slope of the relationship between financial literacy scores and mathematical literacy performance to vary among schools, as well as the intercept.

5.1. Results of the Empty Model

First, we estimate an *empty* model whose results allow us to determine what proportion of the variance in financial literacy performance of students is due to factors associated with the characteristics of the schools (between-school variance) and what proportion is due to students' characteristics (within-school variance).

Table 3 shows the percentages of variance in financial literacy performance for the 15-year-old students explained by differences between schools and within schools in each participating country. The last column shows the variance partition coefficient of each country. As can be observed, between-school differences account for 16 % of the variation in student performance in Spain, 19.8 % in Estonia, and 20.1 % in Poland. The results for Spain, therefore, suggest a greater equity in the country's educational system, indicating that students with low, medium, and high performance in financial literacy can be found in all schools.[6] As we have also highlighted, similar values are obtained in Estonia and Poland, with values well below the OECD average of 37 % (OECD, 2014a), thus confirming that educational outcomes depend more on the characteristics and the circumstances of their students than the features of the schools they were attending.

By contrast, in countries such as Slovenia, Slovakia, and France, the proportion of variance explained is mainly due to factors related to the characteristics of the schools (between-school variation), with estimated variance partition coefficient values above 50 %. School characteristics may also explain differences in student performance in financial literacy.

5.2. Multilevel Modeling: Results of the Random Slope Model

Regarding the variables at the student level, the results of the multilevel estimation are shown in table 4. The table in appendix 4 also adds variables relating to students' experiences with monetary matters. In the following pages, we focus mainly on the results of table 4 because the number of observations that have been used in this estimate is greater than the number of observations used in the estimation reported in appendix 4.

6 The variability within schools is 84 % in Spain, which is obtained by subtracting from 100 the percentage attributed to variability between schools.

Table 3
Student Performance in Financial Literacy: Difference in Between- and Within-School Variance

Countries	Between-school variance	Within-school variance	Variance partition coefficient (VPC)
Spain	1181.805	6188.216	0.160
Estonia	1181.071	4775.772	0.198
Poland	1329.490	5281.344	0.201
Latvia	1369.098	4384.956	0.238
New Zealand	3235.321	10218.170	0.240
United States	2396.122	7373.853	0.245
Australia	2515.262	7650.103	0.247
Colombia	3123.127	7842.582	0.285
Russian Federation	2350.411	5303.719	0.307
Croatia	2641.092	4584.341	0.366
Flemish Community (Belgium)	4075.626	5186.604	0.440
Shanghai	3124.287	3856.487	0.448
Israel	5785.928	7097.964	0.449
Italy	3412.063	4019.793	0.459
Czech Republic	3588.583	3867.899	0.481
France	6058.068	4923.300	0.552
Slovak Republic	6150.831	4785.905	0.562
Slovenia	4365.888	3246.436	0.574

Note: In all countries, the difference is statistically significant at 5 %. The figures shown in the table have been obtained taking into account the corresponding weights. Source: Authors' calculations using the PISA 2012 data set.

5.2.1. Individual Characteristics of Students and Their Relationship to Financial Literacy Scores

Table 4 shows the results of the model at the individual level. First, in all participating countries, mathematical and reading abilities were measured through the PISA 2012 math and reading scores, respectively. The estimated coefficients associated with both variables are positive and statistically significant in all countries, although the values of the coefficients are small (less than 1). Mathematics and reading can capture general ability. In order to be financially literate, students need to be able to read and understand basic financial documents, and also need to have at least a basic level of math ability. It should be noted that the effects are very significant in statistical terms: the p-value is 0.000 in all cases. Taking into account that the correlations between financial literacy and both competences – mathematics and reading performance – are high (0.83 and 0.79, respectively), it can be concluded that the effects are quantitatively high (Cohen, 1988).

Second, in most of the educational systems analyzed, students at age 15 are in general academic education. However, for countries where students at that age may be in general education or in vocational education, a conclu-

sive result has not been observed. General academic education as opposed to vocational or technical education shows a positive relationship with the development of financial competence only in Slovenia and France (15 and 13 points, respectively). On the contrary, in Colombia, vocational education is positively related to the financial literacy score.

On the other hand, the results show that for a large number of countries analyzed, students in upper secondary education score more than those in lower secondary education. This relationship is positive in countries such as the Czech Republic, Latvia, France, the United States, New Zealand, and Australia. With the exception of Latvia, an analysis of correlations between the variables upper versus lower education and grade repetition showed negative and statistically significant coefficients, although the correlations were moderate. This indicates that the lower financial literacy scores of students in lower secondary education may be due to their lag in the education system.

Third, in relation to the other socioeconomic variables shown in table 4, such as gender, results show that boys' scores are higher than girls' scores in financial literacy when controlling for individual and school variables. With respect to immigrant status, needless to say, financial education is considered important for the integration of immigrants in their new country of residence. In many countries, children of immigrants have a higher risk of poor academic performance than children of natives (OECD, 2012b). Immigrant students underperform in PISA, but the performance gap between them and nonimmigrant students varies considerably across countries, even after adjusting for socioeconomic differences. In general, immigrants score lower than natives in financial literacy, especially in the case of first-generation immigrants. In Poland, Shanghai, Latvia, the Slovak Republic, France, Australia, Spain, and New Zealand the estimated coefficient for first-generation immigrants is negative and statistically significant. However, this coefficient is no longer significant for second-generation students in Latvia, New Zealand, and Spain. This result can be interpreted as the integration of young people already born in the country, who perform neither worse nor better than the natives.

Fourth, socioeconomic status, which is measured by the economic, social, and cultural index (ESCS), is related positively and significantly to the performance of students in financial literacy in Colombia, France, and Spain (the estimated coefficients associated with these countries are around 15 in the first and around 5 in the last two). The value of the coefficient of the variable ESCS is interpreted as the increase in financial literacy associated with a one-point increase in the ESCS.

Finally, we note that there are differences in performance in financial literacy according to repetition. Among OECD countries, there are different policies regarding repetition and grade retention. Requiring that students repeat grades implies some cost, not only the expense of providing an additional

Table 4a

Estimated Multilevel Model of Random Slope (Only the Estimated Coefficients Shown)

	Australia	(Flemish) Belgium	Colombia	Croatia	Czech Republic	Estonia	France	Israel	Italy
Level 1 variables related to students Age	0.254	2.938	26.203**	6.001	−27.371**	7.024	−15.446**	5.630	6.481**
Female	−6.240**	−12.572**	−5.508	−13.319**	−8.344**	−9.806**	−3.982	−4.959	−14.462**
Index of economic, social, and cultural status	0.096	−6.165**	14.578**	−0.753	2.201	2.705	4.924*	0.942	0.557
Grade repetition	−13.270**	−3.387	−18.507**	4.903	−7.897	14.537	4.586	−20.349	−13.860**
Mathematical literacy performance	0.566**	0.585**	0.257**	0.538**	0.521**	0.456**	0.599**	0.622**	0.371**
Reading literacy performance	0.500**	0.326**	0.171**	0.363**	0.282**	0.369**	0.216**	0.192**	0.314**
Native	r.c.	r.c.	r.c.	r.c.	r.c.	r.c.	r.c.	r.c.	r.c.
Second-generation immigrant	−11.286**	−12.913	−90.262**	2.280	−21.956**	−6.392	−11.743**	0.202	−4.203
First-generation immigrant	−17.893**	−12.351	53.052**	−2.844	7.966	3.904	−21.814*	17.546**	−0.349
General versus vocational education	−0.046	2.081	−13.976**	4.523	10.623		12.908**	5.890	
Upper versus lower education	12.213**	−2.178			30.704**		27.065*		−3.948
Level 2 variables related to schools Quality of educational resources	0.721	−1.581	4.565	−0.085	−2.569	0.406	0.615	3.508	−0.553
School responsibility for curriculum and assessment	−0.105	5.602**	−6.119*	−0.082	7.712**	2.935	−1.162	6.006**	0.217
Morale of the teaching staff		−0.758	2.158	−2.931	−0.567	0.332	−0.327	1.251	−0.088
School climate	0.441	−0.238	1.666	6.728**	2.271	−3.254	−0.987	−6.551**	4.383**
Class size	−0.064	0.814	0.226	0.912*	1.491**	−0.263 *	0.318	1.328**	0.310*
Public versus private schools	5.162	−5.577	−34.991**	−25.657**	6.379	4.805	2.445		7.841
Rural school	6.636	−31.117**	18.578*	4.094	0.122	13.200**	−21.058	7.376	11.237
Competition between schools	0.237	5.876	−3.558	−6.740	7.038	−0.872	−8.922*	15.043**	5.052*
School selectivity	1.276	−3.593	−9.327**	12.469*	−7.589**	−1.661	0.548	1.021	−1.273
Level 2 variables related to teaching of financial education									
FE not taught as a separate subject	r.c.	r.c.	r.c.		r.c.	r.c.	r.c.	r.c.	r.c.
FE taught as a separate subject 1–19 hours a year	1.726	8.232	1.670		−0.415	−13.722	5.048	4.688	−4.581
FE taught as a separate subject 20 or more hours a year	−2.395	−3.042	0.088		4.257	−12.197	4.398	−0.198	8.925**
FE not taught as a cross-curricular subject	r.c.			r.c.	r.c.	r.c.	r.c.	r.c.	r.c.
FE taught as a cross-curricular subject 1–19 hours a year	0.740			−2.704	−5.115	2.188	7.262	−1.050	−0.108

