

**Colston Warne Lecture**

**Financial Literacy Skills for the 21<sup>st</sup> Century:  
Evidence from PISA**

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## Foreword

I am delighted to be asked to give the Colston Warne Lecture at the American Council on Consumer Interests annual conference. What I want to cover in this lecture is what I consider to be one of the most important topics for consumers: financial literacy. This topic is particularly important for the young and, in this lecture, I will describe the findings from the first international survey on financial literacy among high school students: the Programme for International Student Assessment (PISA). I am honored to chair the financial literacy expert group that designed the financial literacy assessment in PISA. Our journey to design that assessment included meetings in many countries and lasted for several years. It is one of the works I have enjoyed the most. I hope the findings from PISA will be a catalyst for changes in education policies, including adding financial literacy to school curricula.

## Introduction<sup>1</sup>

Governments and employers have increasingly transferred the responsibility to save and invest to individuals. For example, the reduction of state-supported pensions in some countries means individuals must save in order to provide for their own financial security after retirement. For young people, these savings must be ample enough to cover longer retirement periods due to higher life expectancies. Consumer credit has also become widely available, but so have the risks associated with it. Unfortunately, a majority of workers lack sufficient knowledge and skill to manage this new level of individual responsibility (OECD, 2008, Lusardi and Mitchell, 2014).

Financial literacy is an important element of economic and financial stability both for the individual and the economy. Wide-ranging developments in the financial marketplace have contributed to growing concerns about the level of financial literacy of citizens of many countries. Moreover, the 2008 financial crisis demonstrated that ill-informed financial decisions—often caused by a lack of financial literacy—can have tremendous negative consequences (INFE/OECD, 2009; OECD, 2009).

Financial literacy is particularly important for the young, as they face financial decisions that can have important consequences throughout their life. The younger generations' increased responsibility requires them to have the knowledge to make sound financial decisions early on. One such decision is the investment in education, i.e., whether or not to go to college and how to finance that education. When facing major financial decisions such as these, financial literacy is critical.

In 2005, the Organization for Economic Cooperation and Development (OECD) published an important report highlighting the severe lack of financial literacy in many countries

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<sup>1</sup> I would like to thank Flore-Anne Messy from the OECD for her tireless work on PISA, and the Center for Financial Studies at Goethe University, Frankfurt, Germany, for financial support. I am also grateful to Francesca Guiso and Carlo de Bassa Scheresberg for excellent research assistance.

around the world. In 2008, the OECD created the International Network on Financial Education (INFE) in order to reach beyond the OECD member countries to share information, collect evidence, and develop analytical work and policy instruments on key priority areas in financial education. Financial education programs in schools and international measurements of financial literacy were recognized by the OECD and its INFE as top priority issues. In response, dedicated expert subgroups were created to launch data collection and development work in these areas. The lack of data on financial literacy among the young initiated the idea to design a survey that assesses youths' level of financial literacy. These measurements became part of the OECD's Programme for International Student Assessment (PISA).

### **PISA and the Financial Literacy Assessment**

PISA is a triennial international survey. Since its first wave in 2000, PISA has tested 15-year-old students' skills and knowledge in three key domains: mathematics, reading, and science. The most recent wave of PISA, carried out in 2012, assessed about 510,000 students in 65 economies. In addition to student performance data, PISA collects information about student and school backgrounds through questionnaires that are completed by students, heads of school, and, in some countries, parents. These data help identify the factors that may influence student performance. 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. These assessments are conducted to help us understand if students near the end of compulsory education have acquired the knowledge and skills essential for full participation in society. Given these objectives, financial literacy seemed to be a logical addition to PISA.

In 2012, PISA introduced the first optional financial literacy assessment, which became the first large-scale international study to assess youths' financial literacy. A sample of students were selected from the same schools that completed PISA's core assessments in mathematics, reading, and science. As explained later, the PISA financial literacy assessment measures the proficiency of 15-year-olds in demonstrating and applying financial knowledge and skills.

The optional assessment was conducted in a total of 18 countries and economies.<sup>2</sup> 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 United States; 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 nine million 15-year-olds in the schools of the 18 participating countries and economies. In addition, parents, principals, and system leaders provided data on school policies, practices, resources, and other institutional factors.

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<sup>2</sup> Note that in some cases the assessment was performed only in a part of the country and did not cover the entire country.

Planning for the 2012 financial literacy assessment began many years before the assessment. In 2010, the OECD put together an expert group to help design the 2012 financial literacy assessment. This expert group represented stakeholders from different countries and included regulators, practitioners, and academics as well as representatives of treasury departments and central banks. They developed the financial literacy assessment over a two-year period and following a methodology whose main features are described below.

The work of the expert group started by defining financial literacy. While many definitions for financial literacy already exist, the challenge was to articulate a definition that holds true across countries and conveys why financial literacy is such a necessary skill:<sup>3</sup>

*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, 2014b)*

There are four innovative aspects of this definition that 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, like reading, writing, and knowledge of science, enables young people to participate in economic life. As stated in the title of Volume VI of the PISA report, financial literacy is an essential skill for the 21<sup>st</sup> century.

To design the assessment, three dimensions were considered: content, processes, and contexts.

**Content** comprises the areas of knowledge and understanding that are essential for financial literacy. Four content areas were identified:

- Money and transactions
- Planning and managing finances
- Risk and reward
- Financial landscape

**Processes** describe the approaches and mental strategies that are called upon to negotiate the material. They are as follows:

- Identifying financial information
- Analyzing information in a financial context

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<sup>3</sup> For detail see the Financial Literacy Framework, which was published as a chapter in PISA 2012 Assessment and Analytical Framework: Mathematics, Reading, Science, Problem Solving and Financial Literacy (OECD, 2013)

- Evaluating financial issues
- Applying financial knowledge and understanding

**Contexts** refer to the situations in which the financial knowledge, skills, and understanding are applied, ranging from the personal to the global. They were divided into four groups:

- Education and work
- Home and family
- Individual
- Societal

Each of these dimensions is described in more detail in Appendix 1. The table below provides some examples of what being financially literate might mean for a 15-year-old. Examples of the questions used to measure financial literacy are provided in Appendix 2.

**Table 1: 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 theatre, 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.

Source: OECD. (2014). PISA 2012 Results: Students and Money: Financial Literacy Skills [PowerPoint slides]

A certain level of numeracy is considered to be a necessary component of financial literacy, yet mathematical aptitude is not the main focus of the measure. Tasks and questions in the financial literacy assessment were framed in such a way as to avoid the need for substantial calculation.

Basic reading proficiency is also assumed in the financial literacy assessment. To minimize the level of reading literacy required, tasks and questions were designed to be clear, simple, and brief (OECD, 2013). However, complex language was intentionally presented in

tasks that assessed the students' capacity to read and interpret the language of financial documents.<sup>4</sup>

The response formats used in the assessment were based on the type of evidence being collected as well as on technical and pragmatic considerations (OECD, 2013). Two main question formats were used: constructed-response and selected-response.

