

GFLEC

GLOBAL FINANCIAL LITERACY
EXCELLENCE CENTER

Final Report

Enhancing Retirement Savings with School-Based Financial Education

By

Annamaria Lusardi

Academic Director, Global Financial Literacy Excellence Center

Denit Trust Chair Professor of Economics and Accountancy,

The George Washington University School of Business

&

Carlo de Bassa Scheresberg

Senior Research Associate, Global Financial Literacy Excellence Center

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Global Financial Literacy Excellence Center
The George Washington University
School of Business
Duquès Hall, Suite 450
2201 G Street NW
Washington, DC 20052

P: 202-994-7148
F: 202-994-8289
E: gflec@gwu.edu

About the Principal Investigator: Annamaria Lusardi

Annamaria Lusardi is the Denit Trust Chair of Economics and Accountancy at the George Washington University School of Business (GWSB). Moreover, she is the founder and academic director of GWSB's Global Financial Literacy Excellence Center (GFLEC). Previously, she was the Joel Z. and Susan Hyatt Professor of Economics at Dartmouth College, where she taught for twenty years. She has also taught at Princeton University, the University of Chicago Harris School of Public Policy, the University of Chicago Booth School of Business, and Columbia Business School. From January to June 2008, she was a visiting scholar at Harvard Business School. She holds a Ph.D. in Economics from Princeton University and a BA in Economics from Bocconi University.

Dr. Lusardi has won numerous research awards. Among them is a research fellowship from the University of Chicago Harris School of Public Policy, a faculty fellowship from the John M. Olin Foundation, and a junior and senior faculty fellowship from Dartmouth College. She was also awarded the 2015 Financial Literacy Award from the International Federation of Finance Museums, the 2014 William A. Forbes Public Awareness Award from the Council for Economic Education, the 2013 William E. Odom Visionary Leadership Award from the Jump\$tart Coalition for Personal Financial Literacy, and the National Numeracy Network's inaugural 2012 Steen Award. Moreover, she is the recipient of the 2007 Fidelity Pyramid Prize, an award to authors of published applied research that best helps address the goal of improving lifelong financial well-being for Americans.

She has published more than sixty academic articles and edited two books: *Overcoming the Saving Slump: How to Increase the Effectiveness of Financial Education and Saving Programs* published by the University of Chicago Press in 2008, and *Financial Literacy: Implications for Retirement Security and the Financial Marketplace*, joint with Olivia Mitchell, published by Oxford University Press in 2011. Dr Lusardi chairs the Programme for International Student Assessment (PISA)'s Financial Literacy Expert Group. She also chairs the OECD/International Network on Financial Education's Research Committee. In 2009, she served as a faculty advisor for the Office of Financial Education of the U.S. Treasury.

The GFLEC Research Team

The research team at GFLEC is composed of several research assistants and Carlo de Bassa Scheresberg, a Senior Research Associate. At GFLEC, Mr. Scheresberg is responsible for the design, development, and delivery of research projects in financial literacy and financial capability for major stakeholders, such as government organizations, regulatory agencies, and financial corporations. Prior to his work at the Center, Mr. Scheresberg worked in research and consultancy at Jesa Investment & Management in Shanghai, China. He holds an MS in economics from Bocconi University in Milan, Italy.

The authors would like to thank NEFE for its continuing commitment and dedication to research and to financial literacy.

A handwritten signature in cursive script that reads "Annamaria Lusardi".

Annamaria Lusardi
Academic Director, Global Financial Literacy Excellence Center
Denit Trust Chair Professor of Economics and Accountancy,
The George Washington University School of Business

List of deliverables in this final report

1. Research Paper

2. Policy Brief

3. Power Point Presentation

1

Research Paper

Enhancing Retirement Savings
with School-Based Financial
Education

REPORT

Enhancing Retirement Savings with School-Based Financial Education

The Global Financial Literacy Excellence Center (GFLEC)

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Executive summary

In this report we analyze findings from the Organization for Economic Co-operation and Development (OECD)'s 2012 Programme for International Student Assessment (PISA) financial literacy data to understand their implications for the sustainability of the US pension system. In particular, we seek to answer three main questions:

- (1) Why is financial literacy an important element of a robust pension system?
- (2) What is the current level of financial literacy among US high school students and what factors are associated with their level of financial literacy?
- (3) Is the current level of financial literacy among high school students adequate if the US is to maintain a retirement system that relies on individual decisions about saving and investing? If not, how can we improve the financial literacy level of young people, in order to achieve a sustainable and robust retirement system?

Our analysis highlights several main findings that point to how financial literacy among young people is a key factor in the long-term sustainability of the US pension system. In particular, we find that:

- Many young Americans are financially illiterate. According to the 2012 PISA Financial Literacy Assessment, only one in ten students demonstrate the highest level of financial literacy, and 18% score below the baseline level of financial literacy proficiency.
- GDP per capita is only weakly correlated with students' financial literacy performance. Moreover, students in many countries with well-developed financial markets, such as the US, do not earn top scores, implying that financial literacy is not learned simply through interactions with the economic environment. These findings underscore the importance of a well-functioning education system.
- Students' financial literacy depends heavily on their family's socioeconomic status, implying that students from less privileged households are less likely to be financially literate. In particular, students whose households do not have many books, whose parents have lower occupational attainment, and whose households have less wealth are less likely than other students to demonstrate the highest level of financial literacy. These findings have important implications for the transmission of economic inequality among generations.
- Students' school characteristics are also significantly associated with financial literacy scores. Students who attend schools with adequate materials and whose math teachers exhibit a strong degree of control over their classrooms and actively engage with their students are more likely to demonstrate the highest level of financial literacy. In addition, students who participate in extracurricular activities at school and have parents who set high expectations for performance in school are more likely to have high financial literacy scores.

- High socioeconomic status, attending a well-functioning school (which has adequate materials and competent math teachers), and high parental expectations are all correlated, indicating that socioeconomic status influences access to schools with adequate resources and that the intergenerational transmission of inequality in the US is a critical problem. Investing in schools by improving the adequacy of teaching materials and resources, as well as hiring teachers who can control classrooms and actively engage with students, may help fight this cycle—thus working to reduce inequality and improve the overall level of financial literacy among the young.

To summarize: The level of financial literacy demonstrated by 15-year-old Americans does not match the level that is necessary to be successful in today's complex financial markets and rapidly changing retirement landscape. Significant improvements have to be made to ensure a secure economic future for young Americans.

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1. Introduction

Concern over the level of financial literacy in the United States (US) has grown as the shift from defined benefit (DB) to defined contribution (DC) pension systems has transferred the responsibilities for saving and investing onto the individual and as financial products have become more complex. While today's older workers will retire with both DB and DC pensions, young adults are entering a system that is largely based on DC pensions only. The decisions they will have to make are complex and include when to start saving, how much to contribute to retirement accounts, how to invest retirement wealth, whether to borrow from retirement accounts, what to do with retirement accounts when one changes jobs, and when and how to start collecting pension benefits (for example, whether to collect pensions in a lump sum or as an annuity).

Young adults in the US are particularly vulnerable to the risks associated with greater responsibility for financial security. Our previous report showed that young Americans have very low levels of financial literacy, are heavily indebted, are frequent users of high-cost borrowing methods, and are already raiding their retirement accounts (de Bassa Scheresberg and Lusardi, 2014). Given these findings, the development of financial literacy skills among young people is increasingly perceived by policymakers as essential. As recognized by the OECD (2014), a growing number of countries have developed and implemented national strategies for financial education in order to improve the financial literacy of their populations in general, often with a particular focus on younger generations. However, little empirical evidence has been collected to help us understand the determinants of financial literacy among young people, and little research has focused on the implications of financial literacy for the pension landscape.

In this paper, we use data from the 2012 Programme for International Student Assessment (PISA) to analyze key factors and determinants of financial literacy among the young and assess the long-term implications for the robustness of the US retirement system. We find that the average performance of US students is not statistically different from the average performance of students in OECD countries. However, we see large variation in student performance within the US: Only about one in ten students score in the highest level of financial literacy. We also find that performance on the financial literacy assessment is strongly positively associated with variables denoting high family socioeconomic status, well-functioning schools, and competent math teachers. These findings provide suggestions on how to improve the financial knowledge of young people in the US.

The report is organized as follows: Section 2 discusses existing literature on the association between financial literacy and economic outcomes at various stages of individuals' lives; Section 3 describes the main features of the 2012 PISA Financial Literacy Assessment; Section 4 compares US student performance to that of students in other countries; Sections 5, 6, and 7 present our analyses of the data. Section 8 concludes.

2. Literature review

In the past twenty years the retirement landscape in most advanced economies has undergone a number of fundamental changes that have radically increased workers' individual responsibility for their retirement security. With the shift from DB to DC pension schemes, employees have gained far greater individual responsibility for essential financial decisions such as saving for

retirement, investing retirement savings, and decumulating retirement wealth. At the same time, the proliferation of DC plans means that today's workers are directly and immediately exposed to financial market risks (Lusardi and Mitchell, 2011). Moreover, increasing life expectancy and decreasing generosity of welfare systems in most advanced countries have contributed to an environment in which financial security in retirement is more difficult to achieve. Life expectancy is high and continues to increase (Figure 1), meaning that young people today will need to be able to support themselves for much longer than did past generations. As explained by Shoven and Slavov (2014), young adults today are in the historically unprecedented position of having to finance a 30-year retirement with a 40-year career. For the current retirement system to be sustainable, it is critical that employees start contributing to retirement accounts as soon as they begin working.

Current data, however, show that young adults in the US are a particularly vulnerable group. Findings from the 2012 National Financial Capability Study show that young Americans have very low levels of financial literacy. Even more, they are unaware of their financial literacy shortfalls: While 70 percent of respondents age 18 to 34 (the so-called Millennials) rated themselves as having high financial knowledge, only 24 percent demonstrated basic literacy vis-à-vis economic and financial concepts (de Bassa Scheresberg and Lusardi, 2014). Moreover, Millennials carry both short-term and long-term debt. For example, Millennials are heavily indebted through the use of credit cards and alternative financial services such as payday loans and pawnshops. Millennials are also indebted in the long-term, with two-thirds (66%) carrying at least one source of long-term debt, whether a student loan, a home mortgage, or a car loan; 30% have more than one source of long-term debt.

Even college-educated young adults do not fare well. They have more assets than other young adults, but they tend to be heavily burdened by debt, in particular student loans (de Bassa Scheresberg, Lusardi, and Yakoboski, 2014). As reported by the OECD (2014), many students nearing the end of compulsory education have to decide, with their parents, whether to continue with post-compulsory education and, if so, how to finance it. College tuition has risen significantly over the past several years. The average published tuition and fees at private four-year colleges and universities rose by 3% between January 2015 and January 2016—faster than the rate of inflation and the average hourly pay rate, 1.4% and 2.5% respectively. To finance rising tuition costs, more students are taking on educational loans. In 2014, 69% of college graduates held an average of \$29,850 in student loans, contributing to the total US student loan debt of \$1.2 trillion (College Board, 2015). More troubling than the size of this debt is the difficulty borrowers have in paying off their loans. A report by the Federal Reserve Bank of New York (2014) found that student loans have the highest delinquency rate of all consumer debt products. Moreover, a recent study conducted by the Plan Sponsor Council of America (2016) found that 37.6% of Millennial employees feel that their student loan debts are a “moderate” or “high” barrier to saving for retirement.

In a defined contribution pension landscape, young Americans must start contributing to their retirement accounts as soon as they enter the workforce. Yet many young Americans are entering the workforce already carrying some form of debt, and when they begin working, they will have to choose between saving, investing, and paying off their debts. These decisions are complex and require basic knowledge of financial concepts including risk, interest compounding, and inflation. However, a majority of workers—young workers in particular—lack knowledge of these basic financial concepts (Lusardi, Mitchell, and Curto, 2010).

Lack of financial knowledge has consequences. Research over the past few decades has shown that low levels of financial literacy, such as those demonstrated by young Americans, significantly impact individuals' behaviors. Research has linked lower financial literacy with worse day-to-day financial management skills, less precautionary savings, increased use of high-cost borrowing methods, and lower wealth accumulation (Hilgert, Hogarth, and Beverly 2003; Christelis, Jappelli, and Padula 2010; Yoong 2011; Lusardi and Tufano 2015; Stango and Zinman 2009; and the review work of Lusardi and Mitchell 2014).

Lusardi and Mitchell (2011) show that people with higher levels of financial literacy are much more likely to plan for retirement and that, in turn, leaves them better positioned for financial security in old age. Being able to develop and implement a retirement plan is key to retirement security, and those who do not plan will reach retirement with only half the wealth of those who do. Similar results have been seen when looking at international evidence from Europe and Asia as a part of the Global Financial Literacy Excellence Center's Financial Literacy Around the World—or "FLAT World"—Initiative.¹

Recognizing financial literacy's importance for financial behavior, researchers have looked at whether school-mandated financial education increases financial literacy and improves financial decision making. A study that examined financial education programs across states found that young people in states where financial education programs were rigorously implemented had higher credit scores and lower delinquency rates later on, relative to students in states with similar characteristics but without financial education programs (Brown, Collins, Schmeiser, and Urban 2015).

Similarly, several financial education programs implemented in the workplace demonstrate effectiveness, again showing that improving financial knowledge and skills helps employees make better financial decisions. For example, the program by Lusardi, Keller, and Keller (2008), supported by NEFE, increased employees' participation in Supplementary Retirement Accounts. In another project, Clark, Lusardi, and Mitchell (2015) analyzed administrative data from the Federal Reserve System to show that those who are more financially literate are able to earn more on their portfolios. Lusardi, Michaud, and Mitchell (forthcoming) show that financial literacy is able to explain as much as one-third of the inequality in savings close to retirement.

Research has also shown that behaviors and knowledge acquired when young carry on and grow with individuals as they age. A report by the OECD (2010) combined 2000 PISA data with a longitudinal study comprised of follow-up interviews with Canadian PISA respondents every two years from age 15 to age 25. The study, which analyzes the effectiveness of students' reading scores on the 2000 PISA as a predictor for educational attainment later in life, found that those who scored in the top level (Level 5) of the PISA reading assessment were 20 times more likely to attend a post-secondary university than those who scored in the lowest level. At the same time, those who scored in the lowest level were much more likely to drop out of high school than those in any other level.

These research findings show that the skills and knowledge essential for economic success are acquired early in life. The findings can be related to the PISA data in terms of the new pension landscape. Today's pension systems require that individuals immediately start saving and making complex financial decisions. However, in order for this to happen, young workers must be equipped with the appropriate skills and knowledge well before they enter the labor force.

¹ More information about this project is provided on the GFLEC webpage: <http://gflec.org/initiatives/flat-world>

3. The 2012 PISA Financial Literacy Assessment

PISA is an international survey that aims to assess 15-year-old students' skills and knowledge in three key domains: mathematics, reading, and science. Since its first wave in 2000, the PISA survey has been fielded every three years in a growing number of countries. In 2012, some 510,000 students completed the assessment in 65 participating countries and economies, a sample that represents about 28 million 15-year-olds students worldwide (OECD, 2014).

PISA gauges whether students are prepared for future challenges; whether they can analyze, reason, and communicate effectively; and whether they have the capacity to continue learning throughout their lives (OECD, 2014). PISA assessments are conducted to help understand if students near the end of compulsory education have acquired the knowledge and skills that are essential for full participation in society.

In 2012, an assessment measuring financial literacy was added to the survey, and this initiative became the first large-scale international data collection to assess the financial literacy of 15-year-old students. The assessment was conducted in 18 countries and economies.² Thirteen are OECD countries and economies: Australia, the Flemish Community of Belgium, the Czech Republic, Estonia, France, Israel, Italy, New Zealand, Poland, the Slovak Republic, Slovenia, Spain, and the US. Five are partner countries and economies: Colombia, Croatia, Latvia, the Russian Federation, and Shanghai-China. Around 29,000 students completed the financial literacy assessment, representing about 9 million 15-year-olds in the schools of the participating countries and economies. In the US, 158 schools participated in the PISA Financial Literacy Assessment, and 1,133 students, representing a population of over 3.5 million students, took the assessment.

Planning for the 2012 financial literacy assessment began many years before it was administered. In 2010, an expert group of regulators, practitioners, and academics, as well as representatives from treasury departments and central banks, was convened to design the financial literacy assessment.³ The expert group articulated a definition of financial literacy that holds true across countries and conveys why financial literacy is a necessary skill for young people:

Financial literacy is 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, 2014)

Four innovative aspects of this definition should be highlighted. First, financial literacy does not refer simply to knowledge and understanding, but also to its purpose—which is to promote effective decision making. Second, the objective of financial literacy is to improve financial well-being, not to affect a single behavior, such as increasing saving or decreasing debt. Third, financial literacy has effects not just for individuals but for society as well. Fourth, financial literacy,

² In Belgium and China, the assessment was performed only in part of the country.

³ GFLEC's Director Annamaria Lusardi chairs the financial literacy expert groups that designed the financial literacy assessment.

like reading, writing, and knowledge of science, enables young people to participate in economic life (Lusardi, 2015).

