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Student performance in financial literacy

This chapter compares students' performance in the 2015 PISA financial literacy assessment across countries and economies. It discusses what students know about financial literacy and how well they can apply what they know. It also describes how performance in 2015 compares to performance in 2012 in the countries and economies that participated in both assessments. The chapter then examines how student performance in financial literacy compares with performance in the core PISA subjects – mathematics, reading and science. The analysis is complemented with economic and financial information about participating countries and its association with students' performance in financial literacy.



Financial literacy is now recognised by policy makers as an essential life skill. Compared with their parents' generation, young people today are likely to face more complex financial decisions and more financial risk. Given this evolving landscape, a number of countries have been developing and adopting national strategies for financial education as a complement to financial consumer protection and regulation. Most of these strategies target young people, including by integrating financial education topics in school curricula or by developing financial education pilot programmes in schools.

In this context, are 15-year-old students competent and well-prepared to make financial decisions in their adult lives? Can they apply their knowledge and skills to make suitable financial plans? This chapter describes students' performance in the PISA 2015 assessment of financial literacy in 15 participating countries and economies: 10 OECD countries and economies and 5 partner countries and economies.

The chapter describes the tasks associated with each level of proficiency in financial literacy, as measured by PISA, compares results across participating countries and economies, and describes how average performance has changed over time in the countries and economies that participated in both the 2012 and 2015 assessments. It then analyses financial literacy performance in comparison with mathematics, reading and science performance. These analyses are complemented with contextual information about participating countries and economies.

What the data tell us

- Beijing-Shanghai-Jiangsu-Guangdong (China) outperforms all other participating countries/economies in financial literacy. The Flemish Community of Belgium, the participating Canadian provinces, the Russian Federation, the Netherlands and Australia, in descending order of mean performance, have mean scores above the OECD average.
- Some 12% of students across OECD countries and economies are top performers in financial literacy, meaning that they are proficient at Level 5. These students can analyse complex financial products and solve non-routine financial problems. They show an understanding of the wider financial landscape, such as the implication of income-tax brackets and can explain the financial advantages of different types of investments.
- On average across OECD countries and economies, 22% of students perform at or below Level 1. The percentage of students performing at or below Level 1 is larger than 20% in Brazil, Chile, Lithuania, Peru, Poland, the Slovak Republic, Spain and the United States. These students can, at best, recognise the difference between needs and wants, make simple decisions about everyday spending, and recognise the purpose of everyday financial documents, such as an invoice.
- On average across the 10 participating OECD countries and economies, around 38% of the variation in financial literacy scores reflects factors that are uniquely captured by the financial literacy assessment, while the remaining 62% of variation in financial literacy reflects skills that can be measured in the mathematics and/or reading assessments.
- In the Flemish Community of Belgium, Beijing-Shanghai-Jiangsu-Guangdong (China), the participating Canadian provinces and the Russian Federation, students perform better in financial literacy than students around the world who perform similarly in mathematics and reading. In contrast, students in Australia, Brazil, Chile, Italy, Lithuania, the Netherlands, Poland, the Slovak Republic and Spain perform worse than expected in financial literacy, based on the performance of students around the world in mathematics and reading.

HOW THE PISA 2015 FINANCIAL LITERACY RESULTS ARE REPORTED

The PISA test design makes it possible to construct a single scale of proficiency, drawing on all the questions in the financial literacy assessment. Each question is associated with a particular point on the scale that indicates its difficulty, and each student's performance is associated with a particular point on the same scale that indicates his or her estimated financial literacy proficiency. A description of the modelling technique used to construct this scale can be found in the *PISA 2015 Technical Report* (OECD, forthcoming).

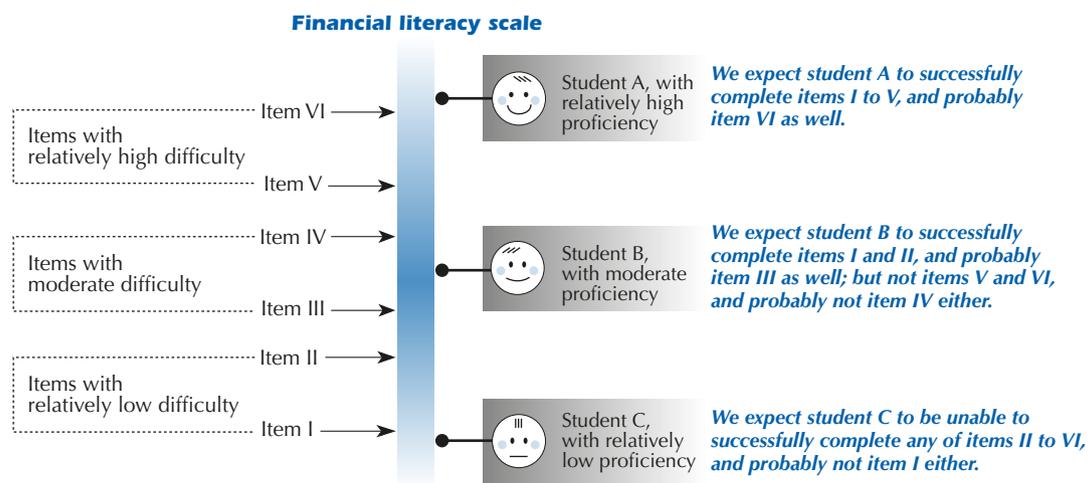
The relative difficulty of questions in a test is estimated by considering the proportion of students who answer each question correctly. Relatively easy questions are answered correctly by a larger proportion of students than more difficult questions. The relative proficiency of students can be estimated by considering the proportion of questions that they answer correctly. A highly proficient student will answer more questions correctly than his or her less-proficient peers. The difficulty of questions and the proficiency of students are presented on a single continuous scale.



The scale shows the kinds of questions that can be answered by more or less proficient students. The higher an individual's proficiency level is located above a given test question, the more likely he or she is to successfully complete the question (and other questions of similar difficulty); the further the individual's proficiency is located below a given question, the less likely is he or she to be able to successfully complete the question and other questions of similar difficulty. Figure IV.3.1 illustrates this probabilistic model.

The location on this scale of different levels of proficiency in financial literacy is set in relation to the particular group of questions used in the assessment. The individual test questions used to measure financial literacy were designed to represent the definition of financial literacy, just as the sample of students who sat the PISA test in 2015 was drawn to represent all 15-year-old students in the participating countries and economies. Estimates of student proficiency reflect the kinds of tasks students would be expected to perform successfully. This means that students are likely to be able to successfully complete questions located at or below the difficulty level associated with their own position on the scale. Conversely, they are unlikely to be able to successfully complete questions above the difficulty level associated with their position on the scale.

Figure IV.3.1 ■ Relationship between questions and student performance on a scale



AVERAGE PERFORMANCE IN FINANCIAL LITERACY

The PISA financial literacy assessment provides an overall picture of 15-year-olds' ability to apply their accumulated knowledge and skills to real-life situations involving financial issues and decisions. Results of this assessment are presented below, covering the average financial literacy performance in each country and economy. PISA outcomes are reported in a variety of ways. This section describes the country/economy results and shows the location of assessment tasks on the overall PISA financial literacy scale. The next section shows how the different levels of proficiency in financial literacy can be characterised, and how these proficiency levels are represented by the questions used in the survey.

When interpreting mean performance, only those differences that are statistically significant are taken into account (Box IV.3.1). Figure IV.3.2 shows the mean score for each country or economy, and allows readers to identify countries/economies with statistically similar means. The first column lists each participating country and economy in descending order of its mean financial literacy score (reported in the second column). Reading across each row, a list is provided of countries and economies with scores that are not significantly different from the value in the second column. The values range from a high of 566 points for Beijing-Shanghai-Jiangsu-Guangdong (China) (hereafter "B-S-J-G [China]") to a low of 393 points for Brazil. Box IV.3.2 discusses issues to bear in mind when interpreting these comparisons.

Figure IV.3.2 shows how participating countries and economies have been further divided into three broad groups as compared to the OECD average (where the OECD average corresponds to the arithmetic mean of the respective country estimates):

- those whose mean scores are close to the OECD average in the assessment of financial literacy (highlighted in dark blue)
- those whose mean scores are above the OECD average (highlighted in pale blue)
- those whose mean scores are below the OECD average (highlighted in medium blue).

Figure IV.3.2 ■ Comparing countries' and economies' mean performance in financial literacy

Mean score	Comparison country/economy	Countries and economies whose mean score is not statistically significantly different from the comparison country's/economy's score
566	B-S-J-G (China)	
541	Belgium (Flemish)	Canadian provinces
533	Canadian provinces	Belgium (Flemish)
512	Russia	Netherlands
509	Netherlands	Australia, Russia
504	Australia	Netherlands
487	United States	Poland, Italy
485	Poland	United States, Italy
483	Italy	Poland, United States
469	Spain	
449	Lithuania	Slovak Republic
445	Slovak Republic	Lithuania
432	Chile	
403	Peru	Brazil
393	Brazil	Peru

Source: OECD, PISA 2015 Database, Table IV.3.1.

Figure IV.3.3 shows how participating countries and economies compare in financial literacy performance, after taking into account the statistical uncertainty around the mean scores, since the reported values are derived from samples. It is possible to say, for example, that the rank of the Netherlands is between fourth and sixth and that of Australia is between fifth and sixth. However, we cannot say which country performed better because the mean scores of the Netherlands (509) and Australia (504) are not statistically significantly different from each other. The main difference between counting the number of countries whose performance is significantly higher (Figure IV.3.2) and the upper rank estimated in Figure IV.3.3 is that the former is based on pairwise comparisons of countries/economies, while the latter takes into account the multiple comparisons involved in computing a rank. Since the rank estimates for each country and economy provide a more nuanced interpretation of the rank positions than comparisons across countries, the results presented in Figure IV.3.3 should preferably be used when examining countries' and economies' rankings.