**Constructed-response questions**<sup>5</sup> require students to generate their own answers. The answer format may be a single word or figure, a few sentences, or a worked calculation.

**Selected-response questions** require students to choose one or more alternatives from a given set of options. Items in this category include multiple-choice or yes/no questions.

The constructed-response questions provide a good format for assessing students' ability to justify a decision or demonstrate an analytical process. The selected-response questions are more suitable for assessing students' ability to identify information as well as their understanding of higher-order concepts that they may not be able to express in their own words.

A mixture of multiple-choice and constructed-response questions was used in the assessment to avoid potential measurement bias. Indeed, previous research has shown that personal characteristics, such as gender, affect responses to different question formats. These are aspects of the assessment that are important to the interpretation of the empirical findings, as will be discussed in more detail below.

The relative difficulty of test questions was estimated based on the proportion of students answering each question correctly; relatively easy questions were answered correctly by a larger proportion of students than more difficult questions (OECD, 2014b). Similarly, the relative proficiency of students was estimated using the proportion of test questions that they answered correctly; a highly proficient student will answer more questions correctly than his or her less proficient peers (OECD, 2014b). The relationship between the difficulty of questions and the proficiency of students was presented on a single continuous scale, which was divided into five levels. Level 2 is the international baseline proficiency level, Level 5 indicates high proficiency, and Level 1 indicates low proficiency (students in Level 1 are considered to be not financially literate). Students at each level are expected to be proficient at the preceding level. A summary description of the five levels of proficiency in financial literacy can be found in Appendix 3. These levels allow researchers to investigate the differences in financial literacy not only across

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<sup>4</sup> The terms that 15-year-olds can reasonably be expected to understand were determined with the help of the expert group (OECD, 2013).

<sup>5</sup> All except the simplest of constructed-response questions were coded by expert judges. The majority of the questions selected for the main financial literacy assessment survey did not require expert judgment (OECD, 2013).

countries but also within countries. Additional information on the methodology can be found in chapter 2 of the PISA report.

## **Empirical findings**

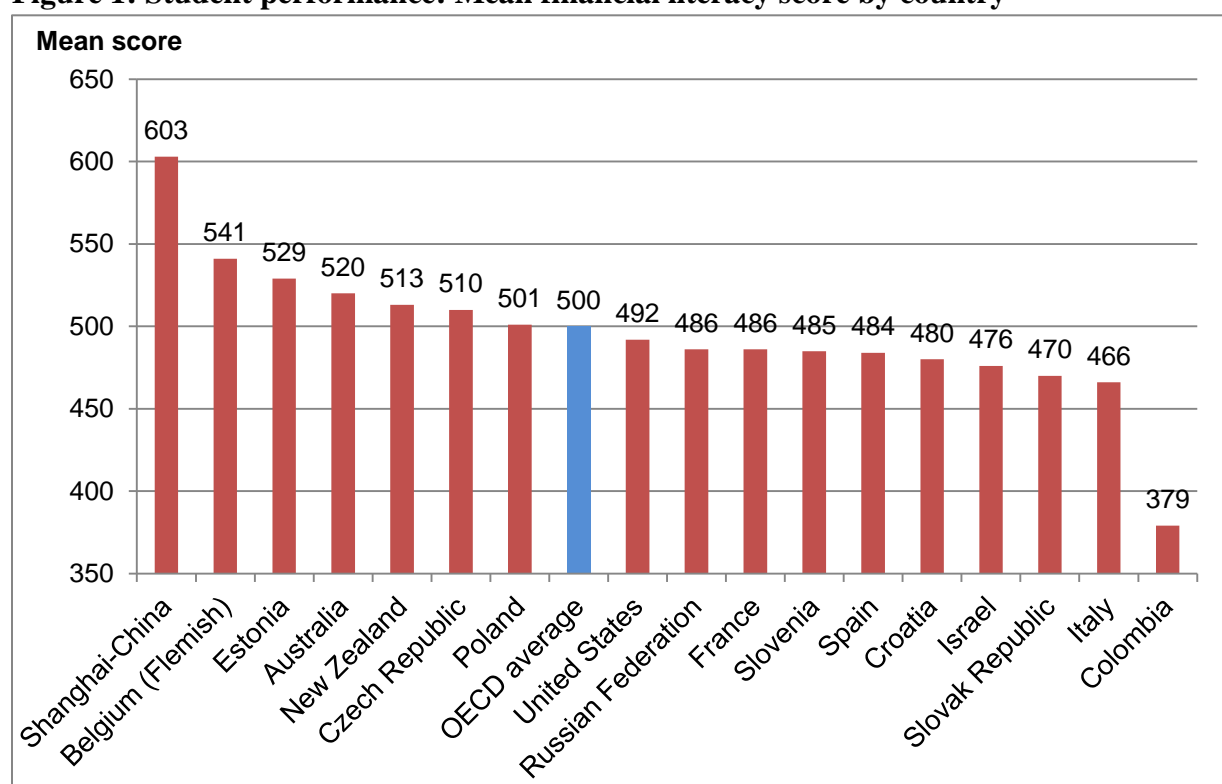
Findings about these data were officially released on July 9, 2014.<sup>6</sup> Figure 1 shows the mean scores for all participating countries and economies.<sup>7</sup> Countries differ sharply on how their youth perform: the values range from 379 points for Colombia to 603 points for Shanghai-China; the average score for the OECD countries is 500. In addition to Shanghai-China, the following countries' scores are statistically significantly higher than the OECD average: the Flemish Community (Belgium), Estonia, Australia, New Zealand, the Czech Republic, and Poland. The countries and economies whose mean scores are statistically significantly lower than the OECD average include the Russian Federation, France, Slovenia, Spain, Croatia, Israel, the Slovak Republic, Italy, and Colombia. As can already be inferred from the simple graph below, students from countries with well-developed financial markets do not always score well on financial literacy, a topic I will return to later in the text.

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<sup>6</sup> The Global Financial Literacy Excellence Center (GFLEC) at the George Washington University hosted the US release of the 2012 PISA financial literacy data in collaboration with the US Department of Education, the US Department of the Treasury, and the Consumer Financial Protection Bureau. For detail see <http://gflec.org/event-category/pisa-program/>.

<sup>7</sup> Students' scores were calculated using an imputation methodology usually referred to as plausible values (PVs). PVs are a selection of likely proficiencies for students who attained each score. A full description of the scoring method can be found in [Chapter 9 of the PISA 2012 Technical Report](#) (OECD, 2012).