FE taught as a cross-curricular subject 20 or more hours a year	−2.454			8.803	−10.153	−1.550	19.269**	12.747	1.915
FE not taught as part of business or economics courses	r.c.	r.c.	r.c.	r.c.	r.c.	r.c.	r.c.		r.c.
FE taught as part of business or economics courses 1–19 hours a year	8.200**	22.465**	1.048	−0.522	−0.112	12.515**	6.379		−0.588
FE taught as part of business or economics courses 20 or more hours a year	7.730**	24.387 **	2.517	0.188	9.047	11.425	−1.619		1.733
FE not taught as part of mathematics	r.c.	r.c.	r.c.	r.c.	r.c.	r.c.	r.c.		
FE taught as part of mathematics 1–19 hours a year	1.333	−4.225	−9.159	4.081	7.712	−3.347	−3.498		
FE taught as part of mathematics 20 or more hours a year	7.816 *	16.996 *	−1.955	6.409	−11.424	6.763	18.642		
FE not taught as part of other social sciences and/or literature	r.c.	r.c.	r.c.		r.c.	r.c.	r.c.	r.c.	r.c.
FE taught as part of other social sciences and/or literature 1–19 hours a year	0.008	5.202	5.130		3.238	6.066	−5.186	−6.595	−0.733
FE taught as part of other social sciences and/or literature 20 or more hours a year	−6.862	9.991	7.033		−10.474	11.857	−12.998	−14.209	1.159
FE is not available as an extracurricular activity	r.c.	r.c.			r.c.	r.c.	r.c.	r.c.	r.c.
FE is available as an extracurricular activity 1–19 hours a year	−7.323	−2.710			29.692**	−2.585	12.665	7.812	2.232
FE is available as an extracurricular activity 20 or more hours a year	9.523	12.009 *			2.699	1.729	2.579	−1.070	−4.026
FE not taught as part of class teachers' lessons			r.c.	r.c.	r.c.	r.c.			
FE taught as part of class teachers' lessons 1–19 hours a year			9.038	−3.752	0.533	−3.044			
FE taught as part of class teachers' lessons 20 or more hours a year			−6.796	−20.303	(omitted)	−5.908			
Constant	−29.458	−16.213	−103.402	−69.530	485.358**	−15.576	294.640**	−48.735	31.485
var(math_ability)	0.01**	0.011**	0.001**	0.001 **	0.008**	0.000**	0.001 **	0.010 **	0.007**
var(_cons)	2802.66**	4326.36**	43.09**	779.33**	2974.09**	491.74**	1649.17**	4191.20**	3289.15**
cov(math_ability,_cons)	−4.47**	−6.737**	0.253	−0.647	−4.729	−0.089	−1.379	−6.602**	−4.562**
var(Residual)	1221.90**	1444.76**	6052.55**	1069.80**	1041.14**	1151.84**	1646.50**	2843.18**	1995.18**
Number of observations	2822	867	1722	1070	927	967	799	863	5107
Number of schools	706	128	283	156	219	179	171	138	834
Log pseudolikelihood	−51609.5	−18957.9	−183920.6	−15341.9	−13927.3	−3141.0	−142455.3	−30218.0	−137122.5

Table 4b

Estimated Multilevel Model of Random Slope (Only the Estimated Coefficients Shown) Continued

	Latvia	New Zealand	Poland	Russia	Shanghai, China	Slovak Republic	Slovenia	Spain	USA
Level 1 variables related to students									
Age	0.367	1.499	6.968*	17.349**	5.430	5.369	6.687	17.378**	3.644
Female	−9.122**	1.709	−8.832**	1.386	−13.491**	−12.230**	−13.661**	1.693	−5.084*
Index of economic, social, and cultural status	0.863	2.494	−2.307	2.855	0.491	−0.384	−3.050	4.735**	2.464
Grade repetition	−16.405**	−5.554	−14.651	−23.806**	−0.621	−8.779	−7.374	−17.967**	−4.328
Mathematical literacy performance	0.450**	0.560**	0.498**	0.540**	0.495**	0.508**	0.447**	0.678**	0.585**
Reading literacy performance	0.341**	0.484**	0.358**	0.177**	0.311**	0.435**	0.448**	0.083**	0.430**
Native	r.c.	r.c.	r.c.	r.c.	r.c.	r.c.	r.c.	r.c.	r.c.
Second-generation immigrant	9.874	0.278	(omitted)	−11.229 *	−42.355**	24.238**	−6.194	−7.443	0.560
First-generation immigrant	−31.933**	−8.334 *	−81.531**	−8.032	−47.332**	−31.575**	−2.447	−13.088*	3.724
General versus vocational education				11.996	4.726	12.753	15.029**		
Upper versus lower education	29.965**	16.043**		−11.894*	−0.592	5.482	17.290		17.107**
Level 2 variables related to schools									
Quality of educational resources	−7.415**	5.475*	0.384	−0.028	0.655	−0.386	−1.895	−2.662	4.616**
School responsibility for curriculum and assessment	1.383	−5.232	−3.893	1.287	−1.545	0.678	2.583	8.790**	1.137
Morale of the teaching staff	2.437	−4.305	0.567	2.543	−3.939**	2.063	3.234		0.571
School climate	−3.989	0.625	1.082	0.336	−0.340	−2.577	0.346	2.206	0.216
Class size	−0.321	−0.086	0.010	−1.166*	0.348	0.132	0.592	−0.887*	−0.084
Public versus private schools	−11.275	2.408	8.620	0.579	−1.220	−7.816	8.717	12.948*	4.003
Rural school	−8.703	−16.382	10.760 *	−25.689**		0.439	−36.125	−47.675**	
Competition between schools	−14.701*	−7.313	14.673**	9.529	2.722	13.133*	−3.352	1.016	5.411
School selectivity	3.494	6.518**	0.245	0.146	4.117	−0.557	4.576*	−3.797	0.692
Level 2 variables related to teaching of financial education									
FE not taught as a separate subject	r.c.		r.c.	r.c.	r.c.	r.c.		r.c.	r.c.
FE taught as a separate subject 1–19 hours a year	−7.946		7.156	−4.199	0.249	4.033		28.050*	1.657
FE taught as a separate subject 20 or more hours a year	12.426		−9.901	10.863	2.373	−3.410		−6.137	−0.043
FE not taught as a cross-curricular subject	r.c.	r.c.	r.c.		r.c.	r.c.	r.c.	r.c.	r.c.
FE taught as a cross-curricular subject 1–19 hours a year	2.727	0.112	3.143		7.897*	4.086	−0.543	5.734	13.662**
FE taught as a cross-curricular subject 20 or more hours a year	16.045**	0.560	22.570		0.644	9.279	2.893	10.165	13.287 *

FE not taught as part of business or economics courses	r.c.	r.c.	r.c.	r.c.	r.c.	r.c.	r.c.	r.c.	r.c.
FE taught as part of business or economics courses 1–19 hours a year	−6.457	−9.003	−2.021	−4.768	0.628	12.981	4.373	−11.127	−2.383
FE taught as part of business or economics courses 20 or more hours a year	7.209	−3.507	32.305**	−7.568	5.471	2.427	−10.094	−6.920	0.551
FE not taught as part of mathematics	r.c.	r.c.	r.c.					r.c.	r.c.
FE taught as part of mathematics 1–19 hours a year	12.476**	0.778	4.688					16.708**	−9.013
FE taught as part of mathematics 20 or more hours a year	20.093**	−13.106	−15.036					−12.762	−6.278
FE not taught as part of other social sciences and/or literature			r.c.	r.c.	r.c.		r.c.	r.c.	r.c.
FE taught as part of other social sciences and/or literature 1–19 hours a year			5.110	9.219	−5.488		−6.697	−6.931	−1.988
FE taught as part of other social sciences and/or literature 20 or more hours a year			8.313	−10.219	1.208		−3.424	7.893	−6.899
FE is not available as an extracurricular activity	r.c.	r.c.	r.c.	r.c.	r.c.		r.c.		r.c.
FE is available as an extracurricular activity 1–19 hours a year	−11.498	−4.420	4.450	0.495	6.347		12.728		−1.943
FE is available as an extracurricular activity 20 or more hours a year	−20.149	−0.461	21.419	2.083	4.480		r.c.		5.349
FE not taught as part of class teachers' lessons							r.c.	r.c.	r.c.
FE taught as part of class teachers' lessons 1–19 hours a year							−4.431	13.969**	−5.843
FE taught as part of class teachers' lessons 20 or more hours a year							51.675**	(omitted)	5.851
Constant	116.417	−48.010	−62.481	−118.316	2.108	−72.632	−101.861	−135.870	−86.832
var(pv1math)	0.001914**	0.008**	0.007**	0.000**	0.002**	0.001**	0.012**	0.002**	
var(_cons)	1930.75**	3014.49**	2330.62**	770.28**	1581.10**	2152.05**	4308.81**	1450.83**	275.21**
cov(pv1math,_cons)	−1.922571	−4.383	−3.837	−0.277	−1.787	−1.618	−7.067	−1.572	
var(Residual)	1164.19**	1595.11**	1011.17**	2326.77**	899.39**	1098.03**	981.08**	1758.24**	1287.20**
Number of observations	807	706	886	1092	1143	965	1114	768	910
Number of schools	174	134	153	206	149	208	265	128	139
Log pseudolikelihood	−3506.6	−13088.4	−105398.5	−362124.1	−31235.5	−14385.3	−3934.9	−87548.6	−1071796.9