Among the 10 participating OECD countries and economies, the Flemish Community of Belgium and the participating Canadian provinces (British Columbia, Manitoba, New Brunswick, Newfoundland and Labrador, Nova Scotia, Ontario and Prince Edward Island) rank between first and second. They also rank between second and third among all countries and economies, following B-S-J-G (China), which ranks first overall. Two other OECD countries, namely Australia and the Netherlands, are high-performing countries in that their mean scores are statistically significantly higher than the OECD average. Both Australia and the Netherlands rank between third and fourth across OECD participating countries and economies; the Netherlands ranks between fourth and sixth among all participating countries and economies; Australia ranks fifth or sixth overall. The average scores of Poland and the United States are not statistically significantly different from the OECD average, both ranking between fifth and seventh across OECD countries and economies, and between seventh and ninth overall. The mean scores of four OECD countries, namely Chile, Italy, the Slovak Republic and Spain, are statistically significantly lower than the OECD average. The ranks of these countries among OECD participating countries and economies are as follows: Italy (between fifth and seventh), Spain (eighth), the Slovak Republic (ninth) and Chile (tenth). The ranks of these countries among all participating countries and economies are as follows: Italy (between seventh and ninth), Spain (tenth), the Slovak Republic (eleventh or twelfth) and Chile (thirteenth).

For subnational entities, whose results are also reported in Chapter 4 and Annex B2, a rank order was not estimated; but the mean score allows for a comparison of performance with that of countries and economies. For example, the Canadian province of British Columbia shows a score between those of top-performers B-S-J-G (China) and the Flemish Community of Belgium.

When partner countries and economies are also taken into consideration, B-S-J-G (China), which represents a specific subset of the national population, ranks first in financial literacy performance. The mean score of the Russian Federation (hereafter "Russia") is higher than the OECD average, with Russia ranking between fourth and fifth across all participating countries and economies. The mean scores of Brazil, Lithuania and Peru are lower than the OECD average. Lithuania ranks between eleventh and twelfth, Peru ranks fourteenth and Brazil ranks the lowest among all participating countries and economies. Box IV.3.2 offers a comparison with data on adults' financial knowledge.



Figure IV.3.3 ■ Financial literacy performance among participating countries/economies

	Financial literacy scale					
	Mean score	S.E.	Range of ranks			
			OECD countries/economies		All countries/economies	
			Upper rank	Lower rank	Upper rank	Lower rank
B-S-J-G (China)	566	(6.0)			1	1
<i>British Columbia (Canadian provinces)</i>	551	(7.1)				
Belgium (Flemish)	541	(3.0)	1	2	2	3
Canadian provinces	533	(4.6)	1	2	2	3
<i>Ontario (Canadian provinces)</i>	533	(6.1)				
<i>Nova Scotia (Canadian provinces)</i>	526	(6.7)				
<i>Massachusetts (United States)</i>	523	(6.7)				
<i>Bolzano (Italy)</i>	523	(6.2)				
<i>Prince Edward Island (Canadian provinces)</i>	522	(10.4)				
<i>Newfoundland and Labrador (Canadian provinces)</i>	519	(7.6)				
Russia	512	(3.3)			4	5
<i>New Brunswick (Canadian provinces)</i>	511	(7.4)				
<i>Trento (Italy)</i>	510	(3.1)				
Netherlands	509	(3.3)	3	4	4	6
<i>Lombardia (Italy)</i>	505	(5.7)				
Australia	504	(1.9)	3	4	5	6
<i>Manitoba (Canadian provinces)</i>	503	(7.1)				
<i>North Carolina (United States)</i>	496	(5.5)				
United States	487	(3.8)	5	7	7	9
Poland	485	(3.0)	5	7	7	9
Italy	483	(2.8)	5	7	7	9
Spain	469	(3.2)	8	8	10	10
<i>Basque Country (Spain)</i>	459	(5.3)				
<i>Campania (Italy)</i>	452	(7.1)				
Lithuania	449	(3.1)			11	12
Slovak Republic	445	(4.5)	9	9	11	12
Chile	432	(3.7)	10	10	13	13
Peru	403	(3.4)			14	14
Brazil	393	(3.8)			15	15

Note: OECD countries and economies are shown in bold black. Partner countries and economies are shown in bold blue. Regions are shown in italics.

Source: OECD, PISA 2015 Database.

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Box IV.3.1 When is a difference statistically significant? Three sources of statistical uncertainty

A difference is called statistically significant if it is unlikely that such a difference could be observed in the estimates based on samples, when in fact no true difference exists in the populations from which the samples are drawn.

The results of the PISA assessments for countries and economies are estimates because they are obtained from samples of students, rather than from a census of all students, and because they are obtained using a limited set of assessment tasks, not the universe of all possible assessment tasks. When students are sampled and assessment tasks are selected with scientific rigour, it is possible to determine the magnitude of the uncertainty associated with the estimate. This uncertainty needs to be taken into account when making comparisons so that differences that could reasonably arise simply due to the sampling of students and items are not interpreted as differences that actually hold for the populations. The design of the PISA test and sample are determined with respect to the objective of reducing, as much as possible, the statistical error associated with country-level statistics. Two sources of uncertainty are taken into account:

- *Sampling error*: The aim of a system-level assessment such as PISA is to generalise the results based on samples to the larger target population. The sampling methods used in PISA ensure not only that the samples are representative and provide a valid estimate of the population mean score and distribution, but also that the

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error due to sampling is reduced to a minimum. The sampling error decreases with the number of schools and (to a lesser extent) of students included in the assessment. The sampling error associated with a country's mean performance estimate is, for most countries, around two to three PISA score points. For the OECD average in core domains (which is based on 35 independent national samples) the sampling error is reduced to about 0.4 PISA score point; for the OECD average in financial literacy (which is based on only 10 independent samples) the sampling error is about 1 PISA score point.

- *Measurement error* (also called imputation error): No test is perfect and can fully measure broad concepts such as mathematics, reading, science or financial literacy. The use of a limited number of items to assess broad domains, for instance, introduces some measurement uncertainty: would the use of a different set of items have resulted in different performance? This uncertainty is quantified in PISA. Among other things, it decreases with the number of items in a domain that underlie a proficiency estimate. It is therefore somewhat larger for minor domains than for major domains, and it is larger for individual students (who only see a fraction of all test items) than for country means (which are based on all test items). It also decreases with the amount of background information available. For country mean estimates, the imputation error is smaller than the sampling error (around 0.5 PISA score point).

When comparing results across different PISA cycles, an additional source of uncertainty must be taken into account. Indeed, even if different PISA assessments use the same metric for measuring performance (for financial literacy, this metric was defined in PISA 2012, when financial literacy was assessed for the first time), the test instruments and items used in the assessment change in each cycle, as do the calibration samples and sometimes the statistical models used for scaling results. To make the results directly comparable over time, scales have to be equated. This means that results are transformed so that they can be expressed on the same metric. The *link error* quantifies the uncertainty around the equating of scales. The procedures used for equating PISA 2015 results to prior scales are described in Annex A5; further details on the link error and the equating procedures are provided in the *PISA 2015 Technical Report* (OECD, forthcoming). Box IV.3.3 discusses further issues related to the comparison of financial literacy performance between the PISA 2012 and 2015 assessments.

The link error affects all scaled values equally and is therefore independent of the size of the student sample. As a result, it is the same for estimates based on individual countries, on subpopulations, and on the OECD average. For comparisons between financial literacy results in PISA 2015 and financial literacy results in PISA 2012, the link error corresponds to about 5.3 score points, making it by far the most significant source of uncertainty in trend comparisons.

Box IV.3.2 **OECD/INFE International Survey of Adult Financial Literacy Competencies**

Addressing a call by G20 Leaders to develop practical tools for financial literacy measurement, the OECD International Network on Financial Education (OECD/INFE) conducted an international data collection exercise to measure financial literacy and financial inclusion. Over 50 000 adults aged 18 to 79 from 30 countries and economies around the world participated in the survey. The results provide insights into aspects of financial knowledge, attitude, behaviour and inclusion (OECD, 2016a).

The OECD/INFE International Survey of Adult Financial Literacy Competencies asked a series of questions aimed at measuring financial knowledge, such as about the time-value of money, interest, inflation, risk and diversification. Results of the survey show that, on average across the 17 participating OECD countries, 62% of adults could answer correctly at least five out of seven financial knowledge questions. Among the countries that also participated in the PISA 2015 financial literacy assessment, fewer than 50% of adults in Brazil and Russia could answer correctly at least five out of seven questions, while 64% of adults in the Netherlands could do so. Comparisons with PISA findings should be made with caution, as the evidence is drawn from different measurement tools and on different sets of countries; but the different country rankings across adults and young people might suggest a considerable generational divide in some countries. For instance, students in Russia perform relatively well at the international level, while adults in that country perform relatively poorly compared to adults in other countries.



STUDENTS AT THE DIFFERENT LEVELS OF PROFICIENCY IN FINANCIAL LITERACY

The single continuous scale of financial literacy constructed for the PISA 2012 assessment was divided into five levels, according to robust statistical principles. The division into five proficiency levels remains valid for the 2015 assessment (see the *PISA 2015 Technical Report* [OECD, forthcoming]).

The descriptions of the proficiency levels were generated on the basis of the tasks located within each level, in order to encapsulate the kinds of knowledge and skills needed to successfully complete those tasks. The set of descriptions is presented as a proficiency scale. Level 5 is the highest described level, and Level 1 is the lowest. Level 5 questions are those found to be the most challenging for 15-year-old students at the end of compulsory education. At each level, students are also expected to be proficient at the preceding level. For example, students performing at Level 4 are expected to possess the competencies described at Levels 4, 3, 2 and 1, while students at Level 1 are likely to be able to complete Level 1 tasks successfully, but are unlikely to be able to complete tasks at Level 2 and higher. Box IV.3.3 provides further explanations on the link between the continuous scale and proficiency levels.

The PISA assessment of financial literacy uses the same method for constructing proficiency scales as other PISA domains. Based on students' performance on the questions in the test, their score points are generated and located on a specific part of the scale that, in turn, is associated with a proficiency level.

