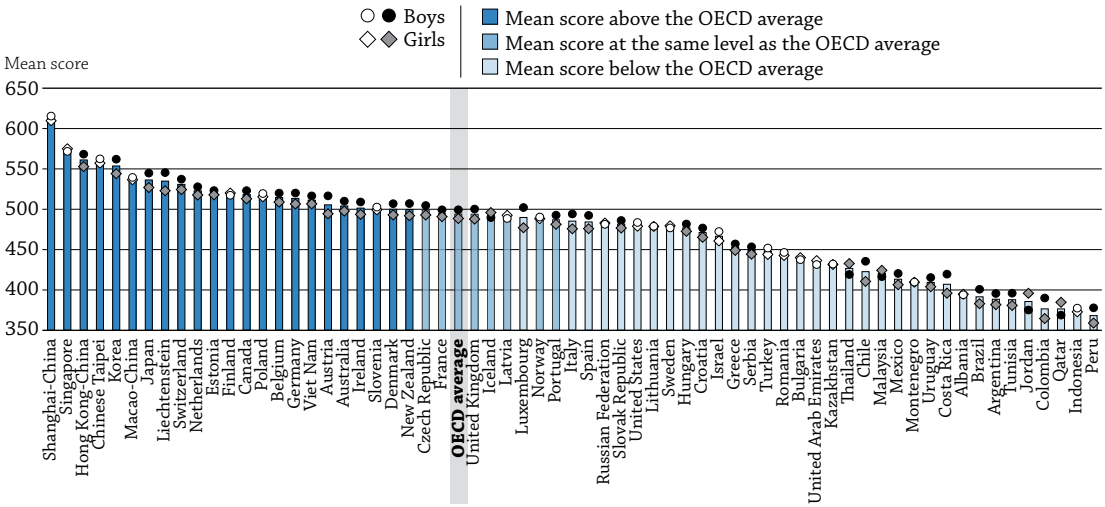
# HOW ARE STUDENT PERFORMANCE AND EQUITY IN EDUCATION RELATED?

- Shanghai-China performs the highest in mathematics of all countries and economies that participated in PISA 2012, with a mean score of 613 points – 119 points, or the equivalent of nearly three years of schooling, above the OECD average. Singapore, Hong Kong-China, Chinese Taipei, Korea, Macao-China, Japan, Liechtenstein, Switzerland and the Netherlands, in descending order of their scores, round out the top ten performers in mathematics.
- Boys perform better than girls in mathematics in 37 of the 64 countries that participated in PISA 2012, and girls outperform boys in five countries.
- Australia, Canada, Estonia, Finland, Hong Kong-China, Japan, Korea, Liechtenstein, the Netherlands and Macao-China combine high levels of performance with equity in education opportunities as assessed in PISA 2012.

## Chart A9.1. Student performance in mathematics, by gender, PISA 2012




**Note:** Gender differences that are statistically significant are marked in a darker tone.
*Countries and economies are ranked in descending order of the mean score in mathematics.*
**Source:** OECD. Table A9.1a. See Annex 3 for notes (*www.oecd.org/edu/eag.htm*).
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## Context

With mathematics as its primary focus, the Programme for International Student Assessment (PISA) 2012 survey measured 15-year-olds' capacity to reason mathematically and use mathematical concepts, procedures, facts and tools to describe, explain and predict phenomena. The triennial survey, which assesses student performance in reading, mathematics, science and problem-solving, does not just ascertain whether students can reproduce what they have learned; it also examines how well they can extrapolate from what they have learned and apply that knowledge in unfamiliar settings, both in and outside of school. This approach reflects the fact that modern societies reward individuals not for what they know, but for what they can do with what they know.

PISA results reveal what is possible in education by showing what students in the highest-performing and most rapidly improving education systems can do. The findings allow policy makers around the world to gauge the knowledge and skills of students in their own countries in comparison with those in other countries, set policy targets against measurable goals achieved by other education systems, and learn from policies and practices applied elsewhere.

In analysing results of the PISA assessment in the context of various demographic and social characteristics of students and schools, such as gender, socio-economic status and immigrant background, PISA also shows how equitably participating countries are providing education opportunities and realising education outcomes – an indication of the level of equity in the society, as a whole.

## Other findings

- On average across OECD countries, **13% of students are top performers in mathematics** (Level 5 or 6). At the same time, 23% of students in OECD countries, and 32% of students in all participating countries, are low performers in mathematics (i.e. they did not reach the baseline Level 2).
- **In only six countries is the gap in mathematics scores between boys and girls – in favour of boys – larger than the equivalent of half a year of formal schooling**.
- Across OECD countries, **15% of the difference in performance among students is explained by disparities in students' socio-economic status**. In countries where this relationship is strong, students from disadvantaged families are less likely to beat the odds against them and achieve high levels of performance. Even more telling, **some 39 score points – the equivalent of around one year of formal schooling –** separate the mathematics performance of those students who are considered socio-economically advantaged and those whose socio-economic status is close to the OECD average.

## Trends

- Of the 64 countries and economies with trend data between 2003 and 2012, 25 improved in mathematics performance, 25 showed no change, and 14 deteriorated.
- Among the countries that showed some improvement between 2003 and 2012, Italy, Poland and Portugal reduced the proportion of low performers and increased the proportion of high performers.
- Of the 39 countries and economies that participated in both PISA 2003 and 2012, Mexico, Turkey and Germany improved both their mathematics performance and their levels of equity in education during the period.

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## Analysis

### Results from PISA 2012

PISA-participating countries and economies can be divided into three broad groups, as shown in Chart A9.1: those whose mean scores are statistically around the OECD average (highlighted in medium blue), those whose mean scores are above the OECD average (highlighted in dark blue), and those whose mean scores are below the OECD average (highlighted in light blue). Across OECD countries, the average score in mathematics in PISA 2012 is 494 points.

