



## **How did countries perform in PISA 2018?**

This chapter compares students' mean scores and the variation in their performance in reading, mathematics and science across the countries and economies that participated in the PISA 2018 assessment. It also highlights differences in social and economic contexts across education systems.

## How did countries perform in PISA 2018?

PISA outcomes are reported in a variety of ways; but the easiest way to gain an understanding of the overall performance of a country or economy is through the mean performance of its students. Because countries' and economies' standing in comparison with other countries/economies that participated in PISA can differ across subjects, this chapter includes multiple comparisons of mean performance. Further comparisons can consider the proportion of students who achieve a certain level of performance (see Chapters 5, 6 and 7 in this volume), or the extent to which learning outcomes vary within countries (see the section on "variation in performance" below and Volume II of the *PISA 2018 Results* report, *Where All Students Can Succeed* [OECD, 2019<sub>[11]</sub>]). No single ranking does justice to the richness of information that PISA provides and, more important, to the variety of goals that education systems pursue. This chapter also highlights the statistical uncertainty in PISA results when comparing countries and economies.

When considering differences in performance across countries and economies, it is also important to consider differences in context – such as a country's level of development or the proportion of 15-year-olds who are in school and eligible to sit the PISA test. These factors are discussed at the end of the chapter.

### What the data tell us

- On average, students in Beijing, Shanghai, Jiangsu and Zhejiang (China) and Singapore outperformed students from all other countries in reading, mathematics and science.
- Differences in performance between students within the same country are, in general, larger than between-country differences in performance. For example, in every country and economy, the performance gap between the highest-scoring 5% of students and the lowest-scoring 5% of students in reading is larger than the difference in mean performance between the highest-performing country and the lowest-performing country.
- While an inadequately resourced education system cannot deliver good results, Estonia, with a level of expenditure on education that is about 30% lower than the OECD average, is nevertheless one of the top-performing OECD countries in reading, mathematics and science.

## MEAN PERFORMANCE IN READING, MATHEMATICS AND SCIENCE

In 2018, the mean reading score amongst OECD countries was 487 points; the mean score in mathematics and science was 489 points. In reading, Beijing, Shanghai, Jiangsu and Zhejiang (China) (hereafter "B-S-J-Z [China]") (555 points) and Singapore (549 points) scored significantly higher than all other countries/economies that participated in PISA 2018. In mathematics and science, the highest mean performance was achieved by students in B-S-J-Z (China) (591 points in mathematics and 590 points in science), and the second-highest mean performance by students in Singapore (569 points in mathematics and 551 points in science).

Table I.4.1, Table I.4.2, and Table I.4.3 show each country's/economy's mean score, and indicate for which pairs of countries/economies the differences between the means are statistically significant. Indeed, when comparing mean performance across countries/economies, only those differences that are statistically significant should be considered (see Chapter 2). For each country/economy shown in the middle column, the countries/economies whose mean scores are not statistically significantly different are listed in the right column. For example, B-S-J-Z (China) scored higher than Singapore on the PISA mathematics and science scales, but in reading, the mean performance of B-S-J-Z (China) was not statistically significantly different from that of Singapore; or students in Germany performed better in science than students in France, but in reading and mathematics, their mean scores were not statistically significantly different.

In Table I.4.1, Table I.4.2, and Table I.4.3, countries and economies are divided into three broad groups: those whose mean scores are statistically around the OECD mean (highlighted in white); those whose mean scores are above the OECD mean (highlighted in blue); and those whose mean scores are below the OECD mean (highlighted in grey).<sup>1</sup>

Twenty countries and economies performed above the OECD average in all three domains (reading, mathematics and science). B-S-J-Z (China) and Singapore were the highest-performing education systems: in all three subjects, their mean scores lay more than 50 points above the average score across OECD countries. In reading, Estonia, Canada, Finland and Ireland were the highest-performing OECD countries (the mean performance of Korea was significantly below that of Estonia, but not below those of Canada, Finland and Ireland; and Poland's score was below those of Estonia, Canada and Finland, but not below that of Ireland) (all countries/economies are listed in descending order of their mean scores).

Table I.4.1 [1/2] **Comparing countries' and economies' performance in reading**

|  |  |
|--|--|
|  | Statistically significantly <b>above</b> the OECD average              |
|  | <b>Not statistically significantly different</b> from the OECD average |
|  | Statistically significantly <b>below</b> the OECD average              |

| Mean score | Comparison country/economy           | Countries and economies whose mean score is not statistically significantly different from the comparison country's/economy's score                     |
|------------|--------------------------------------|---|
| 555        | <b>B-S-J-Z (China)</b>               | Singapore   |
| 549        | <b>Singapore</b>                     | B-S-J-Z (China)   |
| 525        | <b>Macao (China)</b>                 | Hong Kong (China), <sup>1</sup> Estonia, Finland  |
| 524        | <b>Hong Kong (China)<sup>1</sup></b> | Macao (China), Estonia, Canada, Finland, Ireland  |
| 523        | <b>Estonia</b>                       | Macao (China), Hong Kong (China), <sup>1</sup> Canada, Finland, Ireland   |
| 520        | <b>Canada</b>                        | Hong Kong (China), <sup>1</sup> Estonia, Finland, Ireland, Korea  |
| 520        | <b>Finland</b>                       | Macao (China), Hong Kong (China), <sup>1</sup> Estonia, Canada, Ireland, Korea  |
| 518        | <b>Ireland</b>                       | Hong Kong (China), <sup>1</sup> Estonia, Canada, Finland, Korea, Poland   |
| 514        | <b>Korea</b>                         | Canada, Finland, Ireland, Poland, Sweden, United States <sup>1</sup>  |
| 512        | <b>Poland</b>                        | Ireland, Korea, Sweden, New Zealand, United States <sup>1</sup>   |
| 506        | <b>Sweden</b>                        | Korea, Poland, New Zealand, United States, <sup>1</sup> United Kingdom, Japan, Australia, Chinese Taipei, Denmark, Norway, Germany                      |
| 506        | <b>New Zealand</b>                   | Poland, Sweden, United States, <sup>1</sup> United Kingdom, Japan, Australia, Chinese Taipei, Denmark   |
| 505        | <b>United States<sup>1</sup></b>     | Korea, Poland, Sweden, New Zealand, United Kingdom, Japan, Australia, Chinese Taipei, Denmark, Norway, Germany  |
| 504        | <b>United Kingdom</b>                | Sweden, New Zealand, United States, <sup>1</sup> Japan, Australia, Chinese Taipei, Denmark, Norway, Germany   |
| 504        | <b>Japan</b>                         | Sweden, New Zealand, United States, <sup>1</sup> United Kingdom, Australia, Chinese Taipei, Denmark, Norway, Germany                                    |
| 503        | <b>Australia</b>                     | Sweden, New Zealand, United States, <sup>1</sup> United Kingdom, Japan, Chinese Taipei, Denmark, Norway, Germany  |
| 503        | <b>Chinese Taipei</b>                | Sweden, New Zealand, United States, <sup>1</sup> United Kingdom, Japan, Australia, Denmark, Norway, Germany   |
| 501        | <b>Denmark</b>                       | Sweden, New Zealand, United States, <sup>1</sup> United Kingdom, Japan, Australia, Chinese Taipei, Norway, Germany                                      |
| 499        | <b>Norway</b>                        | Sweden, United States, <sup>1</sup> United Kingdom, Japan, Australia, Chinese Taipei, Denmark, Germany, Slovenia  |
| 498        | <b>Germany</b>                       | Sweden, United States, <sup>1</sup> United Kingdom, Japan, Australia, Chinese Taipei, Denmark, Norway, Slovenia, Belgium, France, Portugal <sup>1</sup> |
| 495        | <b>Slovenia</b>                      | Norway, Germany, Belgium, France, Portugal, <sup>1</sup> Czech Republic   |
| 493        | <b>Belgium</b>                       | Germany, Slovenia, France, Portugal, <sup>1</sup> Czech Republic  |
| 493        | <b>France</b>                        | Germany, Slovenia, Belgium, Portugal, <sup>1</sup> Czech Republic   |
| 492        | <b>Portugal<sup>1</sup></b>          | Germany, Slovenia, Belgium, France, Czech Republic, Netherlands <sup>1</sup>  |
| 490        | <b>Czech Republic</b>                | Slovenia, Belgium, France, Portugal, <sup>1</sup> Netherlands, <sup>1</sup> Austria, Switzerland  |
| 485        | <b>Netherlands<sup>1</sup></b>       | Portugal, <sup>1</sup> Czech Republic, Austria, Switzerland, Croatia, Latvia, Russia  |
| 484        | <b>Austria</b>                       | Czech Republic, Netherlands, <sup>1</sup> Switzerland, Croatia, Latvia, Russia  |
| 484        | <b>Switzerland</b>                   | Czech Republic, Netherlands, <sup>1</sup> Austria, Croatia, Latvia, Russia, Italy   |
| 479        | <b>Croatia</b>                       | Netherlands, <sup>1</sup> Austria, Switzerland, Latvia, Russia, Italy, Hungary, Lithuania, Iceland, Belarus, Israel                                     |
| 479        | <b>Latvia</b>                        | Netherlands, <sup>1</sup> Austria, Switzerland, Croatia, Russia, Italy, Hungary, Lithuania, Belarus   |
| 479        | <b>Russia</b>                        | Netherlands, <sup>1</sup> Austria, Switzerland, Croatia, Latvia, Italy, Hungary, Lithuania, Iceland, Belarus, Israel                                    |
| 476        | <b>Italy</b>                         | Switzerland, Croatia, Latvia, Russia, Hungary, Lithuania, Iceland, Belarus, Israel  |
| 476        | <b>Hungary</b>                       | Croatia, Latvia, Russia, Italy, Lithuania, Iceland, Belarus, Israel   |
| 476        | <b>Lithuania</b>                     | Croatia, Latvia, Russia, Italy, Hungary, Iceland, Belarus, Israel   |
| 474        | <b>Iceland</b>                       | Croatia, Russia, Italy, Hungary, Lithuania, Belarus, Israel, Luxembourg   |
| 474        | <b>Belarus</b>                       | Croatia, Latvia, Russia, Italy, Hungary, Lithuania, Iceland, Israel, Luxembourg, Ukraine  |
| 470        | <b>Israel</b>                        | Croatia, Russia, Italy, Hungary, Lithuania, Iceland, Belarus, Luxembourg, Ukraine, Turkey   |
| 470        | <b>Luxembourg</b>                    | Iceland, Belarus, Israel, Ukraine, Turkey   |
| 466        | <b>Ukraine</b>                       | Belarus, Israel, Luxembourg, Turkey, Slovak Republic, Greece  |
| 466        | <b>Turkey</b>                        | Israel, Luxembourg, Ukraine, Greece   |
| 458        | <b>Slovak Republic</b>               | Ukraine, Greece, Chile  |
| 457        | <b>Greece</b>                        | Ukraine, Turkey, Slovak Republic, Chile   |
| 452        | <b>Chile</b>                         | Slovak Republic, Greece, Malta  |
| 448        | <b>Malta</b>                         | Chile   |
| 439        | <b>Serbia</b>                        | United Arab Emirates, Romania   |
| 432        | <b>United Arab Emirates</b>          | Serbia, Romania, Uruguay, Costa Rica  |
| 428        | <b>Romania</b>                       | Serbia, United Arab Emirates, Uruguay, Costa Rica, Cyprus, Moldova, Montenegro, Mexico, Bulgaria, Jordan  |
| 427        | <b>Uruguay</b>                       | United Arab Emirates, Romania, Costa Rica, Cyprus, Moldova, Mexico, Bulgaria  |
| 426        | <b>Costa Rica</b>                    | United Arab Emirates, Romania, Uruguay, Cyprus, Moldova, Montenegro, Mexico, Bulgaria, Jordan   |
| 424        | <b>Cyprus</b>                        | Romania, Uruguay, Costa Rica, Moldova, Montenegro, Mexico, Bulgaria, Jordan   |
| 424        | <b>Moldova</b>                       | Romania, Uruguay, Costa Rica, Cyprus, Montenegro, Mexico, Bulgaria, Jordan  |
| 421        | <b>Montenegro</b>                    | Romania, Costa Rica, Cyprus, Moldova, Mexico, Bulgaria, Jordan  |
| 420        | <b>Mexico</b>                        | Romania, Uruguay, Costa Rica, Cyprus, Moldova, Montenegro, Bulgaria, Jordan, Malaysia, Colombia   |

1. Data did not meet the PISA technical standards but were accepted as largely comparable (see Annexes A2 and A4).

Source: OECD, PISA 2018 Database, Table I.B1.4.

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## How did countries perform in PISA 2018?

Table I.4.1 [2/2] **Comparing countries' and economies' performance in reading**

| Mean score | Comparison country/economy    | Countries and economies whose mean score is not statistically significantly different from the comparison country's/economy's score |
|------------|-------------------------------|---|
| 420        | <b>Bulgaria</b>               | Romania, Uruguay, Costa Rica, Cyprus, Moldova, Montenegro, Mexico, Jordan, Malaysia, Brazil, Colombia                               |
| 419        | <b>Jordan</b>                 | Romania, Costa Rica, Cyprus, Moldova, Montenegro, Mexico, Bulgaria, Malaysia, Brazil, Colombia                                      |
| 415        | <b>Malaysia</b>               | Mexico, Bulgaria, Jordan, Brazil, Colombia  |
| 413        | <b>Brazil</b>                 | Bulgaria, Jordan, Malaysia, Colombia  |
| 412        | <b>Colombia</b>               | Mexico, Bulgaria, Jordan, Malaysia, Brazil, Brunei Darussalam, Qatar, Albania   |
| 408        | <b>Brunei Darussalam</b>      | Colombia, Qatar, Albania, Bosnia and Herzegovina  |
| 407        | <b>Qatar</b>                  | Colombia, Brunei Darussalam, Albania, Bosnia and Herzegovina, Argentina   |
| 405        | <b>Albania</b>                | Colombia, Brunei Darussalam, Qatar, Bosnia and Herzegovina, Argentina, Peru, Saudi Arabia   |
| 403        | <b>Bosnia and Herzegovina</b> | Brunei Darussalam, Qatar, Albania, Argentina, Peru, Saudi Arabia  |
| 402        | <b>Argentina</b>              | Qatar, Albania, Bosnia and Herzegovina, Peru, Saudi Arabia  |
| 401        | <b>Peru</b>                   | Albania, Bosnia and Herzegovina, Argentina, Saudi Arabia, Thailand  |
| 399        | <b>Saudi Arabia</b>           | Albania, Bosnia and Herzegovina, Argentina, Peru, Thailand  |
| 393        | <b>Thailand</b>               | Peru, Saudi Arabia, North Macedonia, Baku (Azerbaijan), Kazakhstan  |
| 393        | <b>North Macedonia</b>        | Thailand, Baku (Azerbaijan)   |
| 389        | <b>Baku (Azerbaijan)</b>      | Thailand, North Macedonia, Kazakhstan   |
| 387        | <b>Kazakhstan</b>             | Thailand, Baku (Azerbaijan)   |
| 380        | <b>Georgia</b>                | Panama  |
| 377        | <b>Panama</b>                 | Georgia, Indonesia  |
| 371        | <b>Indonesia</b>              | Panama  |
| 359        | <b>Morocco</b>                | Lebanon, Kosovo   |
| 353        | <b>Lebanon</b>                | Morocco, Kosovo   |
| 353        | <b>Kosovo</b>                 | Morocco, Lebanon  |
| 342        | <b>Dominican Republic</b>     | Philippines   |
| 340        | <b>Philippines</b>            | Dominican Republic  |

1. Data did not meet the PISA technical standards but were accepted as largely comparable (see Annexes A2 and A4).

Source: OECD, PISA 2018 Database, Table I.B1.4.

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In science, the highest-performing OECD countries were Japan and Estonia. In mathematics, the highest-performing OECD countries were Japan, Korea and Estonia. B-S-J-Z (China), Singapore, Estonia, Canada, Finland, Ireland, Japan and Korea scored above the OECD average in all three subjects, as did Macao (China), Hong Kong (China), Chinese Taipei, Sweden, New Zealand, the United Kingdom, Denmark, Germany, Slovenia, Belgium and France (in descending order of mean performance in reading).

Two countries (the United States and Australia) scored above the OECD average in reading and science, but not in mathematics; in the United States, performance in mathematics was significantly below the OECD average, while the performance of students in Australia was not statistically significantly different from the OECD average. Norway scored above the OECD average in reading and mathematics, but close to the OECD average in science. Three countries (the Czech Republic, the Netherlands and Switzerland) scored above the OECD average in mathematics and science, but close to the OECD average in reading. Some countries achieved above-average results in one subject only; this was the case of Austria, Iceland and Latvia in mathematics.

Eight countries whose mean scores lay below the OECD average (Argentina, Jordan, Lebanon, the Republic of Moldova, the Republic of North Macedonia, Romania, Saudi Arabia and Ukraine) conducted the PISA 2018 test using pen-and-paper forms, designed initially for the PISA 2012 or earlier assessments. Their results are reported on the same scale as those of the remaining countries, just as PISA 2018 results for all remaining countries/economies are reported on the same scale as past PISA results.<sup>2</sup>

The gap in performance between the highest- and lowest-performing OECD countries was 111 score points in reading; it was even larger in mathematics and science.<sup>3</sup> But the difference between the highest-performing and lowest-performing education systems that took part in PISA 2018 was about twice as large (Table I.4.1, Table I.4.2, and Table I.4.3), and the gap in mean performance, across all education systems in the world, is likely to be even larger. Indeed, the developing countries that participated in PISA – either as part of PISA 2018 or, in 2017, as part of the PISA for Development initiative (see Chapter 11 and Ward [2018<sub>[2]</sub>]) – represent only a minority of all developing countries. They often participated with the clear understanding that their students were not learning at adequate levels, even when they were in school. By participating in a global assessment of learning outcomes, these developing countries demonstrated a strong commitment to develop an evidence base for future education reforms and to address the international “learning crisis” (World Bank, 2017<sub>[3]</sub>).