A student at a particular proficiency level would be expected to correctly answer most of a random selection of questions located within the same level. Thus, for example, in a hypothetical assessment composed of tasks spread uniformly across Level 3, students with a score located within Level 3 would be expected to complete at least half of the questions successfully. Because a level covers a range of difficulty and proficiency, the success rates for students vary. Students at the bottom of the level are likely to be able to correctly answer 50% of questions spread uniformly across the level, while students at the top of the level are likely to correctly answer 70% of the same questions.

Figure IV.3.4 provides details about the financial literacy skills, knowledge and understanding required at each level of proficiency described in this volume.

Figure IV.3.4 ■ Summary description of the five levels of proficiency in financial literacy

Level	Score range	What students can typically do
5	Equal to or higher than 625 points	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 analyse 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.
4	550 to less than 625 points	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.
3	475 to less than 550 points	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.
2 Baseline	400 to less than 475 points	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 recognise 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.
1	326 to less than 400 points	Students can identify common financial products and terms and interpret information relating to basic financial concepts. They can recognise the difference between needs and wants and can make simple decisions on everyday spending. They can recognise 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.

Figure IV.3.5 ■ Map of selected financial literacy questions in PISA 2015

Level	Score range	Questions	Position on PISA scale	Nature of the question
5	Equal to or higher than 625 points	BANK ERROR Question 1	797	Evaluate financial issues about the financial landscape by focusing on potential fraud. Students should demonstrate that they know how to take appropriate precautions by recognising what can be considered good advice in case they receive a financial scam e-mail message. Numeric operations are not required.
		INVOICE Question 3 Full credit	660	Interpret a financial document in a complicated situation that is likely to take place in real life. Students are required to calculate the correct amount due, given that the quantity described on the invoice is incorrect. Full credit is given for the responses taking into account the tax change and postage. To get full credit, students need to interpret and use financial and numeric information in an unfamiliar context and solve a financial problem by using multiple numerical operations (i.e. addition, subtraction and calculation of percentages).
4	550 to less than 625 points	NEW OFFER Question 2	582	Evaluate two complex financial products (two different personal loans) with competing information to explain a negative financial consequence of changing to a larger loan. Students need to interpret financial and numeric information, and reason about the effect that different financial actions and variables have on financial well-being. In order to get full credit, students are required to describe a negative consequence of changing loans, such as the time taken to repay the money or the additional interest paid. No numerical operations are required.
		PAY SLIP Question 1	551	Identify financial information on a pay slip. Students need to understand the difference between gross and net pay, that is, the difference between pay before and after any deductions have been made (such as deductions for health care or tax). Numeric operations are not required.
3	475 to less than 550 points	INVOICE Question 3 Partial credit	547	Interpret a financial document in a complicated situation that is likely to take place in real life. Students are required to calculate the correct amount due, given that the quantity described on the invoice is incorrect. Partial credit is given for the responses taking into account either the tax change or postage. To get partial credit, students need to interpret and use financial and numeric information and apply basic numerical operations (i.e. subtraction).
		MOTORBIKE INSURANCE Question 1 Part 3	494	Understand that the higher their risk exposure is with regards to measurable criteria, the more it will cost them to buy appropriate insurance. This question falls under the content area of risk and reward. Students need to be able to identify factors likely to affect the cost of motorbike insurance under given circumstances. No numerical operations are required.
2 Baseline	400 to less than 475 points	INVOICE Question 2	461	Identify a delivery cost in an invoice for clothing. It asks a specific question, and the relevant information is explicitly stated. To answer this question correctly, students need to identify the relevant information, understanding that postage refers to the delivery charge. While calculations are not required, students are required to identify numerical information: the cost of postage.
		AT THE MARKET Question 2	459	Apply the concept of value for money. Students are asked to make a logical comparison between boxed and loose tomatoes and to explain which option provides the best value for money. In order to support their argument, students can provide their answer in words or explain their idea with quantitative information by using the price ("Zed") and weight (kilogram). Using the context of shopping for groceries, this item assesses whether students can interpret and use financial and numeric information and explain their judgment based on proportional reasoning and single basic numerical operations (multiplication and division). To gain credit for this item, students have to demonstrate that they have compared the two ways of buying tomatoes using a common point of comparison.
1	326 to less than 400 points	AT THE MARKET Question 3	398	Evaluate financial information for decision making in shopping. The question examines whether students can recognise that buying things in bulk may be wasteful if a large amount is not needed, and it may be unaffordable to bear the higher absolute cost of buying in bulk in the short term. Students are required to evaluate a financial issue in the situation presented and describe their conclusion in this constructed response question. Students can provide their answers either by using words, without quantitative information, or by using numbers, with quantitative information of the price and weight. Full credit will be given if students can explain that buying more tomatoes at a cheaper price may not always be a good decision for some people.
		INVOICE Question 1	360	Interpret a financial document, an invoice, identifying its purpose in the context of the individual. Students are required to identify financial information by demonstrating a basic understanding of what an invoice is. Calculations are not required.

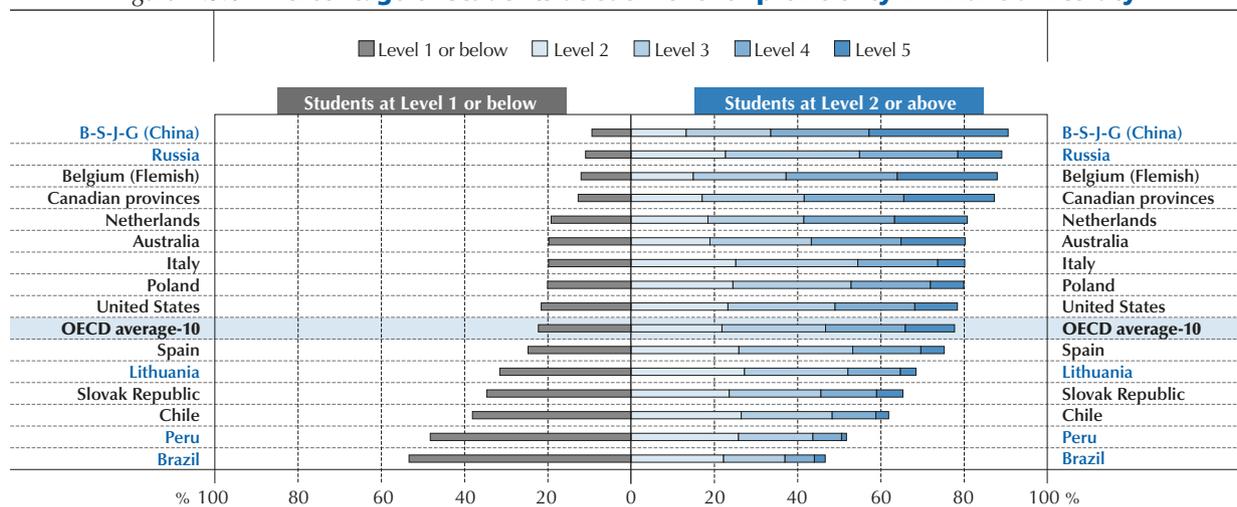


Some questions used in the PISA assessment of financial literacy are presented in Chapter 2 with the aim of showing how student performance was measured (see “Examples of PISA financial literacy assessment questions”). Not all questions can be made public as most will be used again in future assessments in order to establish reliable trends in performance.

Figure IV.3.5 maps the questions presented in Chapter 2 to their corresponding position on the described proficiency scale. Each question can be associated with a particular point on the scale that indicates its relative difficulty. The first column shows the proficiency level within which the question is located. The second column indicates the score range for a question that would allow it to be regarded as falling within that level. The third and fourth columns show the name of the unit and the question difficulty. Questions within the same unit can represent a range of difficulties. The unit INVOICE, for example, is composed of questions or parts of questions at Levels 1, 2, 3 and 5. Thus, a single unit may cover a wide range of difficulty on the PISA financial literacy scale.

The distribution of student performance across the proficiency levels is shown in Figure IV.3.6. Results are presented in terms of the percentage of 15-year-olds within each country and economy performing at the five proficiency levels described in Figure IV.3.4.

Figure IV.3.6 ■ Percentage of students at each level of proficiency in financial literacy



Countries and economies are ranked in descending order of the percentage of students who perform at or above Level 2.

Source: OECD, PISA 2015 Database, Table IV.3.2.

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Box IV.3.3 Interpreting cross-country comparisons of financial literacy performance

In PISA 2015, student performance in financial literacy is described across five levels of proficiency, each of which represents 75 score points. This means that there are 75 points between the top of one level and the top of the next. Thus, a difference in performance of one proficiency level represents a significant gap in performance. To illustrate this gap using the descriptions of levels, students proficient at Level 2 on the financial literacy scale are only starting to apply their knowledge to make financial decisions. They use given information to make financial decisions in contexts that are immediately relevant to them. At Level 3, students have the proficiency expected at Level 2 and below, and also begin to consider the consequences of financial decisions and make simple financial plans in familiar contexts.

By design, approximately two-thirds of the student population in OECD countries and economies score within 100 points of the OECD mean, set at 500 score points in the 2012 financial literacy assessment. The difference in average performance between the highest- and lowest-performing countries and economies among all participants is 173 score points (equivalent to more than two levels of proficiency). Considering only participating OECD countries and economies, the difference between the average performance of the highest- and lowest-performing countries/economies is 109 score points (equivalent to more than one level of proficiency).



Proficiency at Level 1 (scores higher than 326 points but lower than or equal to 400 points)

Students proficient at Level 1 display basic financial literacy skills. They can identify common financial products and terms, and interpret information relating to basic financial concepts, such as recognising the purpose of an invoice. They can recognise the difference between needs and wants and they make simple decisions on everyday spending, such as recognising value by comparing prices per unit. Students at this level can also apply single and basic numerical operations, such as addition, subtraction or multiplication, in financial contexts that they are likely to have personally encountered.