Among the 64 participating countries and economies that participated in PISA 2012, 23 perform above, seven score around, and 34 score below the OECD average.

The difference between the highest- and the lowest-scoring country/economy is 245 points. Among OECD countries, that difference is 140 points. To gauge the magnitude of these score differences, 41 score points corresponds to the equivalent of one year of formal schooling (see Table A1.2 in Volume I of *PISA 2012 Results*).

#### *Gender differences in mathematics performance*

On average across OECD countries, boys outperform girls in mathematics by 11 score points. Despite the stereotype that boys are better than girls at mathematics, boys show an advantage in only 37 out of the 64 countries and economies that participated in PISA 2012, and in only six countries is the gender gap – in favour of boys – larger than the equivalent of half a year of school.

Among the 23 highest performing countries and economies, only in Shanghai-China, Singapore, Chinese Taipei, Macao-China, Finland, Poland and Slovenia boys perform as well as girls in mathematics; in the other countries and economies among this group, boys outperform girls.

The largest difference in scores between boys and girls is seen in Chile, Colombia and Luxembourg: a difference of around 25 points. In Austria, Costa Rica and Liechtenstein, this difference is between 22 and 24 points.

In contrast, in only five countries do girls outperform boys in mathematics. The largest difference is seen in Jordan, where girls score around 21 points higher than boys. Girls also outperform boys in Iceland, Malaysia, Qatar and Thailand.

#### *Trends in average mathematics performance*

Trends in average performance indicate how and whether school systems are improving. Trends in mathematics are available for the 64 countries and economies that participated in PISA 2012. Thirty-eight of these have data on mathematics performance from 2012 and the three previous PISA assessments (2003, 2006 and 2009); 17 have data from 2012 and two prior assessments, and nine have data from 2012 and one previous assessment. To better understand a country's/economy's trends and maximise the number of countries used in the comparisons, this indicator focuses on the annualised change in student performance (see the *Definitions* and *Methodology* sections at the end of this indicator). For countries and economies that participated in all four PISA assessments, the annualised change takes into account all four time points; for those countries that have valid data for fewer assessments, it only takes into account the valid and available information.

As shown in Chart A9.2, performance has remained broadly unchanged, but more countries have improved than deteriorated in their mathematics performance. Of the 64 countries and economies with trend data up to 2012, 25 show an average annual improvement in mathematics performance, while 14 show an average deterioration in performance between 2003 and 2012. For the remaining 25 countries and economies, there is no change in mathematics performance during the period. Albania, Kazakhstan, Malaysia, Qatar and the United Arab Emirates (excluding Dubai) show an average improvement in mathematics performance of more than five score points per year. Among OECD countries, improvements in mathematics performance are observed in Israel (with an average improvement of more than four score points per year), Mexico and Turkey (more than three score points per year), Italy, Poland and Portugal (more than two score points per year), and Chile, Germany and Greece (more than one score point per year). Among countries that have participated in every assessment since 2003, Brazil, Italy, Mexico, Poland, Portugal, Tunisia and Turkey show an average improvement in mathematics performance of more than 2.5 points per year (Table A9.1c).

#### *Top and low performers in mathematics in PISA 2012*

Results from the PISA 2012 assessment show that nurturing top performance and tackling low performance need not be mutually exclusive. Some high-performing countries in PISA 2012, like Estonia and Finland, also show small variations in student scores.

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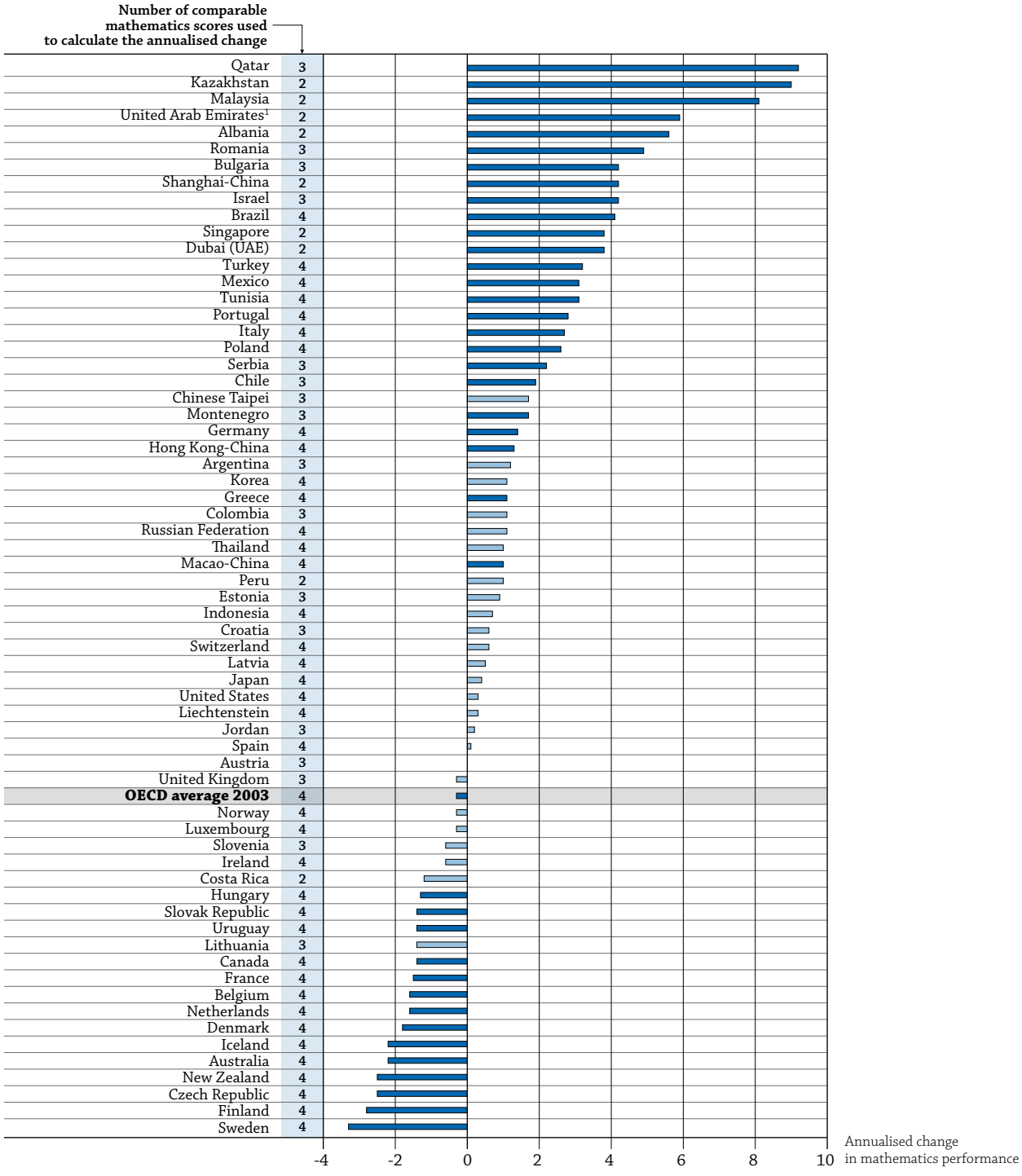
## Chart A9.2. Annualised change in mathematics performance throughout participation in PISA