Note: Dependent variable: total score for each student in the financial literacy assessment. r.c.: reference category. Omitted: variable not considered due to the absence of observations in that category. For some countries, there are blank cells due to the omission of variables not considered as a result of problems in estimation/multicollinearity. **, * Significance at 5 % and 10 % level respectively. The estimate has been made taking into account the relevant weights.

year of education (i.e., direct costs) but also the cost to society in delaying that student's entry into the labor market by at least one year (i.e., opportunity costs) (OECD, 2011). Among the participating countries, it is worth noting the case of Spain, which has the highest repeaters rate among OECD countries. In Spain, around 30 % of the students who participated in the financial literacy assessment had repeated one or two academic years. This is the highest percentage in all participating countries, and more than 2.5 times the OECD average (12.0 %). As can be seen in table 4, across PISA-participating countries and economies, in Australia, Colombia, Italy, Latvia, the Russia Federation, and Spain the scores of students who had repeated at least a grade are significantly lower than those of nonrepeaters. The largest gap is observed in the Russian Federation, Colombia, and Spain. The negative sign for grade repetition has also been found by Morrison and On No (2007) and Greene and Winters (2007). It is important to reflect upon policies of repetition, and on the appropriateness of extending school support programs to pupils with educational difficulties as an effective alternative to educational policy.

5.2.2. The Teaching of Financial Education and Its Relation to Scores on Financial Literacy

In this sub-subsection, we analyze how different ways of providing economic and financial knowledge in schools contribute to the development of financial skills. A summary of these results is shown in table 5. According to the OECD (2017), the different approaches that have been most recently introduced in educational systems in order to improve financial education do not provide conclusive evidence regarding the strategies that produce the best results. However, in this paper, we have found that the two most effective ways of delivering financial education have been financial education taught as a cross-curricular subject and financial education taught as part of business and economics courses. It is expected that financial education taught as part of business and economics courses requires more additional resources (classrooms, teachers, etc.) than financial education taught as a cross-curricular subject. A cost-effectiveness analysis would allow verifying whether the latter is less cost-effective than the former (Levin, 1988).

Going into a more detailed analysis of the results, we find, first, that in Shanghai there is a positive relationship between scores in financial literacy and financial education taught as a cross-curricular subject for less than 20 hours a year. In three other countries, Colombia, France, and Latvia, the scores in financial education increase when it is taught as a cross-curricular subject for 20 hours or more a year. In the United States, this positive effect is observed independently of the number of hours for which financial education is taught as a cross-curricular subject. Financial education taught as a cross-

Table 5
The Teaching of Financial Education and Its Relation to Scores on Financial Literacy

	Australia	Belgium	Colombia	Croatia	Czech Republic	Estonia	France	Israel	Italy	Latvia	New Zealand	Poland	Russian Fed.	Shanghai	Slovak Republic	Slovenia	Spain	United States
FE taught as a separate subject 1–19 hours a year											■						■	
FE taught as a separate subject 20 or more hours a year									■									
FE taught as a cross-curricular subject 1–19 hours a year														■				■
FE taught as a cross-curricular subject 20 or more hours a year			■				■			■								■
FE taught as part of business or economics courses 1–19 hours a year	■	■				■										■		
FE taught as part of business or economics courses 20 or more hours a year	■	■										■						
FE taught as part of mathematics 1–19 hours a year										■							■	
FE taught as part of mathematics 20 or more hours a year	■	■								■								
FE taught as part of other social sciences and/or literature 1–19 hours a year																		
FE taught as part of other social sciences and/or literature 20 or more hours a year																		
FE is available as an extracurricular activity 1–19 hours a year																		
FE is available as an extracurricular activity 20 or more hours a year		■				■												
FE taught as part of class teachers' lessons 1–19 hours a year																	■	
FE taught as part of class teachers' lessons 20 or more hours a year																■		

Note: The shaded cells represent a positive (and statistically significant) relationship between teaching financial education and financial literacy scores shown in table 4 and appendix 4. The observed positive effect of extracurricular activities for 1–19 hours a year in the Czech Republic has been omitted, as the number of schools in that category is negligible.

curricular subject could use real-life examples of economic–financial issues that do not have to be linked to a specific subject. For example, history teachers may use audiovisual material about the Great Depression of the 1930s, the recent financial crisis, etc., to introduce economic concepts into their classes. Or, for example, language professors could use economic news published in the press to develop reading comprehension skills and knowledge of specific economic and financial terms.

Second, there is a positive relationship between financial education taught as part of business or economics courses and the development of financial skills in Australia, F.C. Belgium, Estonia, Poland, and Slovenia. In fact, with the exception of Slovenia, these countries are at the forefront of education systems whose students scored above the OECD average in financial literacy. Therefore, the results suggest that the integration into the school of financial education taught as part of business or economics courses is effective.

Third, financial education taught as part of mathematics enables students to develop financial skills in Australia, F.C. Belgium, Latvia, and Spain. This result indicates that financial skills can be improved by improving mathematical knowledge. Therefore, mathematics teachers have in their hands powerful tools for the development of economic–financial skills – for example, the graphical representation of functions such as supply and demand, the solution of systems of equations for obtaining market equilibrium, or the calculation of rates such as the inflation rate or the unemployment rate. In this regard, Cole et al. (2016) found that additional mathematics training had a positive impact on financial outcomes compared with traditional personal-finance courses, for which they found no effect on financial outcomes.

Finally, there are other forms of financial education teaching that are associated with the development of financial competencies. On the one hand, financial education taught as a separate subject contributes to the development of financial skills among students from Italy, New Zealand, and Spain, after controlling for individual and other school variables. On the other hand, when financial education is available as an extracurricular activity it is significant only in the F.C. Belgium, the Czech Republic, and Estonia. Lastly, financial education taught as part of class teachers' lessons has a positive effect on the score in financial literacy in Spain and Slovenia. However, the teaching of financial education as part of other social sciences and humanities or language and literature subjects is not significant in any of the countries.

5.2.3. Other School Features and Their Relationship to Financial Literacy Scores

We focus now on contextual or school variables shown in table 4. School variables were incorporated to test whether there was a direct group effect

on financial literacy. In relation to these school variables, after controlling for individual variables and those related to the teaching of financial education, there are relatively few estimated coefficients that are statistically significant. In addition, the signs of the coefficients (positive and negative) for the same variable in the different countries do not allow us to conclusively identify the relationship of these school variables with financial literacy. It is clear that there are different educational systems, so in this section we do not go into depth in analyzing the role that these contextual variables exert in the development of financial competencies.

First, it is important to emphasize that neither the quality of educational resources nor responsibility for curriculum and assessment is related to the results on financial literacy. On the one hand, we find positive and statistically significant coefficients for quality of educational resources only in New Zealand and the United States. In both cases, it seems that the highest investments in quality educational resources are related to the results in financial literacy. On the other hand, differences in educational outcomes may also be attributable to internal processes of the school, such as the degree of autonomy. In this paper, the index of school responsibility for curriculum and assessment has been included as an explanatory variable, which mainly reflects the degree of decentralization in relation to aspects such as textbook choice, student assessment policies and procedures, or curriculum contents. This index has a dissimilar influence by country, having a positive relationship with financial literacy scores in F.C. Belgium, the Czech Republic, Israel, and Spain, but a negative relationship in Colombia.

Second, the association between school climate and performance is strong in some countries. The results of the econometric estimation reveal that a positive learning environment in the classroom contributes to the development of financial literacy in Italy and Croatia. In general, classrooms and schools with more disciplinary problems are less favorable to learning, since teachers have to spend more time creating an orderly environment before instruction can begin. Regarding the class size, the estimated coefficient associated with this variable is positive and statistically significant in the Czech Republic, Israel, Croatia, and Italy. However, it is negatively related to financial literacy in the Russian Federation, Spain, and Estonia.