**Figure 1: Student performance: Mean financial literacy score by country**



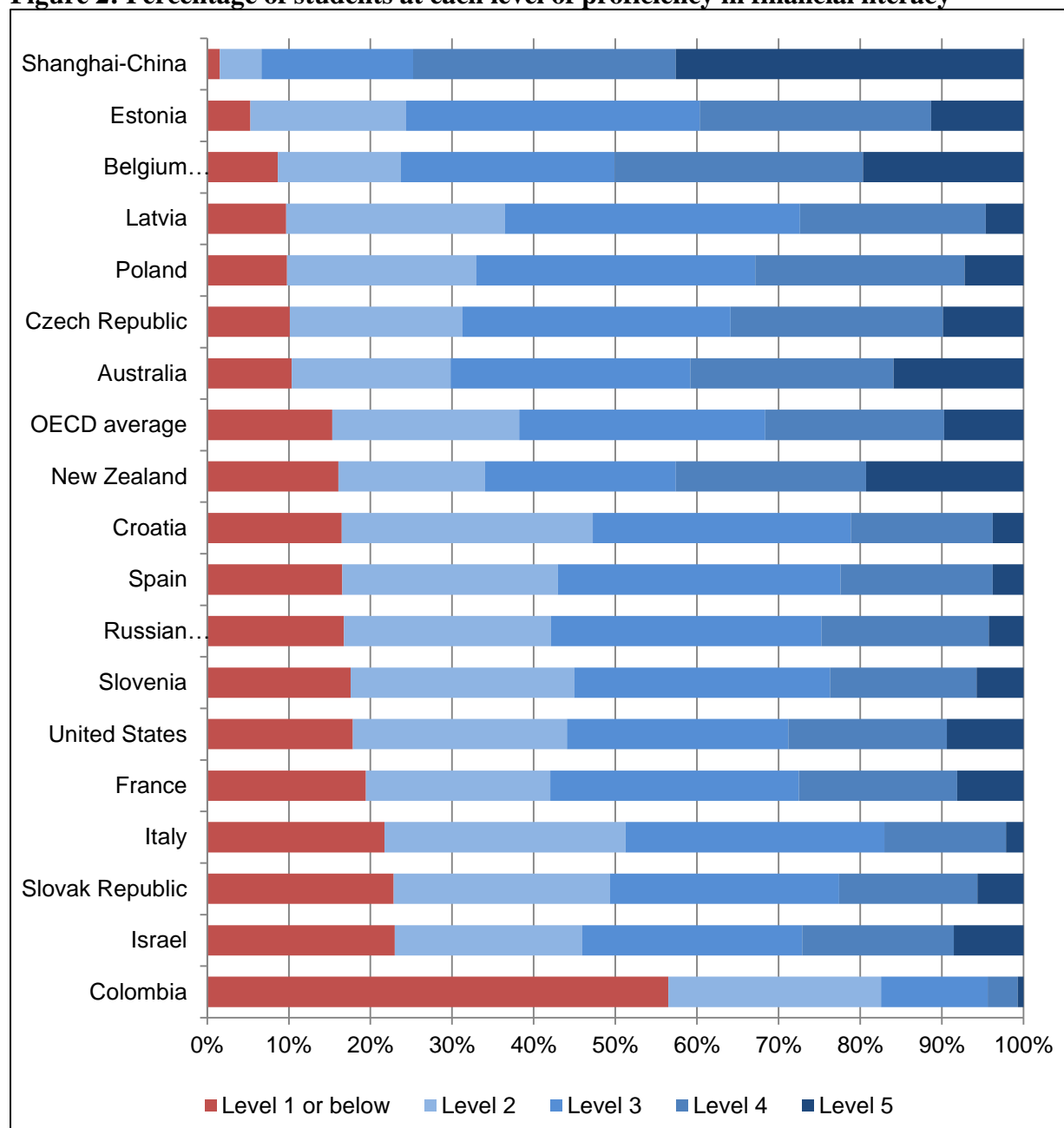
Source: OECD. (2014). *PISA 2012 Results: Students and Money (Volume VI): Financial Literacy Skills for the 21st Century*.

Looking not just at differences across countries but at proficiency scores within countries, Figure 2 shows that only about one in ten students across participating OECD countries and economies is able to perform at or above Level 5. In contrast, 15% of students score below the baseline level of performance. Thus, there is a sizeable proportion of students whose knowledge is very basic and below what is required to be considered financially literate. These low performers can, at best, recognize the difference between needs and wants, make simple decisions about everyday spending, recognize the purpose of common financial documents, and apply basic numerical operations in contexts that they are likely to have encountered personally (OECD, 2014b).

The top- and bottom-performing countries display a high share of students in the top and bottom proficiency levels respectively; in Shanghai-China as many 43% of students perform at Level 5 or above. On the other hand, in Colombia, 56% of students perform at Level 1 or below. There are wide differences in the percentage of students that perform at top and bottom levels across the rest of the countries. In eleven countries, more than 15% of students perform below the baseline level (Figure 2), including the United States (18%), France (19%), and Italy (22%). In contrast, less than 10% of students perform below the baseline in countries and economies such as the Flemish Community of Belgium (9%), Estonia (5%) and Shanghai-China (2%). These groups of students represent a potentially important target for financial education programs.



**Figure 2: Percentage of students at each level of proficiency in financial literacy**



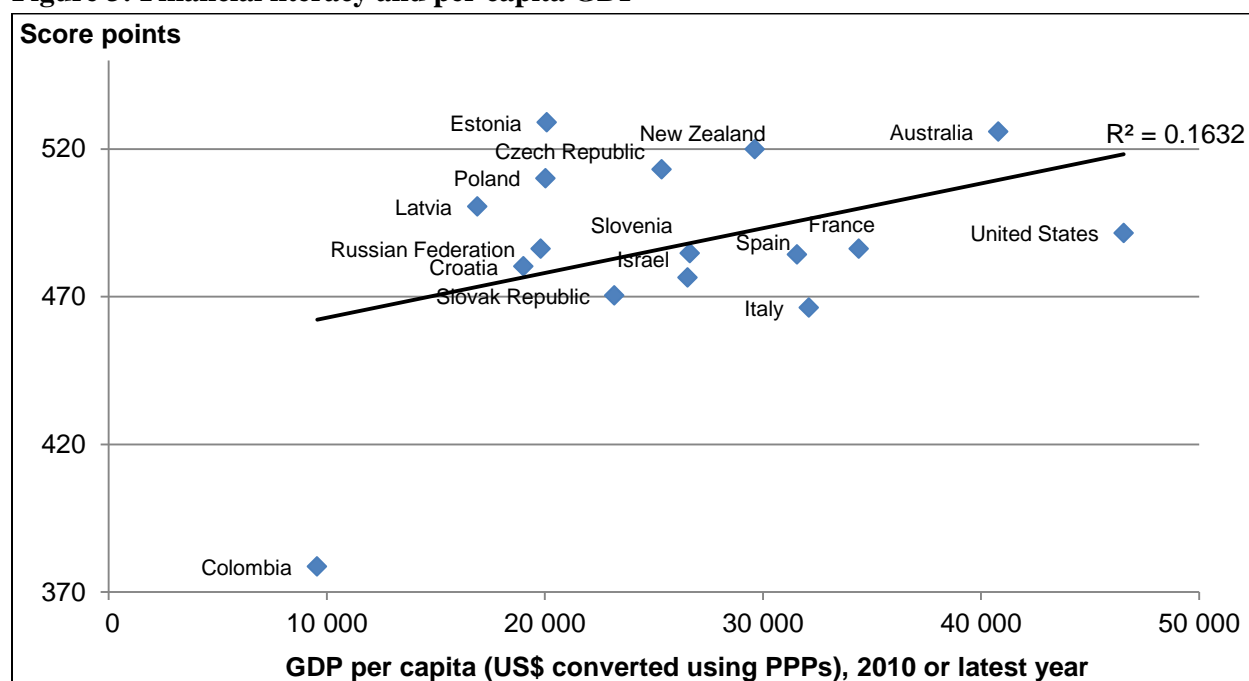
Source: OECD. (2014). *PISA 2012 Results: Students and Money (Volume VI): Financial Literacy Skills for the 21st Century*.