*Mathematics score-point difference associated with one calendar year*




**Note:** Statistically significant score-point changes are marked in a darker tone.
The annualised change is the average annual change in PISA score points from a country's/economy's earliest participation in PISA to PISA 2012. It is calculated taking into account all country's/economy's participation in PISA.
OECD average 2003 compares only OECD countries with comparable mathematics scores since 2003.
1. Excluding Dubai. In the United Arab Emirates, Dubai took the PISA 2009 assessment in 2009 and the rest of the United Arab Emirates in 2010 as part of PISA 2009+. Results are thus reported separately.
*Countries and economies are ranked in descending order of the annualised change in mathematics performance.*
**Source:** OECD. Table A9.1c. See Annex 3 for notes (*www.oecd.org/edu/eag.htm*).
StatLink http://dx.doi.org/10.1787/888933116832

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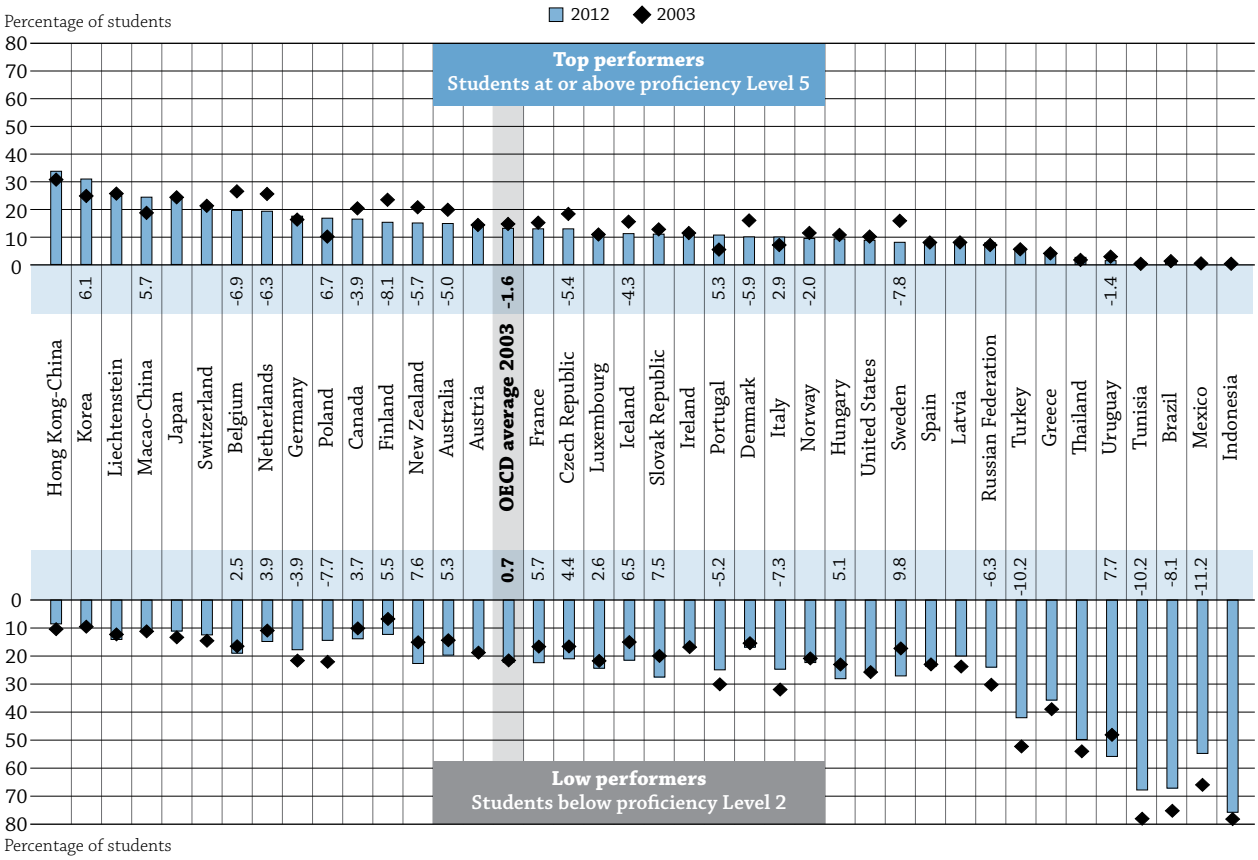
Almost one in three Korean students is a top performer in mathematics, meaning that they score at Level 5 or 6 of the assessment (for a description of the proficiency levels attained by top and low performers, see the *Definitions* and *Methodology* sections at the end of this indicator). This proportion is the largest among all OECD countries. While far larger than the 13% OECD average, this proportion falls short of that found in Shanghai-China, where more than 50% of students are top performers (Table A9.1a).