Table I.4.2<sup>[1/2]</sup> Comparing countries' and economies' performance in mathematics

| Mean score | Comparison country/economy     | Statistically significantly above the OECD average  |   |
|------------|--------------------------------|---|---|
|            |                                | Not statistically significantly different from the OECD average   |   |
|            |                                | Statistically significantly below the OECD average  |   |
|            |                                | Countries and economies whose mean score is not statistically significantly different from the comparison country's/economy's score |   |
| 591        | B-S-J-Z (China)                |   |   |
| 569        | Singapore                      |   |   |
| 558        | Macao (China)                  |   | Hong Kong (China) <sup>1</sup>  |
| 551        | Hong Kong (China) <sup>1</sup> |   | Macao (China)   |
| 531        | Chinese Taipei                 |   | Japan, Korea  |
| 527        | Japan                          |   | Chinese Taipei, Korea, Estonia  |
| 526        | Korea                          |   | Chinese Taipei, Japan, Estonia, Netherlands <sup>1</sup>  |
| 523        | Estonia                        |   | Japan, Korea, Netherlands <sup>1</sup>  |
| 519        | Netherlands <sup>1</sup>       |   | Korea, Estonia, Poland, Switzerland   |
| 516        | Poland                         |   | Netherlands, <sup>1</sup> Switzerland, Canada   |
| 515        | Switzerland                    |   | Netherlands, <sup>1</sup> Poland, Canada, Denmark   |
| 512        | Canada                         |   | Poland, Switzerland, Denmark, Slovenia, Belgium, Finland  |
| 509        | Denmark                        |   | Switzerland, Canada, Slovenia, Belgium, Finland   |
| 509        | Slovenia                       |   | Canada, Denmark, Belgium, Finland   |
| 508        | Belgium                        |   | Canada, Denmark, Slovenia, Finland, Sweden, United Kingdom  |
| 507        | Finland                        |   | Canada, Denmark, Slovenia, Belgium, Sweden, United Kingdom  |
| 502        | Sweden                         |   | Belgium, Finland, United Kingdom, Norway, Germany, Ireland, Czech Republic, Austria, Latvia   |
| 502        | United Kingdom                 |   | Belgium, Finland, Sweden, Norway, Germany, Ireland, Czech Republic, Austria, Latvia, France   |
| 501        | Norway                         |   | Sweden, United Kingdom, Germany, Ireland, Czech Republic, Austria, Latvia, France, Iceland  |
| 500        | Germany                        |   | Sweden, United Kingdom, Norway, Ireland, Czech Republic, Austria, Latvia, France, Iceland, New Zealand                                    |
| 500        | Ireland                        |   | Sweden, United Kingdom, Norway, Germany, Czech Republic, Austria, Latvia, France, Iceland, New Zealand                                    |
| 499        | Czech Republic                 |   | Sweden, United Kingdom, Norway, Germany, Ireland, Austria, Latvia, France, Iceland, New Zealand, Portugal <sup>1</sup>                    |
| 499        | Austria                        |   | Sweden, United Kingdom, Norway, Germany, Ireland, Czech Republic, Latvia, France, Iceland, New Zealand, Portugal <sup>1</sup>             |
| 496        | Latvia                         |   | Sweden, United Kingdom, Norway, Germany, Ireland, Czech Republic, Austria, France, Iceland, New Zealand, Portugal, <sup>1</sup> Australia |
| 495        | France                         |   | United Kingdom, Norway, Germany, Ireland, Czech Republic, Austria, Latvia, Iceland, New Zealand, Portugal, <sup>1</sup> Australia         |
| 495        | Iceland                        |   | Norway, Germany, Ireland, Czech Republic, Austria, Latvia, France, New Zealand, Portugal, <sup>1</sup> Australia                          |
| 494        | New Zealand                    |   | Germany, Ireland, Czech Republic, Austria, Latvia, France, Iceland, Portugal, <sup>1</sup> Australia                                      |
| 492        | Portugal <sup>1</sup>          |   | Czech Republic, Austria, Latvia, France, Iceland, New Zealand, Australia, Russia, Italy, Slovak Republic                                  |
| 491        | Australia                      |   | Latvia, France, Iceland, New Zealand, Portugal, <sup>1</sup> Russia, Italy, Slovak Republic   |
| 488        | Russia                         |   | Portugal, <sup>1</sup> Australia, Italy, Slovak Republic, Luxembourg, Spain, Lithuania, Hungary   |
| 487        | Italy                          |   | Portugal, <sup>1</sup> Australia, Russia, Slovak Republic, Luxembourg, Spain, Lithuania, Hungary, United States <sup>1</sup>              |
| 486        | Slovak Republic                |   | Portugal, <sup>1</sup> Australia, Russia, Italy, Luxembourg, Spain, Lithuania, Hungary, United States <sup>1</sup>                        |
| 483        | Luxembourg                     |   | Russia, Italy, Slovak Republic, Spain, Lithuania, Hungary, United States <sup>1</sup>   |
| 481        | Spain                          |   | Russia, Italy, Slovak Republic, Luxembourg, Lithuania, Hungary, United States <sup>1</sup>  |
| 481        | Lithuania                      |   | Russia, Italy, Slovak Republic, Luxembourg, Spain, Hungary, United States <sup>1</sup>  |
| 481        | Hungary                        |   | Russia, Italy, Slovak Republic, Luxembourg, Spain, Lithuania, United States <sup>1</sup>  |
| 478        | United States <sup>1</sup>     |   | Italy, Slovak Republic, Luxembourg, Spain, Lithuania, Hungary, Belarus, Malta   |
| 472        | Belarus                        |   | United States, <sup>1</sup> Malta   |
| 472        | Malta                          |   | United States, <sup>1</sup> Belarus   |
| 464        | Croatia                        |   | Israel  |
| 463        | Israel                         |   | Croatia   |
| 454        | Turkey                         |   | Ukraine, Greece, Cyprus, Serbia   |
| 453        | Ukraine                        |   | Turkey, Greece, Cyprus, Serbia  |
| 451        | Greece                         |   | Turkey, Ukraine, Cyprus, Serbia   |
| 451        | Cyprus                         |   | Turkey, Ukraine, Greece, Serbia   |
| 448        | Serbia                         |   | Turkey, Ukraine, Greece, Cyprus, Malaysia   |
| 440        | Malaysia                       |   | Serbia, Albania, Bulgaria, United Arab Emirates, Romania  |
| 437        | Albania                        |   | Malaysia, Bulgaria, United Arab Emirates, Romania   |
| 436        | Bulgaria                       |   | Malaysia, Albania, United Arab Emirates, Brunei Darussalam, Romania, Montenegro   |
| 435        | United Arab Emirates           |   | Malaysia, Albania, Bulgaria, Romania  |
| 430        | Brunei Darussalam              |   | Bulgaria, Romania, Montenegro   |
| 430        | Romania                        |   | Malaysia, Albania, Bulgaria, United Arab Emirates, Brunei Darussalam, Montenegro, Kazakhstan, Moldova, Baku (Azerbaijan), Thailand        |
| 430        | Montenegro                     |   | Bulgaria, Brunei Darussalam, Romania  |

1. Data did not meet the PISA technical standards but were accepted as largely comparable (see Annexes A2 and A4).

Source: OECD, PISA 2018 Database, Table I.B1.5.

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Table I.4.2 [2/2] **Comparing countries' and economies' performance in mathematics**

| Mean score | Comparison country/economy    | Countries and economies whose mean score is not statistically significantly different from the comparison country's/economy's score |
|------------|-------------------------------|---|
| 423        | <b>Kazakhstan</b>             | Romania, Moldova, Baku (Azerbaijan), Thailand, Uruguay, Chile   |
| 421        | <b>Moldova</b>                | Romania, Kazakhstan, Baku (Azerbaijan), Thailand, Uruguay, Chile  |
| 420        | <b>Baku (Azerbaijan)</b>      | Romania, Kazakhstan, Moldova, Thailand, Uruguay, Chile, Qatar   |
| 419        | <b>Thailand</b>               | Romania, Kazakhstan, Moldova, Baku (Azerbaijan), Uruguay, Chile, Qatar  |
| 418        | <b>Uruguay</b>                | Kazakhstan, Moldova, Baku (Azerbaijan), Thailand, Chile, Qatar  |
| 417        | <b>Chile</b>                  | Kazakhstan, Moldova, Baku (Azerbaijan), Thailand, Uruguay, Qatar  |
| 414        | <b>Qatar</b>                  | Baku (Azerbaijan), Thailand, Uruguay, Chile, Mexico   |
| 409        | <b>Mexico</b>                 | Qatar, Bosnia and Herzegovina, Costa Rica   |
| 406        | <b>Bosnia and Herzegovina</b> | Mexico, Costa Rica, Peru, Jordan  |
| 402        | <b>Costa Rica</b>             | Mexico, Bosnia and Herzegovina, Peru, Jordan, Georgia, Lebanon  |
| 400        | <b>Peru</b>                   | Bosnia and Herzegovina, Costa Rica, Jordan, Georgia, North Macedonia, Lebanon   |
| 400        | <b>Jordan</b>                 | Bosnia and Herzegovina, Costa Rica, Peru, Georgia, North Macedonia, Lebanon   |
| 398        | <b>Georgia</b>                | Costa Rica, Peru, Jordan, North Macedonia, Lebanon, Colombia  |
| 394        | <b>North Macedonia</b>        | Peru, Jordan, Georgia, Lebanon, Colombia  |
| 393        | <b>Lebanon</b>                | Costa Rica, Peru, Jordan, Georgia, North Macedonia, Colombia  |
| 391        | <b>Colombia</b>               | Georgia, North Macedonia, Lebanon   |
| 384        | <b>Brazil</b>                 | Argentina, Indonesia  |
| 379        | <b>Argentina</b>              | Brazil, Indonesia, Saudi Arabia   |
| 379        | <b>Indonesia</b>              | Brazil, Argentina, Saudi Arabia   |
| 373        | <b>Saudi Arabia</b>           | Argentina, Indonesia, Morocco   |
| 368        | <b>Morocco</b>                | Saudi Arabia, Kosovo  |
| 366        | <b>Kosovo</b>                 | Morocco   |
| 353        | <b>Panama</b>                 | Philippines   |
| 353        | <b>Philippines</b>            | Panama  |
| 325        | <b>Dominican Republic</b>     |   |

1. Data did not meet the PISA technical standards but were accepted as largely comparable (see Annexes A2 and A4).

Source: OECD, PISA 2018 Database, Table I.B1.5.

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## VARIATION IN PERFORMANCE WITHIN COUNTRIES AND ECONOMIES

While differences in average performance across countries and economies are large, the gap that separates the highest-performing and lowest-performing students within any country is, typically, even larger. In reading, for example, the difference between the 95th percentile of performance (the score above which only 5% of students scored) and the 5th percentile of performance (the score below which only 5% of students scored) was more than 220 score points in all countries and economies; on average across OECD countries, 327 score points separated these extremes (Table I.B1.4). This difference corresponds, typically, to capacities that students develop over the equivalent of several years and grades.<sup>4</sup>

The largest differences between top-performing and low-achieving students were found in Israel, Lebanon, Malta and the United Arab Emirates, meaning that learning outcomes at age 15 in these countries are highly unequal (Table I.B1.4).

The smallest differences between high- and low-achieving students were, typically, found amongst countries and economies with the lowest mean scores. In Kosovo, Morocco and the Philippines, even the highest-performing students scored only around the OECD average. In these countries/economies, the 95th percentile of the reading distribution was close to the average score across OECD countries.

The standard deviation summarises the variation in performance amongst 15-year-old students within each country/economy across the entire distribution. The average standard deviation in reading performance within OECD countries was 99 score points. If the between-country variation was also considered ("OECD total"), the standard deviation across all students in OECD countries was 105 score points. By this measure, the smallest variation in reading proficiency was found in Kosovo (68 score points); several other countries and economies whose mean performance was below the OECD average also have small variations in performance (Figure I.4.1). Amongst high-performing systems, B-S-J-Z (China) (87 score points) stood out for its relatively small variation in performance. This indicates that, more than in other high-performing systems, student performance in B-S-J-Z (China) is consistently high: there are smaller-than-average inequalities in learning outcomes.

Table I.4.3<sup>[1/2]</sup> Comparing countries' and economies' performance in science

| Mean score | Comparison country/economy     | Countries and economies whose mean score is not statistically significantly different from the comparison country's/economy's score   |
|------------|--------------------------------|---|
| 590        | B-S-J-Z (China)                |   |
| 551        | Singapore                      |   |
| 544        | Macao (China)                  |   |
| 530        | Estonia                        | Japan   |
| 529        | Japan                          | Estonia   |
| 522        | Finland                        | Korea, Canada, Hong Kong (China), <sup>1</sup> Chinese Taipei   |
| 519        | Korea                          | Finland, Canada, Hong Kong (China), <sup>1</sup> Chinese Taipei   |
| 518        | Canada                         | Finland, Korea, Hong Kong (China), <sup>1</sup> Chinese Taipei  |
| 517        | Hong Kong (China) <sup>1</sup> | Finland, Korea, Canada, Chinese Taipei, Poland  |
| 516        | Chinese Taipei                 | Finland, Korea, Canada, Hong Kong (China), <sup>1</sup> Poland  |
| 511        | Poland                         | Hong Kong (China), <sup>1</sup> Chinese Taipei, New Zealand, Slovenia, United Kingdom   |
| 508        | New Zealand                    | Poland, Slovenia, United Kingdom, Netherlands, <sup>1</sup> Germany, United States <sup>1</sup>   |
| 507        | Slovenia                       | Poland, New Zealand, United Kingdom, Netherlands, <sup>1</sup> Germany, Australia, United States <sup>1</sup>   |
| 505        | United Kingdom                 | Poland, New Zealand, Slovenia, Netherlands, <sup>1</sup> Germany, Australia, United States, <sup>1</sup> Sweden, Belgium  |
| 503        | Netherlands <sup>1</sup>       | New Zealand, Slovenia, United Kingdom, Germany, Australia, United States, <sup>1</sup> Sweden, Belgium, Czech Republic  |
| 503        | Germany                        | New Zealand, Slovenia, United Kingdom, Netherlands, <sup>1</sup> Australia, United States, <sup>1</sup> Sweden, Belgium, Czech Republic, Ireland, Switzerland                   |
| 503        | Australia                      | Slovenia, United Kingdom, Netherlands, <sup>1</sup> Germany, United States, <sup>1</sup> Sweden, Belgium  |
| 502        | United States <sup>1</sup>     | New Zealand, Slovenia, United Kingdom, Netherlands, <sup>1</sup> Germany, Australia, Sweden, Belgium, Czech Republic, Ireland, Switzerland                                      |
| 499        | Sweden                         | United Kingdom, Netherlands, <sup>1</sup> Germany, Australia, United States, <sup>1</sup> Belgium, Czech Republic, Ireland, Switzerland, France, Denmark, Portugal <sup>1</sup> |
| 499        | Belgium                        | United Kingdom, Netherlands, <sup>1</sup> Germany, Australia, United States, <sup>1</sup> Sweden, Czech Republic, Ireland, Switzerland, France                                  |
| 497        | Czech Republic                 | Netherlands, <sup>1</sup> Germany, United States, <sup>1</sup> Sweden, Belgium, Ireland, Switzerland, France, Denmark, Portugal, <sup>1</sup> Norway, Austria                   |
| 496        | Ireland                        | Germany, United States, <sup>1</sup> Sweden, Belgium, Czech Republic, Switzerland, France, Denmark, Portugal, <sup>1</sup> Norway, Austria                                      |
| 495        | Switzerland                    | Germany, United States, <sup>1</sup> Sweden, Belgium, Czech Republic, Ireland, France, Denmark, Portugal, <sup>1</sup> Norway, Austria  |
| 493        | France                         | Sweden, Belgium, Czech Republic, Ireland, Switzerland, Denmark, Portugal, <sup>1</sup> Norway, Austria  |
| 493        | Denmark                        | Sweden, Czech Republic, Ireland, Switzerland, France, Portugal, <sup>1</sup> Norway, Austria  |
| 492        | Portugal <sup>1</sup>          | Sweden, Czech Republic, Ireland, Switzerland, France, Denmark, Norway, Austria, Latvia  |
| 490        | Norway                         | Czech Republic, Ireland, Switzerland, France, Denmark, Portugal, <sup>1</sup> Austria, Latvia   |
| 490        | Austria                        | Czech Republic, Ireland, Switzerland, France, Denmark, Portugal, <sup>1</sup> Norway, Latvia  |
| 487        | Latvia                         | Portugal, <sup>1</sup> Norway, Austria, Spain   |
| 483        | Spain                          | Latvia, Lithuania, Hungary, Russia  |
| 482        | Lithuania                      | Spain, Hungary, Russia  |
| 481        | Hungary                        | Spain, Lithuania, Russia, Luxembourg  |
| 478        | Russia                         | Spain, Lithuania, Hungary, Luxembourg, Iceland, Croatia, Belarus  |
| 477        | Luxembourg                     | Hungary, Russia, Iceland, Croatia   |
| 475        | Iceland                        | Russia, Luxembourg, Croatia, Belarus, Ukraine   |
| 472        | Croatia                        | Russia, Luxembourg, Iceland, Belarus, Ukraine, Turkey, Italy  |
| 471        | Belarus                        | Russia, Iceland, Croatia, Ukraine, Turkey, Italy  |
| 469        | Ukraine                        | Iceland, Croatia, Belarus, Turkey, Italy, Slovak Republic, Israel   |
| 468        | Turkey                         | Croatia, Belarus, Ukraine, Italy, Slovak Republic, Israel   |
| 468        | Italy                          | Croatia, Belarus, Ukraine, Turkey, Slovak Republic, Israel  |
| 464        | Slovak Republic                | Ukraine, Turkey, Italy, Israel  |
| 462        | Israel                         | Ukraine, Turkey, Italy, Slovak Republic, Malta  |
| 457        | Malta                          | Israel, Greece  |
| 452        | Greece                         | Malta   |
| 444        | Chile                          | Serbia, Cyprus, Malaysia  |
| 440        | Serbia                         | Chile, Cyprus, Malaysia, United Arab Emirates   |
| 439        | Cyprus                         | Chile, Serbia, Malaysia   |
| 438        | Malaysia                       | Chile, Serbia, Cyprus, United Arab Emirates   |
| 434        | United Arab Emirates           | Serbia, Malaysia, Brunei Darussalam, Jordan, Moldova, Romania   |
| 431        | Brunei Darussalam              | United Arab Emirates, Jordan, Moldova, Thailand, Uruguay, Romania, Bulgaria   |
| 429        | Jordan                         | United Arab Emirates, Brunei Darussalam, Moldova, Thailand, Uruguay, Romania, Bulgaria  |
| 428        | Moldova                        | United Arab Emirates, Brunei Darussalam, Jordan, Thailand, Uruguay, Romania, Bulgaria   |
| 426        | Thailand                       | Brunei Darussalam, Jordan, Moldova, Uruguay, Romania, Bulgaria, Mexico  |
| 426        | Uruguay                        | Brunei Darussalam, Jordan, Moldova, Thailand, Romania, Bulgaria, Mexico   |
| 426        | Romania                        | United Arab Emirates, Brunei Darussalam, Jordan, Moldova, Thailand, Uruguay, Bulgaria, Mexico, Qatar, Albania, Costa Rica   |
| 424        | Bulgaria                       | Brunei Darussalam, Jordan, Moldova, Thailand, Uruguay, Romania, Mexico, Qatar, Albania, Costa Rica  |
| 419        | Mexico                         | Thailand, Uruguay, Romania, Bulgaria, Qatar, Albania, Costa Rica, Montenegro, Colombia  |
| 419        | Qatar                          | Romania, Bulgaria, Mexico, Albania, Costa Rica, Colombia  |
| 417        | Albania                        | Romania, Bulgaria, Mexico, Qatar, Costa Rica, Montenegro, Colombia, North Macedonia   |
| 416        | Costa Rica                     | Romania, Bulgaria, Mexico, Qatar, Albania, Montenegro, Colombia, North Macedonia  |

1. Data did not meet the PISA technical standards but were accepted as largely comparable (see Annexes A2 and A4).

Source: OECD, PISA 2018 Database, Table I.B1.6.

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## How did countries perform in PISA 2018?