### What explains financial literacy among 15-year-olds? Some insights from the data

Analysis of the PISA data can shed light on the factors that are associated with differences in financial literacy. Below I discuss three main findings related to GDP per capita, gender difference in financial literacy, and the influence of parental background and economic status.

Living in a rich country does not seem to have a strong impact on the financial literacy scores of 15-year-olds. Figure 3 shows the relationship between per capita GDP and students' mean score on the financial literacy assessment. While higher per capita GDP is associated with higher mean scores, the scatter plot shows that some countries with lower levels of per capita GDP perform better on financial literacy measures than higher per capita income countries. For example, the mean scores of the Czech Republic, Estonia, and Poland are higher than those of France, Italy, or the United States, which all have higher per capita GDP than the former countries (OECD, 2014b). Overall, per capita GDP only explains 16% of the variation in the mean scores in financial literacy among the 16 participating countries.<sup>8</sup> The fact that students in advanced economies do not score higher than students in less rich countries underscores the importance of having a well-functioning educational system. Students do not acquire financial knowledge simply by “breathing the air,” this knowledge has to be offered in a rigorous format in school curricula.<sup>9</sup>

**Figure 3: Financial literacy and per capita GDP**



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

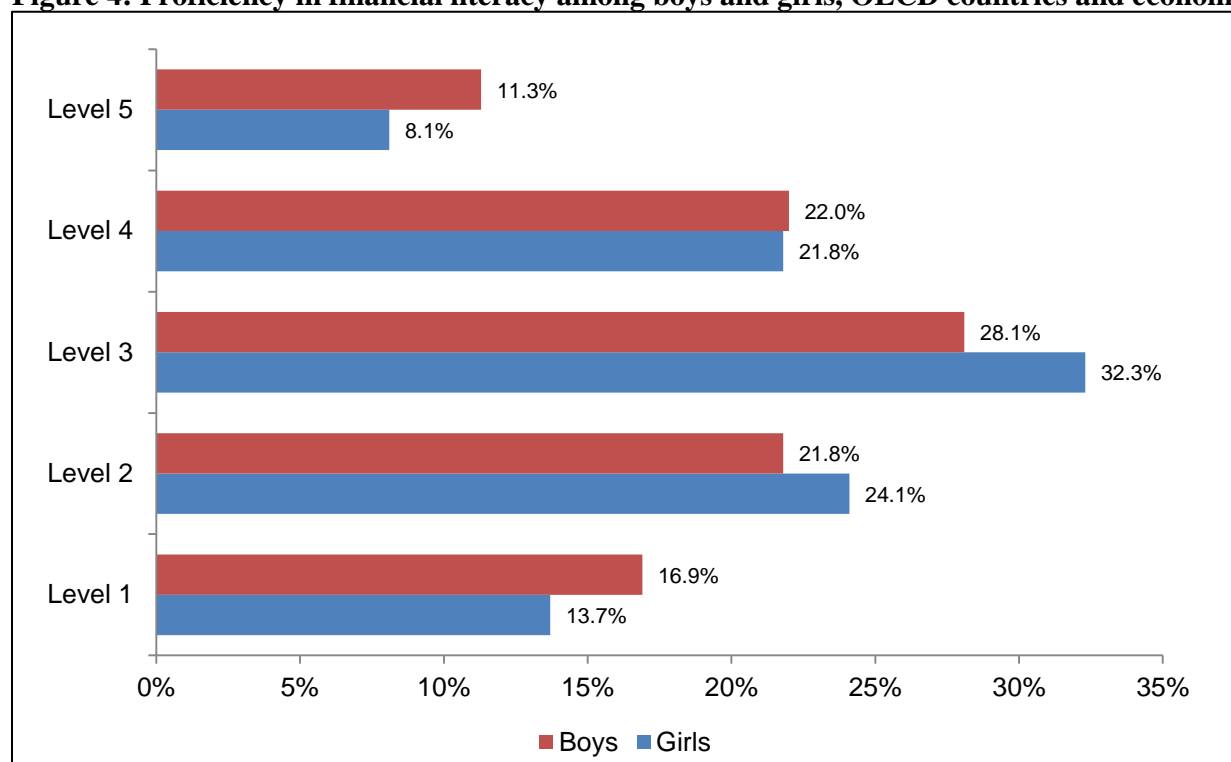
In most countries and economies, there are no gender differences in the average scores in financial literacy. Italy is the sole exception, with boys performing better than girls on average.

<sup>8</sup> The two participating economies that represent specific subsets of their respective countries, i.e., the Flemish Community of Belgium and Shanghai-China of the People's Republic of China, are not included in the regression.

<sup>9</sup> See also my testimony before the Subcommittee on Children and Families of the US Senate Committee on Health, Education, Labor and Pension. [http://gflec.org/wp-content/uploads/2015/01/a738b9\\_0729cbab74994861a46da4d71a678a38.pdf](http://gflec.org/wp-content/uploads/2015/01/a738b9_0729cbab74994861a46da4d71a678a38.pdf)

As mentioned earlier, the financial literacy assessment was designed to minimize potential gender differences in performance resulting from the format of the questions. Letting students answer in their own words (in the constructed-response questions) can minimize gender differences. Although the average scores for boys and girls are similar in most countries, girls and boys are not equally represented among high- and low-performing students. On average, across the OECD countries and economies, there are more boys than girls among the lowest performers (at or below Level 1) and among the top performers (at Level 5). Figure 4 shows that 11% of boys, compared to 8% of girls perform at Level 5, while 15% of boys and 14% of girls perform at or below Level 1. These findings speak to the need for different initiatives to promote financial literacy among girls and boys.