Among countries with similar mean scores in PISA, there are notable differences in the percentage of top-performing students. For example, Denmark has a mean score of 500 points in mathematics in PISA 2012 and 10% of students in that country are top performers in mathematics, a smaller proportion than the OECD average of around 13%. New Zealand has a similar mean mathematics score of 500 points, but 15% of its students attain the highest levels of proficiency.

More than 40% of students in 21 countries and economies, including the OECD countries Chile and Mexico, fail to reach the baseline level of proficiency in mathematics (Level 2). At best, these students can only extract relevant information from a single source and use basic algorithms, formulae, procedures or conventions to solve problems involving whole numbers. The proportion of 15-year-old students at this level varies widely across countries, from fewer than one student in ten in four countries and economies, to the majority of students in 15 countries. Most students who score below Level 2 in mathematics are unlikely to continue with education beyond compulsory schooling, and therefore risk facing difficulties using mathematics concepts throughout their lives.

## Chart A9.3. Percentage of top performers and low performers in mathematics, PISA 2003 and 2012




**Note:** The chart shows only countries and economies that participated in both PISA 2003 and PISA 2012 assessments.
The change between PISA 2003 and PISA 2012 in the share of students performing below Level 2 in mathematics is shown below the country/economy name. The change between PISA 2003 and PISA 2012 in the share of students performing at or above Level 5 in mathematics is shown above the country/economy name. Only statistically significant changes are shown.
OECD average 2003 compares only OECD countries with comparable mathematics scores since 2003.
*Countries and economies are ranked in descending order of the percentage of students at or above proficiency Level 5 in mathematics in 2012.*
**Source:** OECD. Tables A9.1a, A9.1b and A9.1c. See Annex 3 for notes (*www.oecd.org/edu/eag.htm*).
StatLink http://dx.doi.org/10.1787/888933116851

To increase the share of top-performing students, countries and economies need to look at the barriers to success posed by social background (examined in Volume II of *PISA 2012 Results*), the relationship between performance and students' attitudes towards learning (examined in Volume III of *PISA 2012 Results*), and schools' organisation, resources and learning environments (examined in Volume IV of *PISA 2012 Results*).

### *Trends in the proportions of top and low performers*

When considering changes in the proportions of top and low performers between PISA 2003 and PISA 2012, certain patterns emerge. Countries/economies can then be classified according to how these two groups have evolved during the period.

- **Moving everyone up: reductions in the share of low performers and increases in that of top performers**
  Countries that have reduced the proportion of students scoring below Level 2 and increased the proportion of students scoring above Level 5 are those that have been able to spread the improvements in their education systems across all levels of performance. Between 2003 and 2012 this was observed in Italy, Poland and Portugal (Chart A9.3).
- **Reducing underperformance: reductions in the share of low performers but no change in that of top performers**
  Other countries have concentrated change among those students who did not meet the baseline proficiency level. These countries saw significant improvements in the performance of low-performing students who now have the basic skills to fully participate in society. Between 2003 and 2012, Brazil, Germany, Mexico, the Russian Federation, Tunisia and Turkey saw a reduction in the share of students scoring below proficiency Level 2 in mathematics (Chart A9.3).
- **Nurturing top performance: increase in the share of top performers but no change in that of low performers**
  Some countries increased the proportion of students performing at or above Level 5. These are students who can handle complex mathematical content and processes. Between 2003 and 2012, Korea and Macao-China saw around a six percentage-point increase in the share of students performing at this level (Chart A9.3).
- **Increasing the share of low performers or decreasing that of top performers**
  In 16 countries, the proportion of students who do not reach the baseline proficiency level increased or the proportion of students who reach the highest levels of proficiency decreased between PISA 2003 and PISA 2012 (Chart A9.3).

### *Performance and equity*

Equity in education means providing all students, regardless of their socio-economic status, with opportunities to benefit from education. Defined in this way, equity does not imply that everyone will have the same outcomes from education. It does mean, however, that students' socio-economic status has little or no impact on their performance, and that all students, regardless of their background, are offered access to quality educational resources and opportunities to learn.

Although poor performance in school does not automatically stem from socio-economic disadvantage, the socio-economic background of students and schools does appear to have a powerful influence on learning outcomes. Because advantaged families are better able to reinforce and enhance the effect of schools, because students from advantaged families attend higher-quality schools, or because schools are simply better equipped to nurture and develop young people from advantaged backgrounds, in many countries schools tend to reproduce existing patterns of socio-economic advantage, rather than create a more equitable distribution of learning opportunities and outcomes.

Students' socio-economic background is measured with the *PISA index of economic, social and cultural status*, which is based on information provided by students about their parents' education and occupations and their home possessions, such as a desk to use for studying and the number of books in the home (see the *Definitions* and *Methodology* sections at the end of this indicator).

PISA identifies two main measures of equity in education outcomes: the proportion of the variation in performance attributed to socio-economic status (the strength of the socio-economic gradient) and the average magnitude of the differences in performance across socio-economic groups (the slope of the socio-economic gradient).