Third, school type is not significant in most countries. This variable only shows a positive relationship with financial literacy in Spain, where public school students perform better than private school students; the score on financial literacy in Croatia and Colombia is lower if the school is public. In any case, these results must be analyzed with caution, since the type of school is an endogenous variable because the students are not randomly distributed among the different types of schools.

Fourth, in F.C. Belgium, the Russian Federation, and Spain, students enrolled in schools that are located in small towns and rural areas obtain lower scores in financial literacy than students enrolled in schools located in larger cities. Similar results have been found by Ali et al. (2016). The opposite result is observed in Colombia, Estonia, and Poland.

Fifth, regarding competition among schools, it contributes positively to improving financial literacy performance in Israel, Poland, the Slovak Republic, and Italy, while it is negatively related in Latvia and France.

Finally, we consider admission policies, which are controllable by schools. This variable is measured by the index of school choice, and it is positively related to financial literacy scores in Croatia, New Zealand, and Slovenia, while a negative relationship has been found in Colombia and the Czech Republic.

5.2.4. Students' Experiences with Money Matters and Their Relation to Scores on Financial Literacy

The table in annex 4 reports the relationship between students' experiences related to money/financial affairs, such as holding a bank account or having knowledge of financial products, and its performance in assessing financial literacy, controlling for the other variables used in the estimation. Here, in table 6, we show a summary of the students' experiences with money matters and their relation to scores on financial literacy.

First, with regard to the relationship between performance in financial literacy and having a bank account, it is observed that having a bank account is associated with higher scores in financial literacy in New Zealand, F. C. Belgium, Latvia, and Australia. Specifically, students in New Zealand who hold a bank account score 33 points higher than students who do not, and about 12 points in F. C. Belgium, 11 points in Latvia, and 6 points in Australia. The highest differences, in New Zealand and F. C. Belgium, may be due in part to the fact that more than 70 % of students in these countries hold a bank account. In New Zealand, in particular, 15-year-olds do not need parental permission to open a bank account. The positive relationship observed between holding a bank account and results on financial literacy can be interpreted in various ways. On the one hand, having financial knowledge and skills can raise curiosity among students about financial products (Otto, 2013; Sherraden et al., 2011). On the other hand, having a bank account allows students to become familiar with financial topics (Christelis et al., 2015; Sherraden et al., 2011) while encouraging saving habits, with certain long-term benefits in adulthood (Friedline et al., 2011).

Second, holding a prepaid debit card is positively associated with the financial literacy scores in France, Italy, Shanghai, and the Czech Republic. Specifically, holding a prepaid debit card increases the result of financial lit-

Table 6
Students' Experiences with Money Matters and Their Relation to Scores on Financial Literacy

	He/she holds a bank account	He/she does not know what a bank account is	He/she holds a prepaid debit card	He/she does not know what a prepaid debit is
Australia	Δ			
Belgium	Δ			
Colombia		∇		
Croatia				∇
Czech Republic			Δ	
Estonia				∇
France			Δ	∇
Israel				
Italy			Δ	
Latvia	Δ			
New Zealand	Δ	∇		
Poland				∇
Russian Federation				∇
Shanghai			Δ	
Slovak Republic.				
Slovenia				
Spain				∇
United States		∇		

Note: *Delta* increase; ∇ decrease. The deltas correspond to the positive coefficients reported in annex 4 that showed statistical significance.

eracy tests by 17 points in France, about 14 points in Italy, about 11 points in Shanghai, and around 9 points in the Czech Republic.

Finally, it is interesting to see whether or not there are differences in financial literacy performance between students who have a basic knowledge of formal financial products and those who do not. Financial unfamiliarity, which is defined as not knowing what a bank account is and/or not knowing what a prepaid debit card is, was related negatively to the financial literacy scores in Colombia, Croatia, Estonia, France, New Zealand, Poland, the Russian Federation, Spain, and the United States.

6. Conclusion

Financial literacy is an essential skill for life. A globalized world, characterized by a greater complexity of markets and the economy, requires that citizens, especially youth, gain more knowledge and develop more competencies in economic and financial matters than past generations. Students nearing the end of compulsory education are already consumers of financial products:

many have bank accounts, use online payment services, and/or have a prepaid mobile phone. Many of them must decide, with their parents, whether to continue to higher levels of education and, if so, how to pay for it.

The importance of financial literacy is also increasingly recognized in schools. This paper analyzes the factors associated with financial literacy performance in 18 countries that participated in the OECD–PISA program in 2012. This was the first large-scale international study to assess the financial literacy of 15-year-olds acquired in and outside of school. Specifically, the objective of this work has been to study the relationship between the teaching of financial education in schools – and students' experiences with monetary affairs – and the development of economic and financial skills, once one has controlled for individual variables and other school variables. To achieve this goal, we have used the econometric methodology of multilevel analysis.

First, the financial literacy score of young people is mediated by the acquisition of mathematical and reading competencies. To be financially literate, students need some basic knowledge of mathematics and to be able to read and understand basic financial documents. So, mathematics and reading abilities can be considered as prerequisites for financial literacy. The results contribute to the debate on the need to increase hours of mathematics and reading, and to foster a positive attitude towards both.

Second, the interest in determining how schools can contribute to promoting the financial literacy of teenagers is fundamental. The literature that assesses financial education strategies does not provide conclusive results regarding the best way to integrate financial education into an official school curriculum. However, in this paper we have found a positive relationship between the delivery of financial education and students' financial literacy scores across the countries analyzed. It is observed that the financial education taught as a cross-curricular subject has a positive relationship with the development of the economic and financial skills of young people. These results are important from the perspective of educational policy, since they allow for the development of financial skills without the need for direct investment of additional monetary resources. Also, financial education taught as part of business or economics courses has a positive relationship with the economic and financial scores.

Third, regarding students' experiences related to money/financial affairs, access to savings accounts and means of bank payment by young people, which is measured in this work by the possession of a bank account and/or the use of a prepaid debit card, respectively, has a positive relationship with financial literacy. Financial unfamiliarity has the opposite effect on financial literacy scores.

The findings of this paper could gain in robustness if, in the following waves of PISA, the results allow verifying if there are certain methods of

financial education that are cost-effective. Financial education as a cross-curricular subject or as part of mathematics contributes to the development of financial competencies among young people without the need to inject substantial additional human and material resources into educational systems. Helping young people understand financial issues is important, as younger generations are likely to face ever-increasingly complex financial products and services. Therefore, knowing the way in which schools can contribute to promoting financial literacy of young people is fundamental. In this regard, financial education is the best way to equip all young people with the relevant skills to make informed decisions and empower them as consumers.

7. Appendix

7.1. Annex 1

For the financial literacy questions that PISA used to measure financial literacy and concerning the selection of students and/or schools to participate in PISA, see OECD (2012a,c) and OECD (2014c).

The 40 items constituting the financial literacy assessment were newly developed for PISA 2012 and were selected from a pool of 75 items that were similarly tested in a field trial conducted in 2011 in countries participating in this international effort. The participation of countries in expert working groups charged with linking policy objectives with the best internationally available technical expertise ensures that the instruments are internationally valid and take into account the cultural and educational contexts in OECD member and partner countries and economies, that the assessment materials have strong measurement properties, and that the instruments emphasize authenticity and educational validity. (See: OECD, 2012a; OECD, 2013; OECD, 2014a; OECD, 2014c.)

Like other PISA domains, financial literacy is assessed using an instrument designed to provide data that are valid, reliable, and interpretable. To provide valid estimates of student achievement, the sample of students had to be selected using established and professionally recognized principles of scientific sampling in a way that ensured representation of the full target population of 15-year-old students in the participating countries. Furthermore, quality standards had to be maintained with respect to (i) the coverage of the PISA international target population, (ii) accuracy and precision, and (iii) the school and student response rates. As specified in the PISA 2012 Technical Report, meeting the standards will ensure that the students tested come from the same target population in every country, and are in a nearly equivalent age range. Thus the results obtained will not be confounded by potential age effects. Furthermore, to be able to draw conclusions that are valid for the entire population

of 15-year-old students, a representative sample must be selected for participation in the test. The size of this sample should not be too small, in order to achieve required precision of measurement in all countries. For this reason, minimum numbers of participating students and schools are specified. The mode of drawing the samples used in the study is crucial to data quality. The goal of the project is to collect data that are representative of the population at large. To reach this goal, the sampling procedures have to follow established scientific rules. Furthermore, the comparability of the data across countries is guaranteed if the same procedure is used for all national samples. If different sampling procedures are used, then the equivalence of the sampling quality has to be determined (OECD, 2014c).