**Figure 4: Proficiency in financial literacy among boys and girls, OECD countries and economies**



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

Note: The graph shows countries with available data. The OECD average was based on countries and economies with available data.

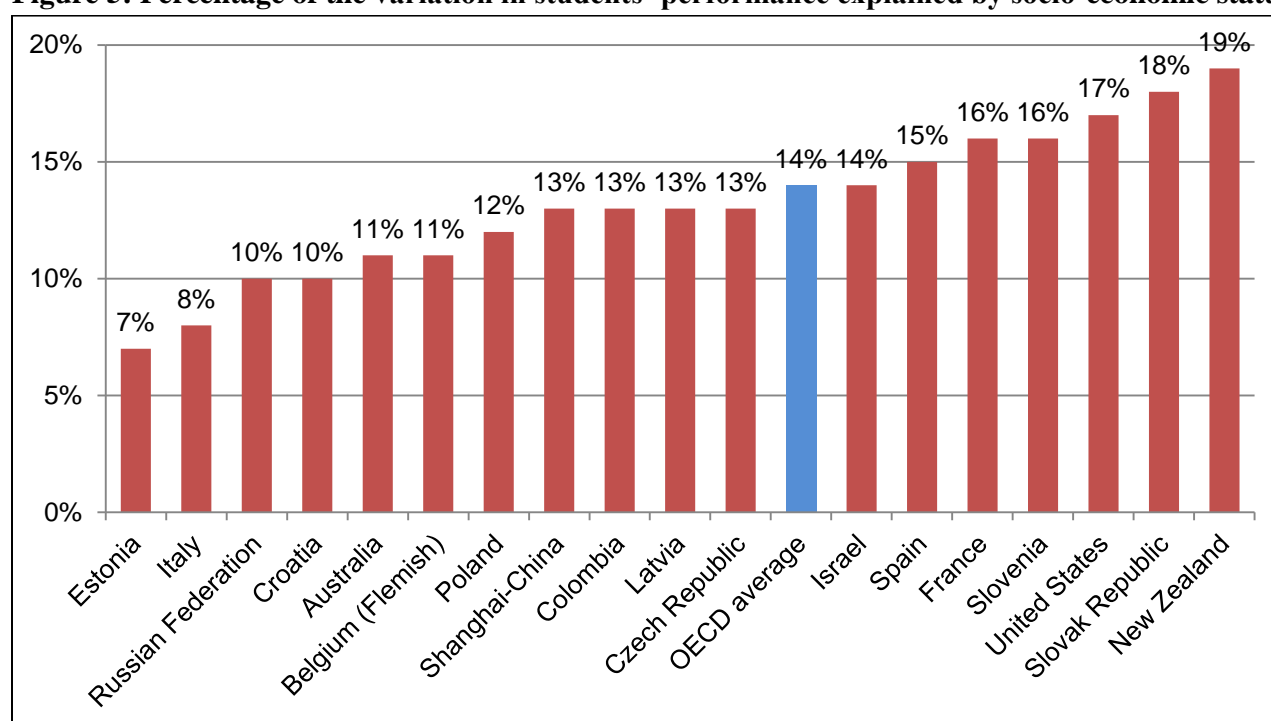
Several studies have documented a strong relationship between financial literacy and socio-economic background both among adults (Lusardi and Mitchell, 2014) and young adults (Lusardi, Mitchell, and Curto, 2010). Socio-economic status is an important determinant of financial literacy even among high school students. Students of higher socio-economic status are more likely to perform better than students of lower socio-economic status.

A student's socio-economic status is estimated by the PISA index of social, cultural, and economic status, which has been built to be internationally comparable. This index is based on

indicators such as parents' education and occupation, the number and type of home possessions (which are used to indicate levels of family wealth), and the educational resources available at home. Students are considered socio-economically advantaged if they are in the top quartile of the index in their country or economy and socio-economically disadvantaged if they are in the bottom quartile.

The PISA results confirm a very strong link between financial literacy and socio-economic status; in all countries the students who come from higher socio-economic households score better in financial literacy. The share of variation in performance explained by socio-economic status ranges from about 7% in Estonia to about 19% in New Zealand (Figure 6). Given the importance of this topic, the OECD, in collaboration with the Global Financial Literacy Excellence Center (GFLEC), organized a conference around this theme a few months after the PISA data was released.<sup>10</sup>

**Figure 5: Percentage of the variation in students' performance explained by socio-economic status**



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

<sup>10</sup> See the program at <http://www.oecd.org/finance/financial-education/oecd-info-gfleysymposiumfinancialliteracy.htm>

### **In focus: A multivariate analysis of PISA data**

The findings from the PISA 2012 financial literacy assessment in this and the OECD report provide a simple overview of financial literacy levels among 15-year-olds. When using multivariate regression analysis to investigate the many factors associated with differences in student performance in financial literacy, the analysis becomes much richer. In particular, it is possible to study the role of students' socio-economic status, age, gender, immigrant background (non-immigrant vs. immigrant), school location (rural vs. urban), language spoken at home (language of test vs. other), whether the student lives in a single-parent household, mothers' labor force participation, and fathers' labor force participation in explaining differences in financial literacy scores. These variables and country fixed effects were controlled for in the findings reported below.

Results from the multivariate analysis confirm the OECD report finding that socio-economic background explains a significant amount of variation in student performance in financial literacy: including this variable proves critical as it considerably increases the fit of the model. For this reason, it is important to account for socio-economic status when looking at how other variables are associated with differences in performance.

### **Summary of Findings**

#### **1. Gender differences exist among the young**

Although boys' financial literacy is not statistically different than that of girls in most countries, gender differences arise after introducing controls: boys perform significantly better (about 10 points higher) than girls.

#### **2. Small age differences still matter**

Although the sample consists of 15-year-old students, the age of students assessed ranges from 15 years and 3 months to 16 years and 2 months. This variation in age is significant: being a year older is associated with an 18-point increase in financial literacy.

#### **3. Learning environment and school resources are important**

Attending a school in a rural location is associated with a significantly lower financial literacy score (13 points lower). In addition to the variables mentioned earlier, average class size and the proportion of math teachers in the school both have a positive significant correlation with student financial literacy: a one-student increase in the average class size is associated with about a 1 point increase in financial literacy. A percentage point increase in the proportion of math teachers is associated with a 0.6 point increase in financial literacy, after accounting for class size. A percentage point increase in the percentage of girls in the class is associated with an 18 point increase in financial literacy, after accounting for class size and proportion of math teachers in the school.