The proportion of the variation in performance explained by socio-economic status, together with performance differences across the socio-economic spectrum, are useful indicators to help determine whether efforts to improve student performance should be targeted mainly at students who perform poorly or come from socio-economically disadvantaged backgrounds. Thus there is an important distinction between the strength of the social gradient,

which is associated with how closely students conform to predictions of performance based on their socio-economic status, and its slope, which refers to the average size of the performance gap associated with a given difference in socio-economic status.

## Chart A9.4. Student performance and equity


**Source:** OECD. Tables A9.1a and A9.2. See Annex 3 for notes (*www.oecd.org/edu/eag.htm*).
StatLink http://dx.doi.org/10.1787/888933116870

### *Students' socio-economic status*

Across OECD countries, 15% of the variation in student performance in mathematics is attributed to differences in students' socio-economic status. Among high-performing countries and economies, this proportion ranges from 3% in Macao-China to 20% in Belgium. In contrast, in Bulgaria, Chile, France, Hungary, Peru, the Slovak Republic and Uruguay, more than 20% of the difference in student performance can be attributed to students' socio-economic status. In countries where this proportion is large, students from disadvantaged families are less likely to achieve high levels of performance.

As Chart A9.4 shows, of the 23 school systems that scored above the OECD average in PISA 2012, the strength of the relationship between performance and socio-economic status is weaker than average in ten countries and economies: Australia, Canada, Estonia, Finland, Hong Kong-China, Japan, Korea, Liechtenstein, Macao-China and the Netherlands. In another ten (Austria, Denmark, Germany, Ireland, Poland, Shanghai-China, Singapore, Slovenia, Switzerland and Viet Nam), the strength of this relationship is about average. Only in three high-performing countries and economies – Belgium, New Zealand and Chinese Taipei – is the relationship between performance and socio-economic status stronger than average.

On average across OECD countries, the slope of the socio-economic gradient is 39 points, meaning that a change of one unit on the *PISA index of economic, social and cultural status* is associated with a difference of 39 score points in mathematics. Advantaged students (those with a value of 1 on the index) are expected to score, on average, 39 points higher than a student with average socio-economic status (with a value of 0 on the index), and 78 points higher than a disadvantaged student (with a value of -1 on the index).

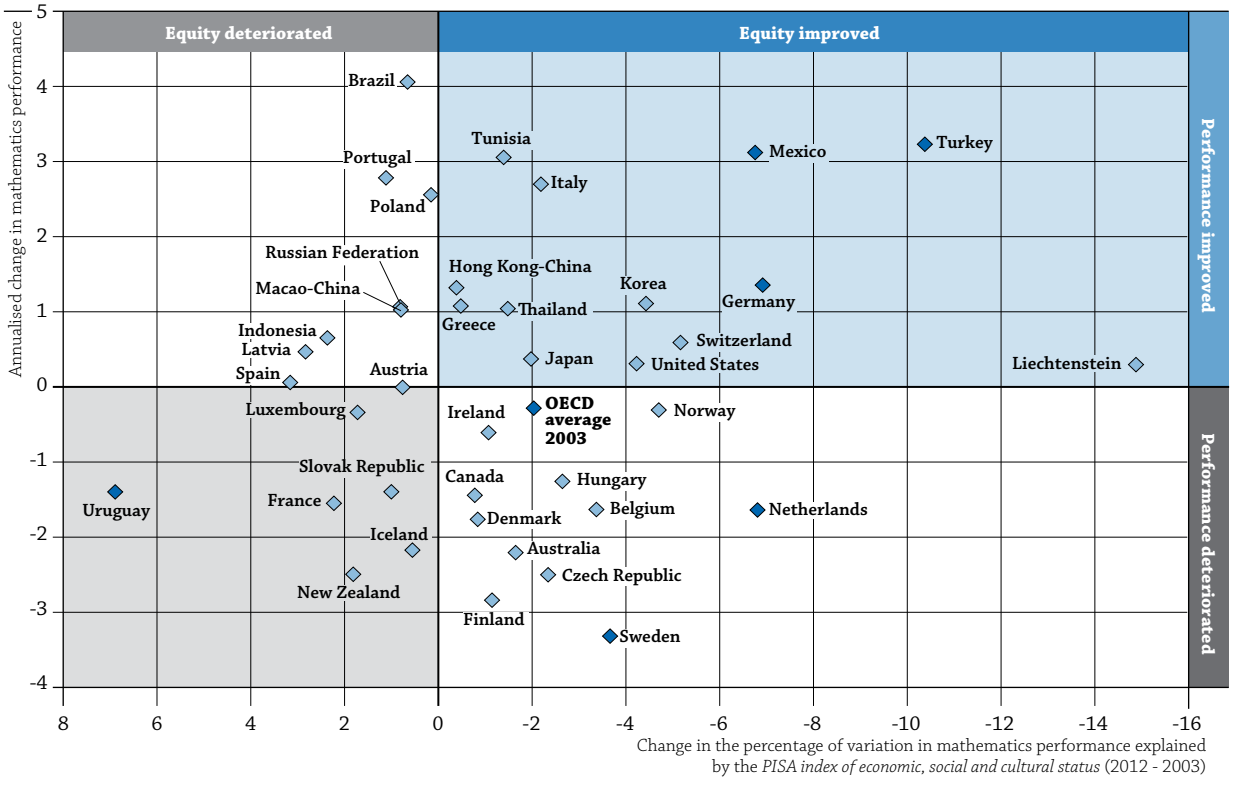
Among the 23 highest-performing countries and economies, performance differences related to socio-economic status are narrower than average in Canada, Estonia, Finland, Hong Kong-China, Macao-China and Viet Nam, about average in 12 countries and economies, and wider than average in five.

In countries with relatively flat gradients, i.e. where performance differences related to socio-economic status are small, policies that specifically target students from disadvantaged backgrounds would not, by themselves, address the needs of many of the country's low-performing students. In this case, targeting low achievers may prove more effective than targeting disadvantaged students.