In addition to student performance data, PISA collected background information about students and schools. Specifically, students were asked about education and access to books, money, and financial products; attitudes toward economics and finance; confidence in financial matters; and spending and saving behaviors (OECD, 2014). Heads of school were asked about the characteristics of their schools, such as whether financial education is offered and, if so, whether it is compulsory; who teaches financial education courses; and whether teachers receive specific professional development on the topic (OECD, 2014).

A single continuous scale of proficiency was constructed to measure financial literacy. The relative difficulty of financial literacy questions was estimated by considering the proportion of students who answered each question correctly. Similarly, the relative proficiency of students was estimated by considering the proportion of students who answered each question correctly. The relationship between the difficulty of the questions and students' proficiency was presented on a single continuous scale divided into five levels. Level 1 is the lowest level, Level 2 serves as the baseline proficiency, and Level 5 represents the highest level of financial literacy proficiency among those tested (OECD, 2014). At each level, students are expected to be proficient at the preceding level.

Students performing at or below Level 1 (i.e., with scores between 326 and 400) display very basic financial literacy and are not able to apply their knowledge to real-life situations involving financial issues and decisions. They can identify common financial products and terms, interpret information relating to basic financial concepts, recognize the difference between needs and wants, and make simple decisions on everyday spending. They can apply single and basic numerical operations in financial contexts that they are likely to have personally encountered.

Level 2 (scores between 400 and 450 points) is considered the baseline of financial literacy proficiency. At this level, students are able to begin to apply their knowledge to financial decisions in contexts that are immediately relevant to them; for example, they can recognize the value of a simple budget, interpret prominent features of everyday financial documents, and apply basic numerical operations. These financial literacy skills may be beneficial for building competencies such as critical thinking and problem solving.

Students proficient at Level 3 (scores between 475 and 550 points) can apply their knowledge to commonly used financial concepts, terms, and products that are relevant to them. They start considering the consequences of financial decisions, and they make simple financial plans in common contexts, such as comparing some of the financial benefits of borrowing money with different interest rates and repayment terms. They are able to make straightforward interpretations of a range of financial documents and to choose the tools that best apply to the financial tasks at hand.

Students proficient at Level 4 (scores between 550 and 625 points) can apply their knowledge of less-common financial concepts to contexts that will be relevant to them in the near future, such as the evaluation of financial documents and financial products. They can make financial decisions taking into account longer-term consequences, and they can solve routine problems in unfamiliar financial contexts. Tasks at Level 4 require an understanding of financial concepts and terms that are likely to be less common for students, such as bank account management and compound interest, and the ability to identify the possible consequences of financial decisions.

Students scoring at Level 5 on the PISA financial literacy scale (scores higher than 625 points) can apply their understanding of a wide range of financial terms and concepts to contexts that may only become relevant in their future, such as borrowing money from loan providers. They can analyze complex financial products and take into account features of financial documents that are significant but unstated or not immediately evident, such as transaction costs. They can work with a high level of accuracy and solve non-routine financial problems, and they are able to look ahead and plan for the future. They can also describe the potential outcomes of financial decisions, showing an understanding of the wider financial landscape.

4. US performance in comparison to other countries

When we look at the distribution of financial literacy scores at an international level, we find that US students perform close to the international average. In Figure 2 we report the mean financial literacy scores among the 18 countries and economies that participated in the 2012 PISA Financial Literacy Assessment. There is large variation in student performance in financial literacy across countries, with Colombia having the lowest score (379 points) and Shanghai-China the highest (603). Students in the US score 492, while the OECD average score is 500.

Interestingly, countries with high GDP per capita do not necessarily have more financially literate students, and many countries with well-developed financial markets, such as the US, do not rank at the top. In fact, only a small proportion (16%) of the variation among countries' mean financial literacy scores is explained by per capita GDP (OECD, 2014). The fact that students in advanced economies do not score higher than students in other countries underscores the importance of having a well-functioning educational system. Students do not acquire financial knowledge simply by interacting with the financial and economic system. Rather, this knowledge has to be transmitted in a rigorous format in school curricula (Lusardi, 2015). The data also document important variations within countries. In the US, only about one in ten students (9.4%) perform at or above Level 5; this is similar to the average proportion of students in OECD countries performing at this level (9.7%). On the other hand, nearly 18% of students in the US score below the baseline level (Level 2), compared to 15% among OECD countries (Figure 3). Thus, a sizeable proportion of students in the US display a very low level of financial literacy.

The generosity of a retirement system could affect (at least in theory) individuals' incentives to invest in financial literacy. As argued by Jappelli and Padula (2013), different social security arrangements may lead to different levels of financial literacy and private savings, and at a global level we should see a correlation between the generosity of the pension system and financial literacy levels among the young.

Figure 4 reports net replacement rates across the G20 countries,⁴ defined as the individual net pension entitlement divided by net pre-retirement earnings, taking into account personal income taxes and social security contributions paid by workers and pensioners. The indicator measures how effectively a pension system provides a retirement income to replace earnings. The chart shows that countries such as Argentina, Turkey, and India offer the highest replacement rates (at levels above 80%), while the US (at 45%) is among the countries with the lowest replacement rates.

⁴ The figures show this indicator measured in percentage of pre-retirement earnings by gender (OECD, 2016).

Figure 5 shows the correlation between PISA financial literacy scores and the net replacement rates, by gender.⁵ High replacement rates in the pension system could be one explanation for some of the low levels of financial literacy. For example, Spain, the Slovak Republic, and Italy, show the highest replacement rates and the lowest levels of financial literacy. On the other hand, New Zealand, the United Kingdom, and the US are among the countries with the lowest replacement rates and tend to have higher financial literacy levels. However, there is great variation in both financial literacy levels and financial education policies at the national level in these countries. New Zealand is among the small but notable group of countries that has taken many initiatives to improve financial literacy in the population. The United Kingdom has made financial literacy instruction mandatory in schools. By contrast, the US has implemented weaker and more dispersed strategies so far. As documented by the 2016 Survey of the States (Council for Economic Education, 2016)—a report that surveys financial education high school mandates at a state level—only 20 US states require high school students to take a course in economics. That is two fewer states than in 2014. Even fewer states (17) require high school students to take a course in personal finance and only five states require a stand-alone semester course in personal finance.

Given this evolving landscape, it is important to evaluate the level of financial literacy among high school students, identify its determinants, and assess what can be done to improve the financial knowledge of young people.

5. Description of variables

An important feature of the PISA data is that it contains information that can be used to investigate the factors associated with better financial literacy scores. To gain a deeper understanding of the financial literacy of US high school students, we study the relationship between financial literacy and five groups of variables: (i) demographic characteristics, (ii) socioeconomic status of students' families, (iii) parent characteristics, (iv) school characteristics, and (v) teacher characteristics. Table 1 shows descriptive statistics (mean, median, minimum, and maximum) as well as the number of non-missing observations.

The first group of variables includes the age and gender of the students, whether they live in a household where Spanish is spoken, and whether they live in a rural area. The mean student age is about 15.8 years, and females are slightly more numerous (51% of the sample). Spanish is spoken at home for 11% of students, and 25% of them live in a rural area.

The second group of variables, denoting family socioeconomic status, includes (i) an index of parent occupation, which assigns greater values for occupations higher up in the professional hierarchy (e.g., managers);⁶ (ii) an index of wealth, constructed using information on whether students have a room of their own, whether they have Internet at home, access to home appliances, the number of cars the family owns, and the number of rooms in the house with a

⁵ The figure reports data only for countries for which both PISA financial literacy scores and net pension replacement rates are available. Note that Belgium and China are not included since the PISA financial literacy data is only collected for a subsample of the populations of students in those countries.

⁶ This index and all other indexes described in this section were constructed by the OECD and are available in the PISA dataset.

bath or shower; (iii) the years of parent education (computed as the maximum over the two parents); (iv) whether students have a computer at home (about 89% do); (v) an index of cultural possessions, constructed using information on whether students' homes contain works of literature, poetry, and art; and (vi) whether students have at least 100 books at home (which is the case for about 29% of respondents).

The third group of variables denotes parent characteristics as reported by the school principal. Specifically, the information addresses whether the majority of parents at a given school (i) have high expectations for their children's scholastic achievement (this happens for 38% of the students) and (ii) volunteer for extracurricular activities (this happens for 32% of the students).

The fourth group of variables denotes school characteristics, such as (i) the ratio of students to teachers (on average, it is about 0.18); (ii) the proportion of math teachers as a share of the total number of teachers (about 0.15 on average); (iii) an index of the adequacy of school educational materials, constructed using information on science laboratory equipment, instructional materials, computers for instruction, Internet connectivity, computer software for instruction, and library materials; (iv) an index of school autonomy, constructed using information on the school responsibility for the curriculum and student assessment; (v) whether the school has three or more extracurricular activities (true for the schools of 55% of students), such as a mathematics club, a mathematics competition, a club with a focus on computers/information, communication technology, and additional mathematics lessons; (vi) whether the school has three or more extracurricular activities, such as school orchestra or choirs and school stage plays or musicals.

The fifth, and final, group of variables is related to the following teacher characteristics: (i) an index of teacher morale, constructed using school principals' reports about whether teachers work with enthusiasm, whether they take pride in the school, and whether they value academic achievement; (ii) an index of class control by the mathematics teacher, constructed using students' answers on whether students in the class listen, make noise, start working early, or come late to class; and (iii) an index of cognitive activation of students by the math teacher, again constructed using students' answers to questions about whether the teacher encourages them to reflect on problems, gives them problems with multiple solutions, allows them to use their own procedures, and helps them learn from their mistakes.

One would expect variables in each of the five groups to be correlated with each other (e.g., the different measures of socioeconomic status) capturing part of the same concepts. To investigate this, we present in Table 2 the cross-correlations of all variables. We note that, indeed, the socioeconomic status variables are positively correlated with each other, but not strongly. For example, the highest correlation is between of having many books at home and years of parent education; at 0.33, which is not a particularly large value. We also note that speaking Spanish at home and living in a rural area are both moderately negatively associated with socioeconomic status variables, as well as with variables denoting parent school involvement and with high quality of instruction at school.

Variables denoting school characteristics are also positively correlated with each other and, for the case of the index of adequacy of school materials, moderately positively associated with indicators of socioeconomic status. This suggests that students with high socioeconomic background are more likely to have access to schools with adequate resources. High parental expectations for children's scholastic achievement are correlated positively with high socioeconomic status and with variables denoting good schools and superior teacher performance.

6. Univariate analysis

After examining the interrelationships of variables that help us account for financial literacy, we investigate how financial literacy outcomes are related to each variable in isolation. We look at three different outcomes: the financial literacy score, the probability of scoring in Levels 4 or 5, and the probability of scoring in Level 1. We examine how these outcome variables change for two different levels of each explanatory variable. For binary indicators (e.g., being female, living in a rural area, attending a school with a high level of extracurricular math activities), these two levels are denoted by “No” or “Yes” answers to the relevant question. For continuous variables (e.g., the various indices constructed by the OECD or the proportion of math teachers), the two levels are computed to indicate whether they are below or above the median value of the variable. We thus calculate the average score and the average prevalence of the respondent being in Levels 4 or 5 and in Level 1 for each of the two levels of each characteristic’s variable, show the difference between them, and compute statistics (the p-value) to check its statistical significance.

Table 3 shows the results of our analysis. It is clear that the score changes considerably and in a statistically significant manner with all socioeconomic status variables, both parental variables, all teacher variables, and all school variables (with the exception of the student to teacher ratio and the proportion of math teachers). With regard to demographic variables, speaking Spanish at home is associated with a lower mean score, while the remaining demographic variables show no statistically significant association with the score.

The same results apply for the probability of being in Levels 4 or 5. For the probability of being in Level 1, we do not obtain significant results for the variables denoting a high level of extracurricular math and creative activities. However, the remaining results are very similar to those for the score and the probability of being in Levels 4 or 5.

All in all, results from the univariate analysis suggest a very strong association between performance in the financial literacy assessment and variables such as socioeconomic status, indices of parental school involvement and parents’ high expectations for their children’s scholastic achievement, as well as variables denoting good functioning of the school and indices of teacher competence.

7. Multivariate analysis

The next step is to use multivariate analysis to investigate the association of financial literacy with the five groups of variables described previously. This analysis allows us to examine the effect of each variable on financial literacy, while including all other variables in the analysis and holding their level constant. In contrast to univariate analysis, our results show the effect of each variable on financial literacy over and above the effect of all the other variables included in the specification.

To perform our multivariate analysis we use an ordinary least squares (OLS) regression specification. The model we estimate is as follows:

$$Y_i = \beta_0 + Dem_i' \beta_1 + SES_i' \beta_2 + Par_i' \beta_3 + School_i' \beta_4 + Teach_i' \beta_5 + \epsilon_i$$

where Y_i denotes three different measures of proficiency in financial literacy of student i , namely the score on the assessment, whether the student scores at Level 4 or 5 (the top levels, indicating high competence in financial literacy), or whether the student scores at Level 1 (which is the level indicating insufficient financial knowledge). Dem_i' denotes a vector of demographic characteristics, SES_i' a vector of socioeconomic characteristics, Par_i' a vector of parent characteristics, $School_i'$ a vector of school characteristics, and $Teach_i'$ a vector of teacher characteristics. All variables denoting indices constructed by the OECD are represented by indicators on whether the student is at the second or third tercile of the values of the index (the base category is the first tercile), so as to be able to interpret the estimates.⁷

The original US sample has 1,133 students. However, as shown in Table 1, some of the variables have missing values. For most of the variables, this problem is not very serious, but there are two exceptions: the indices for class control and for cognitive activation by the math teacher, which have more than 400 missing values each. Because of this, each regression will be performed first excluding and then including those two variables, and the corresponding estimation samples will contain 878 and 568 observations, respectively.

When we examine the complements of these two regression samples, i.e., the samples in which at least one of the regression variables has a missing value, we note that these complements have typically lower average values of family socioeconomic status and of quality of school education materials, and a higher prevalence of students from Spanish-speaking households. Therefore, our samples are likely positively selected on student socioeconomic status, which implies that results should be interpreted with some caution. On the other hand, the larger sample of 878 observations is a sizeable part of the total sample (about 77%), which alleviates to some extent the concerns about sample representativeness.

Our estimation strategy is as follows: First, we include in our empirical specification only the demographic characteristics, and then we progressively add socioeconomic, parent, school, and teacher characteristics. In this way, we can assess whether and how much the characteristics of the students matter and, moreover, which set of variables is most important in explaining differences in financial literacy.

⁷ The one exception is the variable denoting school autonomy, whose distribution does not allow the computation of terciles. We include it in continuous form.

The results for the financial literacy score are shown in Tables 4 and 5 for the large and small samples, respectively. We note that when demographic variables enter alone, age and gender do not matter, but speaking Spanish at home and living in a rural area are negatively associated with financial literacy. On the other hand, when adding family socioeconomic status variables, the effects of these two variables (speaking Spanish at home and living in a rural area) are no longer significant, a result that suggests that their content mostly reflects socioeconomic status. Among the variables denoting the latter, we note that high parent occupation, family wealth, having a computer at home, having cultural possessions, and, especially, having many books at home are very strongly positively associated with the financial literacy score. These effects are also present in the smaller sample (when accounting for more variables), with the exception of family wealth and having a computer. Overall, these results speak to the advantages that a higher family background gives to the student when it comes to his/her financial literacy performance.

When adding the variables denoting high parent expectations for student scholastic achievement and involvement with extracurricular activities, we note that they both are positively associated with financial literacy, although only at a 10% level of statistical significance. In the smaller sample, only parent volunteering is statistically significant.

We then include school-level variables (including teacher morale) in the specification. When we do this, the parental variables have smaller, and no longer statistically significant, coefficients. However, socioeconomic status variables continue to be important. Among school variables, a high proportion of math teachers and quality educational materials are strongly positively associated with the financial literacy score. On the other hand, there is no such association for the variables denoting school autonomy, extracurricular mathematics and creative activities, and teacher morale. These results hold in the smaller estimation sample as well.

Finally, we add the two teacher-related variables that have many missing values, namely those denoting the math teacher's control of the class and level of cognitive activation. We show these results in a fifth specification in Table 5. Both these variables are strongly statistically significant, denoting the importance of teacher quality for student performance on the financial literacy test.

Tables 6 and 7 show the results for the probability of respondents being in Levels 4 or 5, again progressively adding groups of variables as was the case with the financial literacy score. Broadly speaking, we obtain results similar to those for the score: Demographic characteristics do not matter after the inclusion of socioeconomic status variables, while among variables denoting the latter we note that high parent occupation, family wealth, and having lots of books at home are strongly positively associated with being at the two top score levels. This is also true for high values of the proportion of math teachers and of the quality of school educational materials. In the smaller sample, the math teacher's control of the class is positively associated with the probability of being at the top two levels, although at a 10% level of statistical significance.

Finally, we examine the probability of scoring at the lowest level (Level 1). Those results are shown in Tables 8 and 9. Here we have fewer statistically significant results, suggesting that a very low score is influenced by idiosyncratic factors that are not easily captured by observable characteristics. However, it is still the case that higher-level parent occupation and having a lot of books at home are significantly negatively associated with scoring at the lowest level; the same is true for a high value for the quality of school educational materials. In the smaller sample, only the last of these three variables remains important in the richest specification, to which one has to add the variable denoting cognitive activation by the math teacher. Once again, it seems that teacher quality is an important factor for strong performance on the financial literacy assessment.