7.2. Annex 2

The dichotomous variables general versus vocational education and upper versus lower education do not appear for some countries in the econometric analyses. First, in Colombia, there were problems of convergence in the estimation of the model. Second, in some countries, such as Spain, Estonia, and Poland, we had no observations of either variable. In Spain and Estonia, practically all students were in general lower secondary education. In contrast, almost all of the students in Poland were in general upper secondary education. Third, in Latvia, New Zealand, and the USA only the variable upper versus lower education was incorporated. In Latvia and New Zealand, almost all students were in general academic education. In the USA, all students were in general education; in upper education, students in grades 10–12 have been considered, and in lower education grades 7–9. Lastly, in Croatia all students were in upper secondary education, so only the variable general versus vocational education was incorporated.

For each country, the PISA 2012 database provided information on the individual national study program codes, except for Israel. For that country, this information was masked, by request, to protect the confidentiality of participating schools and students and ensure good participation in future rounds of PISA. Given the variety of classifications for this information, and taking into account the diversity of educational systems, a synthesis effort has been made. For each country, it was determined, on the one hand, whether the student is on the general or the vocational track, and on the other, whether the student is in upper or lower secondary education, according to the ISCED classification. More details are provided by the UNESCO Institute of Statistics on the following Web link: http://uis.unesco.org/en/search/site/.

7.3. Annex 3

Table 7a

Descriptive Statistics

	Australia		Belgium		Colombia		Croatia		Czech Rep.		Estonia	
Variables	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.
Financial literacy performance	521.05	102.91	548.81	92.56	397.25	99.42	482.99	83.84	531.15	88.15	534.47	76.65
Age (in years)	15.79	0.29	15.85	0.28	15.87	0.28	15.70	0.29	15.76	0.29	15.82	0.28
Female (% of girls)	0.50	0.50	0.51	0.50	0.52	0.50	0.51	0.50	0.50	0.50	0.49	0.50
Index of economic, social, and cultural status (with mean 0 and SD 1 across OECD countries)	0.19	0.81	0.18	0.88	−1.08	1.10	−0.35	0.85	0.08	0.75	0.16	0.81
Grade repetition (% of repeaters)	0.08	0.27	0.21	0.41	0.39	0.49	0.02	0.15	0.05	0.21	0.03	0.16
Mathematical literacy performance	501.36	90.78	552.29	95.49	368.12	97.56	473.06	85.61	514.62	101.18	541.45	91.85
Reading literacy performance	509.25	97.26	529.00	82.12	398.80	103.36	492.59	86.99	512.01	93.84	524.63	84.24
Native (percentage)	0.82	0.39	0.90	0.30	1.00	0.07	0.88	0.32	0.97	0.17	0.91	0.28
Second-generation immigrant (percentage)	0.10	0.30	0.06	0.23	0.00	0.06	0.08	0.27	0.02	0.13	0.08	0.28
First-generation immigrant (percentage)	0.08	0.28	0.04	0.20	0.00	0.03	0.04	0.20	0.01	0.12	0.00	0.06
General (% of students) versus vocational education	0.88	0.33	0.50	0.50	0.76	0.42	0.30	0.46	0.75	0.43		
Upper (% of students) versus lower education	0.18	0.39	0.99	0.12					0.46	0.50		
Quality of educational resources (index with mean 0 and SD 1 across OECD countries)	0.62	0.98	0.55	0.82	−1.11	1.26	−0.50	0.69	0.06	0.83	−0.20	0.73
School responsibility for curriculum and assessment (index with mean 0 and SD 1 across OECD countries)	0.09	0.89	0.07	0.81	−0.08	0.85	−0.85	0.40	1.01	0.76	0.58	0.92
Morale of the teaching staff (index with mean 0 and SD 1 across OECD countries)			0.01	0.79	0.22	1.00	−0.32	0.92	−0.13	0.86	0.05	0.85
School climate (index with mean 0 and SD 1 across OECD countries)	−0.23	1.04	−0.05	0.91	−0.57	1.17	−0.48	0.96	0.29	0.99	−0.04	0.88
Class size (average number of students per classroom)	25.05	4.01	19.44	3.46	41.66	8.98	26.88	3.75	25.45	4.00	32.01	13.25
Public versus private schools (% of public schools)	0.60	0.49	0.19	0.39	0.82	0.38	0.99	0.11	0.93	0.26	0.98	0.13
Rural school (percentage)	0.08	0.28	0.01	0.09	0.07	0.26	0.01	0.10	0.04	0.19	0.17	0.37
Competition between schools (percentage)	0.94	0.25	0.95	0.21	0.87	0.33	0.81	0.39	0.90	0.30	0.82	0.39
School selectivity (index with mean 0 and SD 1 across OECD countries)	2.23	0.74	2.09	0.78	2.09	0.79	2.97	0.19	2.47	0.78	2.25	0.73

FE not taught as a separate subject	0.72	0.45	0.72	0.45	0.63	0.48			0.76	0.43	0.93	0.25
FE taught as a separate subject 1–19 hours a year	0.10	0.30	0.13	0.34	0.11	0.32			0.15	0.36	0.03	0.18
FE taught as a separate subject 20 or more hours a year	0.18	0.39	0.15	0.35	0.26	0.44			0.09	0.29	0.03	0.18
FE not taught as a cross-curricular subject	0.63	0.48					0.90	0.31	0.20	0.40	0.36	0.48
FE taught as a cross-curricular subject 1–19 hours a year	0.32	0.47					0.08	0.27	0.66	0.47	0.56	0.50
FE taught as a cross-curricular subject 20 or more hours a year	0.06	0.23					0.02	0.15	0.14	0.35	0.08	0.27
FE not taught as part of business or economics courses	0.22	0.41	0.22	0.42	0.50	0.50	0.62	0.49	0.61	0.49	0.55	0.50
FE taught as part of business or economics courses 1–19 hours a year	0.33	0.47	0.27	0.45	0.24	0.43	0.17	0.38	0.27	0.44	0.30	0.46
FE taught as part of business or economics courses 20 or more hours a year	0.45	0.50	0.50	0.50	0.27	0.44	0.21	0.41	0.13	0.33	0.15	0.36
FE not taught as part of mathematics	0.40	0.49	0.33	0.47	0.45	0.50	0.47	0.50	0.09	0.29	0.16	0.36
FE taught as part of mathematics 1–19 hours a year	0.47	0.50	0.63	0.48	0.41	0.49	0.47	0.50	0.85	0.36	0.76	0.43
FE taught as part of mathematics 20 or more hours a year	0.12	0.33	0.05	0.21	0.14	0.35	0.06	0.25	0.06	0.23	0.09	0.28
FE not taught as part of other social sciences and/or literature	0.11	0.31	0.18	0.38	0.42	0.49			0.09	0.29	0.17	0.38
FE taught as part of other social sciences and/or literature 1–19 hours a year	0.74	0.44	0.75	0.43	0.39	0.49			0.89	0.32	0.75	0.43
FE taught as part of other social sciences and/or literature 20 or more hours a year	0.15	0.35	0.07	0.26	0.19	0.40			0.02	0.15	0.08	0.26
FE is not available as an extracurricular activity	0.91	0.29	0.83	0.38					0.93	0.26	0.76	0.43
FE is available as an extracurricular activity 1–19 hours a year	0.08	0.27	0.13	0.34					0.00	0.06	0.22	0.42
FE is available as an extracurricular activity 20 or more hours a year	0.01	0.11	0.04	0.20					0.07	0.25	0.02	0.13
FE not taught as part of class teachers' lessons					0.88	0.32	0.76	0.43	0.82	0.39	0.40	0.49
FE taught as part of class teachers' lessons 1–19 hours a year					0.09	0.29	0.23	0.42	0.18	0.39	0.57	0.50
FE taught as part of class teachers' lessons 20 or more hours a year					0.02	0.16	0.01	0.09			0.03	0.18
Number of observations	2822		867		1722		1070		927		967	