“AT THE MARKET – Question 3” requires Level 1 proficiency. This question asks students to evaluate financial information to make a shopping decision – a situation familiar to many 15-year-old students. It examines whether students can recognise that buying things in bulk may be wasteful if a large amount is not needed, and it may be unaffordable to bear the higher absolute cost of buying in bulk in the short term. Students are required to evaluate this situation from a financial perspective and describe their conclusion in this constructed-response question. Students can provide their answers either without quantitative information or with quantitative information about the price and weight. Full credit is given if students can explain why buying more tomatoes at a cheaper price may not always be a good decision for some people. Tasks at Level 1 require students to identify and recognise basic financial concepts and knowledge. These tasks are prerequisites for applying knowledge to real-life situations, which is required for the tasks at Level 2 and higher.

Students performing at or below Level 1 (that is, below Level 2, which is considered the baseline level of proficiency), are not yet able to apply their knowledge to real-life situations involving financial issues and decisions.

Across the 10 participating OECD countries and economies, 22% of students, on average, perform below the baseline level. A large variation is observed across countries and economies. Even in some high- and middle-performing OECD countries and economies, the percentage of students performing below the baseline level of proficiency is not negligible. In the United States, about 22% of students perform below the baseline level, as do about 20% of students in Australia, Italy and Poland, and 19% of students in the Netherlands. In contrast, among high-performing OECD countries and economies, only slightly more than one in ten students in the Flemish Community of Belgium (12%) and the participating Canadian provinces (13%) perform at or below Level 1. In some low-performing OECD countries, more than 30% of students perform below the baseline level: Chile (38%) and the Slovak Republic (35%). Among partner countries and economies, more than 40% of students in Brazil (53%) and Peru (48%) score below the baseline level, while in Russia, 11% of students perform at this level. Some 9% of students in B-S-J-G (China) and 32% of students in Lithuania perform at Level 1 or below. In Brazil, Chile, Lithuania, Peru and the Slovak Republic, there are more students performing at or below Level 1 than performing at any other proficiency level (Table IV.3.2).

Proficiency at Level 2 (scores higher than 400 points but lower than or equal to 475 points) – Level 2 is the baseline

Level 2 can be considered the baseline level of proficiency in financial literacy that is required to participate in society. At this level, in addition to exhibiting Level 1 proficiency, students are expected to begin to apply their knowledge to make financial decisions in contexts that are immediately relevant to them. They can recognise the value of a simple budget, and undertake a simple assessment of value-for-money, choosing between buying tomatoes by the kilogram or by the box, for example. Students at this level can also apply single, basic numerical operations to answer financial questions, and can show an understanding of the relationships between different financial elements, such as the amount of use and the costs incurred. These skills are essential for full participation in society as an independent and responsible citizen. Beyond their direct relevance and relationship with basic skills in other subjects, like mathematics and reading, these financial literacy skills may also be related to other competencies that are becoming increasingly important, such as critical thinking and problem solving.

“INVOICE – Question 2” is located within proficiency Level 2. This short, constructed-response question asks students to identify a delivery cost in an invoice for clothing. It asks a specific question and the relevant information is explicitly stated. To answer this question correctly, students need to identify the relevant information, understanding that postage refers to the delivery charge. This is an example of the type of interpretation that students may need to make frequently in adult life.

Across the 10 participating OECD countries and economies, on average, 22% of students perform at Level 2. In some countries, Level 2 corresponds to a median level of performance, meaning that the median score, i.e. the score that divides the population into two equal halves – one scoring above the median, one below – falls within Level 2. Level 2 corresponds to the median proficiency of students in Chile, Lithuania, Peru, the Slovak Republic and Spain (Tables IV.3.2 and IV.4.1).



On average across OECD countries and economies, 78% of students are proficient at Level 2 or above. In other words, about eight in ten students can apply their knowledge to commonly used financial products, terms and concepts. In five OECD countries and economies, at least 80% of students perform at or above Level 2: Australia (80%), the Flemish Community of Belgium (88%), the Canadian provinces (87%), Italy (80%) and the Netherlands (81%). Among partner countries and economies, 91% of students in B-S-J-G (China) and 89% of students in Russia perform at or above Level 2, while only 47% of students in Brazil do.

Proficiency at Level 3 (scores higher than 475 points but lower than or equal to 550 points)

Students proficient at Level 3 can apply their knowledge to commonly used financial concepts, terms and products to situations that are relevant to them. In addition to demonstrating proficiency at and below Level 2, students at this level are beginning to consider the consequences of financial decisions, and they make simple financial plans in common contexts, such as starting to compare some of the financial benefits of borrowing money with different interest rates and repayments. They are able to make straightforward interpretations of a range of financial documents, such as an invoice and a pay slip, and apply a range of basic numerical operations, such as making budget calculations. Students at this level can also choose the numerical operations needed to solve routine problems in relatively common financial literacy contexts. Therefore, they show not only a capacity to use mathematical tools but also to choose the tools that best apply to the financial tasks at hand.

The third part of the question “MOTORBIKE INSURANCE” requires Level 3 proficiency. The overall question asks students to identify factors likely to affect the cost of motorbike insurance under given circumstances. While buying insurance may be an unfamiliar situation to 15-year-old students, many students will need to know in their near future whether they have a legal obligation to buy insurance to protect against specific adverse events. They will have to decide whether they want to insure items that they have bought, and they will need to understand what factors are likely to affect the cost of insurance.

The part of the question that is located at Level 3 asks students to indicate whether having been responsible for two road accidents in the previous year is likely to increase the cost of insurance, reduce it or if it is likely to have no effect on cost. While no numerical operations are required, students need to analyse information in a financial context to have an understanding of the financial consequences of their actions. This question falls under the content area of risk and reward because insurance is a product designed specifically to protect individuals against risks and financial losses that they would not otherwise be able to bear.

Across OECD countries, on average, 25% of students score at Level 3, the largest share among the five proficiency levels described in PISA. Similarly, in eight countries and economies (Australia, the Canadian provinces, Italy, the Netherlands, Poland, Russia, Spain and the United States), the largest share of students performs at Level 3 (Table IV.3.2). Level 3 also corresponds to the median level of performance in seven participating countries and economies: Australia, the Canadian provinces, Italy, the Netherlands, Poland, Russia and the United States, (Table IV.4.1).

Across the 10 participating OECD countries and economies, on average, more than half (56%) of students are proficient at Level 3 or above. In four OECD countries and economies, the percentage of students performing at Level 3 or above is higher than 60%: Australia (61%), the Flemish Community of Belgium (73%), the Canadian provinces (70%) and the Netherlands (62%). By contrast, less than 50% of students perform at Level 3 or above in the OECD countries Chile (35%), the Slovak Republic (42%) and Spain (49%). Among partner countries and economies, the percentage of students who perform at or above Level 3 ranges from 24% in Brazil to 77% in B-S-J-G (China).

Proficiency at Level 4 (scores higher than 550 points but lower than or equal to 625 points)

Students proficient at Level 4 on the financial literacy scale can, in addition to demonstrating proficiency at and below Level 3, apply their knowledge of less-common financial concepts and terms to contexts that will be relevant to them as they move towards adulthood. Students at this level can interpret and evaluate a range of detailed financial documents and explain the functions of less-commonly used financial products. They can also make financial decisions taking into account longer-term consequences and can solve routine problems in perhaps unfamiliar financial contexts.

Tasks at Level 4 require an understanding of financial concepts and terms that are likely to be less commonly known among students, such as bank account management and compound interest. Compound interest refers to the process of earning (or paying) interest on interest. Students need to show that they understand that the simple interest rate should be



applied to both the original amount saved or borrowed and any interest that has been added to an account. The tasks at this level also include contexts that are not necessarily familiar to 15-year-old students but that will be relevant to them in their near future, such as a pay slip. Tasks also require an ability to identify the possible consequences of financial decisions, and to choose financial products based on those consequences, such as deciding between two loan offers with different terms and conditions.

“PAY SLIP – Question 1” requires Level 4 proficiency. This multiple-choice question asks students to identify and interpret financial information on a pay slip. While a pay slip is a common financial document, it may be unfamiliar to 15-year-old students. In this question, students need to understand the difference between gross and net pay, that is, the difference between pay before and after any deductions have been made (such as deductions for health care or income tax).

Across the 10 participating OECD countries and economies, on average, 19% of students perform at Level 4. Level 4 corresponds to the median level of performance in the high-performing economies of the Flemish Community of Belgium and B-S-J-G (China) (Tables IV.3.2 and IV.4.1). In the Flemish Community of Belgium, the share of students performing at Level 4 is the largest among the five proficiency levels, meaning that there are more students performing at Level 4 than at any other proficiency level. On average across OECD countries and economies, nearly one in three (31%) students is proficient at Level 4 or above. More than 40% students perform at Level 4 or above in the Flemish Community of Belgium (51%), B-S-J-G (China) (57%) and the Canadian provinces (46%). Less than 20% of students in Brazil (10%), Chile (14%), Lithuania (16%), Peru (8%), and the Slovak Republic (nearly 20%) score at this level or above.

Proficiency at Level 5 (scores higher than 625 points)

Students at Level 5 on the PISA financial literacy scale can successfully complete the most difficult items in this domain. In addition to exhibiting proficiency at or below Level 4, they can apply their understanding of a wide range of financial terms and concepts to contexts that may only become relevant to their lives later on, such as borrowing money from loan providers. Students at this level can analyse 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, such as calculating the bank balance in a given bank statement taking into account multiple factors, such as transfer fees. The tasks at this level are related to students' ability to look ahead and plan for the future to solve financial problems or make the kinds of financial decisions that will be relevant to many of them in the future, regardless of country contexts. Students at Level 5 can also describe the potential outcomes of financial decisions, showing an understanding of the wider financial landscape, such as income tax. These tasks relate to higher-order uses of knowledge and skills and can thus reinforce other competencies, such as the use of basic mathematical knowledge and the ability to look ahead and plan for the future.