### *Trends in equity between PISA 2003 and PISA 2012*

By analysing data across different PISA assessments, it is possible to identify the countries that have moved towards a more equitable school system.

## Chart A9.5. Change between 2003 and 2012 in student performance and equity




**Notes:** Changes in both equity and performance between 2003 and 2012 that are statistically significant are indicated in a darker tone.
The annualised change is the average annual change in PISA score points from a country's/economy's earliest participation in PISA to PISA 2012. It is calculated taking into account all of a country's/economy's participation in PISA.
Only countries and economies with comparable data from PISA 2003 and PISA 2012 are shown.
For comparability over time, PISA 2003 values on the *PISA index of economic, social and cultural status* have been rescaled to the PISA 2012 scale of the index. PISA 2003 results reported in this chart may thus differ from those presented in *Learning for Tomorrow's World: First Results from PISA 2003* (OECD, 2004).
OECD average 2003 considers only those countries with comparable mathematics scores and values on the *PISA index for economic, social and cultural status* since PISA 2003.
**Source:** OECD. Tables A9.1c and A9.2. See Annex 3 for notes (*www.oecd.org/edu/eag.htm*).
StatLink http://dx.doi.org/10.1787/888933116889

Between 2003 and 2012, the average difference in mathematics performance related to a one-unit change in the *PISA index of economic, social and cultural status* remained at 39 score points, but the degree to which students' socio-economic status predicted performance in mathematics decreased from 17% to 15%. In other words, by 2012 it was somewhat easier than it was in 2003 for students to confound predictions about their performance based on their socio-economic status.

Turkey and Mexico moved towards greater equity by reducing both the slope and the strength of the socio-economic gradient, while improving overall performance. This means that, in both of these countries, it was easier for students in 2012 than for students in 2003 to confound expectations about performance, given their socio-economic status, and that the average difference in performance between advantaged and disadvantaged students shrank. In Germany, the performance gap between socio-economically advantaged and disadvantaged students remained unchanged; however, a larger proportion of students performed better than would be predicted by their socio-economic status. Most important, in these three countries, the improvement in equity was combined with an improvement in mathematics performance (Chart A9.5 and Table A9.2).

Other countries and economies that improved mathematics performance (Brazil, Greece, Hong Kong-China, Italy, Macao-China, Poland and Tunisia) maintained their equity levels; only in Portugal were improvements in performance accompanied by a reduction in equity (Table A9.2). These results highlight how, for most countries and economies, improvements in performance need not come at the expense of equity (see Volume II of *the PISA 2012 Results*).

## Definitions

**The annualised change** is the average rate of change at which a country's or economy's average mathematics scores has changed throughout its participation in PISA assessments. Thus, a positive annualised change of x points indicates that the country or economy has improved in performance by x points per year since its earliest comparable PISA results. For countries that have participated in only two assessments, the annualised change is equal to the difference between the two assessments, divided by the number of years that passed between the assessments.

**Low performers** in mathematics are those students who do not reach the baseline Level 2 on the PISA assessment. At Level 2, students can interpret and recognise situations in contexts that require no more than direct inference; extract relevant information from a single source and make use of a single representational mode; employ basic algorithms, formulae, procedures or conventions to solve problems involving whole numbers; and make literal interpretations of the results.

**Top performers** in mathematics are students who score at Level 5 or 6 on the PISA assessment. They can develop and work with models for complex situations, identifying constraints and specifying assumptions; select, compare, and evaluate appropriate problem-solving strategies for dealing with complex problems related to these models; work strategically using broad, well-developed thinking and reasoning skills, appropriate linked representations, symbolic and formal characterisations, and insight pertaining to these situations; and begin to reflect on their work and formulate and communicate their interpretations and reasoning.

## Methodology

The **annualised change** is a robust measure of a country's progress in education outcomes as it is based on information available from all assessments. It is thus less sensitive to abnormal measurements that may alter a country's PISA trends if results are compared only between two assessments. The annualised change is calculated as the best-fitting line throughout a country's participation in PISA. The year that individual students participated in PISA is regressed on their PISA scores, yielding the annualised change. The annualised change also takes into account the fact that, for some countries, the period between PISA assessments is less than three years (for further information, see Volume I of *PISA 2012 Results*).

The ***PISA index of economic, social and cultural status*** (ESCS) was derived from the following three indices: *highest occupational status of parents* (HISEI), *highest education level of parents* in years of education according to ISCED (PARED), and *home possessions* (HOMEPOS). In PISA 2012, students reported the availability of 14 household items at home. In addition, countries added three specific household items that were seen as appropriate measures of family wealth within the country's context. The *index of home possessions* (HOMEPOS) was derived from these household items and also included the variable indicating the number of books at home. However, the home possessions scale for PISA 2012 was computed differently than in the previous cycles for the purpose of enabling a trend study. For more details, please refer to the section on trends in ESCS in the *PISA 2012 Technical Report* (OECD, forthcoming).

The ESCS scores were obtained as component scores for the first principal component with zero being the score of an average OECD student and one being the standard deviation across equally weighted OECD countries. For partner countries, ESCS scores were obtained as:

$$ESCS = \frac{ß_1 HISEI' + ß_2 PARED' + ß_3 HOMEPOS'}{\varepsilon_f}$$

where $ß_1$, $ß_2$ and $ß_3$ are the OECD factor loadings, *HISEI'*, *PARED'* and *HOMEPOS'* the "OECD-standardised" variables and $\varepsilon_f$ is the eigenvalue of the first principal component. For further information on ESCS, please refer to the *PISA 2012 Technical Report* (OECD, forthcoming).