Table I.4.3 [2/2] **Comparing countries' and economies' performance in science**

| Mean score | Comparison country/economy | Countries and economies whose mean score is not statistically significantly different from the comparison country's/economy's score |
|------------|----------------------------|---|
| 415        | Montenegro                 | Mexico, Albania, Costa Rica, Colombia, North Macedonia  |
| 413        | Colombia                   | Mexico, Qatar, Albania, Costa Rica, Montenegro, North Macedonia   |
| 413        | North Macedonia            | Albania, Costa Rica, Montenegro, Colombia   |
| 404        | Peru                       | Argentina, Brazil, Bosnia and Herzegovina, Baku (Azerbaijan)  |
| 404        | Argentina                  | Peru, Brazil, Bosnia and Herzegovina, Baku (Azerbaijan)   |
| 404        | Brazil                     | Peru, Argentina, Bosnia and Herzegovina, Baku (Azerbaijan)  |
| 398        | Bosnia and Herzegovina     | Peru, Argentina, Brazil, Baku (Azerbaijan), Kazakhstan, Indonesia   |
| 398        | Baku (Azerbaijan)          | Peru, Argentina, Brazil, Bosnia and Herzegovina, Kazakhstan, Indonesia  |
| 397        | Kazakhstan                 | Bosnia and Herzegovina, Baku (Azerbaijan), Indonesia  |
| 396        | Indonesia                  | Bosnia and Herzegovina, Baku (Azerbaijan), Kazakhstan   |
| 386        | Saudi Arabia               | Lebanon, Georgia  |
| 384        | Lebanon                    | Saudi Arabia, Georgia, Morocco  |
| 383        | Georgia                    | Saudi Arabia, Lebanon, Morocco  |
| 377        | Morocco                    | Lebanon, Georgia  |
| 365        | Kosovo                     | Panama  |
| 365        | Panama                     | Kosovo, Philippines   |
| 357        | Philippines                | Panama  |
| 336        | Dominican Republic         |   |

Statistically significantly above the OECD average  
 Not statistically significantly different from the OECD average  
 Statistically significantly below the OECD average

1. Data did not meet the PISA technical standards but were accepted as largely comparable (see Annexes A2 and A4).

Source: OECD, PISA 2018 Database, Table I.B1.6.


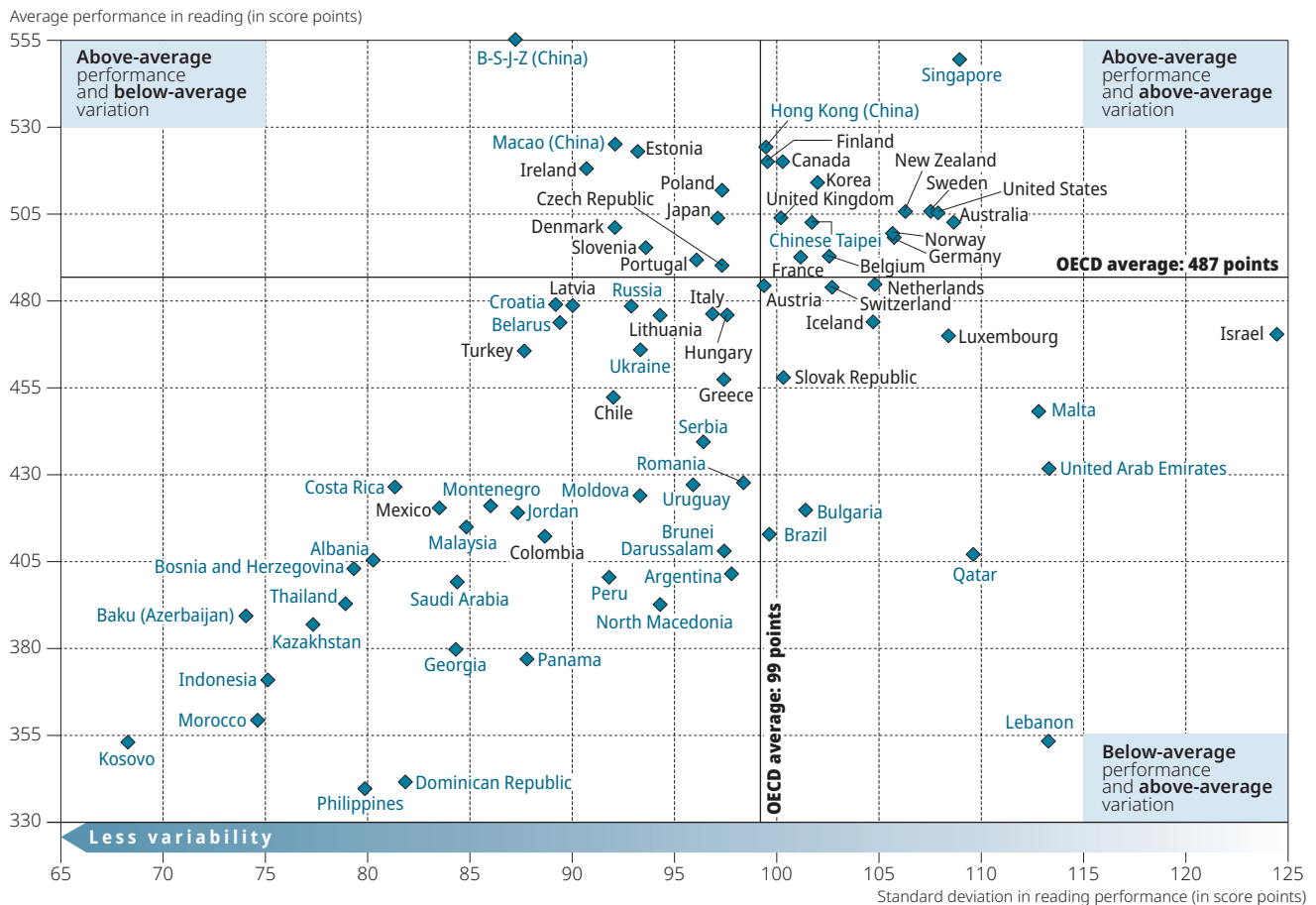

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Figure I.4.1 **Average performance in reading and variation in performance**



Source: OECD, PISA 2018 Database, Table I.B1.4.

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In contrast, Singapore, with mean performance similar to that of B-S-J-Z (China), had one of the widest variations in reading performance (109 score points; the variation in mathematics and in science was closer to the OECD average). This large variation in reading performance in Singapore may be related to the diversity of students' linguistic backgrounds. As shown at the end of this chapter, 43% of students in Singapore reported that they do not speak the test language at home (Figure I.4.11).<sup>5</sup> (Demographic and socio-economic factors related to variations in performance within countries/economies are more extensively analysed in *PISA 2018 Results [Volume II]: Where All Students Can Succeed* [OECD, 2019<sub>[1]</sub>]).

## RANKING COUNTRIES' AND ECONOMIES' PERFORMANCE IN PISA

The goal of PISA is to provide useful information to educators and policy makers concerning the strengths and weaknesses of their country's education system, the progress made over time, and opportunities for improvement. When ranking countries, economies and education systems in PISA, it is important to consider the social and economic context in which education takes place. Moreover, many countries and economies score at similar levels; small differences that are not statistically significant or practically meaningful should not be overly emphasised.

Table I.4.4, Table I.4.5 and Table I.4.6 show, for each country and economy, an estimate of where its mean performance ranks amongst all other countries and economies that participate in PISA as well as, for OECD countries, amongst all OECD countries. Because mean-score estimates are derived from samples and are thus associated with statistical uncertainty, it is often not possible to determine an exact ranking for all countries and economies. However, it is possible to identify the range of possible rankings for the country's/economy's mean performance.<sup>6</sup> This range of ranks can be wide, particularly for countries/economies whose mean scores are similar to those of many other countries/economies.<sup>7</sup>

Table I.4.4, Table I.4.5 and Table I.4.6 also include, for countries where the sampling design supports such reporting, the results of cities, regions, states or other subnational entities within the country.<sup>8</sup> For these subnational entities (whose results are reported in Annex B2), a rank order was not estimated. Still, the mean score and its confidence interval allow for a comparison of performance with that of countries and economies. For example, Alberta (Canada) scored below top-performers B-S-J-Z (China) and Singapore, but close to Macao (China) in reading. These subnational results also highlight differences within countries that are often as large as between-country differences in performance. In reading, for example, more than 40 score points separated the mean performance of Alberta and the mean performance of New Brunswick in Canada, and even larger differences were observed between Astana and the Atyrau region of Kazakhstan.

## A CONTEXT FOR COUNTRIES' PERFORMANCE IN PISA

Comparing the performance of students across vastly diverse countries poses numerous challenges. In any classroom, students with varying abilities, attitudes and social backgrounds are required to respond to the same set of tasks when sitting a test. When comparing the performance of schools in an education system, the same test is used across schools that may differ significantly in the structure and sequencing of their curriculum, in their pedagogical emphasis, in the instructional methods applied, and in the demographic and social contexts of their student population. Comparing the performance of education systems across countries adds further layers of complexity because students are given tests in different languages, and because the social, economic and cultural context of the countries that are being compared are often very different.

However, while students within a country may learn in different contexts according to their home environment and the school they attend, their performance is measured against common standards. And when they become adults, they will all face common challenges and will often have to compete for the same jobs. Similarly, in a global society and economy, the success of education systems in preparing students for life is no longer measured against locally established benchmarks, but increasingly against benchmarks that are common to all education systems around the world. As difficult as international comparisons are, comparisons with the best-performing systems provide important information for educators, and PISA goes to considerable lengths to ensure that such comparisons are valid and fair (see also Annex A6).

This section discusses countries' mean reading performance in PISA in the context of important economic, demographic and social factors that can influence the assessment results (results are similar for mathematics and science). It provides a context for interpreting the results that are presented above and in the following chapters.

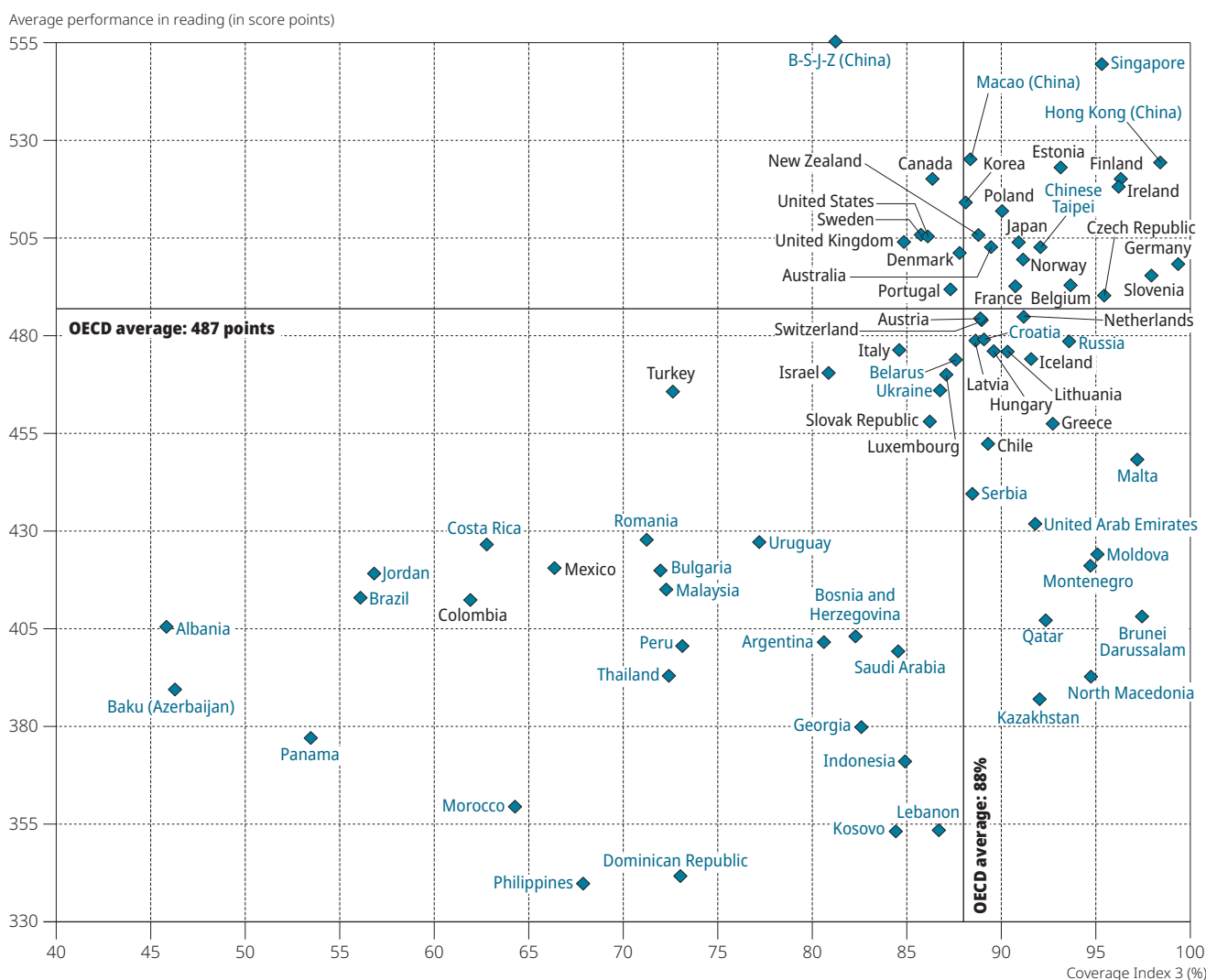
PISA's stringent sampling standards limit the possible exclusion of students and schools and the impact of non-response. These standards are applied to ensure that the results support conclusions that are valid for the PISA target population when comparing adjudicated countries, economies and subnational entities. Chapter 3 provides a definition of the PISA target population, which is the relevant population when comparing school systems.

## How did countries perform in PISA 2018?

But when interpreting PISA results with regard to the overall population of 15-year-olds, sample coverage must be assessed with respect to this wider population. Coverage Index 3, discussed in Chapter 3, provides an estimate of the share of the 15-year-old age cohort covered by PISA. In 2018, it varied from 46% in Baku (Azerbaijan) and 53% in Panama to close to 100% in Germany, Hong Kong (China) and Slovenia. While the PISA results are representative of the target population in all adjudicated countries/economies, they cannot be readily generalised to the entire population of 15-year-olds in countries where many young people of that age are not enrolled in lower or upper secondary school. The mean scores of 15-year-old students in countries with a low Coverage Index 3 are typically below average (Figure I.4.2); but the mean scores amongst all 15-year-olds may be even lower if the reading, mathematics and science competences of the 15-year-olds who were not eligible to sit the PISA test were, on average, below those of eligible 15-year-olds.<sup>9</sup> The following chapters (Chapters 5 through 10) discuss several ways of accounting for the share of 15-year-olds who were not covered by the PISA sample when comparing results across countries and over time.

Variations in population coverage are not the only differences that must be borne in mind when comparing results across countries. As discussed in *PISA 2018 Results (Volume II): Where All Students Can Succeed* (OECD, 2019<sub>[1]</sub>), a family's wealth is related to its children's performance in school, but the strength of this relationship varies markedly across countries. Similarly, the relative prosperity of some countries allows them to spend more on education, while other countries find themselves constrained by a lower national income. It is therefore important to keep the national income of countries in mind when interpreting the performance of middle-income countries, such as Colombia, Moldova, Morocco and the Philippines, compared with high-income countries (defined by the World Bank as countries whose per capita income was above USD 12 375 in 2018).<sup>10</sup>

Figure I.4.2 Reading performance and coverage of the population of 15-year-olds in the PISA sample



Source: OECD, PISA 2018 Database, Tables I.B1.4 and I.A2.1.

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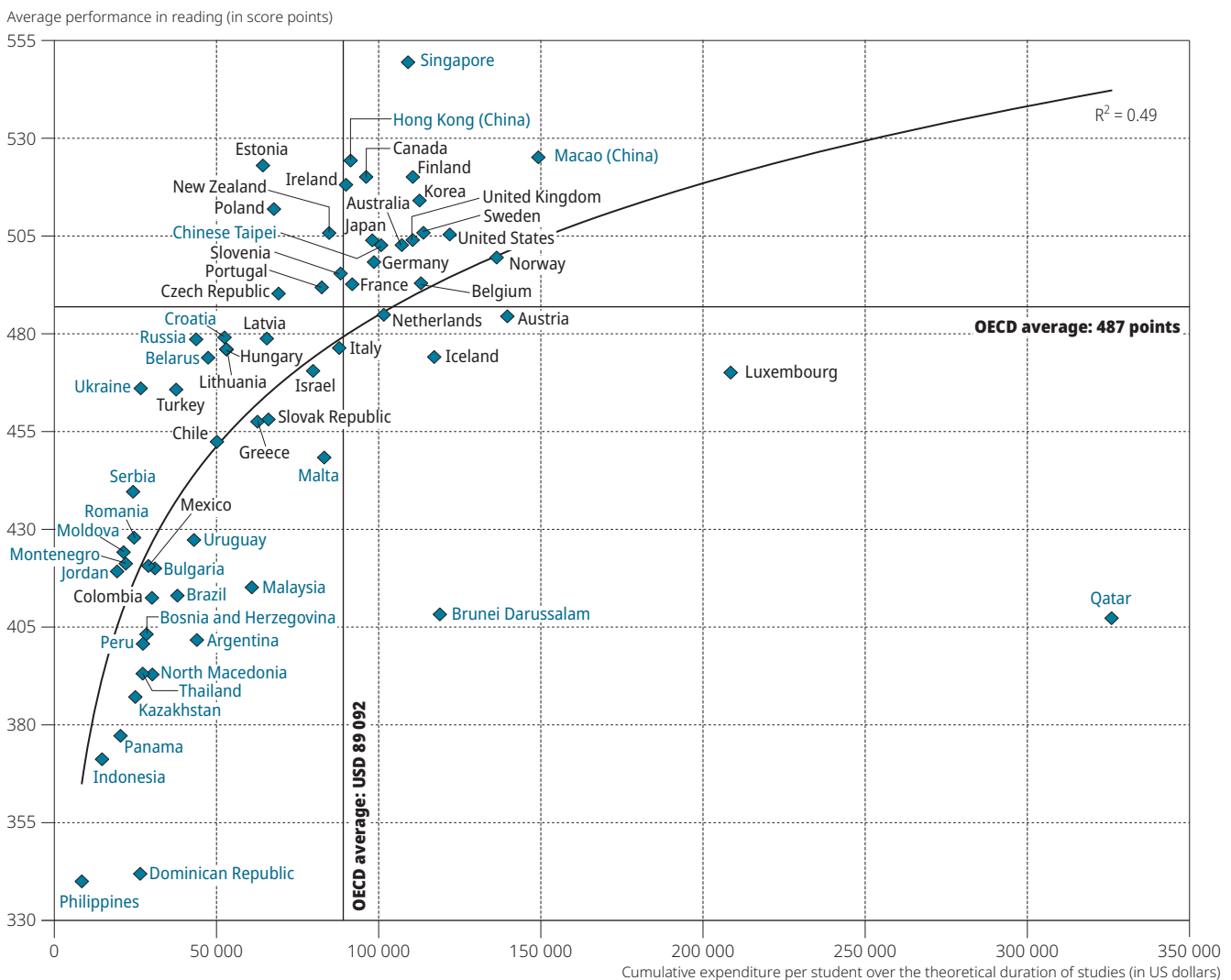


## How did countries perform in PISA 2018?

purchasing power parities [PPP]), a level of cumulative expenditure reached by all OECD countries except Colombia, Mexico and Turkey, spending is much less related to performance. Indeed, Estonia, which spends around USD 64 000 per student (compared to an OECD average expenditure of about USD 89 000), was one of the top-performing OECD countries in reading, mathematics and science in PISA 2018. This shows that, while education needs to be adequately resourced, and is often under-resourced in developing countries, a high level of spending per student is not required to achieve excellence in education.

In most countries, students and their families do not bear the full costs of their primary and secondary education, and often do not pay directly for it, as compulsory education is typically paid for through taxes. But students and their families directly invest their time in education. PISA 2015 highlighted significant differences in the hours of instruction per week among 15-year-old students. Students in Beijing-Shanghai-Jiangsu-Guangdong (China) (hereafter “B-S-J-G [China]”), Chile, Costa Rica, Korea, Chinese Taipei, Thailand and Tunisia spent at least 30 hours per week in regular lessons (all subjects combined), while students in Brazil, Bulgaria, Finland, Lithuania, the Slovak Republic and Uruguay spent less than 25 hours per week. Even larger differences were found in the amount of time that students spent learning outside of regular lessons, i.e. doing homework, taking additional instruction or attending private study. All subjects combined, students in B-S-J-G (China), the Dominican Republic, Qatar, Tunisia and the United Arab Emirates reported that they studied at least 25 hours per week in addition to the required school schedule; in Finland, Germany, Iceland, Japan, the Netherlands, Sweden and Switzerland, they studied less than 15 hours per week outside of school (OECD, 2016, pp. 209-217<sup>[41]</sup>).