The full credit response for “INVOICE – Question 3” requires Level 5 proficiency. This question asks students to interpret a financial document in a rather complex situation that is not uncommon in real life. Students are required to calculate the correct amount due, given that the quantity described on the invoice is incorrect, taking into account the sales tax as a percentage of purchase and the delivery charge. While the situation provided by this task might be unfamiliar to 15-year-olds, students are likely to face this kind of situation in real life as they become independent from their parents. In this task, full credit is given for the responses taking into account the tax change and postage, and partial credit is given to responses that only consider one of those factors. The full-credit score is located at Level 5, illustrating the fact that calculating a new total on an invoice, taking into account several factors, constitutes a significant challenge. To get full credit, students need to interpret and use financial and numeric information in an unfamiliar context and solve a financial problem by using multiple numerical operations, that is, addition, subtraction and calculation of percentages.

Level 5 is the highest described proficiency level in financial literacy; its upper score limit is not defined. Across the 10 participating OECD countries and economies, slightly more than one in ten (12%) students, on average, are proficient at Level 5. About one in four students in the Flemish Community of Belgium (24%) performs at Level 5 as does about one in three students in B-S-J-G (China) (33%). Among OECD countries and economies, between 10% and 25% of students perform at Level 5 in Australia (15%), the Canadian provinces (22%), the Netherlands (18%) and the United States (10%). Less than 10% of students in Chile (3%), Italy (6%), Poland (8%), the Slovak Republic (6%) and Spain (6%) perform at this level. Among the remaining partner countries and economies, about 11% of students in Russia and less than 5% of students in Brazil, Lithuania and Peru perform at this highest level.

TRENDS IN STUDENT PERFORMANCE IN FINANCIAL LITERACY

Financial literacy was assessed in both PISA 2012 and PISA 2015. Eight countries and economies participated in both assessments, including seven OECD countries and economies: Australia, the Flemish Community of Belgium, Italy, Poland,



the Slovak Republic, Spain and the United States; and one partner country: Russia. As not all countries participated in both assessments, when computing the OECD average trends in financial literacy performance, only those countries with valid data to compare the two assessments are included in the average. Comparisons of the OECD average between 2012 and 2015 are therefore based on the seven OECD countries and economies that participated in both assessments. Box IV.3.4 provides further details on the comparability of results between the two assessments.

Box IV.3.4 **Comparing PISA 2012 and 2015 results in financial literacy**

In order to ensure the comparability of PISA results over time, successive assessments must include a sufficient number of common assessment items so that results can be reported on a common scale. Some 39 financial literacy items were used in both the 2012 and 2015 financial literacy assessments (out of a total of 43 items used in 2015). Moreover, the financial literacy assessment framework remained unchanged between the two assessments, and the common items adequately cover the different aspects of the framework.

With each cycle, PISA aims to measure the knowledge and skills that are required to participate fully in society and the economy. This includes making sure the assessment instruments are aligned with new developments in assessment techniques and with the latest understanding of the cognitive processes underlying proficiency in each domain. A major difference between the 2012 and 2015 assessments of all domains, including financial literacy, was the use of computers in 2015, rather than pencils and paper, to deliver the test questions. Most of the countries/economies participating in the PISA 2015 test, including all OECD countries and all countries and economies participating in the financial literacy assessment, assessed their students on computers (see “What is PISA?” at the beginning of this volume).

In order to compare the results of this test to those obtained by earlier cohorts of students on past PISA paper-based tests, the PISA 2015 field trial examined the equivalence of mathematics, reading and science items between computer-based tests and paper-based tests. Items that passed the test of equivalence were used to link across modes and assessment cycles. Given the small number of countries/economies participating in the optional financial literacy assessment in the two cycles, a different procedure was used to link the 2012 and 2015 financial literacy assessments. The PISA 2015 field trial included a mode-effect study comparing the performance of students who were randomly assigned to take the tests in paper-based or in computer-based form. The linking of the financial literacy scales between 2012 and 2015 was performed by using all the available data (the 2012 main study, the 2015 field trial and the 2015 main study), exploiting the equivalence of the two samples in the 2015 field trial. This method provides a consistent and robust linking approach, but it does not provide information on which items are directly comparable across modes. The *PISA 2015 Technical Report* (OECD, forthcoming) provides more details about the scaling of financial literacy and the mode-effect study conducted in the context of the PISA 2015 field trial.

Another major change between the 2012 and 2015 assessments was specific to financial literacy and did not affect the assessment of the other domains. Sampling design and the scheduling of the test changed between the two assessments. Students assessed in financial literacy in 2012 were tested in financial literacy – as well as in mathematics and reading – at the same time as other students were taking the core assessment; students assessed in financial literacy in 2015 took the test in a separate session after having been tested in mathematics reading and science. In most participating countries and economies, the financial literacy testing session took place on the afternoon of the same day in a large majority of sampled schools. However, in Brazil, students in about one in three schools sat the financial literacy test on a different day than the day when they sat the mathematics, reading and science tests; students in about eight out of ten schools in Italy and Russia sat the financial literacy test on a different day than the main test. Genuine financial literacy trends may be confounded by the change in the scheduling of the assessment, especially in countries and economies where most students sat the financial literacy assessment in the afternoon, as those students might have been tired after a long day of testing.

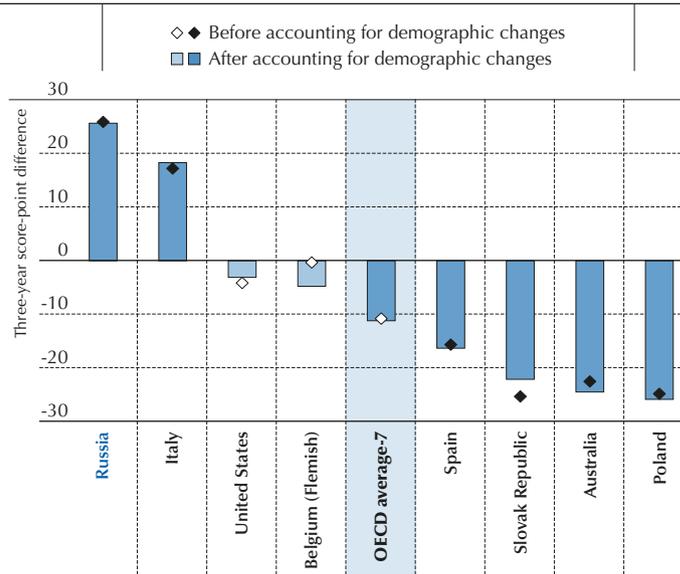
Trends in average performance

On average across OECD countries with comparable data in PISA 2012 and PISA 2015, performance remained stable (the observed decline of 11 points over 3 years is not statistically significant [Figure IV.3.7]). But the stability of the average masks significant changes observed in some countries and economies.

Figure IV.3.7 shows that two countries had a significant improvement in average financial literacy: Italy (where the mean score in financial literacy increased by 17 points between 2012 and 2015) and Russia (where it improved by 26 points). By contrast, four countries show a significant deterioration in average performance: Australia (a drop of 22 score points), Poland (25 score points), the Slovak Republic (25 score points) and Spain (16 score points). The Flemish Community of Belgium and the United States show no significant change in mean performance (Table IV.3.1).

In most countries and economies, changes in average financial literacy performance between 2012 and 2015 are qualitatively consistent with changes in mathematics, reading and science performance over the same period (Table IV.3.8). Russia improved its performance not only in financial literacy but also in reading and mathematics (with no significant change in science). In Australia and Poland, performance deteriorated in science, mathematics and financial literacy, with no change in reading. In the Flemish Community of Belgium, performance remained unchanged in mathematics, reading, science and financial literacy. In the United States, performance remained unchanged in financial literacy, science and reading but declined in mathematics. In the remaining countries and economies, trends in financial literacy are not in line with trends in the other PISA subjects. In Italy, for example, financial literacy performance improved while performance in mathematics and reading remained unchanged and performance in science declined. In the Slovak Republic and Spain, performance in financial literacy deteriorated while performance in the other three subjects remained unchanged.

Figure IV.3.7 ■ Change between 2012 and 2015 in mean financial literacy performance



Notes: Statistically significant differences are shown in a darker tone (see Annex A3).

Only countries/economies that participated in both the PISA 2012 and PISA 2015 assessments are shown.

The three-year trend after accounting for demographic changes shows how the performance of a population with the same demographic profile as the PISA 2015 population has changed over time. Demographic characteristics considered are: students' age (in three-month increments), gender, and immigrant background.

Countries and economies are ranked in descending order of the three-year trend in financial literacy performance, after accounting for demographic changes.

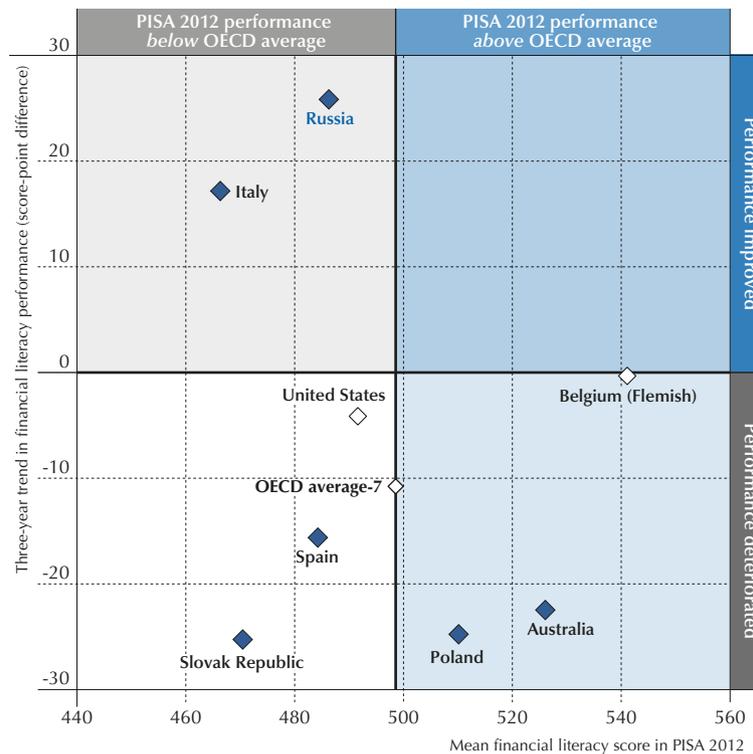
Source: OECD, PISA 2015 Database, Tables IV.3.1 and IV.3.5.