**Note regarding data from Israel**

The statistical data for Israel are supplied by and are under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

## References

OECD (2014), *PISA 2012 Results: What Students Know and Can Do (Volume I, Revised edition, February 2014): Student Performance in Mathematics, Reading and Science*, PISA, OECD Publishing, Paris. *http://dx.doi.org/10.1787/9789264208780-en.*

OECD (2013), *PISA 2012 Results: Excellence Through Equity (Volume II): Giving Every Student the Chance to Succeed,* PISA, OECD Publishing, Paris. *http://dx.doi.org/10.1787/9789264201132-en.*

## Tables of Indicator A9

StatLink http://dx.doi.org/10.1787/888933116737

| | | |
|---|---|---|
| | Table A9.1a | Student performance in mathematics, PISA 2012 |
| WEB | Table A9.1b | Student performance in mathematics, PISA 2003 |
| | Table A9.1c | Change between 2003 and 2012 in student performance in mathematics |
| | Table A9.2 | Relationship between performance in mathematics and socio-economic status |

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## Table A9.1a. Student performance in mathematics, PISA 2012

| | | PISA 2012 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | All students | | | | Gender differences | | | | | | Proficiency levels | | | |
| | | Mathematics performance | | Standard deviation | | Boys | | Girls | | Difference (B - G) | | Below Level 2 (less than 420.07 score points) | | Level 5 or above (above 606.99 score points) | |
| | | Mean score | S.E. | S.D. | S.E. | Mean score | S.E. | Mean score | S.E. | Score dif. | S.E. | % | S.E. | % | S.E. |
| | | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) |
| OECD | Australia | 504 | (1.6) | 96 | (1.2) | 510 | (2.4) | 498 | (2.0) | **12** | (3.1) | 19.7 | (0.6) | 14.8 | (0.6) |
| | Austria | 506 | (2.7) | 92 | (1.7) | 517 | (3.9) | 494 | (3.3) | **22** | (4.9) | 18.7 | (1.0) | 14.3 | (0.9) |
| | Belgium | 515 | (2.1) | 102 | (1.4) | 520 | (2.9) | 509 | (2.6) | **11** | (3.4) | 19.0 | (0.8) | 19.5 | (0.8) |
| | Canada | 518 | (1.8) | 89 | (0.8) | 523 | (2.1) | 513 | (2.1) | **10** | (2.0) | 13.8 | (0.5) | 16.4 | (0.6) |
| | Chile | 423 | (3.1) | 81 | (1.5) | 436 | (3.8) | 411 | (3.1) | **25** | (3.6) | 51.5 | (1.7) | 1.6 | (0.2) |
| | Czech Republic | 499 | (2.9) | 95 | (1.6) | 505 | (3.7) | 493 | (3.6) | **12** | (4.6) | 21.0 | (1.2) | 12.9 | (0.8) |
| | Denmark | 500 | (2.3) | 82 | (1.3) | 507 | (2.9) | 493 | (2.3) | **14** | (2.3) | 16.8 | (1.0) | 10.0 | (0.7) |
| | Estonia | 521 | (2.0) | 81 | (1.2) | 523 | (2.6) | 518 | (2.2) | **5** | (2.6) | 10.5 | (0.6) | 14.6 | (0.8) |
| | Finland | 519 | (1.9) | 85 | (1.2) | 517 | (2.6) | 520 | (2.2) | -3 | (2.9) | 12.3 | (0.7) | 15.3 | (0.7) |
| | France | 495 | (2.5) | 97 | (1.7) | 499 | (3.4) | 491 | (2.5) | **9** | (3.4) | 22.4 | (0.9) | 12.9 | (0.8) |
| | Germany | 514 | (2.9) | 96 | (1.6) | 520 | (3.0) | 507 | (3.4) | **14** | (2.8) | 17.7 | (1.0) | 17.5 | (0.9) |
| | Greece | 453 | (2.5) | 88 | (1.3) | 457 | (3.3) | 449 | (2.6) | **8** | (3.2) | 35.7 | (1.3) | 3.9 | (0.4) |
| | Hungary | 477 | (3.2) | 94 | (2.4) | 482 | (3.7) | 473 | (3.6) | **9** | (3.7) | 28.1 | (1.3) | 9.3 | (1.1) |
| | Iceland | 493 | (1.7) | 92 | (1.3) | 490 | (2.3) | 496 | (2.3) | **-6** | (3.0) | 21.5 | (0.7) | 11.2 | (0.7) |
| | Ireland | 501 | (2.2) | 85 | (1.3) | 509 | (3.3) | 494 | (2.6) | **15** | (3.8) | 16.9 | (1.0) | 10.7 | (0.5) |
| | Israel | 466 | (4.7) | 105 | (1.8) | 472 | (7.8) | 461 | (3.5) | 12 | (7.6) | 33.5 | (1.7) | 9.4 | (1.0) |
| | Italy | 485 | (2.0) | 93 | (1.1) | 494 | (2.4) | 476 | (2.2) | **18** | (2.5) | 24.7 | (0.8) | 9.9 | (0.6) |