Figure I.4.4 Reading performance and spending on education

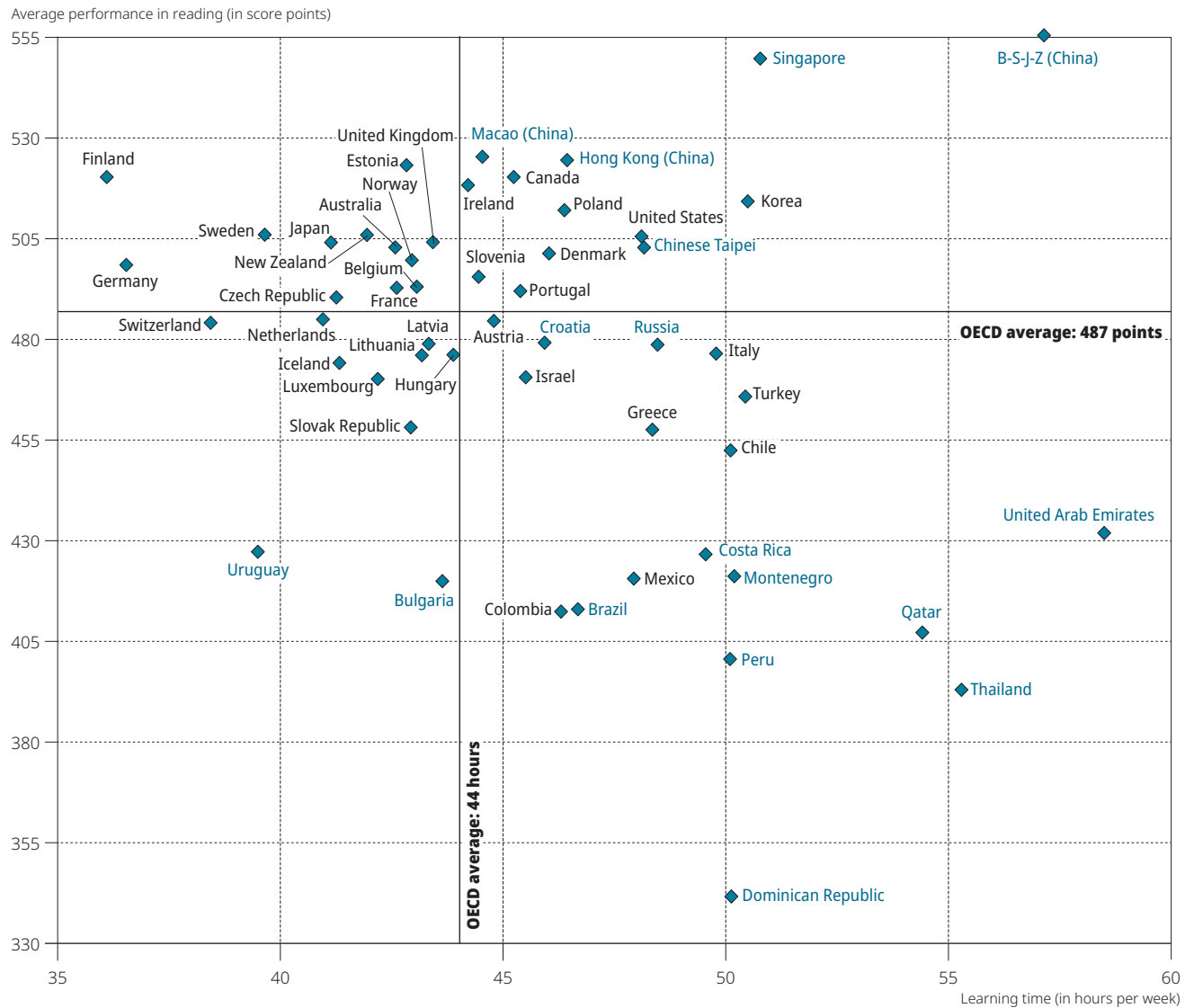


Source: OECD, PISA 2018 Database, Tables I.B1.4 and B3.1.1.

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Based on information about learning time collected in PISA 2015,<sup>14</sup> Figure I.4.5 shows the widely varied combinations of total learning time and performance that can be observed across PISA countries and economies. Countries in the upper-left quadrant can be considered more efficient, in that students reach above-average levels of proficiency but devote less time to learning than 15-year-old students on average across OECD countries. This group includes Finland, Germany, Japan and Sweden. By contrast, in several high-performing countries and economies, including B-S-J-Z (China), Korea and Singapore, students reported spending more than 50 hours per week attending regular lessons or in additional learning activities.

Figure I.4.5 **Reading performance and total learning time per week**



**Notes:** Learning time is based on reports by 15-year-old students in the same country/economy in response to the PISA 2015 questionnaire. For Beijing-Shanghai-Jiangsu-Zhejiang (China) (labelled as B-J-S-Z [China] on the chart), data on learning time amongst students from Beijing-Shanghai-Jiangsu-Guangdong (China) were used.

**Source:** OECD, PISA 2018 Database, Table I.B1.4; and OECD, PISA 2015 Database, Figure II.6.23.

**StatLink** <https://doi.org/10.1787/888934028425>

### The cumulative nature of PISA results

It is not only current economic conditions that matter for education; past economic conditions, and the level of education of previous generations, also influence children's learning outcomes. Indeed, education is a cumulative process: the outcomes of one year of schooling depend on what was learned during the previous year; and the influence of the school environment is compounded by that of the family environment and of the wider social environment in which a child grows up.

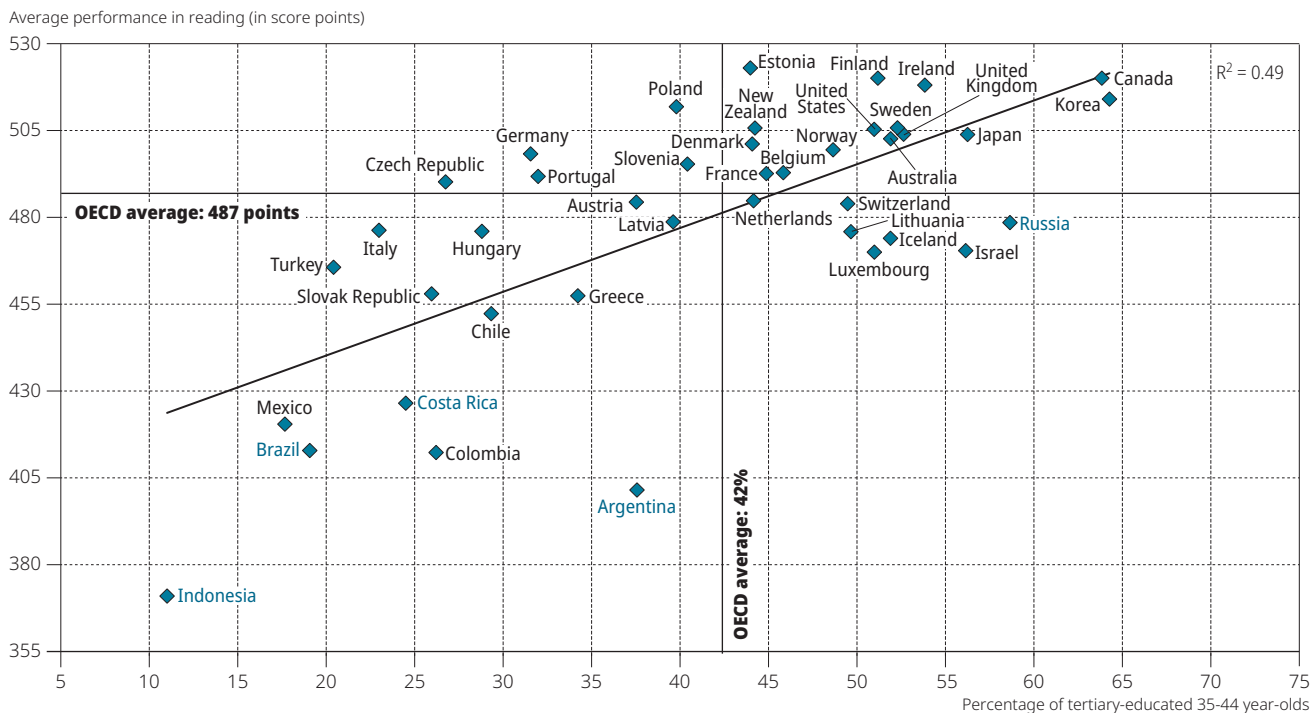
## How did countries perform in PISA 2018?

There is a close inter-relationship between a student's performance in PISA and his or her parents' level of education (as measured by their educational qualifications); and a similarly close inter-relationship can be expected between countries' performance in PISA and adults' level of education and skills. When it comes to educating their children, countries with more highly educated and skilled adults are at an advantage over countries where parents have less education, or where many adults have low literacy skills. Figure I.4.6 shows the relationship between mean reading performance and the percentage of 35-44 year-olds who have attained tertiary education. This group corresponds roughly to the age group of parents of the 15-year-olds assessed in PISA. According to this simple analysis, the share of tertiary-educated 35-44 year-olds accounts for 49% of the variation between countries/economies (N = 41) in 15-year-old students' mean performance (42% across OECD countries, N = 36). Figure I.4.7 shows the relationship between mean reading performance and the average literacy score of 35-54 year-olds in countries that participated in the Survey of Adult Skills, a product of the OECD Programme for the International Assessment of Adult Competencies (PIAAC).<sup>15</sup> Adult literacy accounts for 58% of the variation in mean performance between countries/economies (N = 35).

When interpreting the performance of 15-year-olds in PISA, it is also important to consider that the results reflect more than the quality of lower secondary schooling (which these students have typically just completed, or are about to complete) or the quality of the upper secondary schools that they may be attending (which, in some cases, they have attended for less than a year). They also reflect the quality of learning in earlier stages of schooling, and the cognitive, emotional and social competences students had acquired before they even entered school.

A clear way of showing this is to compare the mean reading performance of 15-year-olds in PISA with the average reading performance achieved towards the end of primary school by students from a similar birth cohort who participated in the Progress in International Reading Literacy Study (PIRLS) in 2011. Some 42 countries, economies and subnational entities that participated in PISA 2018 also participated in PIRLS 2011, a study developed by the International Association for the Evaluation of Educational Achievement (Mullis et al., 2012<sub>[5]</sub>). Figure I.4.8 shows a strong correlation between the results of the reading test for 4th-grade students in PIRLS 2011 and the results of the PISA 2018 reading assessment amongst 15-year-old students (variations in PIRLS results can account for about 72% of the variation in PISA reading results across countries and economies). Despite this clear relationship, countries that scored at similar levels in PIRLS – such as the Russian Federation and Singapore, which were amongst the highest-performing countries – can have very different mean scores in PISA. Differences between PISA and PIRLS in countries' relative standing may reflect the influence of the intervening grades on performance, but could also be related to differences in what is measured and in who is assessed.<sup>16</sup>

Figure I.4.6 Reading performance in PISA and educational attainment amongst 35-44 year-olds

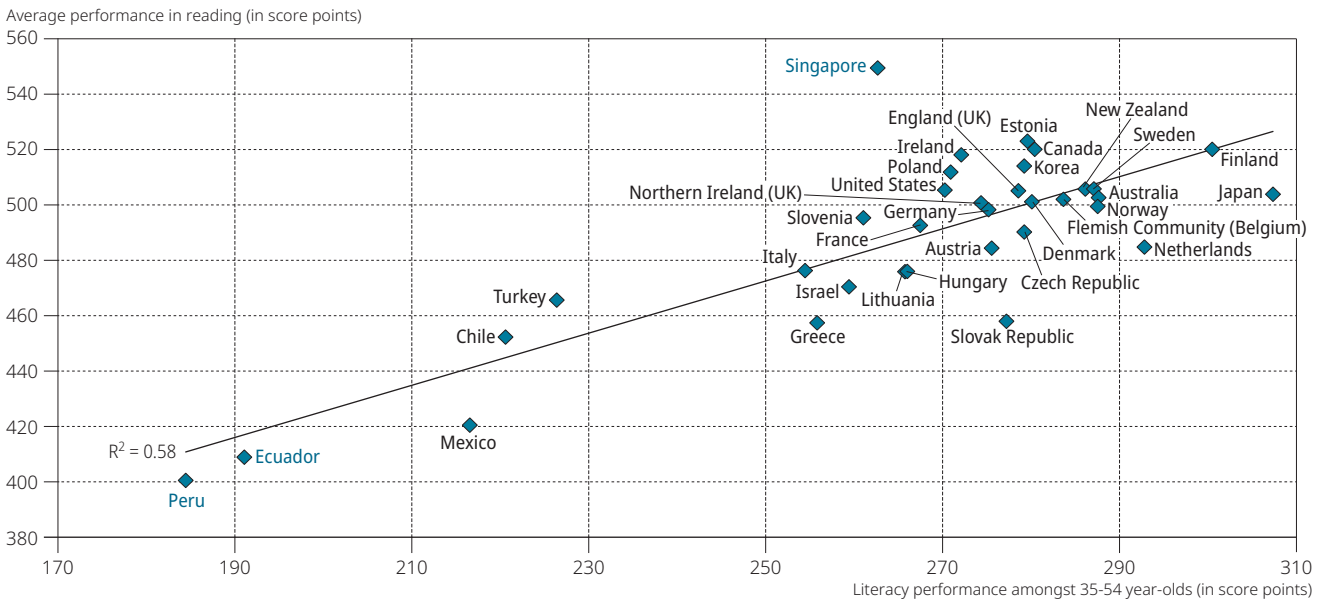


Source: OECD, PISA 2018 Database, Table I.B1.4; OECD (2019<sub>[6]</sub>), *Education at a Glance 2019: OECD Indicators*, OECD Publishing, Paris,

<https://doi.org/10.1787/f8d7880d-en>.

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Figure I.4.7 Reading performance in PISA and literacy amongst 35-54 year-olds

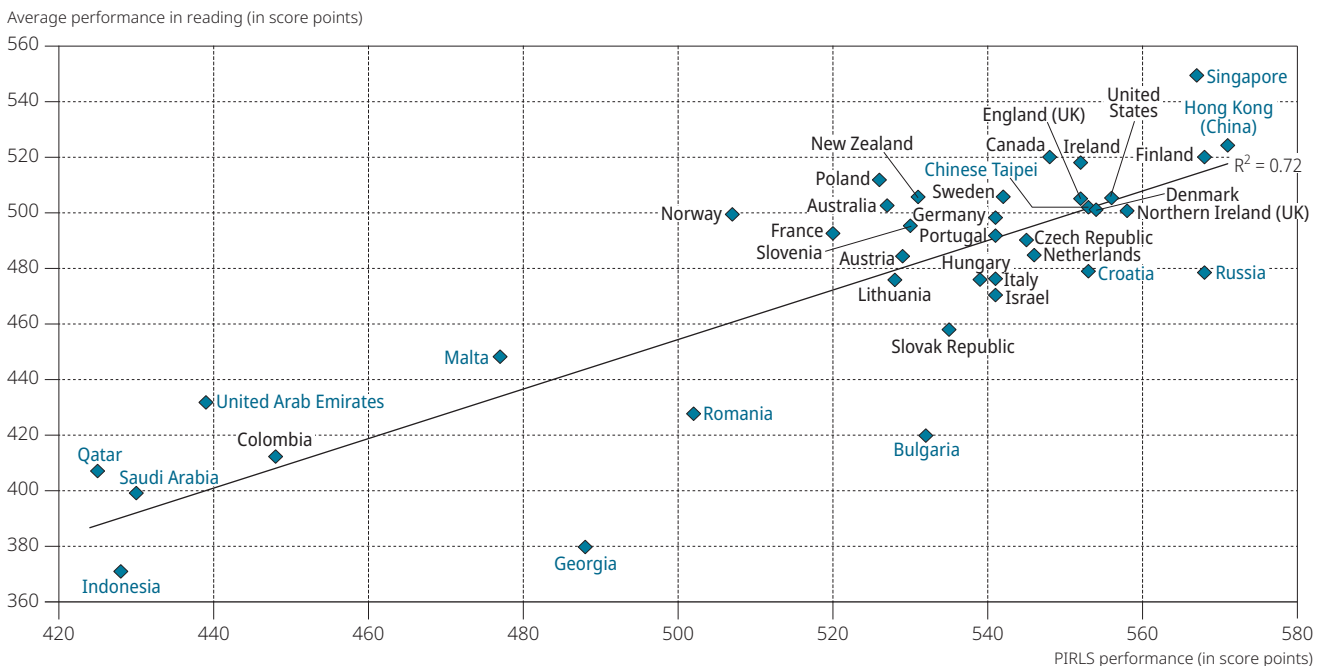


**Note:** Different countries and regions participated in the Survey of Adult Skills (PIAAC) in different years. In all countries and regions, results for 35-54 year-olds are approximated by the results of adults born between 1964 and 1983. No adjustment was made to account for changes in the skills of these adults, or for changes in the composition of these cohorts, between the year in which the Survey of Adult Skills was conducted and 2018. PISA results for the Flemish community (Belgium) are related to PIAAC results for Flanders (Belgium). PIAAC results for Ecuador are related to the country's results in the PISA for Development assessment (2017). For the United States, PIAAC data refer to 2017.

**Source:** OECD, PISA 2018 Database, Table I.B1.4; OECD, Survey of Adult Skills (PIAAC) (2011-12, 2014-15, 2017).

**StatLink** <https://doi.org/10.1787/888934028463>

Figure I.4.8 Reading performance in PISA and 4th-graders' performance in PIRLS 2011



**Notes:** Only countries and economies with available data are shown.

For Morocco, 6th-grade achievement was used rather than 4th-grade achievement.

**Source:** OECD, PISA 2018 Database, Table I.B1.4 and Mullis, I. et al. (2012<sup>[5]</sup>), *PIRLS 2011 International Results in Reading*, [https://timssandpirls.bc.edu/pirls2011/downloads/P11\\_IR\\_FullBook.pdf](https://timssandpirls.bc.edu/pirls2011/downloads/P11_IR_FullBook.pdf).