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Figure IV.3.8 shows the relationship between each country's or economy's average financial literacy performance in 2012 and the difference in mean performance between 2012 and 2015. The Flemish Community of Belgium scored above the OECD average in 2012 and did so in 2015, with no statistically significant change. Both Italy and Russia performed below the OECD average in 2012 and have both improved. Italy was among the lowest-performing countries in 2012, but in 2015 it performed only slightly below the average. Russia scored above average in 2015. The mean performance of Australia declined over the period, but the country still performed above the OECD average in 2015. Poland was above average in 2012 and performed at the average three years later. The Slovak Republic and Spain were already performing below the OECD average in 2012 and their mean scores declined further in 2015.



Figure IV.3.8 ■ **Trends in financial literacy performance**
Compared to the 2012 OECD average



Notes: Three-year trends in financial literacy that are statistically significant are indicated in a darker tone (see Annex A3). Only countries/economies that participated in both the PISA 2012 and PISA 2015 assessments are shown.
Source: OECD, PISA 2015 Database, Table IV.3.1.

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Trends in average performance adjusted for demographics

Changes in a country's or economy's performance can have many sources. For instance, changes can result from demographic shifts in the country's population. By following strict sampling and methodological standards, PISA ensures that all countries and economies measure the proficiency of their 15-year-old students in grades 7 and above. But because of changes in enrolment rates, migration or other demographic and social trends, the characteristics of this reference population may change.

Trends adjusted for demographic changes neutralise some of the changes observed in the composition and coverage of the PISA sample so that it becomes possible to identify some of the sources of the trends observed. Trends adjusted for demographic changes account for adjustments in the age (measured in quarters), gender and immigrant background of the student population. Annex A5 provides details on how these adjusted trends were calculated.

It is possible to analyse the impact of changes in the immigrant background, age and gender of the student population in each country and economy by contrasting the (unadjusted) changes in mean performance, reported above, with those that would have been observed had the overall profile of the student population been the same, throughout the period, as that observed in 2015. Adjusted trends in this section provide an estimate of what the performance trend would have been if the 2012 PISA sample had the same proportion of immigrant students (first- and second-generation) and the same composition by gender and age as the target population in 2015.

Figure IV.3.7 shows that, in all the countries and economies with available data, the demographic shifts in the sample slightly influence the observed trends, but in no country or economy are the direction and significance of the trend affected by these shifts.¹ On average across OECD countries with comparable data in PISA 2012 and PISA 2015, after adjusting for demographic changes, performance declined by 11 score points (a statistically significant decline).

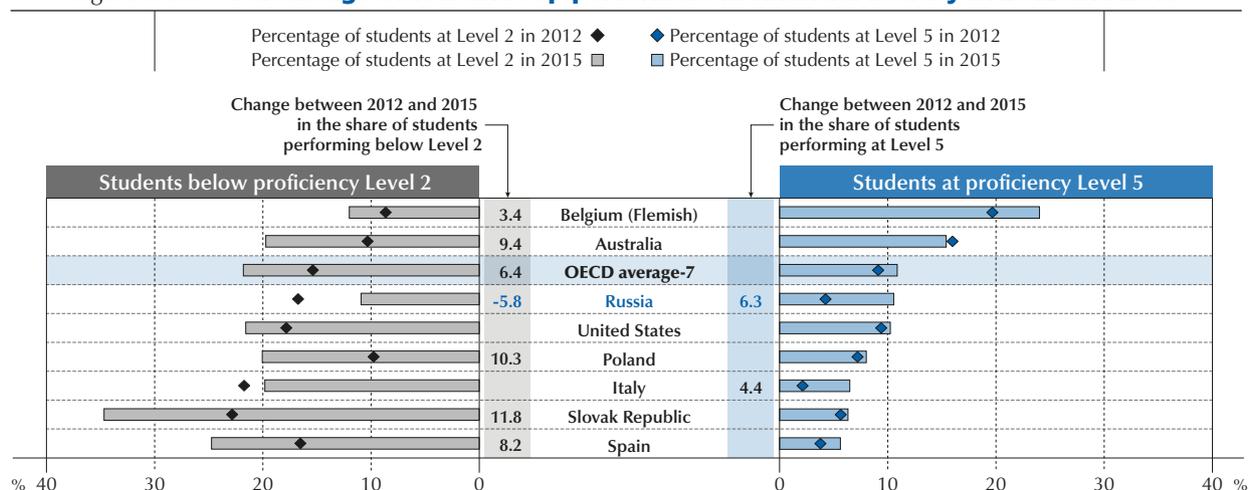
Trends in performance among low- and high-performing students

Changes in a country's or economy's average performance can result from changes at different levels of the performance distribution. For example, for some countries and economies, the average score may increase when the share of students scoring at the lowest levels of the financial literacy scale shrinks because of improved performance among these students. In other countries and economies, improvements in mean scores may be largely the result of improvements in performance among the highest-achieving students and an increase in the share of students who perform at the highest levels.

Figure IV.3.9 shows that across the seven OECD countries with available data, on average, the proportion of students scoring below Level 2 in financial literacy increased by about 6 percentage points between 2012 and 2015 (a significant increase), whereas the proportion of students scoring at Level 5 increased by about 2 percentage points (a non-significant increase). The two countries where mean performance improved also saw an increase in the share of students performing at Level 5: Italy (an increase of 4 percentage points) and Russia (an increase of 6 percentage points). Russia achieved a higher mean score by both reducing the proportion of low performers (by 6 percentage points) and increasing the proportion of students performing at the highest proficiency level (Table IV.3.6).

Between 2012 and 2015, the four countries/economies where mean performance deteriorated also saw an increase in the share of students who perform below Level 2: Australia (where this share grew by 9 percentage points), Poland (by 10 percentage points), the Slovak Republic (by 12 percentage points) and Spain (by 8 percentage points). The share of students who perform below Level 2 also increased slightly (by 3 percentage points) in the Flemish Community of Belgium.

Figure IV.3.9 ■ Percentage of low and top performers in financial literacy in 2012 and 2015



Notes: Only countries/economies that participated in both the PISA 2012 and PISA 2015 assessments are shown.

The change between PISA 2012 and PISA 2015 in the share of students performing below Level 2 in financial literacy is shown to the left of the country/economy name. The change between PISA 2012 and PISA 2015 in the share of students performing at Level 5 in financial literacy is shown to the right of the country/economy name. Only statistically significant changes are shown (see Annex A3).

Countries and economies are ranked in descending order of the percentage of students performing at Level 5 in 2015.

Source: OECD, PISA 2015 Database, Table IV.3.6.

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STUDENT PERFORMANCE IN FINANCIAL LITERACY COMPARED TO PERFORMANCE IN CORE PISA SUBJECTS

What levels of basic competencies are necessary for a student to become financially literate? For instance, some mathematics skills are necessary to perform simple calculations, such as percentages, that may be required to take financial decisions; some reading competencies are needed to read financial documents and identify financial terms. Science literacy and financial literacy have in common the need to analyse, evaluate and solve problems (in different domains), but science competencies are not strictly necessary to be proficient in financial literacy and there are no links across the two assessment frameworks. Interest in financial matters and financial literacy competencies can also support the development of other skills, such as those in mathematics and reading, and provide a potentially engaging, real-life context to a variety of school subjects (Koh and Low, 2010; OECD, 2016b, 2013).



To what extent is the variation in financial literacy performance correlated with performance in other domains, such as mathematics, reading and science? Students who do well in financial literacy are likely to perform well in other areas too, and students who have poor financial literacy skills are likely to do poorly in other subjects. On average across the 10 participating OECD countries and economies, among the top performers in financial literacy (students who attain Level 5), 45% are also top performers in mathematics, 37% are also top performers in reading and 38% are also top performers in science (Table IV.3.3). Similarly, among the low performers in financial literacy (students who perform below Level 2), 65% are also low performers in mathematics, 60% are also low performers in reading and 64% are also low performers in science (Table IV.3.4).

Figure IV.3.10 shows the correlation between student performance in financial literacy and the three other subjects PISA assesses, namely mathematics, reading and science. The correlation across the three core subjects is also reported for comparison. On average across the 10 participating OECD countries and economies, the correlation between financial literacy and mathematics performance is 0.74, the correlation between financial literacy and reading performance is 0.75, and the correlation between financial literacy and science performance is 0.78. Financial literacy is strongly correlated with the other domains, but less so than the three core subjects are correlated among themselves. The correlation between mathematics and reading performance is 0.80, the correlation between mathematics and science performance is 0.89 and the correlation between reading and science performance is 0.87.

There is also some variation across countries and economies in the correlation between student performance in financial literacy and performance in the three core domains (Table IV.3.9). The correlation between financial literacy and performance in the three other domains is relatively weak in Brazil, Russia and the Slovak Republic, where they are about 0.70 or lower. The correlations between financial literacy and the three core subjects are relatively strong (around 0.80 or higher) in Australia, the Flemish Community of Belgium, B-S-J-G (China), the Netherlands and the United States.