8. Conclusions

Young people in the US have to assume increasingly great financial responsibilities at critical points in their lives, including when they are still on the cusp of adulthood. These responsibilities include making decisions about how to finance their education; whether and how to borrow to buy a home, a car, and other items; what kind of retirement plan to choose—and contribution levels to the selected plan. A high level of financial literacy is likely to improve decision making in all of these contexts.

The results of the 2012 PISA Financial Literacy Assessment show that many young Americans' financial literacy levels are not adequate for the financial challenges they are likely to face throughout their lifetimes, including management of their retirement accounts. A particularly worrying finding of our report is that financial literacy depends heavily on students' socioeconomic background. This implies that young people from less privileged backgrounds are less likely to be financially literate and, thus, less likely to do better financially than their parents. In other words, the intergenerational transmission of inequality, via education, in the US is still a problem.

Students' financial literacy performance is also strongly affected by school and teacher quality. We find that students who attend schools with adequate educational materials or who have teachers that can control the classroom and know how to actively engage the class perform much better than their peers. These are all factors that can be influenced by policy decisions. To improve the financial literacy of students in the US, policies need to be implemented to ensure that schools hire competent teachers and adequately train them so they have the skills and materials they need to succeed in the classroom. Moreover, developing coherent standards and instructional frameworks for all students, and then providing schools with the adequate resources to implement such standards will further help improve the overall level of financial literacy in the US. These investments promise to pay powerful future dividends, as adequate financial literacy is likely to generate very large positive economic results for many decades into each student's life.

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Tables and Figures

Table 1. Descriptive statistics

Variable	Mean	Median	Minimum	Maximum	Number of observations
Age	15.83	15.83	15.33	16.33	1,133
Female	0.51	1.00	0.00	1.00	1,133
Language at home is Spanish	0.11	0.00	0.00	1.00	1,099
Lives in a rural area	0.25	0.00	0.00	1.00	1,112
Index of parental occupation	54.12	58.07	11.01	88.70	1,079
Index of wealth	0.51	0.57	-4.09	3.02	1,125
Years of parental education (maximum over the two parents)	13.65	14.00	3.00	16.00	1,107
Has a computer at home	0.89	1.00	0.00	1.00	1,110
Index of cultural possessions	-0.13	-0.48	-1.51	1.27	1,116
Has at least 100 books at home	0.29	0.00	0.00	1.00	1,104
Majority of parents at school have a high expectation of scholastic achievement	0.38	0.00	0.00	1.00	1,065
Majority of parents at school volunteer at extra-curricular activities	0.32	0.00	0.00	1.00	1,034
Student to teacher ratio at school	17.53	16.40	3.25	117.76	1,067
Proportion of math teachers	0.15	0.14	0.07	1.00	1,073
Index of adequacy of school materials	0.40	0.22	-1.96	1.98	1,095
Index of school autonomy	0.39	0.32	-2.87	1.60	1,112
Intensive extracurricular math activities at school	0.55	1.00	0.00	1.00	1,103
Intensive extracurricular creative activities at school	0.72	1.00	0.00	1.00	1,112
Index of teacher morale	-0.01	0.08	-3.98	1.45	1,084
Index of class control by the math teacher	0.08	-0.08	-2.48	1.85	742
Index of cognitive activation in mathematics class	0.30	0.45	-3.07	3.46	717

Note: The table presents descriptive statistics, as well as the number of non-missing observations for the variables used as regressors in the multivariate analysis.

Table 1. Cross-correlation matrix

Variable	Age	Female	Language at home is Spanish	Lives in a rural area	Index of parental occupation	Index of wealth	Years of parental education (maximum over the two parents)	Has a computer at home	Index of cultural possessions	Has at least 100 books at home	Majority of parents at school have a high expectation of scholastic achievement	Majority of parents at school volunteer at extra-curricular activities	Student to teacher ratio at school	Proportion of math teachers	Index of adequacy of school materials	Index of school autonomy	Intensive extracurricular math activities at school	Intensive extracurricular creative activities at school	Index of teacher morale	Index of class control by the math teacher	Index of cognitive activation in mathematics class	Financial literacy score	Is in level 4 or 5 of the fin. literacy score
Female	0.00																						
Language at home is Spanish	0.02	0.03																					
Lives in a rural area	-0.04	-0.02	-0.14																				
Index of parental occupation	-0.04	0.03	-0.30	-0.11																			
Index of wealth	-0.01	-0.08	-0.14	-0.03	0.32																		
Years of parental education (maximum over the two parents)	-0.06	-0.09	-0.24	-0.04	0.52	0.31																	
Has a computer at home	0.05	-0.02	-0.06	0.02	0.13	0.42	0.22																
Index of cultural possessions	-0.04	0.07	-0.06	-0.04	0.23	0.25	0.30	0.16															
Has at least 100 books at home	-0.06	0.09	-0.16	-0.12	0.32	0.22	0.33	0.10	0.32														
Majority of parents at school have a high expectation of scholastic achievement	-0.02	0.00	0.04	-0.18	0.22	0.13	0.19	0.04	0.21	0.16													
Majority of parents at school volunteer at extra-curricular activities	-0.04	-0.04	0.05	-0.11	0.05	0.07	0.07	0.02	0.12	-0.02	0.31												
Student to teacher ratio at school	-0.07	-0.04	0.00	-0.06	0.02	0.02	0.06	-0.01	0.09	-0.06	0.04	0.06											
Proportion of math teachers	-0.05	0.00	0.02	-0.02	0.02	-0.02	0.07	-0.03	0.07	-0.02	0.11	0.08	0.80										
Index of adequacy of school materials	0.01	0.03	-0.08	-0.11	0.17	0.01	0.14	0.03	0.02	0.05	0.19	0.25	-0.03	-0.02									
Index of school autonomy	0.00	0.03	-0.12	-0.01	0.09	0.00	0.10	-0.03	-0.02	0.10	0.10	0.00	-0.03	0.04	0.18								
Intensive extracurricular math activities at school	-0.06	0.00	0.06	-0.29	0.11	0.11	0.03	-0.02	0.02	0.14	0.21	0.07	0.01	0.07	0.11	0.19							
Intensive extracurricular creative activities at school	-0.08	-0.05	0.03	-0.27	0.13	0.05	0.11	0.04	0.08	0.15	0.04	0.13	-0.05	-0.06	0.20	0.26	0.34						
Index of teacher morale	-0.02	-0.03	0.01	0.07	0.15	0.16	0.10	0.12	0.10	-0.01	0.34	0.14	0.23	0.17	0.20	0.13	0.25	0.04					
Index of class control by the math teacher	-0.06	0.06	-0.06	-0.17	0.10	0.16	0.11	0.12	0.12	0.09	0.18	0.13	0.04	0.01	0.17	-0.05	0.07	0.05	0.15				
Index of cognitive activation in mathematics class	0.03	0.07	0.01	-0.14	0.10	0.08	0.08	0.06	0.10	0.08	0.06	0.05	-0.01	0.00	0.09	0.03	0.06	0.08	0.05	0.19			
Financial literacy score	0.05	0.01	-0.12	-0.14	0.29	0.21	0.23	0.16	0.26	0.30	0.22	0.17	0.02	0.07	0.26	0.08	0.10	0.15	0.17	0.27	0.25		
Is in level 4 or 5 of the fin. literacy score	-0.04	-0.04	-0.13	-0.11	0.21	0.16	0.17	0.12	0.21	0.26	0.14	0.12	0.01	0.08	0.24	0.09	0.07	0.16	0.11	0.21	0.17	0.78	
Is in level 1 of the fin. literacy score	-0.08	-0.08	0.08	0.08	-0.18	-0.12	-0.13	-0.14	-0.12	-0.13	-0.12	-0.08	-0.02	-0.03	-0.16	-0.03	-0.05	-0.01	-0.14	-0.17	-0.23	-0.60	-0.25

Note: The table presents the cross-correlations of the variables to be used as regressors in the multivariate analysis.

Table 2. Univariate analysis results

Variable	Mean fin. literacy score,	Mean fin. literacy score,	Difference	p value of the difference	Prevalence of being at level 4 or 5,	Prevalence of being at level 4 or 5,	Difference	p value of the difference	Prevalence of being at level 1,	Prevalence of being at level 1,	Difference	p value of the difference
	Answer: No	Answer: Yes			Answer: No	Answer: Yes			Answer: No	Answer: Yes		
Age - is above the median	490.793	492.613	1.820	0.798	0.297	0.277	-0.019	0.557	0.191	0.163	-0.028	0.278
Female	492.126	491.102	-1.024	0.890	0.306	0.271	-0.035	0.402	0.190	0.168	-0.022	0.370
Language at home is Spanish	499.793	448.606	-51.186	0.000	0.315	0.128	-0.186	0.000	0.149	0.319	0.169	0.004
Lives in a rural area	495.599	482.197	-13.402	0.181	0.308	0.236	-0.072	0.154	0.180	0.168	-0.012	0.781
Index of parental occupation - is above the median	471.880	510.187	38.308	0.000	0.213	0.359	0.145	0.000	0.225	0.135	-0.090	0.000
Years of parental education - is above the median	473.469	514.338	40.869	0.000	0.213	0.383	0.170	0.000	0.208	0.141	-0.066	0.013
Index of wealth - is above the median	467.405	527.442	60.038	0.000	0.203	0.414	0.212	0.000	0.237	0.092	-0.145	0.000
Has a computer at home	426.647	501.074	74.427	0.000	0.089	0.316	0.227	0.000	0.370	0.150	-0.220	0.000
Index of cultural possessions - is above the median	473.434	513.865	40.430	0.000	0.227	0.363	0.137	0.000	0.215	0.134	-0.081	0.002
There are at least 100 books at home	472.842	541.608	68.766	0.000	0.206	0.497	0.291	0.000	0.210	0.082	-0.128	0.000
Majority of parents has high expectations for children's scholastic achievement	476.183	524.637	48.453	0.000	0.233	0.402	0.170	0.000	0.210	0.098	-0.113	0.000
Majority of parents volunteers at school	483.687	512.306	28.620	0.001	0.255	0.361	0.106	0.010	0.193	0.119	-0.074	0.016
Student-teacher ratio at school - is above the median	484.815	497.772	12.957	0.210	0.270	0.305	0.035	0.457	0.192	0.166	-0.025	0.451
Proportion of math teachers - is above the median	491.284	491.895	0.611	0.949	0.299	0.278	-0.021	0.600	0.192	0.166	-0.027	0.434
Index of adequacy of school educational materials - is above the median	473.832	511.324	37.492	0.001	0.222	0.362	0.140	0.002	0.225	0.126	-0.099	0.007
School autonomy is high	478.441	502.994	24.553	0.024	0.237	0.331	0.094	0.055	0.210	0.151	-0.059	0.097
High level of extracurricular math activities at school	470.394	500.785	30.391	0.009	0.183	0.332	0.149	0.001	0.214	0.163	-0.051	0.256
High level of extracurricular creative activities at school	479.105	503.049	23.944	0.019	0.232	0.337	0.105	0.014	0.205	0.155	-0.050	0.176
Index of teacher morale - is above the median	474.849	510.817	35.968	0.001	0.227	0.358	0.131	0.004	0.225	0.125	-0.100	0.004
Index of class control by the math teacher - is above the median	471.259	502.330	31.070	0.000	0.210	0.329	0.119	0.000	0.235	0.149	-0.086	0.012
Index of cognitive activation in mathematics class (anchored) - is above the median	471.008	501.820	30.812	0.000	0.212	0.326	0.114	0.002	0.241	0.147	-0.093	0.006

Note: The table presents shows the financial literacy score, as well as the prevalence of being Levels 4 or 5 and in Level 1 by levels of variables denoting various characteristics.

Table 4. Estimation results – financial literacy score

Variable	Demographic Variables				Demographic + Socio-Economic Status Variables				Demographic + Socio-Economic Status + Parental Variables				Demographic + Socio-Economic Status + Parental + School Variables			
	Coefficient	Std. Error	t statistic	p value	Coefficient	Std. Error	t statistic	p value	Coefficient	Std. Error	t statistic	p value	Coefficient	Std. Error	t statistic	p value
Age	11.526	14.082	0.819	0.413	12.751	13.850	0.921	0.357	14.070	13.637	1.032	0.302	12.214	13.774	0.887	0.375
Female	-1.707	8.172	-0.209	0.835	-6.350	7.686	-0.826	0.409	-6.328	7.614	-0.831	0.406	-6.741	7.060	-0.955	0.340
Language at home is Spanish	-48.847	12.816	-3.812	0.000	-17.109	11.674	-1.466	0.143	-19.475	11.344	-1.717	0.086	-16.250	11.307	-1.437	0.151
Lives in a rural area	-21.598	10.953	-1.972	0.049	-12.099	9.823	-1.232	0.218	-8.965	9.603	-0.933	0.351	-9.275	9.399	-0.987	0.324
Index of parental occupation - 2 nd tertile					18.353	8.409	2.183	0.029	16.019	8.438	1.899	0.058	12.952	8.043	1.610	0.107
Index of parental occupation - 3 ^d tertile					43.852	9.190	4.772	0.000	39.943	9.566	4.176	0.000	38.419	9.585	4.008	0.000
Index of family wealth - 2 nd tertile					20.933	8.306	2.520	0.012	20.666	8.242	2.507	0.012	22.772	8.175	2.785	0.005
Index of family wealth - 3 ^d tertile					28.083	9.018	3.114	0.002	25.613	9.053	2.829	0.005	28.268	9.047	3.125	0.002
Years of parental education					-1.213	1.717	-0.706	0.480	-1.598	1.704	-0.938	0.348	-2.191	1.607	-1.363	0.173
Has a computer at home					31.533	14.360	2.196	0.028	31.750	14.030	2.263	0.024	30.569	13.601	2.248	0.025
Index of family cultural possessions - 2 nd tertile					6.245	9.342	0.669	0.504	5.778	9.435	0.612	0.540	7.759	8.825	0.879	0.379
Index of family cultural possessions - 3 ^d tertile					23.225	9.090	2.555	0.011	18.707	9.085	2.059	0.039	17.497	8.996	1.945	0.052
There are at least 100 books at home					39.400	8.872	4.441	0.000	40.445	8.453	4.785	0.000	39.128	8.493	4.607	0.000
Majority of parents has high expectations for children's scholastic achievement									16.993	8.692	1.955	0.051	12.973	8.248	1.573	0.116
Majority of parents volunteers at school									15.399	8.605	1.790	0.074	5.766	8.662	0.666	0.506
Student-teacher ratio at school													-1.118	0.697	-1.604	0.109
Proportion of math teachers													193.975	82.866	2.341	0.019
Index of adequacy of school educational materials - 2 nd tertile													20.310	10.598	1.916	0.055
Index of adequacy of school educational materials - 3 ^d tertile													34.119	9.291	3.672	0.000
Index of school autonomy													0.699	4.298	0.163	0.871
High level of extracurricular math activities at school													-5.413	10.210	-0.530	0.596
High level of extracurricular creative activities at school													11.651	11.006	1.059	0.290
Index or teacher morale - 2 nd tertile													1.055	9.461	0.112	0.911
Index or teacher morale - 3 ^d tertile													10.259	15.475	0.663	0.507
Constant	330.020	221.090	1.493	0.136	239.365	212.788	1.125	0.261	215.303	209.703	1.027	0.305	223.672	216.734	1.032	0.302
Adjusted R ²	0.024				0.196				0.210				0.239			
Number of observations	878				878				878				878			

Note: The table presents result from an OLS regression of the raw financial literacy score on various student, school, and teacher characteristics.