**StatLink** <https://doi.org/10.1787/888934028482>

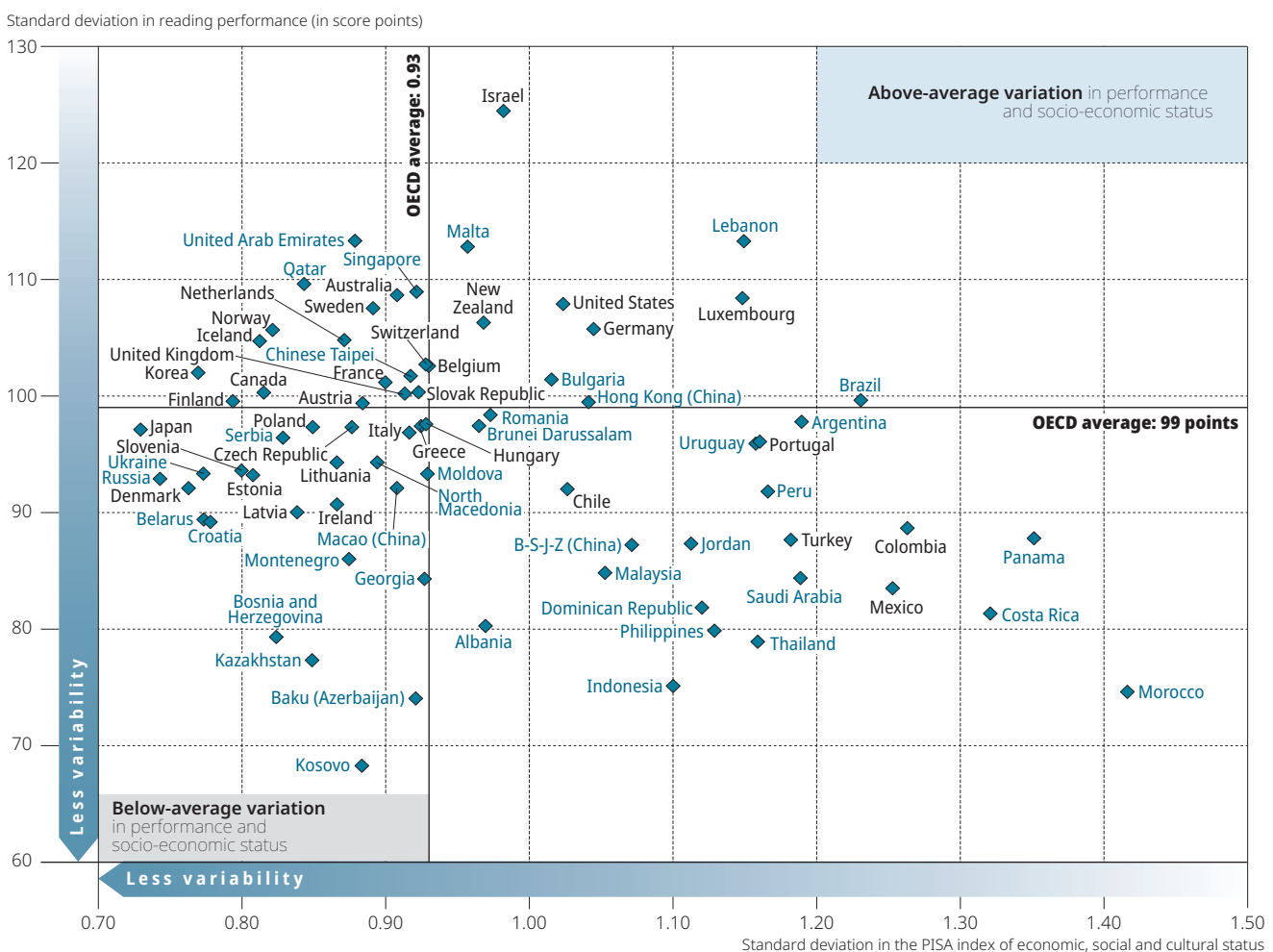
### The challenges of student and language diversity

The challenges education systems face cannot be reduced to differences in the overall resources available for schooling or in the extent to which families and society at large support students' acquisition of core skills. Student diversity, related, for example, to socio-economic inequality and students not speaking the language of instruction at home, must also be considered. The challenge for teachers and education systems is to overcome inequalities and at the same time exploit the benefits of diversity in the classroom (OECD, 2010<sup>[7]</sup>; OECD, 2019<sup>[8]</sup>).

Figure I.4.9 shows how the standard deviation of reading performance, described earlier, relates to a measure of socio-economic heterogeneity within the country (the standard deviation of the PISA index of economic, social and cultural status); see Chapter 2 in *PISA 2018 Results (Volume II): Where All Students Can Succeed* (OECD, 2019<sup>[1]</sup>). There is no strong relationship across countries and economies between the magnitude of socio-economic inequalities and the extent to which learning outcomes vary (this also holds after accounting for mean performance in reading). However, some countries (including Brazil, Lebanon and Luxembourg) have comparatively large variations in socio-economic conditions amongst their students, and also larger variations in learning outcomes amongst their students than that observed in countries with similar overall performance or at similar levels of economic development.

How well students read in the language of instruction is influenced by whether they commonly speak that language at home and, more generally, outside of school, and whether specific support is available for bilingual students and for non-native language learners.<sup>17</sup> Specific policies may also be required to help integrate students with an immigrant background into host societies (OECD, 2019<sup>[8]</sup>); also see *PISA 2018 Results (Volume II): Where All Students Can Succeed* (OECD, 2019<sup>[1]</sup>), Chapters 9 and 10. But even when such policies are in place, the performance of students who immigrated to the country in which they were assessed can be only partially attributed to their host country's education system.

Figure I.4.9 Variation in reading performance and in students' socio-economic status



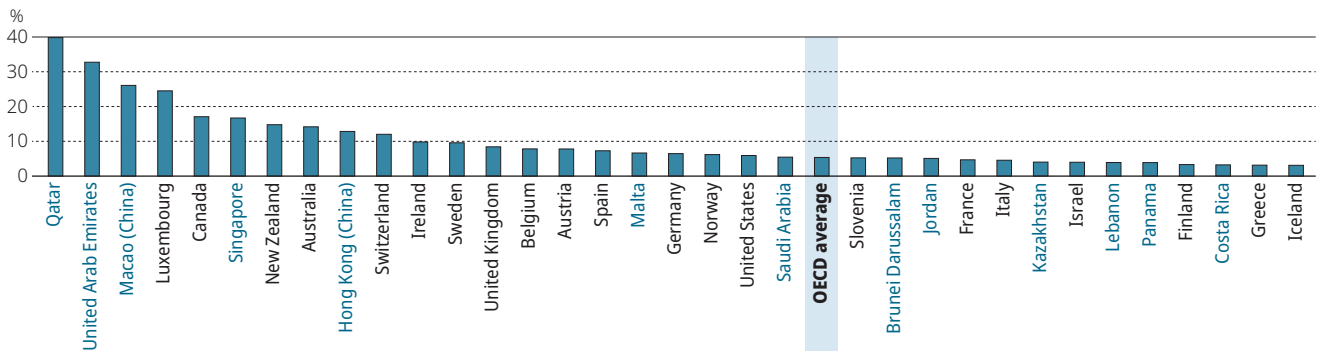
Source: OECD, PISA 2018 Database, Tables I.B1.4 and II.B1.2.1.

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Figure I.4.10 **First-generation immigrant students**

Based on students' reports



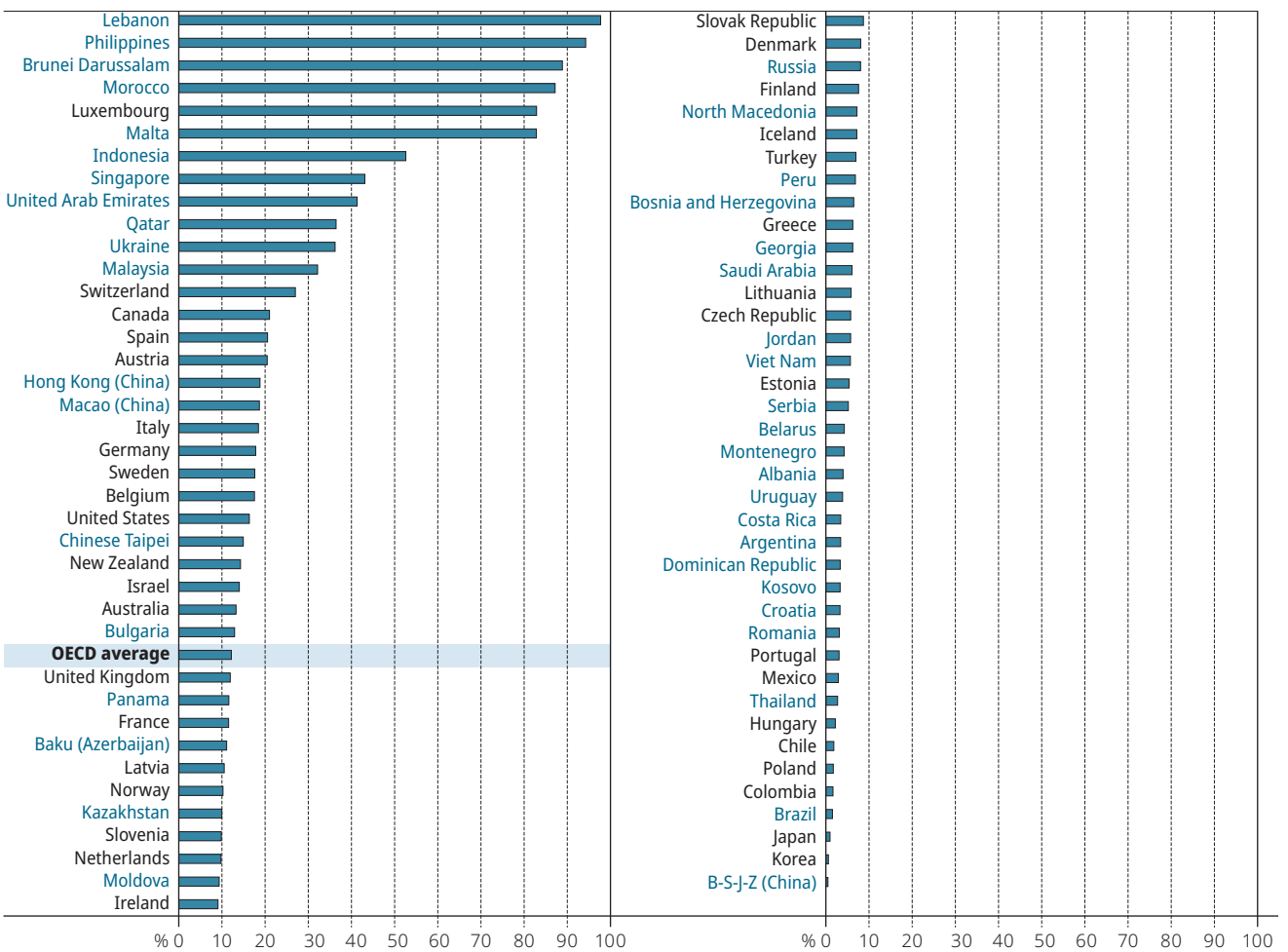
**Note:** Only countries and economies where the percentage of first-generation immigrant students is higher than 3% are shown. Countries and economies are ranked in descending order of the percentage of first-generation immigrant students.

**Source:** OECD, PISA 2018 Database, Table II.B1.9.9.

**StatLink** <https://doi.org/10.1787/888934028520>

Figure I.4.11 **Students who do not speak the language of instruction at home**

Based on students' reports about what language they speak at home most of the time



Countries and economies are ranked in descending order of the percentage of students who speak, most of the time, a language different from the language of instruction at home.

**Source:** OECD, PISA 2018 Database, Table II.B1.9.2.

**StatLink** <https://doi.org/10.1787/888934028539>

## How did countries perform in PISA 2018?

Figure I.4.10 and Figure I.4.11 show the countries where immigration and linguistic diversity are most pronounced.<sup>18</sup> In 2018, more than one in five students in Qatar (40%), the United Arab Emirates (33%), Macao (China) (26%) and Luxembourg (25%) were first-generation immigrants, meaning that they were born outside of the country/economy and their parents were also born outside of the country/economy. In Canada, Singapore, New Zealand, Australia, Hong Kong (China) and Switzerland (in descending order of that share), more than 10% of students were first-generation immigrants. However, some of these immigrants may have already spoken the language of instruction when they arrived. Immigrant students' performance and characteristics are the topic of Chapters 9 and 10 in *PISA 2018 Results (Volume II): Where All Students Can Succeed* (OECD, 2019<sub>[11]</sub>).

On the other hand, great linguistic diversity may exist even in countries that have relatively small shares of immigrant students. More than 80% of students in Lebanon, the Philippines, Brunei Darussalam, Morocco, Luxembourg and Malta (in descending order of that share), and between 41% and 53% of students in Indonesia, Singapore and the United Arab Emirates reported that, most of the time, they speak a different language at home from the language of instruction.

Table I.4.4<sup>[1/3]</sup> Reading performance at national and subnational levels

|   | Reading scale |                         |                |            |                         |            |   |            |
|---|---------------|-------------------------|----------------|------------|-------------------------|------------|---|------------|
|   | Mean score    | 95% confidence interval | Range of ranks |            |                         |            |   |            |
|   |               |                         | OECD countries |            | All countries/economies |            | Countries/economies assessing students on computers |            |
|   |               |                         | Upper rank     | Lower rank | Upper rank              | Lower rank | Upper rank  | Lower rank |
| <b>B-S-J-Z (China)</b>                    | 555           | 550 - 561               |                |            | 1                       | 2          | 1   | 2          |
| <b>Singapore</b>                          | 549           | 546 - 553               |                |            | 1                       | 2          | 1   | 2          |
| <i>Alberta (Canada)</i>                   | 532           | 523 - 540               |                |            |                         |            |   |            |
| <b>Macao (China)</b>                      | 525           | 523 - 528               |                |            | 3                       | 5          | 3   | 5          |
| <b>Hong Kong (China)<sup>1</sup></b>      | 524           | 519 - 530               |                |            | 3                       | 7          | 3   | 7          |
| <i>Ontario (Canada)</i>                   | 524           | 517 - 531               |                |            |                         |            |   |            |
| <b>Estonia</b>                            | 523           | 519 - 527               | 1              | 3          | 3                       | 7          | 3   | 7          |
| <b>Canada</b>                             | 520           | 517 - 524               | 1              | 4          | 4                       | 8          | 4   | 8          |
| <b>Finland</b>                            | 520           | 516 - 525               | 1              | 5          | 4                       | 9          | 4   | 9          |
| <i>Québec (Canada)</i>                    | 519           | 513 - 526               |                |            |                         |            |   |            |
| <i>British Columbia (Canada)</i>          | 519           | 511 - 528               |                |            |                         |            |   |            |
| <b>Ireland</b>                            | 518           | 514 - 522               | 1              | 5          | 5                       | 9          | 5   | 9          |
| <i>Nova Scotia (Canada)</i>               | 516           | 508 - 523               |                |            |                         |            |   |            |
| <b>Korea</b>                              | 514           | 508 - 520               | 2              | 7          | 6                       | 11         | 6   | 11         |
| <i>Newfoundland and Labrador (Canada)</i> | 512           | 503 - 520               |                |            |                         |            |   |            |
| <b>Poland</b>                             | 512           | 507 - 517               | 4              | 8          | 8                       | 12         | 8   | 12         |
| <b>Sweden</b>                             | 506           | 500 - 512               | 6              | 14         | 10                      | 19         | 10  | 19         |
| <b>New Zealand</b>                        | 506           | 502 - 510               | 6              | 12         | 10                      | 17         | 10  | 17         |
| <b>United States<sup>1</sup></b>          | 505           | 498 - 512               | 6              | 15         | 10                      | 20         | 10  | 20         |
| <i>England (United Kingdom)</i>           | 505           | 499 - 511               |                |            |                         |            |   |            |
| <i>Scotland (United Kingdom)</i>          | 504           | 498 - 510               |                |            |                         |            |   |            |
| <b>United Kingdom</b>                     | 504           | 499 - 509               | 7              | 15         | 11                      | 20         | 11  | 20         |
| <b>Japan</b>                              | 504           | 499 - 509               | 7              | 15         | 11                      | 20         | 11  | 20         |
| <b>Australia</b>                          | 503           | 499 - 506               | 8              | 14         | 12                      | 19         | 12  | 19         |
| <b>Chinese Taipei</b>                     | 503           | 497 - 508               |                |            | 11                      | 20         | 11  | 20         |
| <i>Prince Edward Island (Canada)</i>      | 503           | 486 - 519               |                |            |                         |            |   |            |
| <i>Flemish Community (Belgium)</i>        | 502           | 495 - 509               |                |            |                         |            |   |            |
| <b>Denmark</b>                            | 501           | 498 - 505               | 9              | 15         | 13                      | 20         | 13  | 20         |
| <i>Northern Ireland (United Kingdom)</i>  | 501           | 493 - 509               |                |            |                         |            |   |            |
| <b>Norway</b>                             | 499           | 495 - 504               | 10             | 17         | 14                      | 22         | 14  | 22         |
| <i>Saskatchewan (Canada)</i>              | 499           | 493 - 505               |                |            |                         |            |   |            |
| <b>Germany</b>                            | 498           | 492 - 504               | 10             | 19         | 14                      | 24         | 14  | 24         |
| <i>Trento (Italy)</i>                     | 496           | 491 - 501               |                |            |                         |            |   |            |
| <i>Bolzano (Italy)</i>                    | 495           | 489 - 502               |                |            |                         |            |   |            |
| <b>Slovenia</b>                           | 495           | 493 - 498               | 14             | 18         | 19                      | 23         | 19  | 23         |
| <i>Manitoba (Canada)</i>                  | 494           | 488 - 501               |                |            |                         |            |   |            |
| <b>Belgium</b>                            | 493           | 488 - 497               | 15             | 20         | 20                      | 26         | 20  | 26         |
| <b>France</b>                             | 493           | 488 - 497               | 15             | 21         | 20                      | 26         | 20  | 26         |
| <b>Portugal<sup>1</sup></b>               | 492           | 487 - 497               | 15             | 21         | 20                      | 26         | 20  | 26         |
| <b>Czech Republic</b>                     | 490           | 485 - 495               | 16             | 22         | 21                      | 27         | 21  | 27         |
| <i>New Brunswick (Canada)</i>             | 489           | 482 - 496               |                |            |                         |            |   |            |
| <i>Moscow region (Russia)</i>             | 486           | 477 - 495               |                |            |                         |            |   |            |
| <b>Netherlands<sup>1</sup></b>            | 485           | 480 - 490               | 20             | 24         | 24                      | 30         | 24  | 30         |

1. Data did not meet the PISA technical standards but were accepted as largely comparable (see Annexes A2 and A4).


**Notes:** OECD countries are shown in bold black. Partner countries, economies and subnational entities that are not included in national results are shown in bold blue.

Regions are shown in black italics (OECD countries) or blue italics (partner countries).

Range-of-rank estimates are computed based on mean and standard-error-of-the-mean estimates for each country/economy, and take into account multiple comparisons amongst countries and economies at similar levels of performance. For an explanation of the method, see Annex A3.

Countries and economies are ranked in descending order of mean reading performance.

**Source:** OECD, PISA 2018 Database.

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## How did countries perform in PISA 2018?