Figure IV.3.10 ■ **Correlation between financial literacy and performance in the core PISA subjects**

*OECD average correlation, where 0.00 signifies no relationship
and 1.00 signifies the strongest positive relationship*

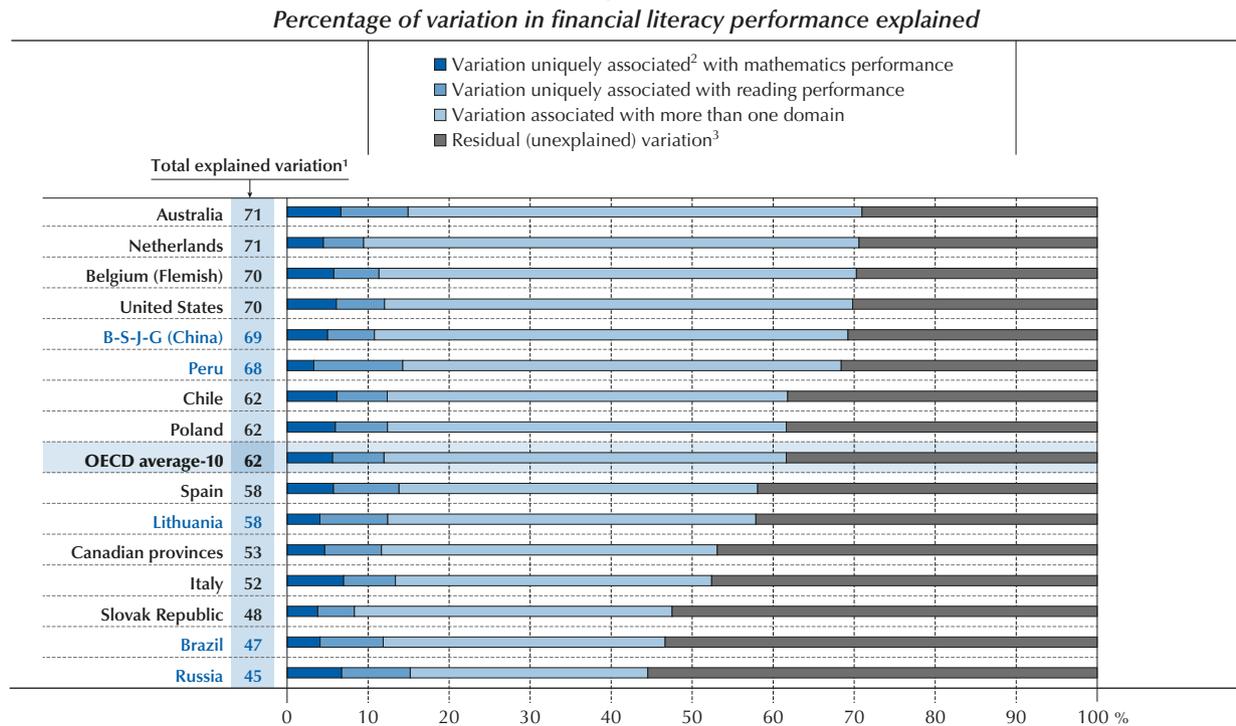
OECD average-10			
Correlation between performance in...			
Mathematics	Reading	Science	... and performance in:
0.74	0.75	0.78	Financial literacy
	0.80	0.89	Mathematics
		0.87	Reading

Source: OECD, PISA 2015 Database, Table IV.3.9.

Another way of looking at the relationship between financial literacy and the core PISA subjects is to examine the extent to which the variation in financial literacy performance can be explained by performance in the subjects that form the foundation on which financial literacy skills are built, such as mathematics and reading. Figure IV.3.11 shows that, on average across the 10 participating OECD countries and economies, around 38% of the financial literacy score reflects factors that are uniquely captured by the financial literacy assessment (the residual variation in Figure IV.3.11); the remaining 62% of the financial literacy score reflects skills that can be measured in mathematics and/or reading assessments. Of this 62%, almost all the variation is shared with mathematics and reading together (about 50% of the total variation); about 6% is uniquely shared between financial literacy and mathematics, and about 6% is uniquely shared between financial literacy and reading.

Figure IV.3.11 also shows how the association of skills in financial literacy with those in mathematics and reading varies across countries and economies.² In Brazil, Russia and the Slovak Republic, performance in mathematics and reading explains less than 50% of the variation in financial literacy performance. These are also countries where the correlations between financial literacy and the two core domains are relatively weak (as shown in Table IV.3.9).³ In contrast, performance in mathematics and reading explains more than 70% of the variation in financial literacy performance in Australia, the Flemish Community of Belgium and the Netherlands, meaning that a large part of the variation in financial literacy scores reflects proficiency in other domains. In these countries and economies, the correlation between financial literacy and the two core subjects is also relatively strong.

Figure IV.3.11 ■ **Variation in financial literacy performance associated with mathematics and reading performance**



1. Total explained variation is the R-squared coefficient from a regression of financial literacy performance on mathematics and reading performance.

2. Variation uniquely associated with mathematics (reading) is measured as the difference between the R-squared of the full regression (a regression of financial literacy on mathematics and reading performance) and the R-squared of a regression of financial literacy on reading (mathematics) only.

3. The residual variation is computed as: 100 - total explained variation.

Countries and economies are ranked in descending order of the percentage of variation in financial literacy performance explained by performance in mathematics and reading.

Source: OECD, PISA 2015 Database, Table IV.3.10a.

StatLink  <http://dx.doi.org/10.1787/888933485094>

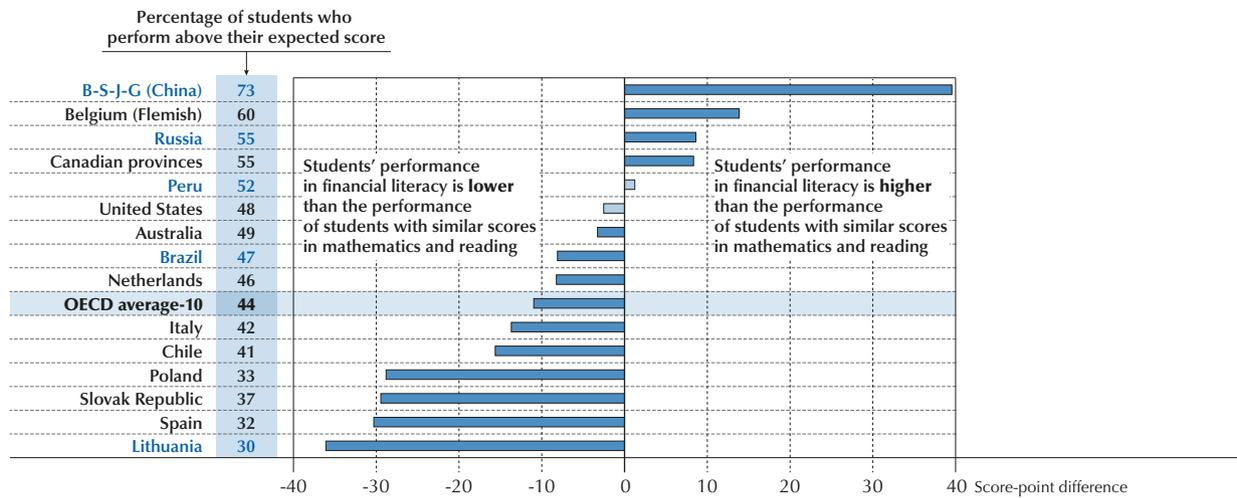
The positive correlations across domains indicate that, in general, students who perform at higher levels in mathematics and reading also perform well in financial literacy. There are, however, wide variations in financial literacy performance for any given level of performance in mathematics and reading, meaning that the skills measured by the financial literacy assessment may go beyond or fall short of the ability to use the knowledge that students acquired from subjects taught in compulsory education. Figure IV.3.12 shows a ranking of countries in relative performance, where relative performance compares students' actual financial literacy performance to the performance that would be expected based on their performance in mathematics and reading.

In the Flemish Community of Belgium, B-S-J-G (China), the Canadian provinces and Russia, students perform better in financial literacy than students in other countries with similar performance in mathematics and reading. In B-S-J-G (China), the difference between students' scores in financial literacy and their expected performance, given their performance in the core domains, is 39 score points. In the Flemish Community of Belgium, B-S-J-G (China), the Canadian provinces and Russia, which are among the highest-performing countries and economies in PISA 2015, more than 50% of students perform better in financial literacy than expected, given their scores in the other two subjects (Table IV.3.11).

In contrast, students in Australia, Brazil, Chile, Italy, Lithuania, the Netherlands, Poland the Slovak Republic and Spain perform worse in financial literacy than students in other countries with similar performance in mathematics and reading. In Lithuania, Poland, the Slovak Republic and Spain, the difference between expected and actual performance exceeds 25 score points. Three of these countries – Lithuania, the Slovak Republic and Spain – also perform below the OECD average. In Poland, the Slovak Republic and Spain, mean performance deteriorated between 2012 and 2015. This suggests that students could be helped in using the skills widely taught in school to attain higher levels of financial literacy.



Figure IV.3.12 ■ **Relative performance in financial literacy**
Difference between the actual financial literacy score and the score predicted by students' performance in mathematics and reading



Note: Statistically significant differences are shown in a darker tone (see Annex A3).

Countries and economies are ranked in descending order of the score-point difference between actual and expected performance.

Source: OECD, PISA 2015 Database, Table IV.3.11.

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A CONTEXT FOR COMPARING COUNTRIES'/ECONOMIES' PERFORMANCE IN FINANCIAL LITERACY

This section provides a brief overview of the context of 12 countries that participated in the PISA 2015 assessment of financial literacy: Australia, Brazil, Chile, Italy, Lithuania, the Netherlands, Peru, Poland, Russia, the Slovak Republic, Spain and the United States. These countries cover a relatively wide geographical area, including North and South America, Western, Central and Eastern Europe, and Oceania, representing about 37% of the world's GDP.

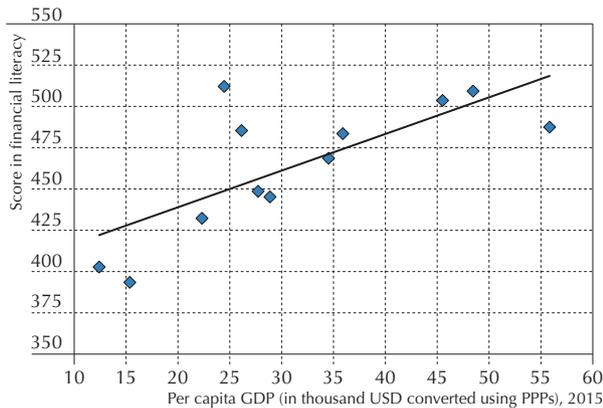
Three participating economies, i.e., the Flemish Community of Belgium, B-S-J-G (China) and the participating Canadian provinces, are not covered in this section as they represent subnational entities of their respective countries. The Flemish Community of Belgium covers about 55% of the 15-year-old population in the whole country; the provinces and municipalities of B-S-J-G (China) represent about 15% of the population aged 0-14 in China; and the seven provinces of Canada that participated in the financial literacy assessment cover 64% of the country's total population of 15-year-olds.