Table 5. Estimation results using a reduced sample – financial literacy score

Variable	Demographic Variables				Demographic + Socio-Economic Status Variables				Demographic + Socio-Economic Status + Parental Variables				Demographic + Socio-Economic Status + Parental + School Variables				Demographic + Socio-Economic Status + Parental + School + Teacher Variables			
	Coefficient	Std. Error	t statistic	p value	Coefficient	Std. Error	t statistic	p value	Coefficient	Std. Error	t statistic	p value	Coefficient	Std. Error	t statistic	p value	Coefficient	Std. Error	t statistic	p value
Age	11.610	12.835	0.905	0.366	13.678	12.686	1.078	0.281	15.845	12.286	1.290	0.197	14.336	13.039	1.099	0.272	21.644	13.652	1.585	0.113
Female	0.871	9.051	0.096	0.923	-1.342	8.742	-0.153	0.878	-0.872	8.891	-0.098	0.922	-1.793	8.027	-0.223	0.823	-3.649	7.496	-0.487	0.626
Language at home is Spanish	-42.342	13.757	-3.078	0.002	-16.111	14.133	-1.140	0.254	-20.260	13.664	-1.483	0.138	-18.377	13.813	-1.330	0.183	-16.481	14.066	-1.172	0.241
Lives in a rural area	-30.620	10.864	-2.818	0.005	-17.738	10.235	-1.733	0.083	-13.390	10.352	-1.293	0.196	-13.816	11.147	-1.239	0.215	-6.063	10.804	-0.561	0.575
Index of parental occupation - 2 nd tertile					0.206	10.988	0.019	0.985	-2.180	10.811	-0.202	0.840	-6.290	10.575	-0.595	0.552	-4.075	10.040	-0.406	0.685
Index of parental occupation - 3 ^d tertile					39.640	11.398	3.478	0.001	36.378	11.288	3.223	0.001	32.050	11.554	2.774	0.006	31.274	11.239	2.783	0.005
Index of family wealth - 2 nd tertile					10.965	9.686	1.132	0.258	10.366	9.358	1.108	0.268	14.927	9.337	1.599	0.110	12.166	9.179	1.325	0.185
Index of family wealth - 3 ^d tertile					16.494	10.421	1.583	0.113	13.450	10.229	1.315	0.189	18.795	10.129	1.856	0.064	15.962	9.970	1.601	0.109
Years of parental education					0.742	2.026	0.366	0.714	0.307	1.943	0.158	0.875	-0.493	1.835	-0.269	0.788	-0.502	1.740	-0.289	0.773
Has a computer at home					17.582	13.359	1.316	0.188	18.823	13.192	1.427	0.154	16.664	13.343	1.249	0.212	10.993	13.346	0.824	0.410
Index of family cultural possessions - 2 nd tertile					13.659	9.798	1.394	0.163	12.952	10.164	1.274	0.203	14.752	9.376	1.573	0.116	13.372	9.728	1.375	0.169
Index of family cultural possessions - 3 ^d tertile					25.876	9.381	2.758	0.006	20.876	9.530	2.191	0.028	21.010	9.267	2.267	0.023	18.683	8.919	2.095	0.036
There are at least 100 books at home					28.139	8.747	3.217	0.001	30.082	8.359	3.599	0.000	30.958	8.475	3.653	0.000	28.341	8.312	3.410	0.001
Majority of parents has high expectations for children's scholastic achievement									13.336	8.414	1.585	0.113	7.758	8.609	0.901	0.367	5.876	8.152	0.721	0.471
Majority of parents volunteers at school									23.444	9.089	2.580	0.010	13.824	9.012	1.534	0.125	11.840	8.858	1.337	0.181
Student-teacher ratio at school													-1.125	0.688	-1.635	0.102	-0.977	0.699	-1.397	0.162
Proportion of math teachers													185.766	81.164	2.289	0.022	173.232	82.163	2.108	0.035
Index of adequacy of school educational materials - 2 nd tertile													20.327	12.125	1.676	0.094	16.880	11.297	1.494	0.135
Index of adequacy of school educational materials - 3 ^d tertile													40.499	12.291	3.295	0.001	35.868	12.351	2.904	0.004
Index of school autonomy													-0.794	5.463	-0.145	0.884	0.853	5.458	0.156	0.876
High level of extracurricular math activities at school													-3.405	10.777	-0.316	0.752	-1.403	10.384	-0.135	0.893
High level of extracurricular creative activities at school													6.180	12.288	0.503	0.615	7.166	11.661	0.615	0.539
Index of teacher morale - 2 nd tertile																	5.132	9.599	0.535	0.593
Index of teacher morale - 3 ^d tertile																	3.857	18.755	0.206	0.837
Index of class control by the teacher - 2 nd tertile																	11.110	9.266	1.199	0.231
Index of class control by the teacher - 3 ^d tertile																	25.120	10.132	2.479	0.013
Index of cognitive activation in mathematics lessons (anchored) - 2 nd tertile																	18.631	8.682	2.146	0.032
Index of cognitive activation in mathematics lessons (anchored) - 3 ^d tertile																	31.057	8.849	3.510	0.000
Constant	329.938	202.501	1.629	0.103	226.298	195.689	1.156	0.248	187.307	190.816	0.982	0.326	195.858	205.310	0.954	0.340	60.501	220.296	0.275	0.784
Adjusted R ²	0.030				0.169				0.190				0.221				0.251			
Number of observations	568				568				568				568				568			

Note: The table presents result from an OLS regression of the raw financial literacy score on various student, school, and teacher characteristics, after including variables denoting the math teacher's control of the class and the cognitive activation of his/her students.

Table 6. Estimation results – probability of being in levels 4 or 5

Variable	Demographic Variables				Demographic + Socio-Economic Status Variables				Demographic + Socio-Economic Status + Parental Variables				Demographic + Socio-Economic Status + Parental + School Variables			
	Coefficient	Std. Error	t statistic	p value	Coefficient	Std. Error	t statistic	p value	Coefficient	Std. Error	t statistic	p value	Coefficient	Std. Error	t statistic	p value
Age	-0.017	0.063	-0.271	0.786	-0.010	0.063	-0.155	0.877	-0.005	0.063	-0.078	0.938	-0.008	0.063	-0.128	0.898
Female	-0.045	0.048	-0.939	0.348	-0.061	0.047	-1.301	0.193	-0.061	0.047	-1.308	0.191	-0.063	0.045	-1.396	0.163
Language at home is Spanish	-0.180	0.065	-2.758	0.006	-0.058	0.066	-0.872	0.383	-0.065	0.065	-1.005	0.315	-0.057	0.066	-0.872	0.383
Lives in a rural area	-0.103	0.056	-1.827	0.068	-0.066	0.053	-1.242	0.214	-0.055	0.053	-1.030	0.303	-0.039	0.047	-0.827	0.408
Index of parental occupation - 2 nd tercile					0.032	0.039	0.816	0.414	0.024	0.040	0.594	0.552	0.012	0.039	0.314	0.754
Index of parental occupation - 3 ^d tercile					0.139	0.049	2.829	0.005	0.125	0.051	2.457	0.014	0.118	0.051	2.338	0.019
Index of family wealth - 2 nd tercile					0.093	0.044	2.120	0.034	0.093	0.045	2.072	0.038	0.102	0.044	2.299	0.022
Index of family wealth - 3 ^d tercile					0.125	0.054	2.320	0.020	0.116	0.054	2.131	0.033	0.121	0.054	2.230	0.026
Years of parental education					-0.002	0.007	-0.253	0.800	-0.003	0.007	-0.422	0.673	-0.006	0.007	-0.857	0.391
Has a computer at home					0.089	0.061	1.454	0.146	0.088	0.061	1.444	0.149	0.083	0.062	1.342	0.179
Index of family cultural possessions - 2 nd tercile					-0.009	0.050	-0.178	0.859	-0.009	0.052	-0.178	0.859	-0.003	0.050	-0.051	0.959
Index of family cultural possessions - 3 ^d tercile					0.061	0.047	1.304	0.192	0.045	0.048	0.935	0.350	0.041	0.047	0.873	0.383
There are at least 100 books at home					0.201	0.044	4.605	0.000	0.207	0.042	4.928	0.000	0.199	0.043	4.683	0.000
Majority of parents has high expectations for children's scholastic achievement									0.047	0.045	1.041	0.298	0.031	0.045	0.700	0.484
Majority of parents volunteers at school									0.070	0.043	1.634	0.102	0.026	0.044	0.587	0.557
Student-teacher ratio at school													-0.005	0.003	-1.438	0.150
Proportion of math teachers													0.972	0.366	2.657	0.008
Index of adequacy of school educational materials - 2 nd tercile													0.056	0.052	1.089	0.276
Index of adequacy of school educational materials - 3 ^d tercile													0.138	0.048	2.851	0.004
Index of school autonomy													-0.002	0.020	-0.081	0.935
High level of extracurricular math activities at school													-0.018	0.041	-0.432	0.666
High level of extracurricular creative activities at school													0.094	0.049	1.922	0.055
Index of teacher morale - 2 nd tercile													0.017	0.047	0.371	0.711
Index of teacher morale - 3 ^d tercile													0.025	0.075	0.341	0.733
Constant	0.647	0.991	0.653	0.514	0.261	0.986	0.265	0.791	0.170	0.984	0.173	0.863	0.094	0.999	0.094	0.925
Adjusted R ²	0.018				0.131				0.138				0.164			
Number of observations	878				878				878				878			

Note: The table presents result from an OLS regression of the probability of being in Levels 4 or 5 of the raw financial literacy score on various student, school, and teacher characteristics.

Table 7. Estimation results using a reduced sample – probability of being in levels 4 or 5

Variable	Demographic Variables				Demographic + Socio-Economic Status Variables				Demographic + Socio-Economic Status + Parental Variables				Demographic + Socio-Economic Status + Parental + School Variables				Demographic + Socio-Economic Status + Parental + School + Teacher Variables			
	Coefficient	Std. Error	t statistic	p value	Coefficient	Std. Error	t statistic	p value	Coefficient	Std. Error	t statistic	p value	Coefficient	Std. Error	t statistic	p value	Coefficient	Std. Error	t statistic	p value
Age	-0.028	0.068	-0.411	0.681	-0.016	0.070	-0.224	0.822	-0.007	0.070	-0.099	0.921	-0.012	0.070	-0.171	0.865	0.008	0.072	0.106	0.916
Female	-0.018	0.063	-0.280	0.780	-0.030	0.062	-0.481	0.630	-0.028	0.063	-0.443	0.658	-0.033	0.060	-0.549	0.583	-0.039	0.059	-0.673	0.501
Language at home is Spanish	-0.189	0.080	-2.360	0.018	-0.079	0.086	-0.915	0.360	-0.091	0.084	-1.078	0.281	-0.086	0.083	-1.032	0.302	-0.080	0.083	-0.967	0.334
Lives in a rural area	-0.132	0.056	-2.376	0.017	-0.077	0.054	-1.445	0.149	-0.063	0.054	-1.166	0.244	-0.058	0.051	-1.148	0.251	-0.037	0.052	-0.713	0.476
Index of parental occupation - 2 nd tertile					-0.020	0.052	-0.375	0.707	-0.027	0.052	-0.516	0.606	-0.046	0.052	-0.888	0.374	-0.040	0.053	-0.761	0.446
Index of parental occupation - 3 ^d tertile					0.139	0.059	2.365	0.018	0.131	0.059	2.235	0.025	0.113	0.060	1.887	0.059	0.110	0.060	1.828	0.068
Index of family wealth - 2 nd tertile					0.085	0.057	1.485	0.138	0.083	0.057	1.474	0.140	0.116	0.056	2.071	0.038	0.109	0.056	1.936	0.053
Index of family wealth - 3 ^d tertile					0.097	0.062	1.562	0.118	0.086	0.062	1.380	0.168	0.118	0.061	1.951	0.051	0.111	0.061	1.799	0.072
Years of parental education					0.000	0.009	0.032	0.975	-0.001	0.009	-0.118	0.906	-0.006	0.009	-0.690	0.491	-0.006	0.008	-0.703	0.482
Has a computer at home					0.074	0.071	1.046	0.296	0.078	0.070	1.112	0.266	0.067	0.072	0.938	0.348	0.050	0.071	0.703	0.482
Index of family cultural possessions - 2 nd tertile					0.047	0.062	0.755	0.450	0.046	0.063	0.730	0.465	0.053	0.060	0.882	0.378	0.050	0.059	0.849	0.396
Index of family cultural possessions - 3 ^d tertile					0.092	0.054	1.706	0.088	0.075	0.057	1.321	0.186	0.074	0.053	1.395	0.163	0.070	0.052	1.330	0.183
There are at least 100 books at home					0.165	0.050	3.296	0.001	0.175	0.048	3.644	0.000	0.173	0.050	3.455	0.001	0.165	0.050	3.328	0.001
Majority of parents has high expectations for children's scholastic achievement									0.022	0.050	0.438	0.661	0.000	0.049	-0.007	0.994	-0.007	0.048	-0.141	0.888
Majority of parents volunteers at school									0.105	0.051	2.036	0.042	0.053	0.050	1.052	0.293	0.047	0.050	0.936	0.349
Student-teacher ratio at school													-0.008	0.003	-2.342	0.019	-0.007	0.003	-2.171	0.030
Proportion of math teachers													1.288	0.384	3.350	0.001	1.257	0.393	3.198	0.001
Index of adequacy of school educational materials - 2 nd tertile													0.081	0.055	1.479	0.139	0.072	0.053	1.344	0.179
Index of adequacy of school educational materials - 3 ^d tertile													0.194	0.065	2.968	0.003	0.180	0.067	2.699	0.007
Index of school autonomy													-0.009	0.025	-0.353	0.724	-0.004	0.026	-0.162	0.871
High level of extracurricular math activities at school													-0.026	0.050	-0.519	0.603	-0.020	0.049	-0.409	0.683
High level of extracurricular creative activities at school													0.060	0.054	1.096	0.273	0.062	0.053	1.157	0.247
Index of teacher morale - 2 nd tertile																	0.030	0.053	0.570	0.568
Index of teacher morale - 3 ^d tertile																	0.002	0.092	0.017	0.986
Index of class control by the math teacher - 2 nd tertile																	0.036	0.054	0.669	0.503
Index of class control by the math teacher - 3 ^d tertile																	0.084	0.048	1.744	0.081
Index of cognitive activation in mathematics class (anchored) - 2 nd tertile																	0.047	0.048	0.974	0.330
Index of cognitive activation in mathematics class (anchored) - 3 ^d tertile																	0.071	0.053	1.347	0.178
Constant	0.812	1.086	0.748	0.455	0.344	1.116	0.308	0.758	0.186	1.116	0.166	0.868	0.178	1.133	0.157	0.875	-0.183	1.177	-0.156	0.876
Adjusted R ²	0.022				0.125				0.135				0.174				0.179			
Number of observations	568				568				568				568				568			

Note: The table presents result from an OLS regression of the probability of being in Levels 4 or 5 of the raw financial literacy score on various student, school, and teacher characteristics, after including variables denoting the math teacher's control of the class and the cognitive activation of his/her students.

Table 8. Estimation results – probability of being in level 1

Variable	Demographic Variables				Demographic + Socio-Economic Status Variables				Demographic + Socio-Economic Status + Parental Variables				Demographic + Socio-Economic Status + Parental + School Variables			
	Coefficient	Std. Error	t statistic	p value	Coefficient	Std. Error	t statistic	p value	Coefficient	Std. Error	t statistic	p value	Coefficient	Std. Error	t statistic	p value
Age	-0.063	0.050	-1.256	0.209	-0.066	0.048	-1.357	0.175	-0.069	0.048	-1.438	0.151	-0.065	0.049	-1.341	0.180
Female	-0.029	0.023	-1.259	0.208	-0.017	0.021	-0.808	0.419	-0.017	0.021	-0.834	0.404	-0.016	0.021	-0.773	0.440
Language at home is Spanish	0.168	0.066	2.556	0.011	0.097	0.070	1.382	0.167	0.103	0.070	1.474	0.141	0.097	0.070	1.389	0.165
Lives in a rural area	0.022	0.047	0.474	0.635	0.004	0.044	0.093	0.926	-0.005	0.043	-0.109	0.914	0.008	0.045	0.183	0.855
Index of parental occupation - 2 nd tercile					-0.075	0.043	-1.775	0.076	-0.069	0.042	-1.623	0.105	-0.061	0.044	-1.398	0.162
Index of parental occupation - 3 ^d tercile					-0.121	0.042	-2.888	0.004	-0.110	0.042	-2.597	0.009	-0.106	0.042	-2.510	0.012
Index of family wealth - 2 nd tercile					-0.047	0.038	-1.230	0.219	-0.046	0.038	-1.219	0.223	-0.051	0.038	-1.331	0.183
Index of family wealth - 3 ^d tercile					-0.050	0.034	-1.475	0.140	-0.043	0.034	-1.282	0.200	-0.054	0.034	-1.574	0.115
Years of parental education					0.005	0.007	0.664	0.507	0.006	0.007	0.809	0.419	0.008	0.007	1.062	0.288
Has a computer at home					-0.105	0.068	-1.547	0.122	-0.106	0.067	-1.582	0.114	-0.104	0.066	-1.564	0.118
Index of family cultural possessions - 2 nd tercile					-0.038	0.043	-0.881	0.378	-0.036	0.043	-0.836	0.403	-0.042	0.043	-0.989	0.323
Index of family cultural possessions - 3 ^d tercile					-0.044	0.031	-1.429	0.153	-0.032	0.031	-1.041	0.298	-0.031	0.030	-1.032	0.302
There are at least 100 books at home					-0.055	0.030	-1.797	0.072	-0.058	0.031	-1.883	0.060	-0.057	0.029	-1.964	0.050
Majority of parents has high expectations for children's scholastic achievement									-0.049	0.026	-1.878	0.060	-0.040	0.026	-1.571	0.116
Majority of parents volunteers at school									-0.042	0.028	-1.495	0.135	-0.021	0.030	-0.699	0.485
Student-teacher ratio at school													0.002	0.003	0.639	0.523
Proportion of math teachers													-0.281	0.363	-0.775	0.438
Index of adequacy of school educational materials - 2 nd tercile													-0.076	0.047	-1.617	0.106
Index of adequacy of school educational materials - 3 ^d tercile													-0.084	0.043	-1.974	0.048
Index of school autonomy													0.000	0.016	0.007	0.994
High level of extracurricular math activities at school													0.009	0.043	0.207	0.836
High level of extracurricular creative activities at school													0.021	0.046	0.460	0.646
Index of teacher morale - 2 nd tercile													-0.022	0.042	-0.519	0.604
Index of teacher morale - 3 ^d tercile													-0.025	0.043	-0.575	0.565
Constant	1.121	0.782	1.434	0.152	1.337	0.759	1.762	0.078	1.404	0.759	1.851	0.064	1.357	0.771	1.760	0.078
Adjusted R ²	0.019				0.075				0.082				0.091			
Number of observations	878				878				878				878			