Table I.4.4 <sup>[2/3]</sup> **Reading performance at national and subnational levels**

|  | Reading scale |                         |                |            |                         |            |   |            |
|--|---------------|-------------------------|----------------|------------|-------------------------|------------|---|------------|
|  | Mean score    | 95% confidence interval | Range of ranks |            |                         |            |   |            |
|  |               |                         | OECD countries |            | All countries/economies |            | Countries/economies assessing students on computers |            |
|  |               |                         | Upper rank     | Lower rank | Upper rank              | Lower rank | Upper rank  | Lower rank |
| <b>Austria</b>                             | 484           | 479 - 490               | 20             | 24         | 24                      | 30         | 24  | 30         |
| <b>Switzerland</b>                         | 484           | 478 - 490               | 19             | 25         | 24                      | 31         | 24  | 31         |
| <i>Wales (United Kingdom)</i>              | 483           | 476 - 491               |                |            |                         |            |   |            |
| <i>German-speaking Community (Belgium)</i> | 483           | 474 - 492               |                |            |                         |            |   |            |
| <i>Toscana (Italy)</i>                     | 482           | 475 - 490               |                |            |                         |            |   |            |
| <i>French Community (Belgium)</i>          | 481           | 475 - 487               |                |            |                         |            |   |            |
| <b>Croatia</b>                             | 479           | 474 - 484               |                |            | 27                      | 36         | 27  | 36         |
| <b>Latvia</b>                              | 479           | 476 - 482               | 23             | 27         | 28                      | 34         | 28  | 34         |
| <b>Russia</b>                              | 479           | 472 - 485               |                |            | 26                      | 36         | 26  | 36         |
| <b>Italy</b>                               | 476           | 472 - 481               | 23             | 29         | 29                      | 37         | 29  | 37         |
| <b>Hungary</b>                             | 476           | 472 - 480               | 24             | 29         | 29                      | 37         | 29  | 37         |
| <b>Lithuania</b>                           | 476           | 473 - 479               | 24             | 28         | 29                      | 36         | 30  | 36         |
| <b>Iceland</b>                             | 474           | 471 - 477               | 25             | 29         | 31                      | 38         | 31  | 37         |
| <b>Belarus</b>                             | 474           | 469 - 479               |                |            | 30                      | 38         | 30  | 38         |
| <b>Israel</b>                              | 470           | 463 - 478               | 25             | 31         | 31                      | 40         | 31  | 39         |
| <b>Luxembourg</b>                          | 470           | 468 - 472               | 29             | 31         | 36                      | 39         | 36  | 39         |
| <b>Ukraine</b>                             | 466           | 459 - 473               |                |            | 36                      | 41         |   |            |
| <b>Turkey</b>                              | 466           | 461 - 470               | 30             | 32         | 38                      | 41         | 38  | 40         |
| <i>Republic of Tatarstan (Russia)</i>      | 463           | 456 - 469               |                |            |                         |            |   |            |
| <i>Sardegna (Italy)</i>                    | 462           | 454 - 470               |                |            |                         |            |   |            |
| <b>Slovak Republic</b>                     | 458           | 454 - 462               | 32             | 34         | 40                      | 43         | 40  | 42         |
| <b>Greece</b>                              | 457           | 450 - 465               | 31             | 34         | 40                      | 43         | 39  | 42         |
| <i>Bogotá (Colombia)</i>                   | 455           | 444 - 465               |                |            |                         |            |   |            |
| <i>CABA (Argentina)</i>                    | 454           | 443 - 464               |                |            |                         |            |   |            |
| <b>Chile</b>                               | 452           | 447 - 457               | 33             | 34         | 42                      | 44         | 41  | 43         |
| <b>Malta</b>                               | 448           | 445 - 452               |                |            | 43                      | 44         | 42  | 43         |
| <b>Serbia</b>                              | 439           | 433 - 446               |                |            | 45                      | 46         | 44  | 45         |
| <i>South (Brazil)</i>                      | 432           | 420 - 444               |                |            |                         |            |   |            |
| <b>United Arab Emirates</b>                | 432           | 427 - 436               |                |            | 45                      | 48         | 44  | 47         |
| <b>Romania</b>                             | 428           | 418 - 438               |                |            | 45                      | 55         |   |            |
| <i>Astana (Kazakhstan)</i>                 | 428           | 413 - 442               |                |            |                         |            |   |            |
| <i>Córdoba (Argentina)</i>                 | 427           | 418 - 436               |                |            |                         |            |   |            |
| <b>Uruguay</b>                             | 427           | 422 - 433               |                |            | 46                      | 52         | 45  | 49         |
| <b>Costa Rica</b>                          | 426           | 420 - 433               |                |            | 46                      | 54         | 45  | 50         |
| <i>Middle-West (Brazil)</i>                | 425           | 407 - 443               |                |            |                         |            |   |            |
| <i>Almaty (Kazakhstan)</i>                 | 424           | 409 - 440               |                |            |                         |            |   |            |
| <b>Cyprus</b>                              | 424           | 422 - 427               |                |            | 48                      | 53         | 46  | 50         |
| <b>Moldova</b>                             | 424           | 419 - 429               |                |            | 47                      | 54         |   |            |
| <i>Southeast (Brazil)</i>                  | 424           | 418 - 430               |                |            |                         |            |   |            |
| <i>Karagandy region (Kazakhstan)</i>       | 422           | 409 - 436               |                |            |                         |            |   |            |
| <b>Montenegro</b>                          | 421           | 419 - 423               |                |            | 50                      | 55         | 48  | 51         |
| <b>Mexico</b>                              | 420           | 415 - 426               | 35             | 36         | 49                      | 57         | 47  | 52         |
| <b>Bulgaria</b>                            | 420           | 412 - 428               |                |            | 48                      | 58         | 46  | 53         |

1. Data did not meet the PISA technical standards but were accepted as largely comparable (see Annexes A2 and A4).


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Countries and economies are ranked in descending order of mean reading performance.

**Source:** OECD, PISA 2018 Database.

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Table I.4.4<sup>[3/3]</sup> Reading performance at national and subnational levels

|   | Reading scale |                         |                |            |                         |            |   |            |
|---|---------------|-------------------------|----------------|------------|-------------------------|------------|---|------------|
|   | Mean score    | 95% confidence interval | Range of ranks |            |                         |            |   |            |
|   |               |                         | OECD countries |            | All countries/economies |            | Countries/economies assessing students on computers |            |
|   |               |                         | Upper rank     | Lower rank | Upper rank              | Lower rank | Upper rank  | Lower rank |
| Jordan                                      | 419           | 413 - 425               |                |            | 49                      | 57         |   |            |
| <i>Kostanay region (Kazakhstan)</i>         | 417           | 407 - 427               |                |            |                         |            |   |            |
| Malaysia                                    | 415           | 409 - 421               |                |            | 53                      | 58         | 50  | 54         |
| <i>DI Yogyakarta (Indonesia)</i>            | 414           | 402 - 425               |                |            |                         |            |   |            |
| <i>PBA (Argentina)</i>                      | 413           | 402 - 424               |                |            |                         |            |   |            |
| Brazil                                      | 413           | 409 - 417               |                |            | 55                      | 59         | 51  | 54         |
| <i>North-Kazakhstan region (Kazakhstan)</i> | 413           | 403 - 422               |                |            |                         |            |   |            |
| <i>DKI Jakarta (Indonesia)</i>              | 412           | 399 - 426               |                |            |                         |            |   |            |
| Colombia                                    | 412           | 406 - 419               | 35             | 36         | 54                      | 61         | 51  | 57         |
| Brunei Darussalam                           | 408           | 406 - 410               |                |            | 58                      | 61         | 54  | 57         |
| Qatar                                       | 407           | 406 - 409               |                |            | 59                      | 62         | 55  | 58         |
| Albania                                     | 405           | 402 - 409               |                |            | 59                      | 64         | 55  | 59         |
| <i>East-Kazakhstan region (Kazakhstan)</i>  | 405           | 392 - 418               |                |            |                         |            |   |            |
| Bosnia and Herzegovina                      | 403           | 397 - 409               |                |            | 59                      | 65         | 55  | 59         |
| Argentina                                   | 402           | 396 - 407               |                |            | 60                      | 66         |   |            |
| Peru  | 401           | 395 - 406               |                |            | 61                      | 66         | 57  | 60         |
| Saudi Arabia                                | 399           | 393 - 405               |                |            | 61                      | 66         |   |            |
| <i>Akmola region (Kazakhstan)</i>           | 395           | 386 - 404               |                |            |                         |            |   |            |
| Thailand                                    | 393           | 387 - 399               |                |            | 64                      | 69         | 59  | 62         |
| North Macedonia                             | 393           | 391 - 395               |                |            | 66                      | 68         |   |            |
| <i>North (Brazil)</i>                       | 392           | 379 - 406               |                |            |                         |            |   |            |
| <i>Pavlodar region (Kazakhstan)</i>         | 391           | 378 - 403               |                |            |                         |            |   |            |
| Baku (Azerbaijan)                           | 389           | 384 - 394               |                |            | 66                      | 69         | 60  | 62         |
| <i>Northeast (Brazil)</i>                   | 389           | 381 - 397               |                |            |                         |            |   |            |
| <i>Tucumán (Argentina)</i>                  | 389           | 379 - 399               |                |            |                         |            |   |            |
| Kazakhstan                                  | 387           | 384 - 390               |                |            | 68                      | 69         | 61  | 62         |
| <i>Aktobe region (Kazakhstan)</i>           | 381           | 372 - 389               |                |            |                         |            |   |            |
| Georgia                                     | 380           | 376 - 384               |                |            | 70                      | 71         | 63  | 64         |
| <i>West-Kazakhstan region (Kazakhstan)</i>  | 378           | 369 - 388               |                |            |                         |            |   |            |
| Panama                                      | 377           | 371 - 383               |                |            | 70                      | 72         | 63  | 65         |
| Indonesia                                   | 371           | 366 - 376               |                |            | 71                      | 72         | 64  | 65         |
| <i>Zhambyl region (Kazakhstan)</i>          | 369           | 362 - 376               |                |            |                         |            |   |            |
| <i>South-Kazakhstan region (Kazakhstan)</i> | 368           | 361 - 375               |                |            |                         |            |   |            |
| <i>Kyzyl-Orda region (Kazakhstan)</i>       | 366           | 361 - 372               |                |            |                         |            |   |            |
| <i>Mangistau region (Kazakhstan)</i>        | 361           | 349 - 372               |                |            |                         |            |   |            |
| <i>Almaty region (Kazakhstan)</i>           | 360           | 351 - 369               |                |            |                         |            |   |            |
| Morocco                                     | 359           | 353 - 366               |                |            | 73                      | 74         | 66  | 67         |
| Lebanon                                     | 353           | 345 - 362               |                |            | 73                      | 75         |   |            |
| Kosovo                                      | 353           | 351 - 355               |                |            | 74                      | 75         | 66  | 67         |
| <i>Atyrau region (Kazakhstan)</i>           | 344           | 335 - 352               |                |            |                         |            |   |            |
| Dominican Republic                          | 342           | 336 - 347               |                |            | 76                      | 77         | 68  | 69         |
| Philippines                                 | 340           | 333 - 346               |                |            | 76                      | 77         | 68  | 69         |

1. Data did not meet the PISA technical standards but were accepted as largely comparable (see Annexes A2 and A4).


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Countries and economies are ranked in descending order of mean reading performance.

**Source:** OECD, PISA 2018 Database.

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## How did countries perform in PISA 2018?

Table I.4.5<sup>[1/3]</sup> **Mathematics performance at national and subnational levels**

|  | Mathematics scale |                         |                |            |                         |            |   |    |
|--|-------------------|-------------------------|----------------|------------|-------------------------|------------|---|----|
|  | Mean score        | 95% confidence interval | Range of ranks |            |                         |            |   |    |
|  |                   |                         | OECD countries |            | All countries/economies |            | Countries/economies assessing students on computers |    |
|  |                   | Upper rank              | Lower rank     | Upper rank | Lower rank              | Upper rank | Lower rank  |    |
| <b>B-S-J-Z (China)</b>                     | 591               | 586 - 596               |                |            | 1                       | 1          | 1   | 1  |
| <b>Singapore</b>                           | 569               | 566 - 572               |                |            | 2                       | 2          | 2   | 2  |
| <b>Macao (China)</b>                       | 558               | 555 - 561               |                |            | 3                       | 4          | 3   | 4  |
| <b>Hong Kong (China)<sup>1</sup></b>       | 551               | 545 - 557               |                |            | 3                       | 4          | 3   | 4  |
| <b>Québec (Canada)</b>                     | 532               | 525 - 539               |                |            |                         |            |   |    |
| <b>Chinese Taipei</b>                      | 531               | 525 - 537               |                |            | 5                       | 7          | 5   | 7  |
| <b>Japan</b>                               | 527               | 522 - 532               | 1              | 3          | 5                       | 8          | 5   | 8  |
| <b>Korea</b>                               | 526               | 520 - 532               | 1              | 4          | 5                       | 9          | 5   | 9  |
| <b>Estonia</b>                             | 523               | 520 - 527               | 1              | 4          | 6                       | 9          | 6   | 9  |
| <b>Bolzano (Italy)</b>                     | 521               | 515 - 528               |                |            |                         |            |   |    |
| <b>Netherlands<sup>1</sup></b>             | 519               | 514 - 524               | 2              | 6          | 7                       | 11         | 7   | 11 |
| <b>Trento (Italy)</b>                      | 518               | 513 - 523               |                |            |                         |            |   |    |
| <b>Flemish Community (Belgium)</b>         | 518               | 511 - 524               |                |            |                         |            |   |    |
| <b>Poland</b>                              | 516               | 511 - 521               | 4              | 8          | 9                       | 13         | 9   | 13 |
| <b>Switzerland</b>                         | 515               | 510 - 521               | 4              | 9          | 9                       | 14         | 9   | 14 |
| <b>Ontario (Canada)</b>                    | 513               | 504 - 521               |                |            |                         |            |   |    |
| <b>Canada</b>                              | 512               | 507 - 517               | 5              | 11         | 10                      | 16         | 10  | 16 |
| <b>Alberta (Canada)</b>                    | 511               | 501 - 521               |                |            |                         |            |   |    |
| <b>Denmark</b>                             | 509               | 506 - 513               | 6              | 11         | 11                      | 16         | 11  | 16 |
| <b>Slovenia</b>                            | 509               | 506 - 512               | 7              | 11         | 12                      | 16         | 12  | 16 |
| <b>Belgium</b>                             | 508               | 504 - 513               | 7              | 13         | 12                      | 18         | 12  | 18 |
| <b>Finland</b>                             | 507               | 503 - 511               | 7              | 13         | 12                      | 18         | 12  | 18 |
| <b>German-speaking Community (Belgium)</b> | 505               | 495 - 515               |                |            |                         |            |   |    |
| <b>British Columbia (Canada)</b>           | 504               | 494 - 515               |                |            |                         |            |   |    |
| <b>England (United Kingdom)</b>            | 504               | 498 - 510               |                |            |                         |            |   |    |
| <b>Navarre (Spain)</b>                     | 503               | 486 - 519               |                |            |                         |            |   |    |
| <b>Castile and León (Spain)</b>            | 502               | 493 - 512               |                |            |                         |            |   |    |
| <b>Sweden</b>                              | 502               | 497 - 508               | 10             | 19         | 15                      | 24         | 15  | 24 |
| <b>United Kingdom</b>                      | 502               | 497 - 507               | 10             | 19         | 15                      | 24         | 15  | 24 |
| <b>Norway</b>                              | 501               | 497 - 505               | 11             | 19         | 16                      | 24         | 16  | 24 |
| <b>Germany</b>                             | 500               | 495 - 505               | 11             | 21         | 16                      | 26         | 16  | 26 |
| <b>Ireland</b>                             | 500               | 495 - 504               | 12             | 21         | 17                      | 26         | 17  | 26 |
| <b>Czech Republic</b>                      | 499               | 495 - 504               | 12             | 21         | 17                      | 26         | 17  | 26 |
| <b>Basque Country (Spain)</b>              | 499               | 492 - 506               |                |            |                         |            |   |    |
| <b>Austria</b>                             | 499               | 493 - 505               | 12             | 23         | 17                      | 28         | 17  | 28 |
| <b>Cantabria (Spain)</b>                   | 499               | 484 - 514               |                |            |                         |            |   |    |
| <b>Galicia (Spain)</b>                     | 498               | 490 - 507               |                |            |                         |            |   |    |
| <b>La Rioja (Spain)</b>                    | 497               | 478 - 517               |                |            |                         |            |   |    |
| <b>Aragon (Spain)</b>                      | 497               | 485 - 508               |                |            |                         |            |   |    |
| <b>Latvia</b>                              | 496               | 492 - 500               | 15             | 23         | 20                      | 28         | 20  | 28 |
| <b>Toscana (Italy)</b>                     | 496               | 487 - 504               |                |            |                         |            |   |    |
| <b>France</b>                              | 495               | 491 - 500               | 15             | 24         | 20                      | 29         | 20  | 29 |
| <b>Iceland</b>                             | 495               | 491 - 499               | 16             | 24         | 21                      | 29         | 21  | 29 |
| <b>French Community (Belgium)</b>          | 495               | 490 - 501               |                |            |                         |            |   |    |
| <b>New Zealand</b>                         | 494               | 491 - 498               | 18             | 24         | 22                      | 29         | 22  | 29 |
| <b>Nova Scotia (Canada)</b>                | 494               | 482 - 507               |                |            |                         |            |   |    |
| <b>Portugal<sup>1</sup></b>                | 492               | 487 - 498               | 18             | 26         | 23                      | 31         | 23  | 31 |
| <b>Northern Ireland (United Kingdom)</b>   | 492               | 484 - 500               |                |            |                         |            |   |    |
| <b>Australia</b>                           | 491               | 488 - 495               | 20             | 25         | 25                      | 31         | 25  | 31 |

1. Data did not meet the PISA technical standards but were accepted as largely comparable (see Annexes A2 and A4).


**Notes:** OECD countries are shown in bold black. Partner countries, economies and subnational entities that are not included in national results are shown in bold blue.

Regions are shown in black italics (OECD countries) or blue italics (partner countries).

Range-of-rank estimates are computed based on mean and standard-error-of-the-mean estimates for each country/economy, and take into account multiple comparisons amongst countries and economies at similar levels of performance. For an explanation of the method, see Annex A3.

Countries and economies are ranked in descending order of mean mathematics performance.