Table 7b

Descriptive Statistics Continued

	France		Israel		Italy		Latvia		New Zealand		Poland	
Variables	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.
Financial literacy performance	496.06	97.95	490.12	104.62	479.29	84.60	501.05	75.10	528.34	111.51	516.16	80.75
Age (in years)	15.87	0.29	15.71	0.29	15.76	0.29	15.77	0.30	15.74	0.29	15.72	0.29
Female (% of girls)	0.52	0.50	0.52	0.50	0.50	0.50	0.52	0.50	0.52	0.50	0.50	0.50
Index of economic, social, and cultural status (with mean 0 and SD 1 across OECD countries)	−0.04	0.81	0.24	0.85	0.01	0.95	−0.13	0.88	0.13	0.77	−0.14	0.94
Grade repetition (% of repeaters)	0.23	0.42	0.02	0.13	0.14	0.34	0.06	0.24	0.06	0.23	0.05	0.21
Mathematical literacy performance	527.29	96.07	481.39	106.02	492.64	96.17	507.93	81.03	512.52	97.39	513.85	88.89
Reading literacy performance	515.48	101.83	505.79	120.71	495.47	96.45	501.89	82.63	521.09	103.57	521.36	90.67
Native (percentage)	0.87	0.34	0.84	0.37	0.93	0.25	0.96	0.19	0.74	0.44	1.00	0.03
Second-generation immigrant (percentage)	0.10	0.29	0.11	0.32	0.02	0.14	0.03	0.18	0.10	0.30		
First-generation immigrant (percentage)	0.04	0.19	0.05	0.22	0.05	0.21	0.00	0.06	0.16	0.37	0.00	0.03
General (% of students) versus vocational education	0.88	0.33			0.54	0.50						
Upper (% of students) versus lower education	0.76	0.43			0.98	0.13	0.03	0.17	0.94	0.23		
Quality of educational resources (index with mean 0 and SD 1 across OECD countries)	0.37	0.98	−0.37	1.11	0.03	0.88	0.05	0.69	0.25	1.02	0.38	0.90
School responsibility for curriculum and assessment (index with mean 0 and SD 1 across OECD countries)	−0.07	0.86	−0.04	0.91	0.34	0.90	−0.23	0.79	0.58	0.84	0.36	0.81
Morale of the teaching staff (index with mean 0 and SD 1 across OECD countries)	−0.40	1.00	0.17	0.92	−0.57	0.92	0.06	0.75	0.37	0.89	−0.13	0.92
School climate (index with mean 0 and SD 1 across OECD countries)	0.04	1.02	−0.16	1.03	0.07	0.92	−0.25	0.89	−0.21	0.91	0.05	0.86
Class size (average of students per classroom)	29.60	4.87	30.85	4.82	25.16	8.75	22.55	5.84	25.62	3.89	24.46	6.37
Public versus private schools (% of public schools)	0.82	0.39			0.96	0.20	0.99	0.09	0.94	0.23	0.92	0.27
Rural school (percentage)	0.07	0.25	0.18	0.38	0.03	0.17	0.18	0.38	0.06	0.24	0.29	0.45
Competition between schools (percentage)	0.62	0.49	0.80	0.40	0.54	0.50	0.94	0.24	0.92	0.27	0.72	0.45
School selectivity (index with mean 0 and SD 1 across OECD countries)	2.00	0.82	2.35	0.79	2.50	0.74	1.99	0.81	2.29	0.88	1.88	0.71
FE not taught as a separate subject	0.72	0.45	0.76	0.42	0.82	0.38	0.93	0.25			0.98	0.15
FE taught as a separate subject 1–19 hours a year	0.08	0.26	0.14	0.35	0.05	0.22	0.04	0.19			0.02	0.14
FE taught as a separate subject 20 or more hours a year	0.20	0.40	0.10	0.30	0.13	0.34	0.03	0.17			0.00	0.07

FE not taught as a cross-curricular subject	0.71	0.45	0.56	0.50	0.81	0.39	0.58	0.49	0.80	0.40	0.86	0.34
FE taught as a cross-curricular subject 1–19 hours a year	0.19	0.39	0.38	0.49	0.13	0.34	0.34	0.47	0.17	0.38	0.13	0.34
FE taught as a cross-curricular subject 20 or more hours a year	0.10	0.31	0.05	0.22	0.06	0.24	0.08	0.27	0.02	0.15	0.01	0.07
FE not taught as part of business or economics courses	0.34	0.47			0.59	0.49	0.76	0.43	0.08	0.28	0.82	0.38
FE taught as part of business or economics courses 1–19 hours a year	0.28	0.45			0.26	0.44	0.14	0.34	0.36	0.48	0.15	0.36
FE taught as part of business or economics courses 20 or more hours a year	0.38	0.49			0.15	0.36	0.10	0.31	0.56	0.50	0.03	0.16
FE not taught as part of mathematics	0.64	0.48					0.24	0.43	0.56	0.50	0.29	0.45
FE taught as part of mathematics 1–19 hours a year	0.36	0.48					0.71	0.45	0.41	0.49	0.69	0.46
FE taught as part of mathematics 20 or more hours a year	0.01	0.08					0.05	0.22	0.03	0.16	0.02	0.16
FE not taught as part of other social sciences and/or literature	0.59	0.49	0.61	0.49	0.56	0.50					0.22	0.42
FE taught as part of other social sciences and/or literature 1–19 hours a year	0.36	0.48	0.35	0.48	0.39	0.49					0.76	0.43
FE taught as part of other social sciences and/or literature 20 or more hours a year	0.05	0.21	0.05	0.21	0.05	0.22					0.02	0.14
FE is not available as an extracurricular activity	0.92	0.27	0.74	0.44	0.87	0.33	0.91	0.29	0.82	0.38	0.73	0.45
FE is available as an extracurricular activity 1–19 hours a year	0.05	0.22	0.17	0.37	0.11	0.32	0.04	0.21	0.09	0.29	0.24	0.43
FE is available as an extracurricular activity 20 or more hours a year	0.03	0.16	0.09	0.29	0.01	0.11	0.05	0.22	0.08	0.27	0.03	0.18
Number of observations	799		863		5107		807		706		886	

Note: This table shows the descriptive statistics calculated from the observations used in the econometric analysis shown in Table 4. Average values of financial literacy performance for each country shown in this table differ from that shown in Table 1. This is because in the latter were considered all the observations available and the corresponding weights. N.B. For the variables related to the teaching of financial education, the mean value indicates the percentage of schools in each category.

Table 7c

Descriptive Statistics Continued

	Russian Federation		Shanghai-China		Slovak Republic		Slovenia		Spain		United States	
Variable	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Financial literacy performance	487.49	86.48	601.80	84.81	477.81	102.08	472.30	87.62	490.79	82.78	500.56	95.62
Age (in years)	15.80	0.28	15.76	0.30	15.82	0.28	15.75	0.29	15.86	0.28	15.83	0.29
Female (% of girls)	0.51	0.50	0.51	0.50	0.50	0.50	0.47	0.50	0.49	0.50	0.52	0.50
Index of economic, social and cultural status (with mean 0 / SD 1 across OECD countries)	−0.05	0.73	−0.41	1.00	−0.13	0.92	0.03	0.85	−0.07	0.99	0.21	0.98
Grade repetition (% of repeaters)	0.02	0.14	0.10	0.29	0.05	0.23	0.02	0.15	0.27	0.44	0.13	0.34
Mathematical literacy performance	482.22	92.52	624.38	107.68	482.06	102.47	488.87	90.95	486.49	86.63	488.99	86.28
Reading literacy performance	461.65	89.12	577.40	86.25	462.27	97.58	476.41	83.65	490.85	93.20	521.95	86.97
Native (percentage)	0.89	0.31	0.99	0.11	0.99	0.11	0.91	0.28	0.89	0.31	0.81	0.40
Second generation immigrant (percentage)	0.08	0.27	0.00	0.07	0.01	0.07	0.05	0.23	0.02	0.13	0.14	0.35
First generation immigrant (percentage)	0.03	0.17	0.01	0.09	0.01	0.08	0.03	0.18	0.09	0.28	0.05	0.22
General (% of students) versus vocational education	0.95	0.21	0.78	0.41	0.61	0.49	0.39	0.49				
Upper (% of students) versus lower education	0.17	0.37	0.56	0.50	0.61	0.49	0.99	0.07			0.89	0.32
Quality of educational resources (index with mean 0 / SD 1 across OECD countries)	−0.46	0.94	0.19	1.23	−0.55	0.70	0.38	0.83	0.01	0.87	0.36	1.09
School responsibility for curriculum and assessment (index with mean 0 / SD 1 across OECD countries)	−0.24	0.82	−0.59	0.78	0.52	0.99	−0.34	0.73	−0.40	0.76	−0.40	0.83
Moral of the teaching staff (index with mean 0 / SD 1 across OECD countries)	0.00	0.89	−0.03	0.95	−0.28	0.85	−0.21	0.84			−0.10	0.97
School climate (index with mean 0 / SD 1 across OECD countries)	−0.21	1.41	0.22	1.81	−0.22	0.83	−0.43	0.79	0.18	0.96	−0.24	0.85
Class size (average of students per classroom)	22.99	4.59	39.24	7.58	23.55	4.62	24.73	4.21	25.33	4.97	26.24	5.43
Public versus private schools (% of public schools)	0.99	0.08	0.92	0.27	0.92	0.27	0.98	0.15	0.64	0.48	0.93	0.25
Rural school (percentage)	0.15	0.36			0.10	0.29	0.01	0.07	0.02	0.12		
Competition between schools (percentage)	0.80	0.40	0.82	0.39	0.88	0.33	0.77	0.42	0.87	0.34	0.77	0.42
School selectivity (index with mean 0 / SD 1 across OECD countries)	1.88	0.77	2.41	0.68	2.38	0.80	1.89	0.73	1.23	0.50	2.02	0.84
FE not taught as a separate subject	0.66	0.47	0.76	0.42	0.80	0.40			0.92	0.27	0.49	0.50
FE taught as a separate subject 1–19 hours a year	0.19	0.40	0.13	0.34	0.11	0.31			0.02	0.14	0.05	0.23
FE taught as a separate subject 20 or more hours a year	0.14	0.35	0.10	0.31	0.09	0.29			0.06	0.24	0.45	0.50