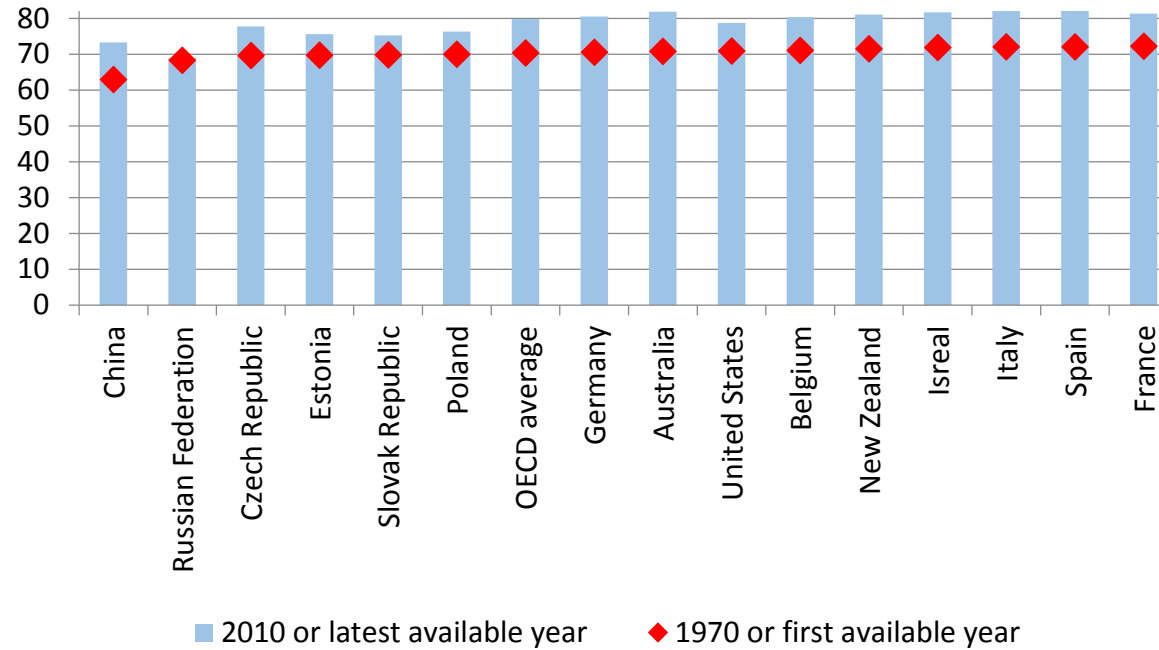
Note: The table presents result from an OLS regression of the probability of being in Level 1 of the raw financial literacy score on various student, school, and teacher characteristics, after including variables denoting the math teacher's control of the class and the cognitive activation of his/her students.

Table 9. Estimation results using a reduced sample – probability of being in level 1

Variable	Demographic Variables				Demographic + Socio-Economic Status Variables				Demographic + Socio-Economic Status + Parental Variables				Demographic + Socio-Economic Status + Parental + School Variables				Demographic + Socio-Economic Status + Parental + School + Teacher Variables			
	Coefficient	Std. Error	t statistic	p value	Coefficient	Std. Error	t statistic	p value	Coefficient	Std. Error	t statistic	p value	Coefficient	Std. Error	t statistic	p value	Coefficient	Std. Error	t statistic	p value
Age	-0.078	0.054	-1.448	0.147	-0.081	0.052	-1.550	0.121	-0.086	0.052	-1.652	0.098	-0.078	0.053	-1.477	0.140	-0.103	0.057	-1.819	0.069
Female	-0.032	0.029	-1.084	0.278	-0.031	0.029	-1.059	0.290	-0.032	0.029	-1.099	0.272	-0.027	0.028	-0.965	0.335	-0.023	0.029	-0.813	0.416
Language at home is Spanish	0.128	0.069	1.853	0.064	0.072	0.072	0.997	0.319	0.082	0.072	1.137	0.255	0.079	0.075	1.047	0.295	0.075	0.074	1.005	0.315
Lives in a rural area	0.062	0.064	0.956	0.339	0.038	0.063	0.605	0.545	0.027	0.062	0.441	0.659	0.038	0.059	0.635	0.526	0.011	0.058	0.183	0.855
Index of parental occupation - 2 nd tertile					-0.015	0.058	-0.262	0.794	-0.009	0.058	-0.160	0.873	0.001	0.059	0.017	0.986	-0.008	0.056	-0.143	0.886
Index of parental occupation - 3 ^d tertile					-0.094	0.048	-1.949	0.051	-0.086	0.048	-1.792	0.073	-0.075	0.048	-1.559	0.119	-0.074	0.047	-1.575	0.115
Index of family wealth - 2 nd tertile					-0.008	0.049	-0.164	0.870	-0.007	0.049	-0.134	0.893	-0.013	0.047	-0.271	0.787	-0.003	0.046	-0.063	0.950
Index of family wealth - 3 ^d tertile					-0.017	0.049	-0.357	0.721	-0.010	0.049	-0.203	0.839	-0.025	0.046	-0.530	0.596	-0.015	0.044	-0.346	0.729
Years of parental education					-0.005	0.011	-0.481	0.631	-0.004	0.011	-0.384	0.701	-0.002	0.011	-0.197	0.844	-0.002	0.010	-0.195	0.846
Has a computer at home					-0.051	0.076	-0.677	0.498	-0.054	0.075	-0.723	0.469	-0.052	0.079	-0.661	0.508	-0.034	0.079	-0.431	0.666
Index of family cultural possessions - 2 nd tertile					-0.026	0.047	-0.558	0.577	-0.024	0.048	-0.515	0.607	-0.032	0.047	-0.682	0.495	-0.023	0.050	-0.466	0.641
Index of family cultural possessions - 3 ^d tertile					-0.032	0.036	-0.893	0.372	-0.019	0.035	-0.553	0.580	-0.024	0.037	-0.642	0.521	-0.012	0.038	-0.312	0.755
There are at least 100 books at home					-0.026	0.039	-0.659	0.510	-0.030	0.040	-0.768	0.442	-0.037	0.035	-1.067	0.286	-0.029	0.035	-0.814	0.416
Majority of parents has high expectations for children's scholastic achievement									-0.033	0.030	-1.112	0.266	-0.019	0.032	-0.589	0.556	-0.015	0.031	-0.478	0.633
Majority of parents volunteers at school									-0.058	0.030	-1.953	0.051	-0.036	0.033	-1.094	0.274	-0.030	0.032	-0.932	0.351
Student-teacher ratio at school													0.001	0.004	0.342	0.732	0.001	0.004	0.157	0.875
Proportion of math teachers													-0.213	0.470	-0.453	0.650	-0.160	0.483	-0.331	0.741
Index of adequacy of school educational materials - 2 nd tertile													-0.082	0.058	-1.403	0.161	-0.068	0.056	-1.218	0.223
Index of adequacy of school educational materials - 3 ^d tertile													-0.105	0.057	-1.853	0.064	-0.091	0.054	-1.663	0.096
Index of school autonomy													0.001	0.022	0.068	0.946	-0.004	0.022	-0.163	0.870
High level of extracurricular math activities at school													-0.006	0.046	-0.135	0.892	-0.012	0.045	-0.269	0.788
High level of extracurricular creative activities at school													0.036	0.054	0.672	0.502	0.032	0.053	0.601	0.548
Index or teacher morale - 2 nd tertile																	-0.038	0.049	-0.783	0.434
Index or teacher morale - 3 ^d tertile																	-0.006	0.055	-0.118	0.906
Index of class control by the teacher - 2 nd tertile																	-0.031	0.041	-0.765	0.444
Index of class control by the teacher - 3 ^d tertile																	-0.056	0.051	-1.095	0.273
Index of cognitive activation in mathematics lessons (anchored) - 2 nd tertile																	-0.083	0.050	-1.650	0.099
Index of cognitive activation in mathematics lessons (anchored) - 3 ^d tertile																	-0.140	0.046	-3.013	0.003
Constant	1.360	0.852	1.597	0.110	1.591	0.805	1.978	0.048	1.688	0.809	2.087	0.037	1.587	0.826	1.921	0.055	2.061	0.898	2.296	0.022
Adjusted R ²	0.018				0.045				0.052				0.063				0.093			
Number of observations	568				568				568				568				568			

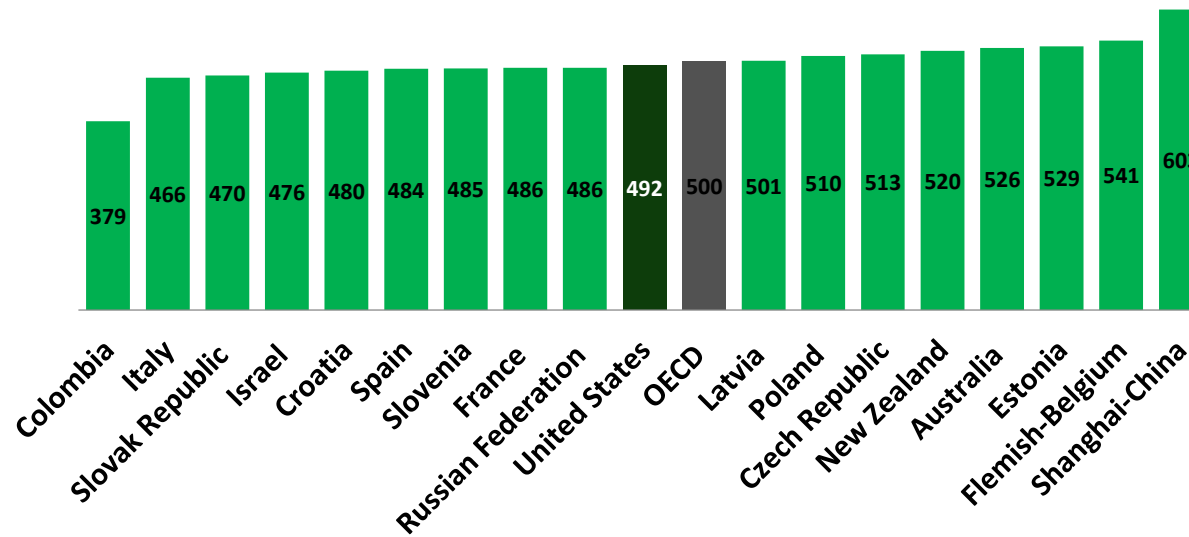
Note: The table presents result from an OLS regression of the probability of being in Level 1 of the raw financial literacy score on various student, school, and teacher characteristics, after including variables denoting the math teacher's control of the class and the cognitive activation of his/her students.

Figure 1. The increase in life expectancy



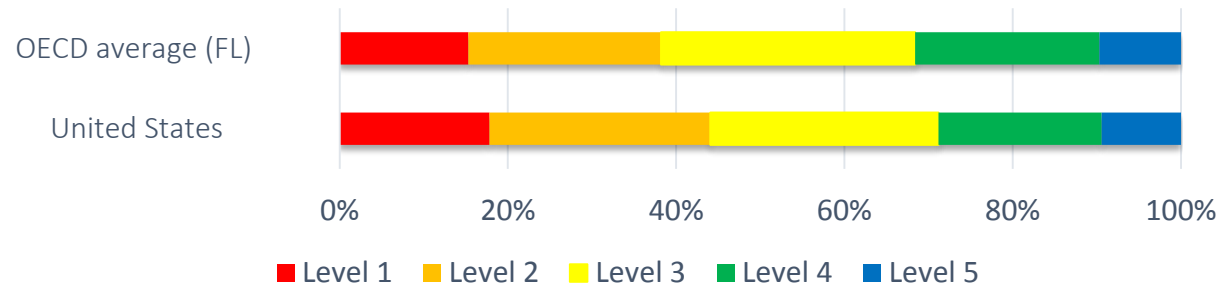
Source: OECD Factbook 2013: Economic, Environmental and Social Statistics © OECD 2012

Figure 2. Average financial literacy score across participating countries/economies



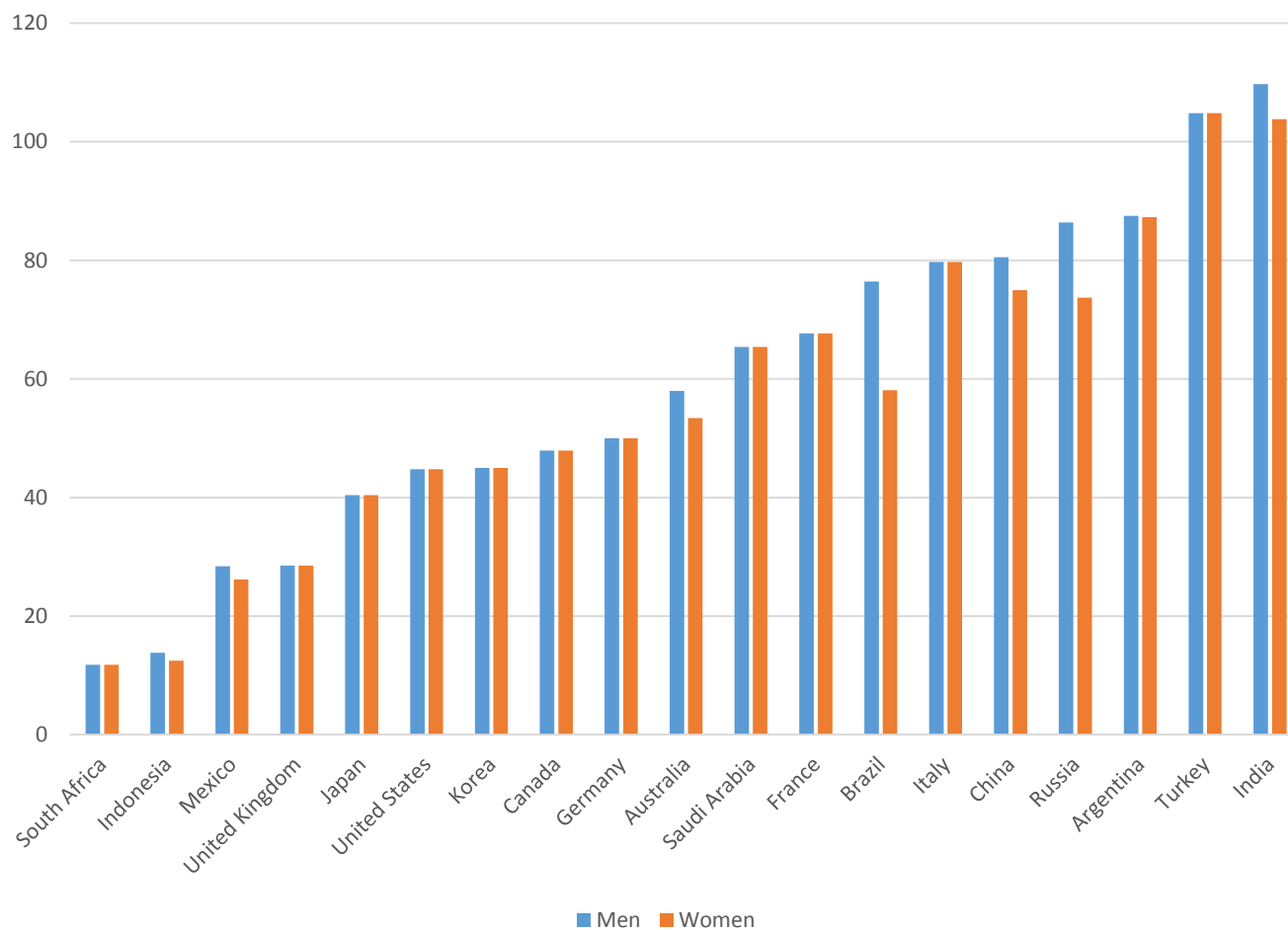
Source: OECD. (2014). *PISA 2012 Results: Students and Money (Volume VI): Financial Literacy Skills for the 21st Century*.