**Source:** OECD, PISA 2018 Database.

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Table I.4.5 <sup>[2/3]</sup> **Mathematics performance at national and subnational levels**

|   | Mathematics scale |                         |                |            |                         |            |   |            |
|---|-------------------|-------------------------|----------------|------------|-------------------------|------------|---|------------|
|   | Mean score        | 95% confidence interval | Range of ranks |            |                         |            |   |            |
|   |                   |                         | OECD countries |            | All countries/economies |            | Countries/economies assessing students on computers |            |
|   |                   |                         | Upper rank     | Lower rank | Upper rank              | Lower rank | Upper rank  | Lower rank |
| <i>New Brunswick (Canada)</i>               | 491               | 480 - 502               |                |            |                         |            |   |            |
| <i>Asturias (Spain)</i>                     | 491               | 481 - 500               |                |            |                         |            |   |            |
| <i>Catalonia (Spain)</i>                    | 490               | 482 - 498               |                |            |                         |            |   |            |
| <i>Scotland (United Kingdom)</i>            | 489               | 481 - 497               |                |            |                         |            |   |            |
| <i>Newfoundland and Labrador (Canada)</i>   | 488               | 476 - 501               |                |            |                         |            |   |            |
| <b>Russia</b>                               | 488               | 482 - 494               |                |            | 27                      | 35         | 27  | 35         |
| <i>Wales (United Kingdom)</i>               | 487               | 479 - 495               |                |            |                         |            |   |            |
| <b>Italy</b>                                | 487               | 481 - 492               | 23             | 29         | 28                      | 35         | 28  | 35         |
| <i>Prince Edward Island (Canada)</i>        | 487               | 465 - 508               |                |            |                         |            |   |            |
| <b>Slovak Republic</b>                      | 486               | 481 - 491               | 23             | 29         | 28                      | 35         | 28  | 35         |
| <i>Madrid (Spain)</i>                       | 486               | 479 - 492               |                |            |                         |            |   |            |
| <i>Saskatchewan (Canada)</i>                | 485               | 475 - 495               |                |            |                         |            |   |            |
| <b>Luxembourg</b>                           | 483               | 481 - 486               | 25             | 29         | 31                      | 36         | 31  | 36         |
| <i>Balearic Islands (Spain)</i>             | 483               | 472 - 493               |                |            |                         |            |   |            |
| <i>Manitoba (Canada)</i>                    | 482               | 474 - 489               |                |            |                         |            |   |            |
| <b>Spain</b>                                | 481               | 479 - 484               | 26             | 31         | 32                      | 37         | 32  | 37         |
| <b>Lithuania</b>                            | 481               | 477 - 485               | 26             | 31         | 32                      | 37         | 32  | 37         |
| <b>Hungary</b>                              | 481               | 477 - 486               | 26             | 31         | 31                      | 37         | 31  | 37         |
| <i>Castile-La Mancha (Spain)</i>            | 479               | 469 - 489               |                |            |                         |            |   |            |
| <b>United States<sup>1</sup></b>            | 478               | 472 - 485               | 27             | 31         | 32                      | 39         | 32  | 39         |
| <i>Murcia (Spain)</i>                       | 474               | 462 - 485               |                |            |                         |            |   |            |
| <i>Comunidad Valenciana (Spain)</i>         | 473               | 465 - 482               |                |            |                         |            |   |            |
| <b>Belarus</b>                              | 472               | 467 - 477               |                |            | 37                      | 40         | 37  | 40         |
| <b>Malta</b>                                | 472               | 468 - 475               |                |            | 37                      | 39         | 37  | 39         |
| <i>Extremadura (Spain)</i>                  | 470               | 457 - 482               |                |            |                         |            |   |            |
| <i>Andalusia (Spain)</i>                    | 467               | 459 - 476               |                |            |                         |            |   |            |
| <i>Sardegna (Italy)</i>                     | 467               | 459 - 475               |                |            |                         |            |   |            |
| <b>Croatia</b>                              | 464               | 459 - 469               |                |            | 39                      | 41         | 40  | 41         |
| <b>Israel</b>                               | 463               | 456 - 470               | 32             | 32         | 39                      | 42         | 39  | 41         |
| <i>Canary Islands (Spain)</i>               | 460               | 452 - 469               |                |            |                         |            |   |            |
| <i>Zhambyl region (Kazakhstan)</i>          | 456               | 444 - 467               |                |            |                         |            |   |            |
| <b>Turkey</b>                               | 454               | 449 - 458               | 33             | 34         | 42                      | 46         | 42  | 45         |
| <b>Ukraine</b>                              | 453               | 446 - 460               |                |            | 41                      | 46         |   |            |
| <b>Greece</b>                               | 451               | 445 - 457               | 33             | 34         | 42                      | 46         | 42  | 45         |
| <b>Cyprus</b>                               | 451               | 448 - 453               |                |            | 42                      | 46         | 42  | 45         |
| <i>Astana (Kazakhstan)</i>                  | 450               | 435 - 466               |                |            |                         |            |   |            |
| <i>Almaty (Kazakhstan)</i>                  | 448               | 434 - 463               |                |            |                         |            |   |            |
| <b>Serbia</b>                               | 448               | 442 - 454               |                |            | 42                      | 47         | 42  | 46         |
| <i>Kostanay region (Kazakhstan)</i>         | 448               | 435 - 461               |                |            |                         |            |   |            |
| <i>Karagandy region (Kazakhstan)</i>        | 446               | 431 - 460               |                |            |                         |            |   |            |
| <b>Malaysia</b>                             | 440               | 435 - 446               |                |            | 46                      | 50         | 45  | 49         |
| <i>Pavlodar region (Kazakhstan)</i>         | 438               | 426 - 449               |                |            |                         |            |   |            |
| <b>Albania</b>                              | 437               | 432 - 442               |                |            | 47                      | 51         | 46  | 49         |
| <i>East-Kazakhstan region (Kazakhstan)</i>  | 437               | 423 - 451               |                |            |                         |            |   |            |
| <b>Bulgaria</b>                             | 436               | 429 - 444               |                |            | 47                      | 53         | 46  | 51         |
| <b>United Arab Emirates</b>                 | 435               | 431 - 439               |                |            | 47                      | 51         | 46  | 50         |
| <i>CABA (Argentina)</i>                     | 434               | 425 - 444               |                |            |                         |            |   |            |
| <i>North-Kazakhstan region (Kazakhstan)</i> | 433               | 422 - 443               |                |            |                         |            |   |            |
| <i>Melilla (Spain)</i>                      | 432               | 411 - 452               |                |            |                         |            |   |            |


1. Data did not meet the PISA technical standards but were accepted as largely comparable (see Annexes A2 and A4).

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Range-of-rank estimates are computed based on mean and standard-error-of-the-mean estimates for each country/economy, and take into account multiple comparisons amongst countries and economies at similar levels of performance. For an explanation of the method, see Annex A3.

Countries and economies are ranked in descending order of mean mathematics performance.

**Source:** OECD, PISA 2018 Database.

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## How did countries perform in PISA 2018?

Table I.4.5 <sup>[3/3]</sup> **Mathematics performance at national and subnational levels**

|   | Mathematics scale |                         |                |            |                         |            |   |            |
|---|-------------------|-------------------------|----------------|------------|-------------------------|------------|---|------------|
|   | Mean score        | 95% confidence interval | Range of ranks |            |                         |            |   |            |
|   |                   |                         | OECD countries |            | All countries/economies |            | Countries/economies assessing students on computers |            |
|   |                   |                         | Upper rank     | Lower rank | Upper rank              | Lower rank | Upper rank  | Lower rank |
| <b>Brunei Darussalam</b>                    | 430               | 428 - 432               |                |            | 50                      | 53         | 49  | 51         |
| <b>Romania</b>                              | 430               | 420 - 440               |                |            | 47                      | 56         |   |            |
| <i>DI Yogyakarta (Indonesia)</i>            | 430               | 417 - 442               |                |            |                         |            |   |            |
| <b>Montenegro</b>                           | 430               | 427 - 432               |                |            | 50                      | 53         | 49  | 51         |
| <i>Bogotá (Colombia)</i>                    | 430               | 420 - 439               |                |            |                         |            |   |            |
| <b>Kazakhstan</b>                           | 423               | 419 - 427               |                |            | 53                      | 57         | 52  | 54         |
| <i>DKI Jakarta (Indonesia)</i>              | 421               | 406 - 436               |                |            |                         |            |   |            |
| <b>Moldova</b>                              | 421               | 416 - 425               |                |            | 54                      | 59         |   |            |
| <i>Aktobe region (Kazakhstan)</i>           | 420               | 408 - 432               |                |            |                         |            |   |            |
| <b>Baku (Azerbaijan)</b>                    | 420               | 414 - 425               |                |            | 54                      | 60         | 52  | 57         |
| <i>Kyzyl-Orda region (Kazakhstan)</i>       | 419               | 403 - 436               |                |            |                         |            |   |            |
| <b>Thailand</b>                             | 419               | 412 - 425               |                |            | 53                      | 60         | 52  | 57         |
| <i>West-Kazakhstan region (Kazakhstan)</i>  | 418               | 405 - 430               |                |            |                         |            |   |            |
| <b>Uruguay</b>                              | 418               | 413 - 423               |                |            | 54                      | 60         | 52  | 57         |
| <b>Chile</b>                                | 417               | 413 - 422               | 35             | 35         | 55                      | 60         | 53  | 57         |
| <b>Qatar</b>                                | 414               | 412 - 417               |                |            | 58                      | 61         | 55  | 58         |
| <i>Ceuta (Spain)</i>                        | 411               | 387 - 435               |                |            |                         |            |   |            |
| <i>Akmola region (Kazakhstan)</i>           | 411               | 399 - 424               |                |            |                         |            |   |            |
| <b>Mexico</b>                               | 409               | 404 - 414               | 36             | 36         | 60                      | 63         | 57  | 60         |
| <b>Bosnia and Herzegovina</b>               | 406               | 400 - 412               |                |            | 61                      | 65         | 58  | 61         |
| <b>Costa Rica</b>                           | 402               | 396 - 409               |                |            | 61                      | 66         | 58  | 62         |
| <i>South-Kazakhstan region (Kazakhstan)</i> | 401               | 390 - 412               |                |            |                         |            |   |            |
| <i>South (Brazil)</i>                       | 401               | 391 - 412               |                |            |                         |            |   |            |
| <i>Córdoba (Argentina)</i>                  | 400               | 392 - 409               |                |            |                         |            |   |            |
| <b>Peru</b>                                 | 400               | 395 - 405               |                |            | 62                      | 67         | 59  | 62         |
| <b>Jordan</b>                               | 400               | 393 - 406               |                |            | 62                      | 68         |   |            |
| <i>Almaty region (Kazakhstan)</i>           | 399               | 389 - 409               |                |            |                         |            |   |            |
| <b>Georgia</b>                              | 398               | 392 - 403               |                |            | 63                      | 68         | 60  | 63         |
| <i>Middle-West (Brazil)</i>                 | 396               | 379 - 412               |                |            |                         |            |   |            |
| <b>North Macedonia</b>                      | 394               | 391 - 398               |                |            | 65                      | 69         |   |            |
| <b>Lebanon</b>                              | 393               | 386 - 401               |                |            | 63                      | 69         |   |            |
| <i>Southeast (Brazil)</i>                   | 392               | 386 - 398               |                |            |                         |            |   |            |
| <b>Colombia</b>                             | 391               | 385 - 397               | 37             | 37         | 66                      | 70         | 62  | 64         |
| <i>Mangistau region (Kazakhstan)</i>        | 391               | 373 - 409               |                |            |                         |            |   |            |
| <i>PBA (Argentina)</i>                      | 387               | 377 - 397               |                |            |                         |            |   |            |
| <b>Brazil</b>                               | 384               | 380 - 388               |                |            | 69                      | 72         | 64  | 65         |
| <i>Atyrau region (Kazakhstan)</i>           | 382               | 368 - 396               |                |            |                         |            |   |            |
| <b>Argentina</b>                            | 379               | 374 - 385               |                |            | 70                      | 73         |   |            |
| <b>Indonesia</b>                            | 379               | 373 - 385               |                |            | 70                      | 73         | 64  | 65         |
| <b>Saudi Arabia</b>                         | 373               | 367 - 379               |                |            | 71                      | 74         |   |            |
| <b>Morocco</b>                              | 368               | 361 - 374               |                |            | 73                      | 75         | 66  | 67         |
| <i>North (Brazil)</i>                       | 366               | 352 - 380               |                |            |                         |            |   |            |
| <b>Kosovo</b>                               | 366               | 363 - 369               |                |            | 74                      | 75         | 66  | 67         |
| <i>Tucumán (Argentina)</i>                  | 364               | 354 - 374               |                |            |                         |            |   |            |
| <i>Northeast (Brazil)</i>                   | 363               | 356 - 371               |                |            |                         |            |   |            |
| <b>Panama</b>                               | 353               | 348 - 358               |                |            | 76                      | 77         | 68  | 69         |
| <b>Philippines</b>                          | 353               | 346 - 359               |                |            | 76                      | 77         | 68  | 69         |
| <b>Dominican Republic</b>                   | 325               | 320 - 330               |                |            | 78                      | 78         | 70  | 70         |

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**Source:** OECD, PISA 2018 Database.


**StatLink**  <https://doi.org/10.1787/888934028311>



Table I.4.6<sup>[1/3]</sup> Science performance at national and subnational levels

|   | Science scale |                         |                |            |                         |            |   |            |
|---|---------------|-------------------------|----------------|------------|-------------------------|------------|---|------------|
|   | Mean score    | 95% confidence interval | Range of ranks |            |                         |            |   |            |
|   |               |                         | OECD countries |            | All countries/economies |            | Countries/economies assessing students on computers |            |
|   |               |                         | Upper rank     | Lower rank | Upper rank              | Lower rank | Upper rank  | Lower rank |
| <b>B-S-J-Z (China)</b>                    | 590           | 585 - 596               |                |            | 1                       | 1          | 1   | 1          |
| <b>Singapore</b>                          | 551           | 548 - 554               |                |            | 2                       | 2          | 2   | 2          |
| <b>Macao (China)</b>                      | 544           | 541 - 546               |                |            | 3                       | 3          | 3   | 3          |
| <i>Alberta (Canada)</i>                   | 534           | 525 - 542               |                |            |                         |            |   |            |
| <b>Estonia</b>                            | 530           | 526 - 534               | 1              | 2          | 4                       | 5          | 4   | 5          |
| <b>Japan</b>                              | 529           | 524 - 534               | 1              | 3          | 4                       | 6          | 4   | 6          |
| <b>Finland</b>                            | 522           | 517 - 527               | 2              | 5          | 5                       | 9          | 5   | 9          |
| <i>Québec (Canada)</i>                    | 522           | 514 - 529               |                |            |                         |            |   |            |
| <b>Korea</b>                              | 519           | 514 - 525               | 3              | 5          | 6                       | 10         | 6   | 10         |
| <i>Ontario (Canada)</i>                   | 519           | 511 - 526               |                |            |                         |            |   |            |
| <b>Canada</b>                             | 518           | 514 - 522               | 3              | 5          | 6                       | 10         | 6   | 10         |
| <b>Hong Kong (China)<sup>1</sup></b>      | 517           | 512 - 522               |                |            | 6                       | 11         | 6   | 11         |
| <i>British Columbia (Canada)</i>          | 517           | 506 - 527               |                |            |                         |            |   |            |
| <b>Chinese Taipei</b>                     | 516           | 510 - 521               |                |            | 6                       | 11         | 6   | 11         |
| <b>Poland</b>                             | 511           | 506 - 516               | 5              | 9          | 9                       | 14         | 9   | 14         |
| <i>Galicia (Spain)</i>                    | 510           | 503 - 518               |                |            |                         |            |   |            |
| <i>Flemish Community (Belgium)</i>        | 510           | 503 - 516               |                |            |                         |            |   |            |
| <b>New Zealand</b>                        | 508           | 504 - 513               | 6              | 10         | 10                      | 15         | 10  | 15         |
| <i>Nova Scotia (Canada)</i>               | 508           | 499 - 517               |                |            |                         |            |   |            |
| <i>England (United Kingdom)</i>           | 507           | 501 - 513               |                |            |                         |            |   |            |
| <b>Slovenia</b>                           | 507           | 505 - 509               | 6              | 11         | 11                      | 16         | 11  | 16         |
| <i>Newfoundland and Labrador (Canada)</i> | 506           | 494 - 519               |                |            |                         |            |   |            |
| <b>United Kingdom</b>                     | 505           | 500 - 510               | 6              | 14         | 11                      | 19         | 11  | 19         |
| <b>Netherlands<sup>1</sup></b>            | 503           | 498 - 509               | 7              | 16         | 12                      | 21         | 12  | 21         |
| <b>Germany</b>                            | 503           | 497 - 509               | 7              | 16         | 12                      | 21         | 12  | 21         |
| <b>Australia</b>                          | 503           | 499 - 506               | 8              | 15         | 13                      | 20         | 13  | 20         |
| <b>United States<sup>1</sup></b>          | 502           | 496 - 509               | 7              | 18         | 12                      | 23         | 12  | 23         |
| <i>Prince Edward Island (Canada)</i>      | 502           | 484 - 519               |                |            |                         |            |   |            |
| <i>Castile and León (Spain)</i>           | 501           | 491 - 511               |                |            |                         |            |   |            |
| <i>Saskatchewan (Canada)</i>              | 501           | 493 - 508               |                |            |                         |            |   |            |
| <b>Sweden</b>                             | 499           | 493 - 505               | 9              | 19         | 14                      | 24         | 14  | 24         |
| <b>Belgium</b>                            | 499           | 494 - 503               | 11             | 19         | 16                      | 24         | 16  | 24         |
| <i>Bolzano (Italy)</i>                    | 498           | 490 - 506               |                |            |                         |            |   |            |
| <b>Czech Republic</b>                     | 497           | 492 - 502               | 12             | 21         | 17                      | 26         | 17  | 26         |
| <i>Asturias (Spain)</i>                   | 496           | 487 - 505               |                |            |                         |            |   |            |
| <b>Ireland</b>                            | 496           | 492 - 500               | 13             | 21         | 18                      | 26         | 18  | 26         |
| <i>Cantabria (Spain)</i>                  | 495           | 477 - 513               |                |            |                         |            |   |            |
| <b>Switzerland</b>                        | 495           | 489 - 501               | 13             | 23         | 18                      | 28         | 18  | 28         |
| <i>Trento (Italy)</i>                     | 495           | 491 - 499               |                |            |                         |            |   |            |
| <i>Aragon (Spain)</i>                     | 493           | 483 - 504               |                |            |                         |            |   |            |
| <b>France</b>                             | 493           | 489 - 497               | 16             | 23         | 21                      | 28         | 21  | 28         |
| <b>Denmark</b>                            | 493           | 489 - 496               | 16             | 23         | 21                      | 28         | 21  | 28         |
| <i>New Brunswick (Canada)</i>             | 492           | 481 - 504               |                |            |                         |            |   |            |
| <i>Navarre (Spain)</i>                    | 492           | 480 - 504               |                |            |                         |            |   |            |
| <b>Portugal<sup>1</sup></b>               | 492           | 486 - 497               | 16             | 24         | 21                      | 29         | 21  | 29         |
| <i>Northern Ireland (United Kingdom)</i>  | 491           | 482 - 500               |                |            |                         |            |   |            |
| <b>Norway</b>                             | 490           | 486 - 495               | 18             | 24         | 23                      | 29         | 23  | 29         |
| <i>Scotland (United Kingdom)</i>          | 490           | 482 - 498               |                |            |                         |            |   |            |
| <b>Austria</b>                            | 490           | 484 - 495               | 18             | 25         | 23                      | 30         | 23  | 30         |

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**Source:** OECD, PISA 2018 Database.

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## How did countries perform in PISA 2018?