FE not taught as a cross-curricular subject			0.67	0.47	0.10	0.29	0.49	0.50	0.74	0.44	0.58	0.49
FE taught as a cross-curricular subject 1–19 hours a year			0.28	0.45	0.71	0.46	0.47	0.50	0.22	0.41	0.27	0.44
FE taught as a cross-curricular subject 20 or more hours a year			0.05	0.22	0.20	0.40	0.04	0.20	0.04	0.19	0.15	0.36
FE not taught as part of business or economics courses	0.63	0.48	0.55	0.50	0.51	0.50	0.56	0.50	0.78	0.42	0.23	0.42
FE taught as part of business or economics courses 1–19 hours a year	0.19	0.39	0.33	0.47	0.26	0.44	0.26	0.44	0.08	0.26	0.24	0.43
FE taught as part of business or economics courses 20 or more hours a year	0.18	0.38	0.12	0.33	0.23	0.42	0.18	0.38	0.15	0.35	0.53	0.50
FE not taught as part of mathematics									0.39	0.49	0.44	0.50
FE taught as part of mathematics 1–19 hours a year									0.56	0.50	0.39	0.49
FE taught as part of mathematics 20 or more hours/year									0.05	0.21	0.17	0.38
FE not taught as part of other social sciences and/or literature	0.16	0.37	0.26	0.44			0.38	0.48	0.48	0.50	0.48	0.50
FE taught as part of other social sciences and/or literature 1–19 hours a year	0.68	0.47	0.68	0.47			0.61	0.49	0.44	0.50	0.33	0.47
FE taught as part of other social sciences and/or literature 20 or more hours/year	0.16	0.37	0.06	0.24			0.01	0.11	0.08	0.27	0.20	0.40
FE is not available as an extra-curricular activity	0.43	0.50	0.42	0.49			0.93	0.25			0.85	0.35
FE is available as an extra-curricular activity 1–19 hours a year	0.48	0.50	0.51	0.50			0.05	0.21			0.07	0.26
FE is available as an extra-curricular activity 20 or more hours a year	0.09	0.28	0.07	0.25			0.02	0.14			0.07	0.26
FE not taught as part of class teacher lessons							0.83	0.37	0.91	0.29	0.95	0.22
FE taught as part of class teacher lessons 1–19 hours a year							0.16	0.37	0.09	0.29	0.05	0.21
FE taught as part of class teacher lessons 20 or more hours a year							0.00	0.07			0.01	0.09
Number of observations	1092		1143		965		1114		768		910	

Note: This table shows the descriptive statistics calculated from the observations used in the econometric analysis shown in Table 4. Average values of financial literacy performance for each country shown in this table differ from that shown in Table 1. This is because in the latter were considered all the observations available and the corresponding weights.
N.B. For the variables related to the teaching of financial education, the mean value indicates the percentage of schools in each category.

7.4. Annex 4

Table 8a

Estimated Multilevel Random Slope Model with Variables Related to Money Matters (Only the Estimated Coefficients Shown)

	Australia	(Flemish) Belgium	Colombia	Croatia	Czech Republic	Estonia	France	Israel	Italy
Level 1 variables related to students									
Age	−0.796	9.427	62.942**	7.201	−38.497**	1.267	−9.141	11.274	6.073
Female	−12.097**	−11.474**	−12.250	−20.730**	−6.307*	−11.105**	−2.251	−11.818**	−17.716**
Index of economic, social, and cultural status	−3.204	−8.295**	17.020**	0.818	−1.547	2.385	3.101	2.065	−1.376
Grade repetition	−7.189	4.396	−22.250**	−5.326	−15.730	9.946	−36.609**	1.937	−12.761**
Mathematical literacy performance	0.491**	0.501**	0.123	0.454**	0.530**	0.377**	0.565**	0.506**	0.374**
Reading literacy performance	0.578**	0.393**	0.321**	0.444**	0.225**	0.433**	0.240**	0.277**	0.336**
Native	r.c.	r.c.	r.c.	r.c.	r.c.	r.c.	r.c.	r.c.	r.c.
Second-generation immigrant	−18.645**	−0.961	(omitted)	11.530	−18.910	−13.718**	−9.966	−15.231**	−9.773
First-generation immigrant	−18.281**	−13.870	37.057*	−0.531	−4.520	12.680	−26.381	7.749	1.753
General versus vocational education	0.820	3.955	−18.983**	1.539	12.891		23.680**		9.313**
Upper versus lower education	17.236**	19.134			32.611**		−9.326		21.984
Level 1 variables related to money matters									
He/she holds a bank account	6.222*	11.600**	4.957	0.326			−2.523	0.986	−1.208
He/she does not have a bank account	r.c.	r.c.	r.c.	r.c.			r.c.	r.c.	r.c.
He/she does not know what a bank account is	−13.428	9.988	−100.123**	5.731			−28.533	−3.035	−3.234
He/she holds a prepaid debit card		−2.259	−21.124	r.c.	9.152**	5.828	16.815**	−15.057	13.662**
He/she does not have a prepaid debit card		r.c.	r.c.	r.c.	r.c.	r.c.	r.c.	r.c.	r.c.
He/she does not know what a prepaid debit card is		−3.997	21.931	−51.459**	−3.247	−6.942*	−77.792*	6.081	−1.512
Level 2 variables related to schools									
Quality of educational resources	0.378	−1.404	7.071	−0.934	−1.620	−1.117	1.288	4.407	0.267
School responsibility for curriculum and assessment		4.238	−4.112	−2.236	4.027	3.651	0.182	5.341*	1.398
Morale of the teaching staff		0.045	5.033	−1.428	0.921	2.415	1.478	5.588	−0.410
School climate		2.747	1.646	6.173**	2.793	−2.320	−3.982	−3.759	2.817
Class size		0.460	−0.321	0.514	0.930	−0.281	−0.787	0.715	0.161
Public versus private schools		−5.193	−20.018	−22.387**	4.566	10.585	0.005		20.408**
Rural school	9.374	0.615	−0.855	−2.227	−0.668	8.408	−16.986	2.257	16.728
Competition between schools	5.278	−8.256	−11.531	−4.569	−0.643	−0.177	−7.634	21.020**	3.020
School selectivity	0.212	−4.271	−4.084	13.438*	−3.033	−4.740	−1.004	−0.122	1.553
Level 2 variables related to teaching of financial education									
FE not taught as a separate subject	r.c.	r.c.	r.c.	r.c.	r.c.		r.c.	r.c.	r.c.
FE taught as a separate subject 1–19 hours a year	−3.397	10.140	−0.433	−9.659	−6.022		3.893	−1.809	−2.116
FE taught as a separate subject 20 or more hours a year	−5.329	0.861	−15.041	−8.116	−6.232		4.083	−21.080	2.399

FE not taught as a cross-curricular subject	r.c.	r.c.	r.c.	r.c.	r.c.	r.c.	r.c.	r.c.	r.c.
FE taught as a cross-curricular subject 1–19 hours a year	2.027	−5.709	10.492	−2.652	−2.464	−0.965	7.533	1.454	0.454
FE taught as a cross-curricular subject 20 or more hours a year	0.539	−2.489	22.880*	−1.326	2.869	−2.844	35.125**	−2.417	2.142
FE not taught as part of business or economics courses	r.c.	r.c.	r.c.	r.c.	r.c.	r.c.	r.c.		r.c.
FE taught as part of business or economics courses 1–19 hours a year	9.328 *	20.333**	−19.927	6.295	2.766	8.694*	−0.029		−0.404
FE taught as part of business or economics courses 20 or more hours a year	8.360*	22.108**	−14.943	−2.230	15.888	5.575	−5.370		3.249
FE not taught as part of mathematics	r.c.	r.c.		r.c.	r.c.	r.c.	r.c.		
FE taught as part of mathematics 1–19 hours a year	−0.410	−2.469		4.844	4.447	−4.606	−5.056		
FE taught as part of mathematics 20 or more hours a year	7.360	29.008**		11.803	4.949	15.835	−3.763		
FE not taught as part of other social sciences and/or literature	r.c.	r.c.	r.c.		r.c.	r.c.	r.c.	r.c.	r.c.
FE taught as part of other social sciences and/or literature 1–19 hours a year	−0.722	8.244	−5.896		11.493	2.888	−8.363	−7.493	0.693
FE taught as part of other social sciences and/or literature 20 or more hours a year	−4.435	19.738	−6.991		−9.377	3.795	−19.148	2.408	2.744
FE is not available as an extracurricular activity	r.c.	r.c.	r.c.		r.c.	r.c.	r.c.	r.c.	r.c.
FE is available as an extracurricular activity 1–19 hours a year	−7.952	−14.404	−3.757		47.624**	−4.088	9.351	9.826	−1.447
FE is available as an extracurricular activity 20 or more hours a year	7.890	−5.727	−17.684		14.786	17.897*	−14.728	21.448	−5.227
FE not taught as part of class teachers' lessons				r.c.	r.c.	r.c.			
FE taught as part of class teachers' lessons 1–19 hours a year				−7.843	−1.412	1.543			
FE taught as part of class teachers' lessons 20 or more hours a year				−15.964	(omitted)	−0.472			
Constant	−15.179	−114.269	−656.441**	−77.087	687.993**	90.578	250.366	−101.288	−16.476
var(math_ability)	0.013**	0.005**	0.035**	0.002**	0.003**	0.007**	0.001**	0.007**	0.021**
var(_cons)	4277.44**	1595.85**	5773.52**	50.13**	1249.59**	2938.43**	1533.52**	2278.63**	7654.18**
cov(math_ability,_cons)	−6.685	−2.617	−14.300	−0.277	−1.581	−4.427	−1.288	−3.857	−12.478**
var(Residual)	1114.63**	1390.95**	5847.82**	1102.99**	897.90**	1150.25**	1631.79**	2627.07**	1723.67**
Number of observations	1397	396	668	482	449	452	385	396	2119
Number of schools	673	125	263	155	200	167	162	136	738
Log pseudolikelihood	−25575.1	−8626.8	−70223.1	−6895.0	−6727.3	−1460.1	−68455.6	−13766.6	−59367.4