Figure 3. Financial literacy levels



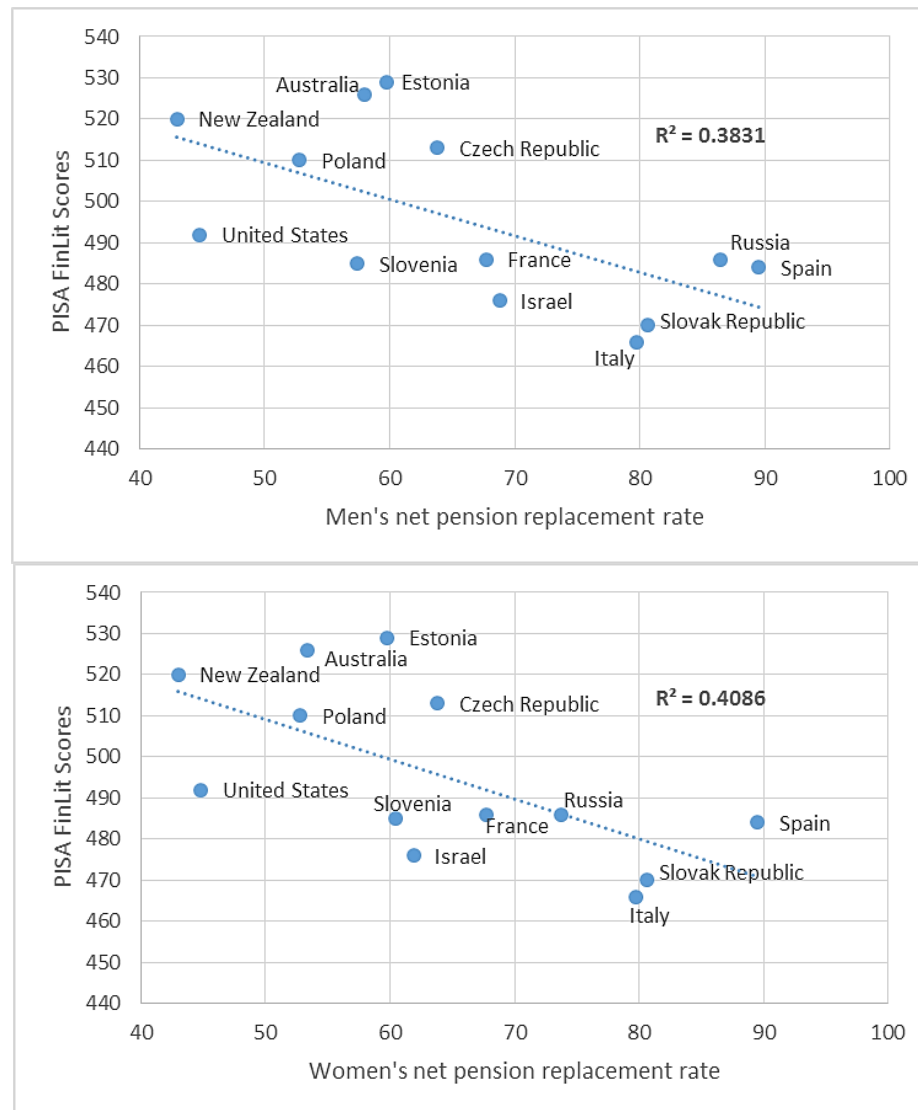
Source: OECD. (2014). *PISA 2012 Results: Students and Money (Volume VI): Financial Literacy Skills for the 21st Century*.

Figure 4. Net pension replacement rates by gender, G20 (2014)



Source: OECD (2016), *Pensions at a Glance*

Figure 5. Net pension replacement rates by gender and PISA financial literacy scores



Source: Authors' calculations on OECD data.

About GFLEC

Founded in 2011 at the George Washington University School of Business, the Global Financial Literacy Excellence Center (GFLEC), formerly known as the Global Center for Financial Literacy (GCFL), has positioned itself to be the world's leading center for financial literacy research and policy. Through rigorous scholarship and research, wide-reaching education, and global policy and services, the Center works with partners in Washington, DC, throughout the United States, and across the globe to raise the level of financial knowledge.

GFLEC builds on more than ten years of academic research by Professor Annamaria Lusardi, an early contributor to financial literacy as a field of study. By virtue of its location in the heart of Washington, DC, the Center is positioned to directly influence policy makers.

Our Mission and Vision

Through its research and expertise, GFLEC seeks to inform policy as well as develop and promote financial literacy programs around the world. GFLEC focuses on groundbreaking research, with particular emphasis on financial education in schools, in the workplace, and in the community. It is also engaged in research that looks at financial literacy among the young and women, two particularly vulnerable populations. GFLEC seeks to make research findings more accessible to policymakers and practitioners in order to help shape national and international dialogue around financial literacy.



Global Financial Literacy Excellence Center
The George Washington University
School of Business
Duquès Hall, Suite 450
2201 G Street NW
Washington, DC 20052

P: 202-994-7148
E: gfllec@gwu.edu

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Policy Brief

Enhancing Retirement Savings with School-Based Financial Education

Enhancing Retirement Savings with School-Based Financial Education*

The US pension landscape has changed drastically in the last two decades. The move from a system in which defined benefit (DB) plans predominated to one in which defined contribution (DC) plans dominate has shifted much of the responsibility for retirement savings onto the individual. Today's young Americans are in the historically unprecedented position of having to finance a 30-year retirement with a 40-year career. For this new DC pension system to be sustainable, it is important that workers start contributing to their retirement accounts early in their career. Many young Americans, however, enter the workforce already in debt and are confronted with the decision of whether to save for retirement or paying off debt. In order to adequately make such decisions, young Americans must be equipped with at least a basic level of financial literacy.

In this study we examined data from the 2012 Programme for International Student Assessment (PISA) conducted by the Organisation for Economic Co-Operation and Development's (OECD) to assess to what extent the financial literacy of young Americans is compatible with the complex financial decisions they have to make to be successful in this new retirement landscape. The study, titled "Enhancing Retirement Savings with School-Based Financial Education", was prepared by the Global Financial Literacy Excellence Center at The George Washington University as part of a grant for the National Endowment for Financial Education (NEFE). The report speaks of the need for more financial education and financial literacy to help young adults navigate a new and complex retirement environment.

Data

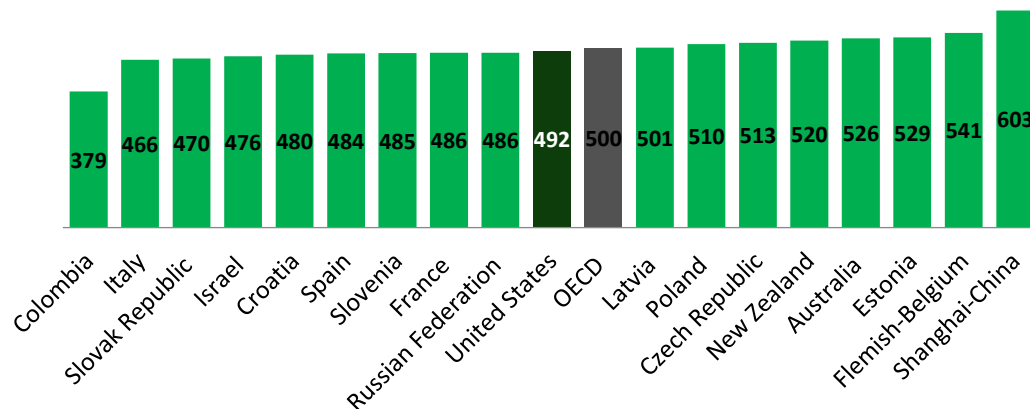
PISA is a triennial survey, first administered in 2000, that is designed to assess the extent to which students near the end of compulsory education have acquired the knowledge and skills essential for full participation in society. In 2012, PISA surveyed approximately 510,000 15-year-old students in 65 economies. In this wave, an optional financial literacy assessment was added for the first time. This assessment was completed by approximately 29,000 students in 18 countries (13 OECD member countries plus five partner countries—Colombia, Croatia, Latvia, the Russian Federation, and Shanghai-China)—making it the first international financial literacy assessment of this kind. In the United States 1,133 students took the financial literacy assessment.

Domestic and international variations in financial literacy

When we compare financial literacy scores across all 18 countries, we see large variations in financial literacy performance, with the US scoring similar to the OECD average. Meanwhile students in Shanghai-China perform one hundred points higher, with an average score of 603, and students in Colombia score significantly lower, at 379 points (Figure 1).

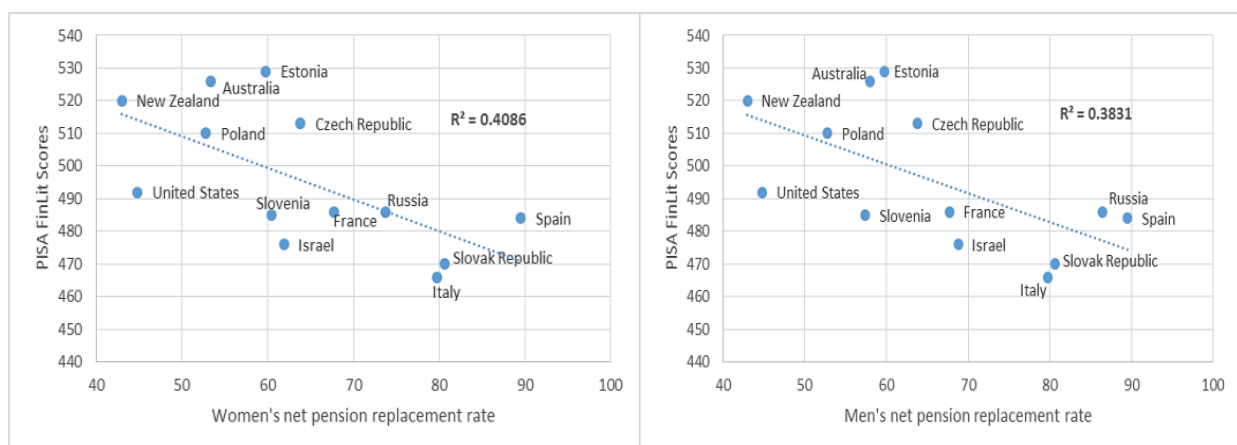
* This research has been supported by a generous grant from the National Endowment for Financial Education (NEFE).

Figure 1.
Average financial literacy score across participating countries



Students in countries with well-developed financial markets do not earn top scores, implying that financial literacy is not learned simply through interactions with the economic environment. Moreover, when we correlate financial literacy scores with an index that reflects pension system generosity we find that the US is one of the countries where pension entitlement benefits are lowest, but also where young adults do not have high levels of financial literacy (Figure 2).² These findings underscore the importance of building a strong education system where young adults have the knowledge necessary to make sound financial decisions and plan for the future.

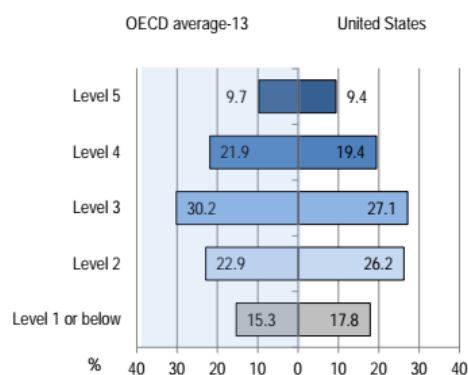
Figure 2.
Net pension replacement rates by gender and PISA financial literacy scores



² As a proxy for pension system generosity we used pension replacement rates, defined as the individual net pension entitlement divided by net pre-retirement earnings. This indicator measures the extent to which different pension systems provide retirement income to replace earnings.

Another striking feature of the data is the variation of financial literacy performance within countries. This is especially true for the United States. To compare financial literacy within countries, student performance was presented on a continuous scale divided into five proficiency levels. Level 1 is the lowest level, Level 2 serves as the baseline proficiency, and Level 5 represents the highest level of financial literacy proficiency among those tested. Figure 3 shows that only one in ten students in the US performs at the highest performance level, while almost 18% perform below the baseline level.³ As such, the data show a large financial literacy performance gap in the US.

Figure 3.
15-year-old students at each level of proficiency in financial literacy



What determines financial literacy among 15-year-old students?

In our report we look at how financial literacy varies by four types of variables: (1) student demographics; (2) socioeconomic status; (3) parent characteristics; (4) school and teacher characteristics.

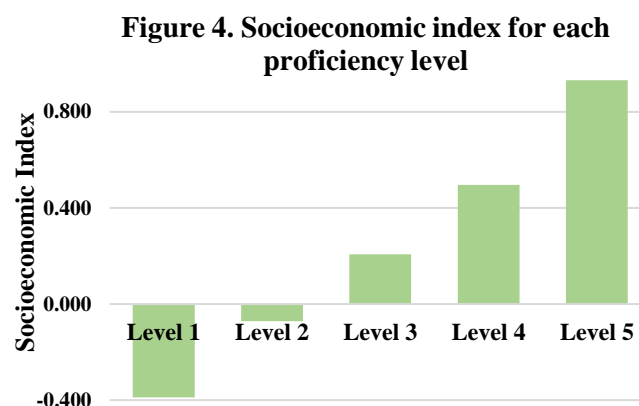
1. Student demographics and financial literacy

Looking at student demographics, we find that speaking Spanish as the main language in the household and living in a rural environment are both negatively associated with students' probability of scoring in the top two levels of the financial literacy assessment (Level 4 or 5). This may indicate that students who do not speak English at home are not fully comprehending the questions they are being asked. Moreover, students in rural areas may find it more difficult to have access to quality education.

³ Source: US Country Note from the OECD 2012 PISA report.

2. Financial literacy depends heavily on socioeconomic status

Students' household socioeconomic status was determined using an indicator that combines several factors, including family wealth, home possessions, and parental education. Our analysis shows that, even when controlling for other variables, students' financial literacy performance is heavily dependent on their household's socioeconomic status. In particular, Figure 4 shows that proficiency levels increase with students' socioeconomic status.



Breaking down the index, we find that students who perform at the highest level are more likely to have many books at home, a computer, and have parents with high occupational attainment. This relationship, coupled with the large economic inequality in the United States, in part explains the large variation in financial literacy performance within the United States.

3. Parents involvement and students' financial literacy

To determine the effect of parents on students' financial literacy score, we look at several parental characteristics. We find that parents' expectations for their children's scholastic achievements is significantly associated with students' financial literacy performance. Specifically, students whose parents have high expectations are less likely to score in the lowest proficiency level and more likely to score in the two highest levels, compared to other children. Parents who hold ambitious expectations for their children may be motivating and guiding them in their learning, thus creating the conditions that promote academic success and the acquisition of skills.

4. Student performance is influenced by their school and teachers

In addition to their socioeconomic status and parents' characteristics, students' financial literacy performance is significantly associated with their schools' and teachers' characteristics. In terms of school characteristics, we find that students who perform in the highest levels are more likely to attend a school with adequate teaching materials.

Moreover, teacher competency plays a large role in students' financial literacy performance. We find that students who attend a school with adequate teaching materials and competent teachers—meaning teachers who demonstrate control over their classroom and try to actively engage with students—are more likely to perform at the two highest levels.

Conclusions

In today's rapidly changing pension landscape, young Americans need knowledge of basic financial concepts to ensure their future economic success. However, the level of financial literacy demonstrated by 15-year-old Americans is not sufficient. Significant improvements have to be made to ensure a robust and sustainable pension system as well as a secure economic future for young Americans.

We find that students' household socioeconomic status, parental characteristics, and school characteristics have a significant impact on students' financial literacy score. Many of these characteristics are also associated with one another. In particular, high family wealth, high socioeconomic status, and attending a well-functioning school (which has adequate materials and competent math teachers) are all correlated in a way that indicates that families of lower socioeconomic status lack access to schools with adequate resources and that the intergenerational transmission of economic inequality in the US is a critical problem.

As such, we provide the following recommendations: (1) **invest in schools** by training teachers and ensuring students have adequate educational materials to work with, as our findings underscore the importance of a well-functioning school system, (2) **encourage parental involvement** in their children's scholastic achievements in order to create conditions that promote academic success, and (3) work to **close the performance gap** between the lowest and highest performers, as this will help to mitigate the transmission of economic inequality between generations. These steps are of paramount importance to build a successful school system that prepares young Americans to be successful in life.

About GFLEC

Founded in 2011 at the George Washington University School of Business, the Global Financial Literacy Excellence Center (GFLEC) has positioned itself to be the world's leading center for financial literacy research and policy. Through rigorous scholarship and research, wide-reaching education, and global policy and services, the Center works with partners in Washington, DC, throughout the United States, and across the globe to raise the level of financial knowledge. The Center builds on more than fifteen years of academic research on financial literacy by Director Annamaria Lusardi, an early contributor to financial literacy as a field of study. Director Lusardi is the chair of PISA's financial literacy expert group that developed the 2012 Financial Literacy Assessment. GFLEC also hosted the release of the PISA data in 2012 at The George Washington University School of Business. The Center also builds on important policy work with key institutions, including the US Department of the Treasury, the World Bank, FINRA Investor Education Foundation, and the Organisation for Economic Co-operation and Development—entities with which Director Lusardi has collaborated for many years. GW's unparalleled location at the heart of the US capital, where both national and global policy decisions are made, elevates the Center's influence. For more information, please visit GFLEC's website at www.gflec.org.