Table I.4.6 <sup>[2/3]</sup> Science performance at national and subnational levels

|  | Science scale |                         |                |            |                         |            |   |            |
|--|---------------|-------------------------|----------------|------------|-------------------------|------------|---|------------|
|  | Mean score    | 95% confidence interval | Range of ranks |            |                         |            |   |            |
|  |               |                         | OECD countries |            | All countries/economies |            | Countries/economies assessing students on computers |            |
|  |               |                         | Upper rank     | Lower rank | Upper rank              | Lower rank | Upper rank  | Lower rank |
| <i>Manitoba (Canada)</i>                   | 489           | 482 - 497               |                |            |                         |            |   |            |
| <i>Catalonia (Spain)</i>                   | 489           | 479 - 498               |                |            |                         |            |   |            |
| <i>Wales (United Kingdom)</i>              | 488           | 481 - 496               |                |            |                         |            |   |            |
| <i>Basque Country (Spain)</i>              | 487           | 479 - 496               |                |            |                         |            |   |            |
| <b>Latvia</b>                              | 487           | 484 - 491               | 21             | 25         | 26                      | 30         | 26  | 30         |
| <i>Madrid (Spain)</i>                      | 487           | 481 - 493               |                |            |                         |            |   |            |
| <i>La Rioja (Spain)</i>                    | 487           | 471 - 502               |                |            |                         |            |   |            |
| <i>French Community (Belgium)</i>          | 485           | 479 - 490               |                |            |                         |            |   |            |
| <i>Castile-La Mancha (Spain)</i>           | 484           | 473 - 496               |                |            |                         |            |   |            |
| <i>German-speaking Community (Belgium)</i> | 483           | 469 - 498               |                |            |                         |            |   |            |
| <b>Spain</b>                               | 483           | 480 - 486               | 24             | 27         | 29                      | 32         | 29  | 32         |
| <i>Balearic Islands (Spain)</i>            | 482           | 472 - 492               |                |            |                         |            |   |            |
| <b>Lithuania</b>                           | 482           | 479 - 485               | 25             | 27         | 30                      | 33         | 30  | 33         |
| <b>Hungary</b>                             | 481           | 476 - 485               | 24             | 28         | 29                      | 34         | 29  | 34         |
| <i>Murcia (Spain)</i>                      | 479           | 468 - 490               |                |            |                         |            |   |            |
| <b>Russia</b>                              | 478           | 472 - 483               |                |            | 30                      | 37         | 30  | 36         |
| <i>Comunidad Valenciana (Spain)</i>        | 478           | 469 - 486               |                |            |                         |            |   |            |
| <b>Luxembourg</b>                          | 477           | 474 - 479               | 27             | 29         | 32                      | 36         | 32  | 36         |
| <b>Iceland</b>                             | 475           | 472 - 479               | 28             | 30         | 33                      | 37         | 33  | 37         |
| <i>Toscana (Italy)</i>                     | 475           | 467 - 483               |                |            |                         |            |   |            |
| <i>Extremadura (Spain)</i>                 | 473           | 462 - 485               |                |            |                         |            |   |            |
| <b>Croatia</b>                             | 472           | 467 - 478               |                |            | 33                      | 40         | 33  | 39         |
| <b>Belarus</b>                             | 471           | 466 - 476               |                |            | 34                      | 40         | 34  | 39         |
| <i>Andalusia (Spain)</i>                   | 471           | 462 - 480               |                |            |                         |            |   |            |
| <i>Canary Islands (Spain)</i>              | 470           | 461 - 478               |                |            |                         |            |   |            |
| <b>Ukraine</b>                             | 469           | 463 - 475               |                |            | 35                      | 42         |   |            |
| <b>Turkey</b>                              | 468           | 464 - 472               | 30             | 32         | 36                      | 41         | 36  | 40         |
| <b>Italy</b>                               | 468           | 463 - 473               | 30             | 33         | 36                      | 42         | 36  | 41         |
| <b>Slovak Republic</b>                     | 464           | 460 - 469               | 30             | 33         | 39                      | 42         | 38  | 41         |
| <b>Israel</b>                              | 462           | 455 - 469               | 30             | 33         | 38                      | 43         | 38  | 42         |
| <b>Malta</b>                               | 457           | 453 - 460               |                |            | 42                      | 44         | 41  | 43         |
| <i>CABA (Argentina)</i>                    | 455           | 444 - 465               |                |            |                         |            |   |            |
| <i>Sardegna (Italy)</i>                    | 452           | 444 - 460               |                |            |                         |            |   |            |
| <b>Greece</b>                              | 452           | 445 - 458               | 34             | 35         | 43                      | 45         | 42  | 44         |
| <i>Bogotá (Colombia)</i>                   | 451           | 441 - 460               |                |            |                         |            |   |            |
| <b>Chile</b>                               | 444           | 439 - 448               | 35             | 35         | 44                      | 47         | 43  | 46         |
| <b>Serbia</b>                              | 440           | 434 - 446               |                |            | 45                      | 49         | 44  | 48         |
| <i>DI Yogyakarta (Indonesia)</i>           | 439           | 429 - 449               |                |            |                         |            |   |            |
| <b>Cyprus</b>                              | 439           | 436 - 442               |                |            | 45                      | 48         | 44  | 47         |
| <i>Melilla (Spain)</i>                     | 439           | 424 - 454               |                |            |                         |            |   |            |
| <b>Malaysia</b>                            | 438           | 432 - 443               |                |            | 45                      | 50         | 44  | 48         |
| <b>United Arab Emirates</b>                | 434           | 430 - 438               |                |            | 47                      | 52         | 47  | 50         |
| <b>Brunei Darussalam</b>                   | 431           | 429 - 433               |                |            | 49                      | 53         | 48  | 50         |
| <i>Almaty (Kazakhstan)</i>                 | 431           | 414 - 447               |                |            |                         |            |   |            |
| <b>Jordan</b>                              | 429           | 424 - 435               |                |            | 49                      | 56         |   |            |
| <b>Moldova</b>                             | 428           | 424 - 433               |                |            | 49                      | 55         |   |            |
| <i>Astana (Kazakhstan)</i>                 | 428           | 413 - 443               |                |            |                         |            |   |            |
| <i>DKI Jakarta (Indonesia)</i>             | 428           | 415 - 441               |                |            |                         |            |   |            |
| <i>Karagandy region (Kazakhstan)</i>       | 428           | 414 - 442               |                |            |                         |            |   |            |

1. Data did not meet the PISA technical standards but were accepted as largely comparable (see Annexes A2 and A4).


**Notes:** OECD countries are shown in bold black. Partner countries, economies and subnational entities that are not included in national results are shown in bold blue.

Regions are shown in black italics (OECD countries) or blue italics (partner countries).

Range-of-rank estimates are computed based on mean and standard-error-of-the-mean estimates for each country/economy, and take into account multiple comparisons amongst countries and economies at similar levels of performance. For an explanation of the method, see Annex A3.

Countries and economies are ranked in descending order of mean mathematics performance.

**Source:** OECD, PISA 2018 Database.

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Table I.4.6<sup>[3/3]</sup> Science performance at national and subnational levels

|   | Science scale |                         |                |            |                         |            |   |            |
|---|---------------|-------------------------|----------------|------------|-------------------------|------------|---|------------|
|   | Mean score    | 95% confidence interval | Range of ranks |            |                         |            |   |            |
|   |               |                         | OECD countries |            | All countries/economies |            | Countries/economies assessing students on computers |            |
|   |               |                         | Upper rank     | Lower rank | Upper rank              | Lower rank | Upper rank  | Lower rank |
| <i>Córdoba (Argentina)</i>                  | 427           | 418 - 437               |                |            |                         |            |   |            |
| <i>Kostanay region (Kazakhstan)</i>         | 426           | 415 - 438               |                |            |                         |            |   |            |
| <b>Thailand</b>                             | 426           | 420 - 432               |                |            | 50                      | 58         | 49  | 54         |
| <b>Uruguay</b>                              | 426           | 421 - 431               |                |            | 51                      | 57         | 49  | 53         |
| <b>Romania</b>                              | 426           | 417 - 435               |                |            | 49                      | 60         |   |            |
| <b>Bulgaria</b>                             | 424           | 417 - 431               |                |            | 50                      | 59         | 49  | 55         |
| <i>South (Brazil)</i>                       | 419           | 408 - 431               |                |            |                         |            |   |            |
| <b>Mexico</b>                               | 419           | 414 - 424               | 36             | 37         | 55                      | 62         | 51  | 57         |
| <i>North-Kazakhstan region (Kazakhstan)</i> | 419           | 409 - 429               |                |            |                         |            |   |            |
| <b>Qatar</b>                                | 419           | 417 - 421               |                |            | 56                      | 60         | 52  | 56         |
| <b>Albania</b>                              | 417           | 413 - 421               |                |            | 57                      | 63         | 53  | 58         |
| <b>Costa Rica</b>                           | 416           | 409 - 422               |                |            | 56                      | 63         | 52  | 58         |
| <i>Middle-West (Brazil)</i>                 | 415           | 399 - 431               |                |            |                         |            |   |            |
| <i>Ceuta (Spain)</i>                        | 415           | 402 - 428               |                |            |                         |            |   |            |
| <b>Montenegro</b>                           | 415           | 413 - 418               |                |            | 58                      | 63         | 54  | 58         |
| <i>Southeast (Brazil)</i>                   | 414           | 408 - 419               |                |            |                         |            |   |            |
| <i>PBA (Argentina)</i>                      | 413           | 403 - 424               |                |            |                         |            |   |            |
| <i>East-Kazakhstan region (Kazakhstan)</i>  | 413           | 402 - 424               |                |            |                         |            |   |            |
| <b>Colombia</b>                             | 413           | 407 - 419               | 36             | 37         | 58                      | 64         | 54  | 59         |
| <i>Pavlodar region (Kazakhstan)</i>         | 413           | 401 - 425               |                |            |                         |            |   |            |
| <b>North Macedonia</b>                      | 413           | 410 - 416               |                |            | 60                      | 63         |   |            |
| <b>Peru</b>                                 | 404           | 399 - 409               |                |            | 63                      | 67         | 58  | 61         |
| <b>Argentina</b>                            | 404           | 398 - 410               |                |            | 63                      | 68         |   |            |
| <b>Brazil</b>                               | 404           | 400 - 408               |                |            | 64                      | 67         | 59  | 61         |
| <i>Akmola region (Kazakhstan)</i>           | 401           | 391 - 411               |                |            |                         |            |   |            |
| <b>Bosnia and Herzegovina</b>               | 398           | 393 - 404               |                |            | 65                      | 70         | 60  | 64         |
| <b>Baku (Azerbaijan)</b>                    | 398           | 393 - 402               |                |            | 66                      | 70         | 60  | 64         |
| <i>Zhambyl region (Kazakhstan)</i>          | 397           | 389 - 406               |                |            |                         |            |   |            |
| <b>Kazakhstan</b>                           | 397           | 394 - 400               |                |            | 67                      | 70         | 61  | 64         |
| <b>Indonesia</b>                            | 396           | 391 - 401               |                |            | 67                      | 70         | 61  | 64         |
| <i>West-Kazakhstan region (Kazakhstan)</i>  | 391           | 381 - 401               |                |            |                         |            |   |            |
| <i>Tucumán (Argentina)</i>                  | 391           | 381 - 401               |                |            |                         |            |   |            |
| <i>Aktobe region (Kazakhstan)</i>           | 389           | 379 - 399               |                |            |                         |            |   |            |
| <b>Saudi Arabia</b>                         | 386           | 381 - 392               |                |            | 71                      | 73         |   |            |
| <i>North (Brazil)</i>                       | 384           | 373 - 396               |                |            |                         |            |   |            |
| <b>Lebanon</b>                              | 384           | 377 - 391               |                |            | 71                      | 74         |   |            |
| <b>Georgia</b>                              | 383           | 378 - 387               |                |            | 71                      | 74         | 65  | 66         |
| <i>Northeast (Brazil)</i>                   | 383           | 375 - 390               |                |            |                         |            |   |            |
| <i>Almaty region (Kazakhstan)</i>           | 380           | 371 - 390               |                |            |                         |            |   |            |
| <b>Morocco</b>                              | 377           | 371 - 382               |                |            | 73                      | 74         | 65  | 66         |
| <i>Kyzyl-Orda region (Kazakhstan)</i>       | 374           | 365 - 384               |                |            |                         |            |   |            |
| <i>South-Kazakhstan region (Kazakhstan)</i> | 373           | 366 - 380               |                |            |                         |            |   |            |
| <b>Kosovo</b>                               | 365           | 363 - 367               |                |            | 75                      | 76         | 67  | 68         |
| <b>Panama</b>                               | 365           | 359 - 370               |                |            | 75                      | 77         | 67  | 69         |
| <i>Mangistau region (Kazakhstan)</i>        | 365           | 355 - 374               |                |            |                         |            |   |            |
| <i>Atyrau region (Kazakhstan)</i>           | 361           | 350 - 371               |                |            |                         |            |   |            |
| <b>Philippines</b>                          | 357           | 351 - 363               |                |            | 76                      | 77         | 68  | 69         |
| <b>Dominican Republic</b>                   | 336           | 331 - 341               |                |            | 78                      | 78         | 70  | 70         |


1. Data did not meet the PISA technical standards but were accepted as largely comparable (see Annexes A2 and A4).

**Notes:** OECD countries are shown in bold black. Partner countries, economies and subnational entities that are not included in national results are shown in bold blue. Regions are shown in black italics (OECD countries) or blue italics (partner countries).

Range-of-rank estimates are computed based on mean and standard-error-of-the-mean estimates for each country/economy, and take into account multiple comparisons amongst countries and economies at similar levels of performance. For an explanation of the method, see Annex A3.

Countries and economies are ranked in descending order of mean mathematics performance.

**Source:** OECD, PISA 2018 Database.

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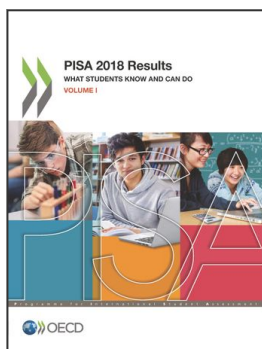
1. Because the membership of the OECD has changed over time, the three categories (around, above and below the OECD mean) are not comparable to the corresponding categories used in earlier PISA reports.
2. See Annex A5 for a discussion of how the scales are linked, and of the comparability of results between paper- and computer-based assessments.
3. While score points in reading, mathematics and science are not comparable, differences in scores can be compared through a standardised effect-size metric, such as Cohen's *d*.
4. In reading, 220 points is approximately equal to the distance between the mid-point of Proficiency Level 5 – a level at which students can comprehend lengthy texts, deal with concepts that are abstract or counterintuitive, and establish distinctions between fact and opinion, based on implicit cues pertaining to the content or source of the information – and the mid-point of Proficiency Level 2 – a level at which students are capable of identifying the main idea in a text of moderate length, of finding information based on explicit though sometimes complex criteria, and of reflecting on the purpose and form of texts only when explicitly directed to do so, but have difficulty with reading tasks that do not contain explicit cues or that do contain distractors and competing information (see Chapter 5 for more detailed descriptions of what students can do at different levels of the reading scale).
5. In reading, students in Singapore who reported that they do not speak English at home scored 54 points (S.E.: 3.3 points) below students who reported that they speak English at home; in mathematics, the difference was only 32 points (S.E.: 2.9 points).
6. In this report, the range of ranks is defined as the 97.5% confidence interval for the rank statistic. This means that there is at least a 97.5% probability that the interval defined by the upper and lower ranks, and computed based on PISA samples, contains the true rank of the country/economy (see Annex A3).
7. The lowest rank of country/economy A is not merely given by the number of countries/economies whose mean scores are above those of country/economy A in Table I.4.1, Table I.4.2, and Table I.4.3, and whose names are not listed amongst the non-significant differences compared to country/economy A in those tables. For more details about the methodology behind the computation of a confidence interval for the rank, see Annex A3.
8. In addition to adjudicated subnational entities, whose data were carefully reviewed against technical and scientific standards, the table also includes any subnational entity that constituted one or more explicit sampling strata and that achieved, through deliberate over-sampling or sometimes, due to its large size within the country, a sample of at least 25 participating schools and 875 assessed students. It also includes some subnational entities that conducted a census, and where the country requested that results be reported at the subnational level. For non-adjudicated entities, response rates were not assessed separately from those of the country as a whole, and results must be interpreted with caution.
9. If the distribution of performance amongst the eligible 15-year-olds (first-order) stochastically dominates that of the non-eligible 15-year-olds, then the mean and all percentiles of the PISA target population represent an upper bound on the percentiles of the population encompassing all 15-year-olds.
10. See <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups> (accessed on 23 August 2019).
11. The GDP values represent per capita GDP in 2018 at current prices, expressed in USD. The conversion from local currencies to equivalent USD accounts for differences in purchasing power across countries and economies.
12. Spending per student is approximated by multiplying the expenditure per student on educational institutions in 2018 (from public and private sources), at each level of education, by the theoretical duration of education at the respective level, up to the age of 15. Cumulative expenditure for a given country is approximated as follows: let  $n_0$ ,  $n_1$  and  $n_2$  be the typical number of years spent by a student from the age of 6 up to the age of 15 in primary, lower secondary and upper secondary education. Let  $E_0$ ,  $E_1$  and  $E_2$  be the annual expenditure per student in USD converted using purchasing power parity in primary, lower secondary and upper secondary education, respectively. The cumulative expenditure is then calculated by multiplying current annual expenditure for each level of education by the typical duration of study in that level, using the following formula:  $CE = n_0 E_0 + n_1 E_1 + n_2 E_2$ .
13. The countries and economies included in each analysis may vary due to data availability. The percentage of variation in mean reading performance accounted for by each variable cannot therefore be directly compared.
14. The indicator of total learning time computed based on 2015 data is used as a proxy for the time investment of PISA 2018 students, because PISA 2018 did not collect data on out-of-school learning time.
15. Different countries participated in the Survey of Adult Skills (PIAAC) in different years. In all countries, results for 35-54 year-olds are approximated by the results of adults born between 1964 and 1983. No adjustment is made to account for changes in the skills of these adults, or for changes in the composition of these cohorts, between the year in which the survey was conducted and 2018. PISA results for the Flemish Community of Belgium are related to PIAAC results for Flanders (Belgium). PIAAC results for Ecuador are related to the country's results in the PISA for Development assessment (2017). For the United States, PIAAC data refer to 2017.
16. PISA and PIRLS assess different constructs and different samples. For example, PIRLS uses a grade-based definition of the target population, while PISA uses an age-based definition. Dropout between the end of primary school and the age of 15 may reduce the comparability of samples across assessments. Also note that the cohort that was assessed in PIRLS 2011 differs by 1 or 2 years, in most cases, from the cohort assessed in PISA 2018. In addition, cohort composition could have changed in some countries and economies due to migration. It is beyond the scope of this chapter to analyse these differences in detail.

17. As noted in Worden (2012<sup>[9]</sup>), bilingualism and multilingualism can have multiple benefits for students and should be encouraged. Bilingualism, in particular, is associated with enhanced executive control (Bialystok, 2011<sup>[11]</sup>). Despite the many advantages of bilingualism, it has been shown that bilingual children, on average, know significantly fewer words in each language than comparable monolingual children (Bialystok et al., 2009<sup>[10]</sup>). Several high-performing countries in PISA have large shares of bilingual students, including Singapore, one of the highest-performing countries in all subjects, and Switzerland, which scores around the OECD average in reading, but above the OECD average in mathematics.
18. International PISA data cannot describe all aspects of ethnic diversity. For example, in Australia, New Zealand or in the Americas, PISA measures of linguistic diversity and immigrant status do not necessarily cover indigenous populations, which use the language of instruction in everyday life.

## References

- Bialystok, E.** (2011), "Reshaping the mind: The benefits of bilingualism.", *Canadian Journal of Experimental Psychology/Revue canadienne de psychologie expérimentale*, Vol. 65/4, pp. 229-235, <http://dx.doi.org/10.1037/a0025406>. [11]
- Bialystok, E.** et al. (2009), "Bilingual Minds", *Psychological Science in the Public Interest*, Vol. 10/3, pp. 89-129, <http://dx.doi.org/10.1177/1529100610387084>. [10]
- Mullis, I.** et al. (2012), *PIRLS 2011 International Results in Reading*, TIMSS & PIRLS International Study Center and International Association for the Evaluation of Educational Achievement (IEA), [https://timssandpirls.bc.edu/pirls2011/downloads/P11\\_IR\\_FullBook.pdf](https://timssandpirls.bc.edu/pirls2011/downloads/P11_IR_FullBook.pdf) (accessed on 3 July 2019). [5]
- OECD** (2019), *Education at a Glance 2019: OECD Indicators*, OECD Publishing, Paris, <https://doi.org/10.1787/f8d7880d-en>. [6]
- OECD** (2019), *PISA 2018 Results (Volume II): Where All Students Can Succeed*, PISA, OECD Publishing, Paris, <https://doi.org/10.1787/b5fd1b8f-en>. [1]
- OECD** (2019), *The Road to Integration: Education and Migration*, OECD Reviews of Migrant Education, OECD Publishing, Paris, <https://dx.doi.org/10.1787/d8ceec5d-en>. [8]
- OECD** (2016), *PISA 2015 Results (Volume II): Policies and Practices for Successful Schools*, PISA, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9789264267510-en>. [4]
- OECD** (2010), *Educating Teachers for Diversity: Meeting the Challenge*, Educational Research and Innovation, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9789264079731-en>. [7]
- Ward, M.** (2018), "PISA for Development: Results in Focus", *PISA in Focus*, No. 91, OECD Publishing, Paris, <https://dx.doi.org/10.1787/c094b186-en>. [2]
- Worden, J.** (2012), "Bilingual education policy and language learning in Estonia and Singapore", in *Languages in a Global World: Learning for Better Cultural Understanding*, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9789264123557-11-en>. [9]
- World Bank** (2017), *World Development Report 2018: Learning to Realize Education's Promise*, The World Bank, <http://dx.doi.org/10.1596/978-1-4648-1096-1>. [3]





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