#### **4. Parents' employment rates contribute to differences in financial literacy**

The labor force participation of mothers and fathers of students are both negatively correlated with student performance: a percentage point increase in mothers' labor force participation is associated with a 0.05 point decrease in financial literacy, whereas a percentage point increase in fathers' labor force participation is associated with a 0.17 point decrease in financial literacy.<sup>11</sup>

The first wave of results from the PISA financial literacy assessment is important as a benchmark for future data and to identify methods that are most suitable for developing students' financial literacy in different countries. A second financial literacy assessment is scheduled for 2015 and seventeen countries and economies<sup>12</sup> plan on participating (OECD, 2014b). Nine of these participated in the 2012 assessment, and their continued participation will allow for comparisons in financial literacy levels of students over time. This will be particularly useful in assessing the effectiveness of new programs aimed at developing students' financial knowledge and behavior.

The OECD results from the 2012 PISA financial literacy assessment provide an overview of financial literacy levels and their relationship with various characteristics of the students, schools, and countries that participated in the assessment. However, further analyses can offer more insights into the determinants of financial literacy. For example, Hospido, Villanueva, and Zamarro (2014) have used PISA data to study the effect of financial literacy training in secondary education in Spain. Bottazzi and Lusardi (2015) used PISA data to study gender differences in financial literacy in Italy. Christelis, Georgarakos, and Lusardi (2015) assessed the exposure to financial products and its effect on financial literacy. Their preliminary findings show that bank account ownership has a positive effect on the financial literacy of 15-year-olds.

#### **Using PISA data to inform education reforms and policy**

PISA data has had a great impact on education policy in its core domains of mathematics, reading, and science. For example, Switzerland and Germany initiated significant education policy reforms after the release of the first round of PISA results (Bieber, 2010; Niemann, 2010). Both countries were faced with lower-than-expected results in student performance. In Germany the findings from PISA 2000 generated an intense policy debate (Breakspear, 2012). The

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<sup>11</sup> For brevity, estimates are not reported but are available from the author upon request.

<sup>12</sup> These countries and economies plan on participating: Australia, the Flemish Community of Belgium, Brazil, Canada, Chile, Italy, Lithuania, the Netherlands, New Zealand, the People's Republic of China, Peru, Poland, the Russian Federation, the Slovak Republic, Spain, the United Kingdom, and the United States.

resulting reforms included generating national standards and establishing further support for disadvantaged students, especially those from immigrant backgrounds (Ertl, 2006).

Similarly, Mexico launched a reform known as the “Alliance for Educational Quality” in response to its poor performance in mathematics, reading, and science in the 2006 PISA (Figazzolo, 2009). In the US and France, education reforms designed to increase efficiency and competitiveness were justified by PISA data (Figazzolo, 2009). PISA results have also been used in Germany, Ireland, and Australia to make the case for more testing and evaluation (Figazzolo, 2009).

There has been a growing awareness of the importance of financial literacy in recent years, and many governments have become concerned with the levels of financial literacy of their population. Many have also recognized that financial literacy is especially important among the young, as this group faces increasingly more responsibility in making financial decisions. Interestingly, New Zealand and the Czech Republic, two countries that did much better on the financial literacy assessment than on the mathematics and reading assessments, are among the countries where a national strategy for financial literacy has been implemented (*Economist*, 2014).

A very important predictor of financial literacy is socio-economic status. Large disparities in performance highlight the importance of providing all students with equal access to resources and opportunities that can improve their financial literacy. Gaps in financial literacy determined by socio-economic status and family wealth can persist as these students become adults and into subsequent generations. Researchers have shown that financial literacy can play an important role in explaining wealth inequality. For example, in the United States, financial literacy alone can account for more than 40 percent of wealth inequality (Lusardi, Michaud, and Mitchell, 2013). Empirically, financial literacy has been linked to many financial decisions affecting assets, debt, and net wealth holdings (Lusardi and Mitchell, 2014). These findings indicate that disparities in financial knowledge early in life can act as a multiplier of economic inequality among older adults. The levels of and differences in financial knowledge among the young can have important consequences later in life. Thus, policy interventions could specifically target disadvantaged students, such as girls and students of low socio-economic status.

Countries such as the United Kingdom have passed laws to mandate financial literacy in high school. Schools provide an ideal venue for financial education programs and have the potential to become one of the pillars of a well-functioning retirement system. Financial education programs in school are not only scalable, but all demographic groups can benefit from them. In the US, a number of states have mandated that personal finance classes be taught in high school curricula. That education matters; research shows that when young people are exposed to rigorous financial education programs, they have higher credit scores and lower delinquency rates on their loans (Brown, Collins, Schmeiser, and Urban, 2014). This study confirms earlier findings by Tennyson and Nguyen (2001), who used Jump\$tart data and looked closely at state education requirements for personal finance education. They concluded that when

students were mandated to take a financial education course, they performed much better than students in states with no personal finance mandates.

### **High school financial education is a lever that can improve retirement security**

This lecture started by noting how the pension system has changed, not only in the United States, but in many countries around the world. The findings from the PISA financial literacy assessment have implications for retirement security as well. Major changes to pension systems and rising life expectancy in most advanced countries mean that financial security after retirement can be more difficult to achieve. In tandem, the shift from defined benefit to defined contribution pension systems transfers the responsibility of retirement saving onto individuals, even though few people have the skills required to make savvy financial decisions. For a defined contribution system to be sustainable, participants have to start contributing to retirement accounts as soon as they start working. Research shows that those who have low financial literacy are less likely to contribute to a retirement account, plan for retirement, and invest in high-return assets (Lusardi and Mitchell, 2014). The very low level of financial literacy among the young presents a challenge for the working of a system that relies on personal responsibility and the saving and investment decisions of individuals.

Gender differences among 15-year-old students are likely to persist throughout adulthood. Although the OECD report indicates that gender differences in financial literacy are not significant for most countries, our research finds that significant gender differences do exist in all countries, once factors such as socio-economic status, age, and other variables are accounted for. Gender differences in financial knowledge have also been observed among adults in a number of countries (Lusardi and Mitchell, 2014). Women tend to live longer than men and earn less than men over their lifetime, which means that financial decisions are particularly important for them when it comes to securing long-term financial well-being (OECD, 2013). The PISA financial literacy assessment results can help inform programs and policies related to retirement security.

### **Conclusion**

Financial literacy has become a skill that is essential to living and thriving in the modern economy. The financial choices that younger generations face are far more challenging than those faced by past generations. For example, financial services and products have become more complex and more widely accessible due to globalization and digital technologies. Individuals today must take on greater responsibility for their financial decisions, such as investing in additional education, saving for a child's education, or planning for retirement. Over the course of their adulthood, today's youth will bear more financial risks due to increased life expectancy, a decrease in welfare and occupational benefits, and uncertain economic and job prospects. In addition, 15-year-old students face immediate financial decisions; most are already consumers of financial services, such as bank accounts with access to online payment facilities. It is important



for young people nearing adulthood to be financially literate in order to face complex financial decisions that could affect the rest of their lives.