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Presentation

Enhancing Retirement Savings with School-Based Financial Education

Enhancing Retirement Savings with School-Based Financial Education

A study prepared by the
Global Financial Literacy Excellence Center (GFLEC)



A new pension landscape

- In many countries the pension system is shifting from defined benefit (DB) to defined contribution (DC)
- DC plans shift responsibility from employers to employees
- These plans require that young Americans start saving as soon as they enter the workforce



The challenges of young Americans

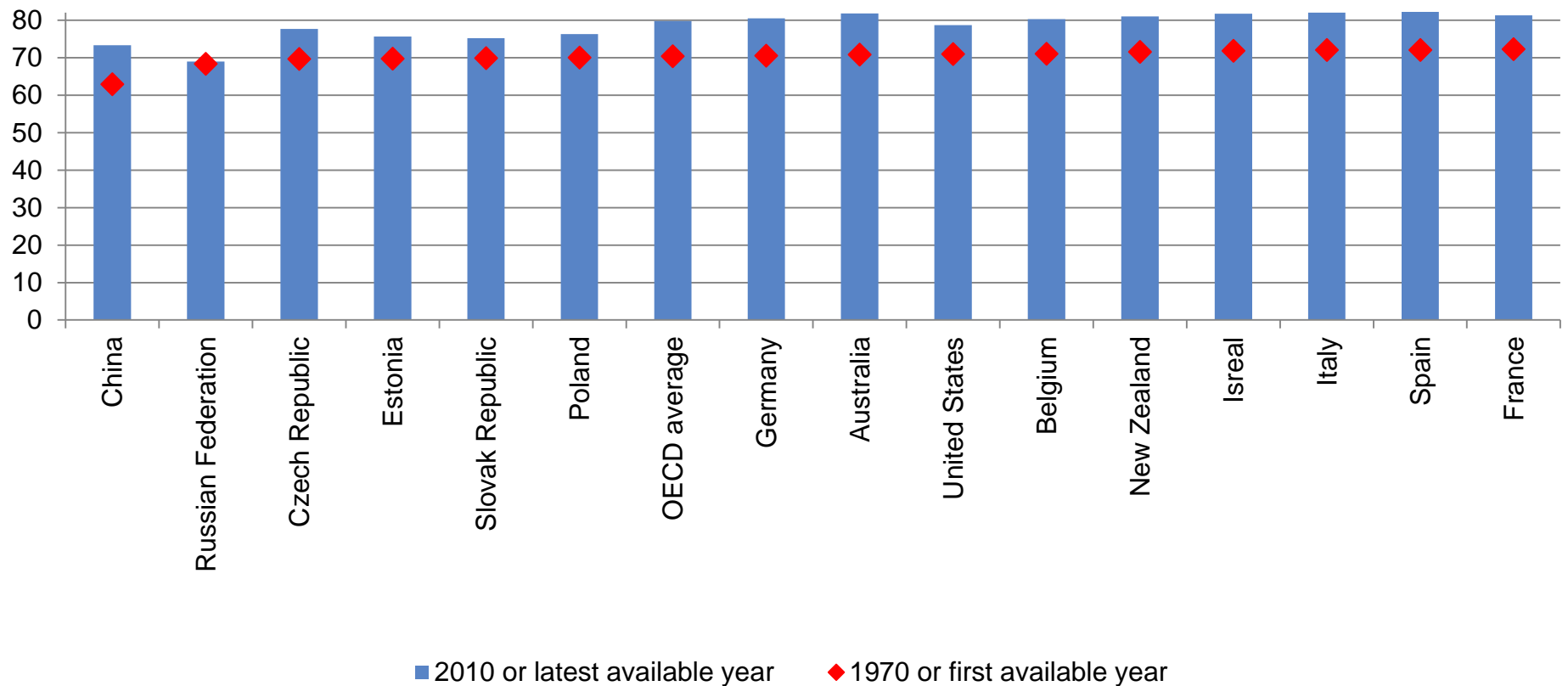
- While starting to save early is important, many young Americans face important financial barriers to saving, including:

- Large student loans
- High credit card debt
- Low level of precautionary savings



- Young Americans need an understanding of basic financial concepts to make complex decisions about saving for retirement, investing, and paying off debt

Increases in life expectancy change everything



- Life expectancy is higher than ever and continues to rise
- In a DC pension system, saving early is critical if today's young people hope to have sufficient resources at retirement

Financing a 30-year retirement with a 40-year career

- Because of increases in life expectancy, young Americans are in the historically unprecedented condition of having to finance a 30-year retirement with a 40-year career
- In order to do so, they must decide when and how much to save, as well as what type of plan to enroll in, all of which require a knowledge of basic financial concepts



Financial literacy and planning for retirement

- Research has shown that people with higher levels of financial literacy are more likely to plan for retirement, meaning these individuals will be better positioned for financial security in old age (Lusardi & Mitchell, 2011)
- Being able to develop and implement a retirement plan is key to retirement security, and those who do not plan will reach retirement with only **half the wealth** of those who do plan (Lusardi & Mitchell, 2011)



Financial literacy and planning for retirement

- It is imperative that young Americans be equipped with an understanding of basic financial concepts by the time they enter the workforce
- This knowledge will allow them to make smart financial decisions and adequately prepare for retirement in this new pension system



Our Research

- Our research uses the 2012 PISA data to understand whether young Americans' financial literacy levels are consistent with those necessary to succeed in today's environment
- We identify several key determinants of financial literacy to help practitioners and policymakers better equip young Americans in the future

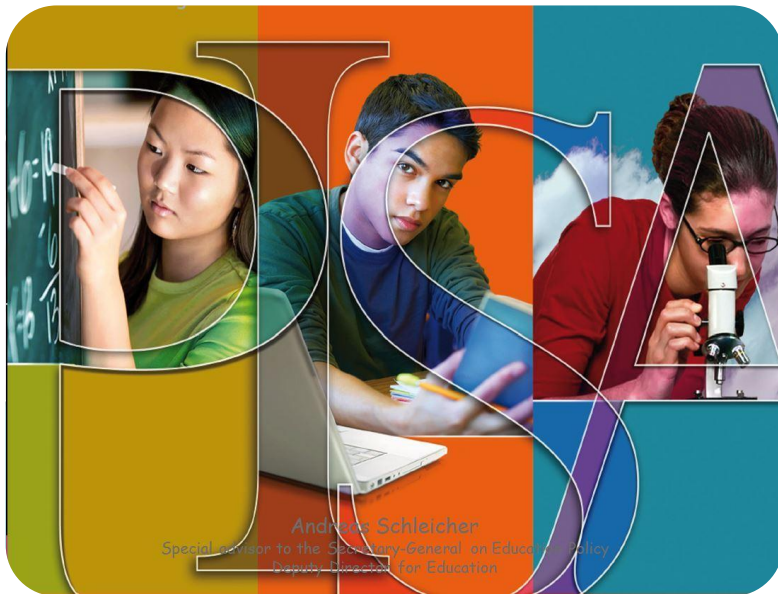


Programme for International Student Assessment (PISA)

Are students well prepared for future challenges?

Can they analyze, reason and communicate effectively?

Do they have the capacity to continue learning throughout life?



Since 2000, every three years the OECD Programme for International Student Assessment (PISA) answers these questions and more. It assesses to what extent students near the end of compulsory education have acquired some of the knowledge and skills essential for full participation in society.

Why is the PISA data unique?

As reported by the OECD, PISA is unique in the way it looks at

Public policy issues

- PISA helps stakeholders understand how well schools are equipping today's youth for adult life, whether education systems are fair, and whether some schools and teaching methods are more effective than others

Literacy

- Rather than examine mastery of specific school curricula, PISA looks at students' ability to apply what they learn in school to real-life situations

Lifelong learning

- PISA not only looks at student performance but also finds out about students' potential for lifelong learning by asking them about their motivation, their beliefs, and their learning strategies

Performance over time

- Countries and economies participating in successive PISA cycles can compare the performance of their students over time and assess the impact of education policy decisions

2012 PISA data

- In 2012, over half a million students (representing 28 million 15-year-olds in 65 countries/economies) took the test
- The assessment included topics such as mathematics, reading, science, and problem solving
- For the first time, an optional **financial literacy module** was included in the assessment and 18 countries participated
- The survey also included information regarding students' parents; school policies, practices, and resources; and institutional factors that we use to identify determinants of financial literacy

2012 PISA Financial Literacy Assessment

- The 2012 PISA financial literacy assessment is the first large-scale international financial literacy test for 15-year-olds
- 18 countries participated in the 2012 Financial Literacy Assessment (13 of which are OECD countries)
- Australia, Belgium (Flemish Community), Shanghai-China, Colombia, Croatia, Czech Republic, Estonia, France, Israel, Italy, Latvia, New Zealand, Poland, Russia, Slovak Republic, Slovenia, Spain, and the United States were among the participating countries



Creating the financial literacy assessment

- A group of experts convened by the OECD spent two years designing the 2012 module on financial literacy
- They included many stakeholders from countries around the world (Treasury departments, central banks, regulators, practitioners, academics)
- GFLEC's academic director (Prof. Lusardi) chairs the expert group

Definition of financial literacy

*“Financial literacy is **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 wellbeing** of **individuals and society**, and to enable **participation in economic life.**”*

Four key aspects of the financial literacy definition

There are four innovative aspects of this definition:

- 1) Financial literacy does not refer only to knowledge and understanding, but also to promoting effective decision making
- 2) The objective of financial literacy is to improve overall financial well-being, not to affect a single behavior
- 3) Financial literacy has effects not just for individuals but for society as well
- 4) Financial literacy, like reading, writing, and knowledge of science, enables young people to fully participate in economic life

Organizing the domain

The assessment was designed to cover three dimensions of financial literacy: content, process, and contexts (see chapter 2 of the OECD's PISA report)

1. Content

Areas of knowledge and understanding

2. Processes

Approaches and mental strategies

3. Contexts

Situations in which knowledge and understanding are applied

Examples of what financial literacy might mean for 15-year-olds

Being able to...	For example...
Balance priorities and plan what to spend money on	If they go to the movie theater, will they still have enough money for the bus fare home? Or would it be better to buy pizza and invite friends home?
Remember that some purchases have ongoing costs	A games console will need new games; a motorbike will need fuel, and so on.
Be alert to possible fraud	Some emails that look like they came from their bank might not be legitimate. They should know what to do if they are not sure
Know what risk is and what insurance is meant for	If their phone gets stolen, they should ask their parents if it is covered by their household insurance.
Make an informed decision about credit	They should know that if they buy a computer on credit, they will have to pay interest on the loan as well as paying the advertised price for the computer, and they should realize that the less they repay of that loan each month, the more they will pay in interest.

Scores and proficiency levels

- The difficulty of test questions are estimated based on the proportion of students answering each question correctly
- Student proficiency was estimated using the proportion of test questions they answered correctly
- The relationship between the difficulty of questions and the proficiency of students was presented on a scale divided into five levels:
 - **Level 1** indicates low proficiency
 - **Level 2** indicates baseline proficiency
 - **Level 3** indicates intermediate proficiency
 - **Levels 4 and 5** indicate high proficiency

Proficiency levels

- **Level 1:**
 - Lowest proficiency level
 - Students display very basic financial literacy and are not able to apply their knowledge to real-life situations
- **Level 2:**
 - Baseline level of financial literacy proficiency
 - Students begin to apply their knowledge to financial decisions in contexts that are immediately relevant to them
- **Level 3:**
 - Students start considering the consequences of financial decisions, and they make simple financial plans in common contexts

Proficiency levels (cont'd)

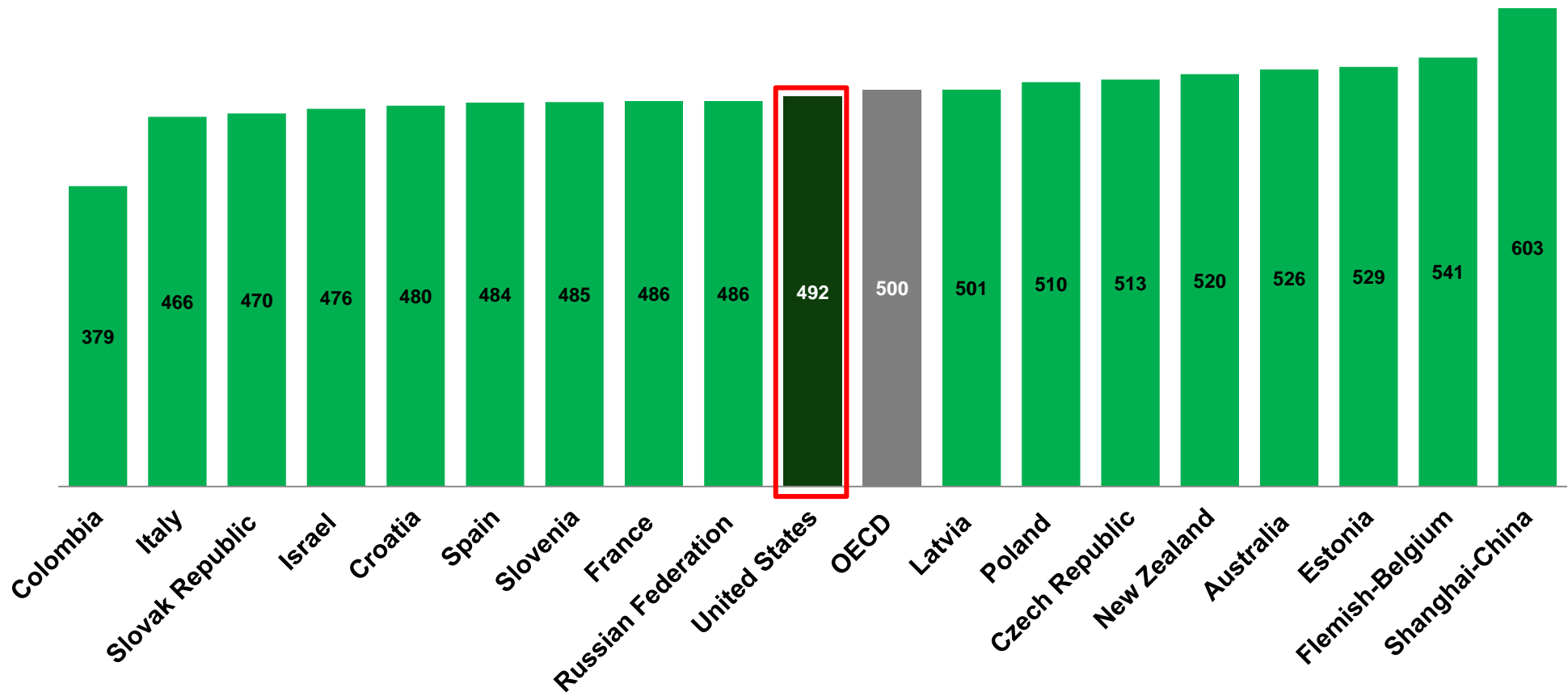
- **Level 4:**

- Students can apply their knowledge of less-common financial concepts to contexts that will be relevant to them in the near future

- **Level 5:**

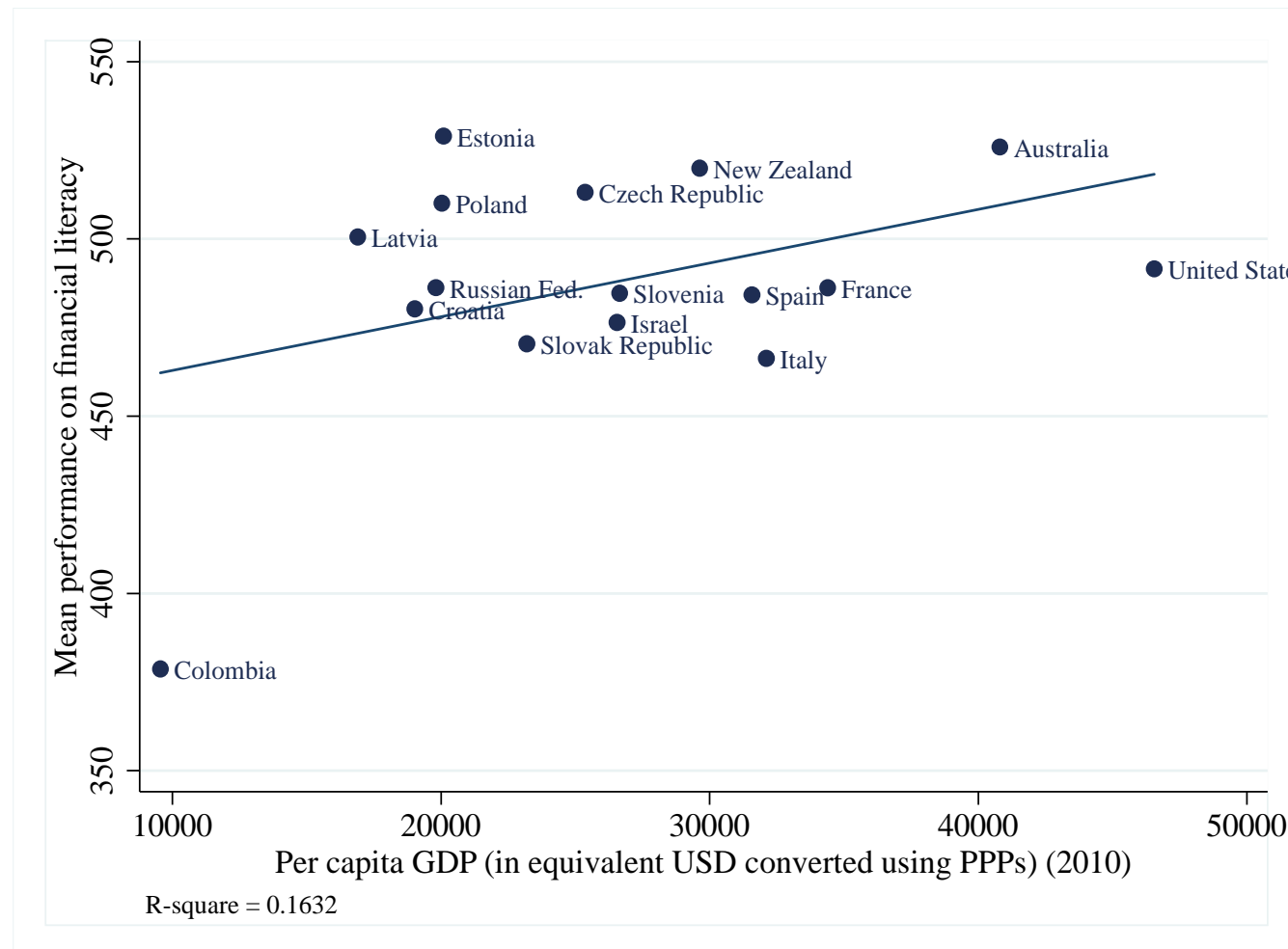
- Highest proficiency level
- Students can apply their understanding of a wide range of financial terms and concepts to contexts that may only become relevant in their future