The section particularly highlights countries' characteristics that may inform the analysis of students' proficiency in financial literacy, such as national income, income distribution, the development of financial markets, expenditure on education and financial knowledge among adults (Table IV.3.12).

There are significant differences in the size of these countries' national economies and national income. GDP (in 2011 US dollars) varies from USD 77 billion in Lithuania to USD 16 890 billion in the United States. The per capita GDP (in equivalent USD converted using purchasing power parity) ranges from USD 12 402 in Peru and USD 15 359 in Brazil to USD 48 459 in the Netherlands and USD 55 837 in the United States. Eleven out of the 12 countries have levels of per capita GDP higher than USD 15 000.

Figure IV.3.13 shows the relationship between per capita GDP and students' average performance in financial literacy. The figure offers a best-fit line to give an indication of the direction of the relationship between per capita GDP and students' mean score in financial literacy, but does not display statistics about the strength of this association because they are based on a small number of country points. The scatter plot shows that, overall, per capita national income is positively associated with average performance in financial literacy, but some countries with lower per capita GDP perform better in financial literacy than wealthier countries. For instance, Lithuania, Poland and the Slovak Republic have similar per capita GDP (between USD 25 000 and 30 000), but students in Poland score 40 points higher, on average, than students in the Slovak Republic.

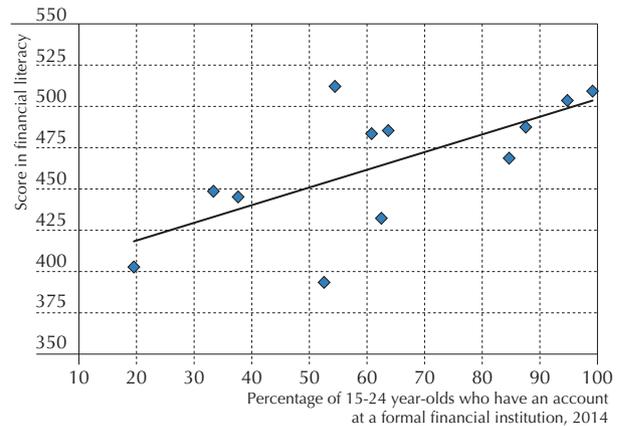
Figure IV.3.13 ■ Financial literacy performance and per capita GDP



Source: OECD, PISA 2015 Database, Table IV.3.12 and World Bank (2017), World Development Indicators, <http://data.worldbank.org/products/wdi>.

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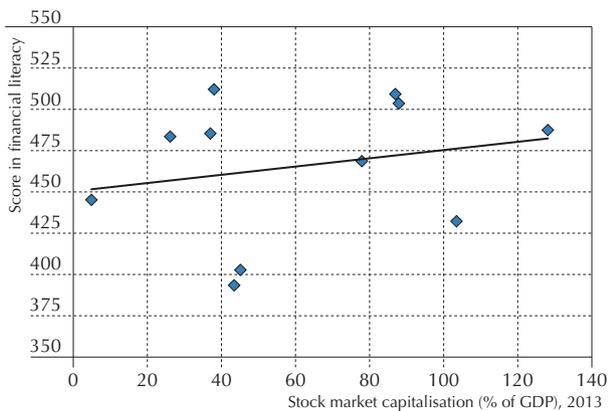
Figure IV.3.14 ■ Financial literacy and access to basic financial products



Source: OECD, PISA 2015 Database, Table IV.3.12 and Demircuc-Kunt, A, et al. (2015), "The Global Findex Database 2014: Measuring financial inclusion around the world", World Bank, www.worldbank.org/en/programs/globalindex.

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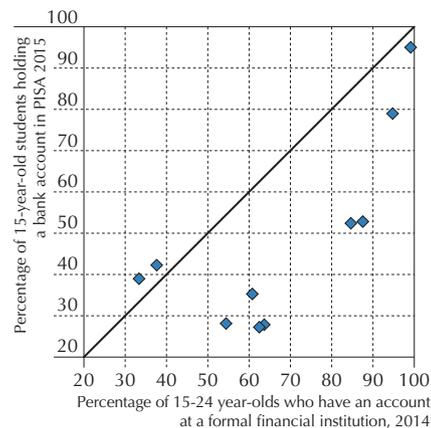
Figure IV.3.15 ■ Financial literacy and financial market development



Source: OECD, PISA 2015 Database, Table IV.3.12 and World Bank (2015), Global Financial Development Database, <http://data.worldbank.org/data-catalog/global-financial-development>.

StatLink <http://dx.doi.org/10.1787/888933485138>

Figure IV.3.16 ■ Access to basic financial products



Source: OECD, PISA 2015 Database, Table IV.3.12 and Demircuc-Kunt, A, et al. (2015), "The Global Findex Database 2014: Measuring financial inclusion around the world", World Bank, www.worldbank.org/en/programs/globalindex.

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Likewise, the distribution of income within these 12 countries is relatively diverse. The Gini coefficient measures the extent to which the income distribution among individuals or households within an economy deviates from a perfectly equal distribution. A Gini coefficient of zero represents perfect equality (each person earns the same income), while 1.0 implies perfect inequality (all income goes to one person and the rest earn nothing). The degree of income equality varies from 0.26 (the most equal) in the Slovak Republic to 0.5 and over in Chile and Brazil, the most unequal.

To have an idea of the development of financial markets, it is useful to look at both the degree to which individuals can and do use financial services (financial access), as well as the size of financial institutions and markets (financial depth). The degree of access to financial products also varies among these 12 countries. The percentage of 15-24 year-olds who have an account at a formal financial institution ranges from less than 20% in Peru to over 90% in Australia and the Netherlands. Among 25-64 year-olds, more than 90% of adults in Australia, Italy, Lithuania, the Netherlands, the Slovak Republic, Spain and the United States have an account at a formal financial institution, while in Peru, only 33% of adults do.



Figure IV.3.14 shows the percentage of 15-24 year-olds who have an account at a formal financial institution compared with students' mean score in financial literacy. The scatterplots indicate that there is a positive relationship between the percentage of young people and adults holding financial products and students' mean score in financial literacy. However, access to financial products does not categorically determine average performance in financial literacy. Brazil and Russia have very similar percentages of young people who have an account at a formal financial institution (slightly above 50%), but students in Russia score more than 110 points higher in financial literacy, on average, than students in Brazil. The financial literacy mean scores in Poland and the United States are not statistically significantly different from each other, but the percentage of young people with an account is around 24 percentage points higher in the United States than in Poland.

The size of stock market capitalisation as a percentage of GDP provides an indication of the depth of a country's financial market. Stock market capitalisation varies from 5% of GDP in the Slovak Republic to over 100% of GDP in Chile and the United States. Figure IV.3.15 shows the association between stock market capitalisation as a percentage of GDP and students' mean score in financial literacy. The scatterplot shows that the points are dispersed and that there is only a weak, positive relationship.

The data on the percentage of 15-24 year-olds who have an account at a formal financial institution (collected by the World Bank) can also be compared to the percentage of 15-year-old students who have a bank account, as reported by students participating in the PISA assessment. Data from the two sources are broadly consistent and, in most countries, with the exception of Lithuania and the Slovak Republic, the percentage of 15-year-old students who have a bank account is lower than the percentage of 15-24 year-olds who have an account at a formal financial institution. This difference is to be expected, given the different age range and the slightly different definition of an account. The relatively small discrepancies in Lithuania and the Slovak Republic can be due to a larger number of young people opening accounts in 2015 or to measurement error.

Countries also vary by the financial resources invested in education. Even though financial education is only beginning to be introduced in school in many countries, education expenditure per student gives an indication of the overall resources devoted to schools. The cumulative expenditure in education per student from the age of 6 up to the age of 15 ranges from less than USD 50 000 in Brazil, Chile, Lithuania and Peru, to over USD 90 000 in Australia, the Netherlands and the United States.

The average level of financial knowledge among the adult population offers another indication of the opportunities students may have to improve their financial literacy by discussing and learning from adults. The OECD/INFE International Survey of Adult Financial Literacy Competencies (Box IV.3.2) shows that, among the few countries that participated in both the OECD/INFE financial literacy survey and the PISA 2015 financial literacy assessment, the percentage of adults who can answer correctly at least five out of seven financial knowledge questions ranges from 45% in Russia to 64% in the Netherlands.

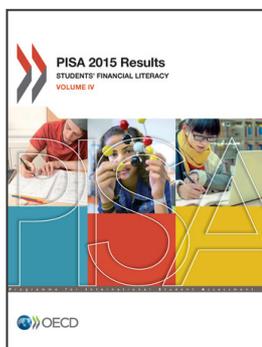


Notes

1. The significance of the difference between observed and adjusted trends is not formally tested. Because both trends share a common link error and a perfectly correlated sampling and measurement error (they are estimated on the same samples and data), while each of the estimates is subject to statistical uncertainty, the difference between the two estimates is not subject to these sources of uncertainty.
2. The relationship between financial literacy and science performance is not discussed in the text and figures because science competencies are not strictly necessary to be proficient in financial literacy and there are no links across the two assessment frameworks. The relationship between performance in financial literacy and performance in science, in addition to mathematics and reading, is nevertheless presented in the tables.
3. Correlation and explained variance are strictly related concepts. For instance, a correlation of around 0.74 between financial literacy and mathematics, on average across OECD countries and economies, implies that about half of the variation in financial literacy performance ($0.74 \times 0.74 = 0.55$) is common across the two domains of mathematics and financial literacy.

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From:
PISA 2015 Results (Volume IV)
Students' Financial Literacy

Access the complete publication at:
<https://doi.org/10.1787/9789264270282-en>

Please cite this chapter as:

OECD (2017), "Student performance in financial literacy", in *PISA 2015 Results (Volume IV): Students' Financial Literacy*, OECD Publishing, Paris.

DOI: <https://doi.org/10.1787/9789264270282-7-en>

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