Table 8b

Estimated Multilevel Random Slope Model with Variables Related to Money Matters (Only the Estimated Coefficients Shown) Continued

	Latvia	New Zealand	Poland	Russia	Shanghai-China	Slovak Republic	Slovenia	Spain	USA
Level 1 variables related to students									
Age	0.607	−1.490	7.244	9.468	9.946	−0.988	9.594	11.549	5.106
Female	−11.701**	−1.369	−14.853**	2.098	−20.343**	−11.290**	−12.583**	0.908	−8.479**
Index of economic, social, and cultural status	3.059	1.553	−0.289	6.805*	1.118	−0.878	−5.265*	1.070	1.755
Grade repetition	−3.579	−23.965**	−7.731	−30.351**	1.778	−8.094	10.386	−10.818	5.061
Mathematical literacy performance	0.399**	0.574**	0.414**	0.468**	0.443**	0.479**	0.458**	0.659**	0.556**
Reading literacy performance	0.385**	0.445**	0.439**	0.233**	0.413**	0.478**	0.494**	0.161**	0.459**
Native	r.c.	r.c.		r.c.	r.c.	r.c.	r.c.	r.c.	r.c.
second-generation immigrant	14.260*	5.885		−8.541	−72.727**	14.719	−1.090	−31.447	1.617
first-generation immigrant	−34.994**	−14.483**		−18.069	13.460	−56.106**	−23.951**	−25.972**	22.166**
General versus vocational education				18.583	4.355	5.096	12.616**		
Upper versus lower education	25.925*	16.267		0.374	−4.813	4.762	7.034		19.715**
Level 1 variables related to money matters									
He/she holds a bank account	10.916**	33.145**		8.142	r.c.		3.892	2.564	2.468
He/she does not have a bank account	r.c.	r.c.		r.c.	r.c.		r.c.	r.c.	r.c.
He/she does not know what a bank account is	4.086	−66.920**		6.054	−8.702		r.c.	9.495	−30.084**
He/she holds a prepaid debit card		1.279	−5.691	0.681	10.641*	−0.247	3.135	−6.125	0.403
He/she does not have a prepaid debit card		r.c.	r.c.	r.c.	r.c.	r.c.	r.c.	r.c.	r.c.
He/she does not know what a prepaid debit card is		−10.224	−32.115**	−42.237**	r.c.	18.746	r.c.	−15.834*	−18.089
Level 2 variables related to schools									
Quality of educational resources	−7.247**	2.724	−0.748	−0.897	0.057	−4.829	−4.361	1.231	7.705**
School responsibility for curriculum and assessment	0.681	−3.307	−2.483	−0.007	−0.985	−2.798	2.992	10.834**	−1.106
Morale of the teaching staff	3.257	−3.339	0.611	1.774	−3.260	3.358	1.174	−5.480	1.711
School climate	−3.707	0.627	−3.978	−0.097	0.090	0.633	1.334	3.119	−0.019
Class size	−0.689	−0.644	−0.180	0.581	0.480*	−0.118	0.407	−0.897	−0.507
Public versus private schools	−12.607	3.363	4.872	−17.963	8.975	−16.035	7.695	9.934	13.193
Rural school	−8.004	−34.250**	7.851			−9.429	−5.543	−31.394*	
Competition between schools	−17.981**	−12.574	19.228**	1.960	7.289	8.606	−4.574	−0.053	14.060**
School selectivity	3.721	4.868	−0.106	4.981	2.702	−1.749	4.063	−8.512	−0.511
Level 2 variables related to teaching of financial education									
FE not taught as a separate subject	r.c.	r.c.		r.c.	r.c.	r.c.	r.c.	r.c.	r.c.
FE taught as a separate subject 1–19 hours a year	−19.244	23.936**		−5.911	6.479	−4.224	−0.171	−4.282	−0.170
FE taught as a separate subject 20 or more hours a year	13.413	−9.018		6.904	2.843	−15.363	8.155	−18.526	−5.317
FE not taught as a cross-curricular subject	r.c.	r.c.	r.c.		r.c.	r.c.		r.c.	r.c.

FE taught as a cross-curricular subject 1–19 hours a year	4.357	1.684	8.834		3.782	1.269		5.274	9.941
FE taught as a cross-curricular subject 20 or more hours a year	19.927**	10.603	25.990		−1.881	11.179		18.754	8.211
FE not taught as part of business or economics courses	r.c.	r.c.	r.c.	r.c.	r.c.	r.c.	r.c.		r.c.
FE taught as part of business or economics courses 1–19 hours a year	r.c.	−0.530	0.703	6.548	−0.470	13.047	12.342**		−4.535
FE taught as part of business or economics courses 20 or more hours a year	−7.336	7.202	35.740**	−4.472	4.860	−1.780	−6.770		−2.419
FE not taught as part of mathematics	r.c.	r.c.	r.c.	r.c.	r.c.		r.c.	r.c.	r.c.
FE taught as part of mathematics 1–19 hours a year	6.781	2.475	−2.240	1.830	5.093		−2.797	7.438	3.131
FE taught as part of mathematics 20 or more hours a year	12.823	−11.679	−11.943	6.796	−15.312		16.119	−21.961	−3.931
FE not taught as part of other social sciences and/or literature			r.c.	r.c.	r.c.			r.c.	
FE taught as part of other social sciences and/or literature 1–19 hours a year			8.025	1.893	−7.447			−1.483	
FE taught as part of other social sciences and/or literature 20 or more hours a year			2.087	−16.673	−0.898			7.006	
FE is not available as an extracurricular activity		r.c.	r.c.	r.c.	r.c.		r.c.		r.c.
FE is available as an extracurricular activity 1–19 hours a year		−3.956	3.307	3.741	5.028		6.661		−4.603
FE is available as an extracurricular activity 20 or more hours a year		1.016	19.620	11.032	8.086		−16.059		3.609
FE not taught as part of class teachers' lessons							r.c.	r.c.	r.c.
FE taught as part of class teachers' lessons 1–19 hours a year							−1.714	15.260**	−9.238
FE taught as part of class teachers' lessons 20 or more hours a year							41.660**	(omitted)	17.974
Constant	124.140	−0.464	−52.728	−18.451	−103.928	52.960	−161.370	−63.312	−118.703
var(math_ability)	0.003**	0.000**	0.007**	0.002**	0.005**	0.000**	0.010**	0.006**	
var(_cons)	2718.80**	22.20**	1827.93**	1878.74**	2555.79**	1234.93**	2304.96**	2798.70**	235.60**
cov(math_ability,_cons)	−3.014	0.075	−3.369	−1.935	−3.280	−0.551	−4.536	−4.008	
var(Residual)	1114.19**	1419.26**	960.65**	1874.29**	941.66**	974.82**	913.78**	1773.64**	1229.35**
Number of observations	377	314	416	465	548	439	521	315	432
Number of schools	161	120	147	187	148	185	232	126	136
Log pseudolikelihood	−1607.9	−5500.5	−49008.6	−150459.7	−15073.9	−6470.8	−1874.5	−36119.1	−498263.0

Note: Dependent variable: total score for each student in the financial literacy assessment. r.c.: reference category. Omitted: variable not considered due to the absence of observations in that category. For some countries, there are blank cells due to the omission of variables not considered because of problems in estimation/multicollinearity. For the United States, a random intercept model was estimated. **,*: Significance at 5 % and 10 % levels, respectively. The estimate has been made taking into account the relevant weights.

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