Large proportions of students—in countries and economies at all levels of economic and financial development—demonstrate only very basic financial literacy skills. More than 15% of students in the participating OECD countries and economies perform below the baseline level of proficiency. These students can complete only the simplest financial tasks, such as recognizing the difference between needs and wants or comparing the value of goods based on a comparison of their price per unit (OECD, 2014b). An improvement in financial literacy for these low-performing students is necessary to ensure their full participation in economic life.

I want to end this lecture with a statement I usually make at the end of all of my presentations and which is very much in line with what the PISA data is about: *“just as it was not possible to contribute to and thrive in an industrialized society without basic literacy—the ability to read and write—so it is not possible to successfully navigate today’s world without being financially literate. Financial literacy truly is an essential skill for the 21<sup>st</sup> century.”*

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## Appendix 1: Description and typical tasks for the categories of each assessment dimension

Content Category	Typical tasks within this category include...
<b>Money and transactions:</b> Includes the awareness of the different forms and purposes of money and handling simple monetary transactions such as everyday payments, spending, value for money, bank cards, checks, bank accounts and currencies.	<p><i>Asking students to show that they:</i></p> <ul style="list-style-type: none"> <li>• recognize bank notes and coins</li> <li>• can identify different ways to pay for items, in person or via the Internet</li> <li>• can check transactions listed on a bank statement</li> </ul>
<b>Planning and managing finances:</b> Includes planning and managing of income and wealth over both the short term and long term, and in particular the knowledge and ability to monitor income and expenses, as well as to make use of income and other available resources to enhance financial well-being.	<p><i>Asking students to show that they:</i></p> <ul style="list-style-type: none"> <li>• understand what government taxes and benefits are</li> <li>• can draw up a budget to plan regular spending and saving</li> <li>• understand the impact of compound interest on savings</li> </ul>
<b>Risk and reward:</b> Incorporates the ability to identify ways of managing, balancing and covering risks (including through insurance and saving products) and an understanding of the potential for financial gains or losses across a range of financial contexts and products, such as a credit agreement with a variable interest rate, and investment products	<p><i>Asking for an examination of the potential risks or rewards associated with:</i></p> <ul style="list-style-type: none"> <li>• various types of investment and savings vehicles</li> <li>• various forms of credit</li> <li>• market volatility</li> <li>• diversification</li> </ul>
<b>Financial landscape:</b> Relates to the character and features of the financial world. It covers knowing the rights and responsibilities of consumers in the financial marketplace and within the general financial environment, and the main implications of financial contracts. It also incorporates an understanding of the consequences of change in economic conditions and public policies, such as changes in interest rates, inflation, taxation or welfare benefits	<p><i>Assessing whether students:</i></p> <ul style="list-style-type: none"> <li>• understand that buyers and sellers have rights and responsibilities</li> <li>• can identify which providers are trustworthy</li> <li>• are aware of the economic climate</li> <li>• understand how the ability to build wealth or access credit depends on economic factors such as interest rates, inflation and credit scores</li> </ul>
Processes Category	Typical tasks within this category include...
<b>Identify financial information:</b> Applicable when the individual searches and accesses sources of financial information and identifies or recognizes their relevance.	<p><i>Asking students to show that they:</i></p> <ul style="list-style-type: none"> <li>• can identify the features of a purchase invoice</li> <li>• can locate information in a legal contract</li> <li>• can recognize financial terminology, eg. inflation</li> </ul>
<b>Analyze information in a financial context:</b> Covers a wide range of cognitive activities undertaken in financial contexts, including interpreting, comparing and contrasting, synthesizing, and extrapolating from information that is provided.	<p><i>Asking students to show that they:</i></p> <ul style="list-style-type: none"> <li>• can compare the terms offered by different mobile phone contracts</li> <li>• can work out whether an advertisement for a loan is likely to include unstated conditions</li> </ul>
<b>Evaluate financial issues:</b> Focuses on recognizing or constructing financial justifications and explanations, drawing on financial knowledge and understanding applied in specified contexts. It also involves cognitive activities, such as explaining, assessing and generalizing.	<p><i>Asking students to show that they:</i></p> <ul style="list-style-type: none"> <li>• can identify the relative financial merits of making a purchase or deferring it, given specified financial circumstances</li> </ul>

<b>Apply financial knowledge and understanding:</b> Focuses on taking effective action in a financial setting by using knowledge of financial products and contexts and understanding of financial concepts.	<p><i>Asking students to show that they:</i></p> <ul style="list-style-type: none"> <li>• can work out whether purchasing power will decline or increase over time when prices are changing at a given rate</li> </ul>
<b>Contexts Category</b>	<b>Typical tasks within this category include...</b>
<b>Education and work:</b> This category is important to 15-year-old students. While many students will continue in education or training at post-compulsory education, some of them may soon move into the labor market or may already be engaged in casual employment outside of school hours.	<p><i>Scenarios that involve:</i></p> <ul style="list-style-type: none"> <li>• understanding payslips</li> <li>• planning to save for tertiary study</li> <li>• investigating the benefits and risks of taking out a student loan</li> <li>• participating in workplace savings schemes</li> </ul>
<b>Home and family:</b> Includes financial issues relating to the costs involved in running a household. It is most likely that 15-year-old students will be living with family, but this context category also encompasses households that are not based on family relationships, such as the kind of shared accommodation that young people often use shortly after leaving the family home.	<p><i>Scenarios that involve:</i></p> <ul style="list-style-type: none"> <li>• buying household items or family groceries</li> <li>• keeping records of family spending</li> <li>• making decisions about budgeting and prioritizing spending</li> </ul>
<b>Individual:</b> Important within personal finance and especially for students, as most of their financial decisions, including using products such as mobile phones or laptops, are related to themselves and made for their personal benefit, and as many risks and responsibilities must also be borne by individuals. It includes choosing personal products and services as well as contractual issues, such as getting a loan.	<p><i>Scenarios that involve:</i></p> <ul style="list-style-type: none"> <li>• choosing products and services such as clothing, toiletries or haircuts</li> <li>• buying consumer goods such as electronic or sports equipment</li> <li>• opening a bank account</li> </ul>
<b>Societal:</b> The core of the financial literacy domain is focused on personal finances, but this context category recognizes that individuals' financial decisions and behaviors can influence and be influenced by the rest of society. It includes matters such as being informed and understanding the rights and responsibilities of financial consumers and understanding the purpose of taxes and local government charges.	<p><i>Scenarios that involve:</i></p> <ul style="list-style-type: none"> <li>• being informed about consumer rights and responsibilities</li> <li>• understanding the purpose of taxes</li> <li>• being aware of business interests</li> <li>• taking into account the role of consumer purchasing power</li> </ul>


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

## Appendix 2: Sample questions

The actual questions that were used in the assessment are confidential and were not distributed. PISA questions often refer to situations that take place in the fictional country of Zedland, where the Zed is the unit of currency. This artificial currency has been introduced to enhance comparability across countries and is explained to the students before the test begins.