Financial literacy around the world



- We see large variations in financial literacy between countries
- The average performance of US students is close to the OECD average

GDP per capita and financial literacy



GDP per capita only explains 16% of country-level variations in financial literacy

GDP per capita and financial literacy (cont'd)

- GDP per capita explains very little of the country-level variation in financial literacy
- Moreover, students in many countries with well-developed financial markets, such as the US, do not perform in the top level of financial literacy

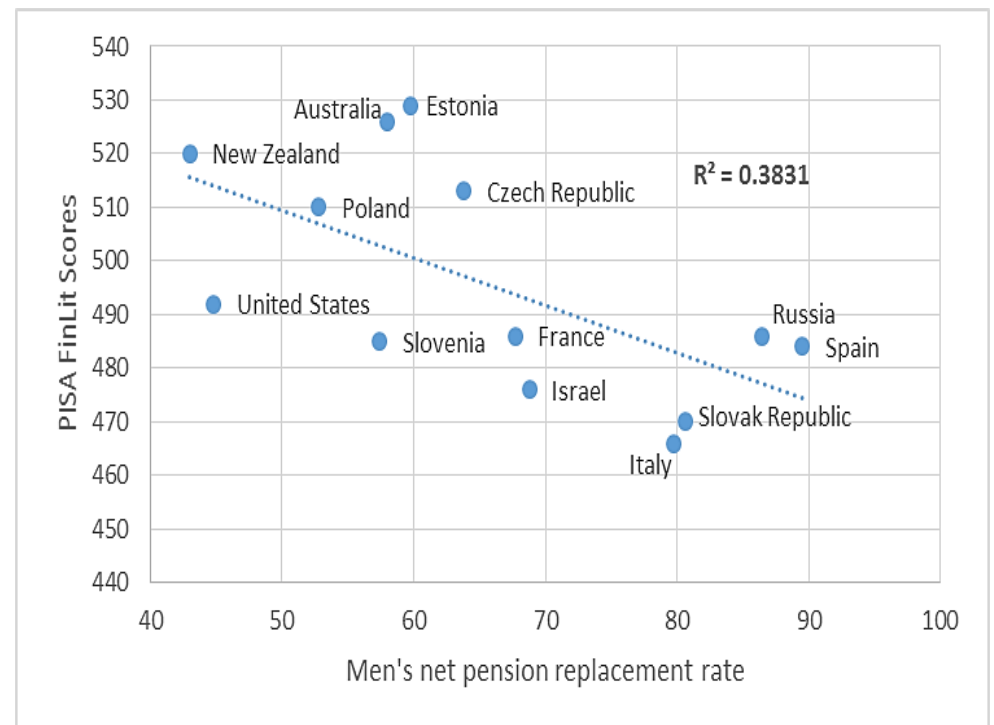
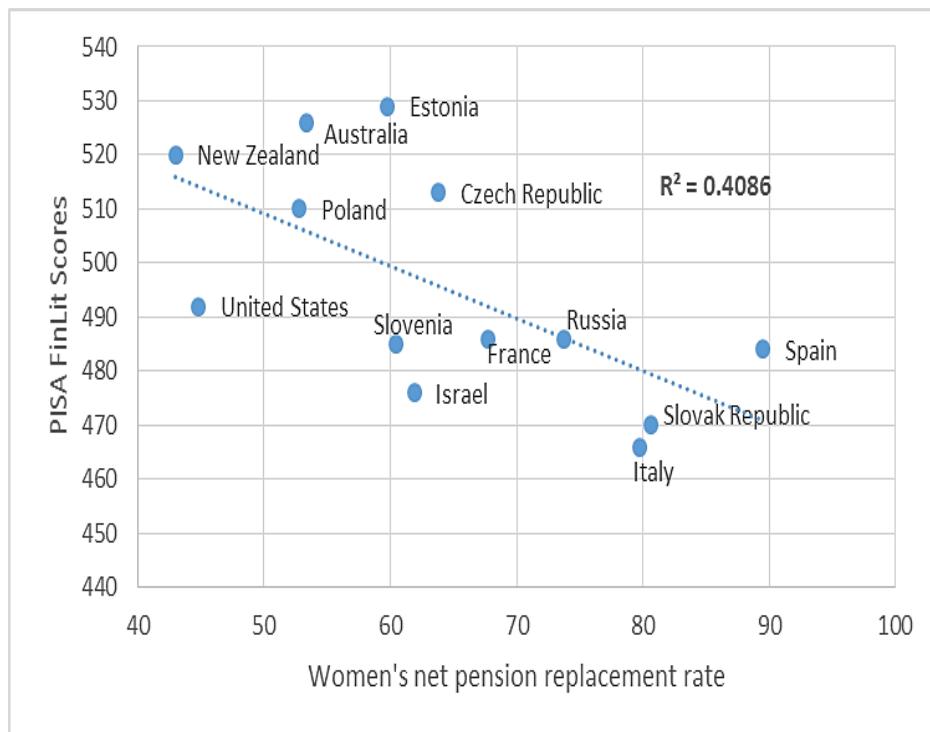
This implies that financial literacy is not learned simply through interactions with the economic environment

Pension system generosity and financial literacy

- In order to understand the relationship between pension schemes and financial literacy, we look at the relationship between pension generosity and students' financial literacy scores across countries
- The OECD pension generosity index assesses how effectively a country's pension system provides a retirement income to replaces earnings
 - The index is defined as the individual net pension entitlement divided by net pre-retirement earnings
 - The index accounts for personal income taxes and social security contributions paid by workers and pensioners

Explaining country-level financial literacy variation through pension system generosity

- Pension system generosity is correlated with students' PISA financial literacy assessment scores for both women and men



Explaining country-level financial literacy variation through pension system generosity

- Countries that have lower replacement rates tend to have higher financial literacy scores
 - Lower net pension replacement rates may raise incentives for individuals to invest in financial education
- This relationship only holds for countries that have done a lot in implementing and making financial education readily available
 - Countries that have low pension replacement rates and uneven or little financial education, such as the US, will continue to demonstrate low financial literacy scores
- Low pension replacement rates raise individuals' incentives to invest in financial education, but this pension scheme must be coupled with a readily available and rigorous financial education system.

The US sample

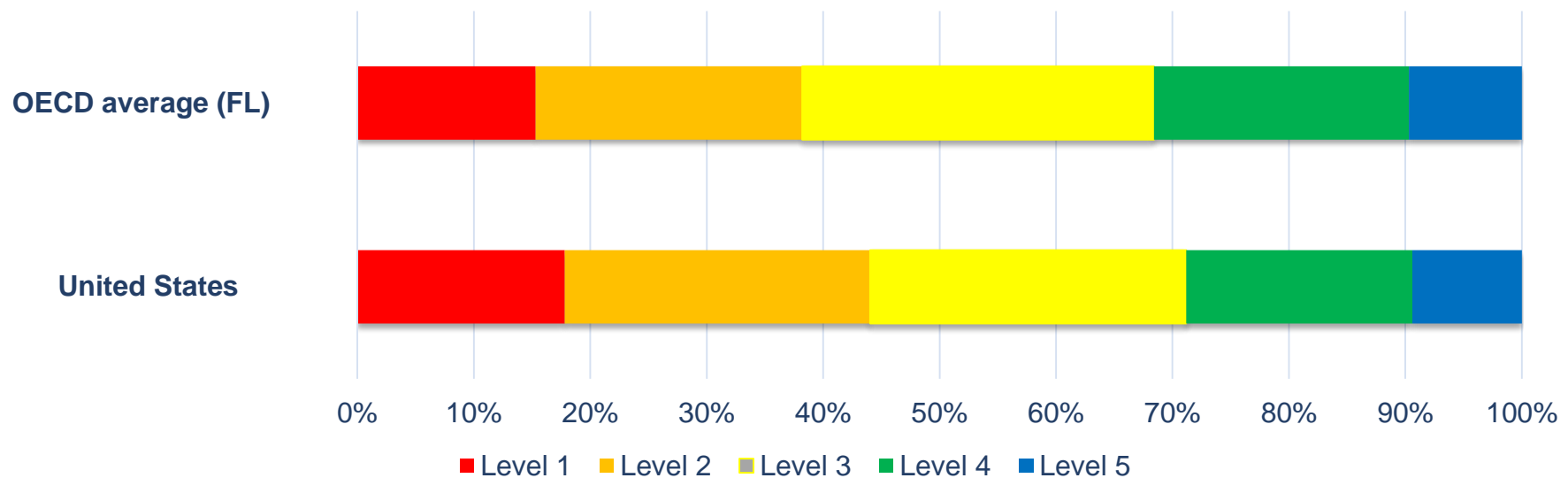
1,133 students across 158 schools in the United States took the PISA Financial Literacy Assessment in 2012. These respondents represent over 3.5 million students throughout the United States.

<i>Student Characteristics</i>	
Female	51%
American with American parents	77%
<i>Parent Characteristics</i>	
Mean highest parental education	13.6 years
Father is employed	85.9%
Mother is employed	74.4%
<i>School Characteristics</i>	
Average class size	26.2 students
Average proportion of math teachers	14.6%



Financial literacy variation within the US

- Large variations in student performance can be seen within the United States



- Only one in ten students in the United States (9.4%) score in the highest level (level 5) compared to 15% among the OECD average
- **Nearly 18% of students in the United States do not reach the baseline level of proficiency in financial literacy (level 2)**

Univariate analysis of the US data

- In addition to student scores, the 2012 PISA assessment includes information regarding
 1. Demographic characteristics of students
 2. Parent characteristics
 3. School characteristics
 4. Teacher characteristics
- Our analysis looks at how variables in each of these categories affects (1) students' financial literacy scores; (2) a student's probability of scoring in the lowest level (level 1); and (3) a student's probability of scoring in the top two levels (levels 4 and 5)
- We also look at the relationships between each of these variables

Univariate analysis – major findings

- Our analysis shows that financial literacy scores increase with many household, parental, and school demographic variables.
- Specifically, results suggest a very strong association between performance in the financial literacy assessment and variables such as
 1. Socioeconomic status
 2. Parents involvement in child's school
 3. High parental expectations for children's scholastic achievement
 4. High functionality of the school
 5. Teacher competence and classroom control

Univariate analysis – major findings (cont'd)

- We also look at the relationship between student, parent, household, and school characteristics
- We find that high socioeconomic status, attending a well-functioning school, and high parental expectations are all correlated
- Socioeconomic status greatly influences access to schools with adequate resources, suggesting that the intergenerational transmission of inequality is a critical problem in the US

Why do we need a multivariate analysis?

- Univariate analysis can sometimes inflate the association between financial literacy and a given characteristic
 - e.g., a positive correlation between financial literacy and cultural possessions may be due to the latter being an indicator of material wealth
- We use a multivariate analysis so we can see whether and how much each set of variables is impacting the financial literacy score, while holding the other variables constant
- We first include only demographic characteristics, and progressively add socioeconomic, parent, school, and teacher characteristics so we can assess which set of variables is most important in explaining differences in financial literacy.

Multivariate analysis: regression model

We use the following model to estimate students' financial literacy scores:

$$Y_i = \beta_0 + Dem'_i\beta_1 + SES'_i\beta_2 + Par'_i\beta_3 + School'_i\beta_4 + Teach'_i\beta_5 + \epsilon_i$$

Where

- Y_i is the financial literacy score of student i
- Dem'_i is a vector of demographic characteristics
- SES'_i is a vector of socioeconomic characteristics
- Par'_i is a vector of parent characteristics
- $School'_i$ is a vector of school characteristics
- $Teach'_i$ is a vector of teacher characteristics

The original US sample has 1,133 students; however, because some variables have missing values, we utilize a subsample of 878 respondents and a second subsample of 568 respondents when we include teacher variables.

Student demographic characteristics and financial literacy performance

- We first look at the effect of student demographic characteristics on financial literacy scores
 - Initially it can be seen that speaking Spanish at home and/or living in a rural area are negatively correlated with financial literacy
 - However these coefficients are no longer significant when we include additional variables relating to students socioeconomic status

Variable	Demographic Variables				Demographic + Socio-Economic Status + Parental + School Variables			
	Coefficient	Std. Error	t statistic	p value	Coefficient	Std. Error	t statistic	p value
Age	11.526	14.082	0.819	0.413	12.214	13.774	0.887	0.375
Female	-1.707	8.172	-0.209	0.835	-6.741	7.060	-0.955	0.340
Language at home is Spanish	-48.847	12.816	-3.812	0.000	-16.250	11.307	-1.437	0.151
Lives in a rural area	-21.598	10.953	-1.972	0.049	-9.275	9.399	-0.987	0.324
Index of parental occupation - 2 nd tercile					12.952	8.043	1.610	0.107
Index of parental occupation - 3 ^d tercile					38.419	9.585	4.008	0.000
Index of family wealth - 2 nd tercile					22.772	8.175	2.785	0.005
Index of family wealth - 3 ^d tercile					28.268	9.047	3.125	0.002
Years of parental education					-2.191	1.607	-1.363	0.173
Has a computer at home					30.569	13.601	2.248	0.025
Index of family cultural possessions - 2 nd tercile					7.759	8.825	0.879	0.379
Index of family cultural possessions - 3 ^d tercile					17.497	8.996	1.945	0.052
There are at least 100 books at home					39.128	8.493	4.607	0.000
Majority of parents has high expectations for children's scholastic achievement					12.973	8.248	1.573	0.116
Majority of parents volunteers at school					5.766	8.662	0.666	0.506
Student-teacher ratio at school					-1.118	0.697	-1.604	0.109
Proportion of math teachers					193.975	82.866	2.341	0.019
Index of adequacy of school educational materials - 2 nd tercile					20.310	10.598	1.916	0.055
Index of adequacy of school educational materials - 3 ^d tercile					34.119	9.291	3.672	0.000
Index of school autonomy					0.699	4.298	0.163	0.871
High level of extracurricular math activities at school					-5.413	10.210	-0.530	0.596
High level of extracurricular creative activities at school					11.651	11.006	1.059	0.290
Index or teacher morale - 2 nd tercile					1.055	9.461	0.112	0.911
Index or teacher morale - 3 ^d tercile					10.259	15.475	0.663	0.507
Constant	330.020	221.090	1.493	0.136	223.672	216.734	1.032	0.302
Adjusted R ²	0.024				0.239			
Number of observations	878				878			

Socioeconomic characteristics and financial literacy performance

- Socioeconomic status is determined using an indicator developed by the OECD
- The PISA index of economic, social and cultural status (ESCS) is based on three indicators: (1) parents' education and occupation, (2) number and type of home possessions, (3) educational resources available at home
- The index is normalized to have a mean of zero and standard deviation of one, thus a negative ESCS value means that the student is in a disadvantaged position compared to the average US household

Socioeconomic characteristics and financial literacy performance

Higher socioeconomic status is strongly and positively associated with higher financial literacy scores.

- In particular, we find that students whose households have more books, higher family wealth, and whose parents have higher level of occupation are more likely to demonstrate the highest level of financial literacy



School/teacher characteristics and financial literacy

We find that students' school characteristics are strongly associated with financial literacy

- Specifically students who attend schools with
 1. Adequate materials
 2. Teachers who actively engage students
 3. Teachers who have control over their classroomare more likely to perform at the top two levels (levels 4 and 5) on the financial literacy assessment.

Parent characteristics and financial literacy

- In addition to school, socioeconomic, and student characteristics we incorporate parent characteristics to the multivariate regression
- We find that parental expectations for students' scholastic achievement is associated with their financial literacy score

In particular, students whose parents have high expectations for their children's scholastic achievement are more likely to score in the top level

Conclusions

- US students score just below the OECD average in financial literacy
 - This level of financial literacy does not match the level needed to achieve a sustainable and robust pension system
- GDP per capita is only weakly correlated with students' performance in financial literacy
- Students in many countries with well-developed financial markets do not earn top scores
 - This implies that financial literacy is not learned simply through interactions with the economic environment

Conclusions (cont'd)

- Student financial literacy scores depend heavily on socioeconomic status
 - Students with higher socioeconomic status are more likely to perform in the top levels
- Students who attend schools with adequate materials and competent teachers (i.e., teachers who actively engage with students and have control over the classroom) are more likely to score in the top levels
- Parents' expectations also play an important role in students' financial literacy performance

Policy implications

- A well functioning education system is crucial if today's students are to succeed in America's rapidly changing financial landscape
- Financial literacy levels in the US need to be raised in order to ensure that a DC pension system is sustainable
- This can be done by
 - Developing and implementing a coherent set of national standards and teaching framework
 - Investing more in schools by improving educational materials and training teachers
 - Encouraging parental involvement in children's scholastic achievements to create conditions that allow for academic success

Thank you

Global Financial Literacy Excellence Center (GFLEC)

Web site: <http://www.gflec.org/>

E-mail: alusardi@gwu.edu

Follow us on twitter: [@A_Lusardi](https://twitter.com/A_Lusardi)