### Example 1: INVOICE (Level 1)

Sarah receives this invoice in the mail

				
<b>Breezy Clothing</b>		Invoice Invoice Number: 2034 Date issued: 28 February		
Sarah Johanson 29 Worthill Rd Kensington Zedland 3122		Breezy Clothing 498 Marple Lane Brightwell Zedland 2090		
Product code	Description	Quantity	Unit cost	Total (excluding tax)
T011	T-shirt	3	20	60 zeds
J023	jeans	1	60	60 zeds
S002	scarf	1	10	10 zeds
Total Excluding Tax:				130 zeds
Tax 10%:				13 zeds
Postage:				10 zeds
Total Including Tax:				153 zeds
Already Paid:				0 zeds
Total due:				153 zeds
Date due:				31 March

#### Question

Why was this invoice sent to Sarah?

- A. Because Sarah needs to pay the money to Breezy Clothing.
- B. Because Breezy Clothing needs to pay the money to Sarah.
- C. Because Sarah has paid the money to Breezy Clothing.
- D. Because Breezy Clothing has paid the money to Sarah.

**Correct answer: (A) – Because Sarah needs to pay the money to Breezy Clothing.**

**Nature of the task:** Recognise the purpose of an invoice. Calculations are not required in this item.

**Content:** *money and transactions*

**Process:** *identify financial information*

**Context:** *individual*

## **Example 2: NEW OFFER**

**(Level 5)**

Mrs Jones has a loan of 8000 zeds with FirstZed Finance. The annual interest rate on the loan is 15%. Her repayments each month are 150 zeds.

After one year Mrs Jones still owes 7400 zeds.

Another finance company called Zedbest will give Mrs Jones a loan of 10 000 zeds with an annual interest rate of 13%. Her repayments each month would also be 150 zeds.

### **Question**

If she takes the Zedbest loan, Mrs Jones will immediately pay off her existing loan.  
What are two other **financial** benefits for Mrs Jones if she takes the Zedbest loan?

1. ....
2. ....

**Correct answer: She will be paying a lower interest rate AND She will have more money available**

**Nature of the task:** Recognise positive consequences of transferring a loan to a lower interest rate. Calculations are not required in this item. Note that the following question – not reported in this online example – asks students about the possible disadvantages of taking the Zedbest loan.

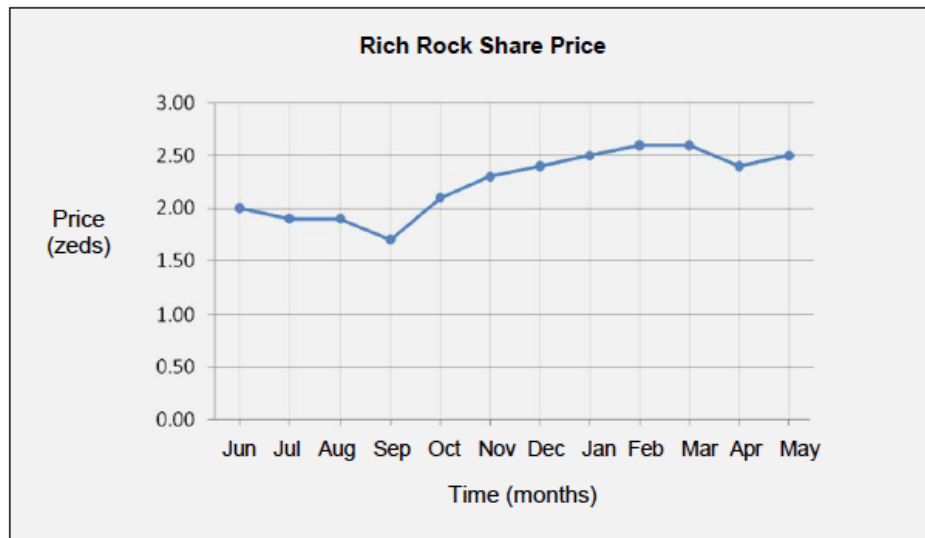
**Content:** *planning and managing finances*

**Process:** *analyse information in a financial context*

**Context:** *individual*

### Example 3: SHARES (Level 3)

This graph shows the price of one Rich Rock share over a 12-month period.



#### Question

Which statements about the graph are true?

Statement	Is the statement true or false?
The best month to buy the shares was September.	True / False
The share price increased by about 50% over the year.	True / False

**Correct answer:** Only the first statement is true

**Nature of the task:** Analyse information in a financial context by considering the information in a line graph about an investment product. The graph shows how the price of shares has changed over a year. The first part of the question assesses a student's understanding that shares should be bought when the price is low. The second part of the question assesses whether students can correctly identify the increase in share prices and calculate the percentage change over time.

**Content:** *risk and reward*

**Process:** *analyse information in a financial context*

**Context:** *individual*



### Appendix 3: Summary description of the five levels of proficiency in financial literacy

Level	Score range	% of students able to perform tasks at each level or above (OECD average)	What students can typically do
1	326 to less than 400 points	95.2%	Students can identify common financial products and terms and interpret information relating to basic financial concepts. They can recognize the difference between needs and wants and can make simple decisions on everyday spending. They can recognize the purpose of everyday financial documents such as an invoice and apply single and basic numerical operations (addition, subtraction or multiplication) in financial contexts that they are likely to have experienced personally.
<b>2 Baseline</b>	400 to less than 475 points	84.7%	Students begin to apply their knowledge of common financial products and commonly used financial terms and concepts. They can use given information to make financial decisions in contexts that are immediately relevant to them. They can recognize the value of a simple budget and can interpret prominent features of everyday financial documents. They can apply single basic numerical operations, including division, to answer financial questions. They show an understanding of the relationships between different financial elements, such as the amount of use and the costs incurred.
3	475 to less than 550 points	61.8%	Students can apply their understanding of commonly used financial concepts, terms and products to situations that are relevant to them. They begin to consider the consequences of financial decisions and they can make simple financial plans in familiar contexts. They can make straightforward interpretations of a range of financial documents and can apply a range of basic numerical operations, including calculating percentages. They can choose the numerical operations needed to solve routine problems in relatively common financial literacy contexts, such as budget calculations.
4	550 to 625 points	31.6%	Students can apply their understanding of less common financial concepts and terms to contexts that will be relevant to them as they move towards adulthood, such as bank account management and compound interest in saving products. They can interpret and evaluate a range of detailed financial documents, such as bank statements, and explain the functions of less commonly used financial products. They can make financial decisions taking into account longer-term consequences, such as understanding the overall cost implication of paying back a loan over a longer period, and they can solve routine problems in less common financial contexts.
5	equal to or higher than 625 points	9.7%	Students can apply their understanding of a wide range of financial terms and concepts to contexts that may only become relevant to their lives in the long-term. They can analyze complex financial products and can 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 can describe the potential outcomes of financial decisions, showing an understanding of the wider financial landscape, such as income tax.

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