| | Japan | 536 | (3.6) | 94 | (2.2) | 545 | (4.6) | 527 | (3.6) | **18** | (4.3) | 11.1 | (1.0) | 23.7 | (1.5) |
| | Korea | 554 | (4.6) | 99 | (2.1) | 562 | (5.8) | 544 | (5.1) | **18** | (6.2) | 9.1 | (0.9) | 30.9 | (1.8) |
| | Luxembourg | 490 | (1.1) | 95 | (0.9) | 502 | (1.5) | 477 | (1.4) | **25** | (2.0) | 24.3 | (0.5) | 11.2 | (0.4) |
| | Mexico | 413 | (1.4) | 74 | (0.7) | 420 | (1.6) | 406 | (1.4) | **14** | (1.2) | 54.7 | (0.8) | 0.6 | (0.1) |
| | Netherlands | 523 | (3.5) | 92 | (2.1) | 528 | (3.6) | 518 | (3.9) | **10** | (2.8) | 14.8 | (1.3) | 19.3 | (1.2) |
| | New Zealand | 500 | (2.2) | 100 | (1.2) | 507 | (3.2) | 492 | (2.9) | **15** | (4.3) | 22.6 | (0.8) | 15.0 | (0.9) |
| | Norway | 489 | (2.7) | 90 | (1.3) | 490 | (2.8) | 488 | (3.4) | 2 | (3.0) | 22.3 | (1.1) | 9.4 | (0.7) |
| | Poland | 518 | (3.6) | 90 | (1.9) | 520 | (4.3) | 516 | (3.8) | 4 | (3.4) | 14.4 | (0.9) | 16.7 | (1.3) |
| | Portugal | 487 | (3.8) | 94 | (1.4) | 493 | (4.1) | 481 | (3.9) | **11** | (2.5) | 24.9 | (1.5) | 10.6 | (0.8) |
| | Slovak Republic | 482 | (3.4) | 101 | (2.5) | 486 | (4.1) | 477 | (4.1) | **9** | (4.5) | 27.5 | (1.3) | 11.0 | (0.9) |
| | Slovenia | 501 | (1.2) | 92 | (1.0) | 503 | (2.0) | 499 | (2.0) | 3 | (3.1) | 20.1 | (0.6) | 13.7 | (0.6) |
| | Spain | 484 | (1.9) | 88 | (0.7) | 492 | (2.4) | 476 | (2.0) | **16** | (2.2) | 23.6 | (0.8) | 8.0 | (0.4) |
| | Sweden | 478 | (2.3) | 92 | (1.3) | 477 | (3.0) | 480 | (2.4) | -3 | (3.0) | 27.1 | (1.1) | 8.0 | (0.5) |
| | Switzerland | 531 | (3.0) | 94 | (1.5) | 537 | (3.5) | 524 | (3.1) | **13** | (2.7) | 12.4 | (0.7) | 21.4 | (1.2) |
| | Turkey | 448 | (4.8) | 91 | (3.1) | 452 | (5.1) | 444 | (5.7) | 8 | (4.7) | 42.0 | (1.9) | 5.9 | (1.1) |
| | United Kingdom | 494 | (3.3) | 95 | (1.7) | 500 | (4.2) | 488 | (3.8) | **12** | (4.7) | 21.8 | (1.3) | 11.8 | (0.8) |
| | United States | 481 | (3.6) | 90 | (1.3) | 484 | (3.8) | 479 | (3.9) | 5 | (2.8) | 25.8 | (1.4) | 8.8 | (0.8) |
| | OECD average | 494 | (0.5) | 92 | (0.3) | 499 | (0.6) | 489 | (0.5) | **11** | (0.6) | 23.0 | (0.2) | 12.6 | (0.1) |
| | OECD average 2003[1] | 496 | (0.5) | 92 | (0.3) | 502 | (0.6) | 491 | (0.6) | **11** | (0.6) | 22.2 | (0.2) | 13.1 | (0.2) |
| Partners | Albania | 394 | (2.0) | 91 | (1.4) | 394 | (2.6) | 395 | (2.6) | -1 | (3.3) | 60.7 | (1.0) | 0.8 | (0.2) |
| | Argentina | 388 | (3.5) | 77 | (1.7) | 396 | (4.2) | 382 | (3.4) | **14** | (2.9) | 66.5 | (2.0) | 0.3 | (0.1) |
| | Brazil | 391 | (2.1) | 78 | (1.6) | 401 | (2.2) | 383 | (2.3) | **18** | (1.8) | 67.1 | (1.0) | 0.8 | (0.2) |
| | Bulgaria | 439 | (4.0) | 94 | (2.2) | 438 | (4.7) | 440 | (4.2) | -2 | (4.1) | 43.8 | (1.8) | 4.1 | (0.6) |
| | Colombia | 376 | (2.9) | 74 | (1.7) | 390 | (3.4) | 364 | (3.2) | **25** | (3.2) | 73.8 | (1.4) | 0.3 | (0.1) |
| | Costa Rica | 407 | (3.0) | 68 | (1.8) | 420 | (3.6) | 396 | (3.1) | **24** | (2.4) | 59.9 | (1.9) | 0.6 | (0.2) |
| | Croatia | 471 | (3.5) | 88 | (2.5) | 477 | (4.4) | 465 | (3.7) | **12** | (4.1) | 29.9 | (1.4) | 7.0 | (1.1) |
| | Hong Kong-China | 561 | (3.2) | 96 | (1.9) | 568 | (4.6) | 553 | (3.9) | **15** | (5.7) | 8.5 | (0.8) | 33.7 | (1.4) |
| | Indonesia | 375 | (4.0) | 71 | (3.3) | 377 | (4.4) | 373 | (4.3) | 5 | (3.4) | 75.7 | (2.1) | 0.3 | (0.2) |
| | Jordan | 386 | (3.1) | 78 | (2.7) | 375 | (5.4) | 396 | (3.1) | **-21** | (6.3) | 68.6 | (1.5) | 0.6 | (0.4) |
| | Kazakhstan | 432 | (3.0) | 71 | (1.8) | 432 | (3.4) | 432 | (3.3) | 0 | (2.9) | 45.2 | (1.7) | 0.9 | (0.3) |
| | Latvia | 491 | (2.8) | 82 | (1.5) | 489 | (3.4) | 493 | (3.2) | -4 | (3.6) | 19.9 | (1.1) | 8.0 | (0.8) |
| | Liechtenstein | 535 | (4.0) | 95 | (3.7) | 546 | (6.0) | 523 | (5.8) | **23** | (8.8) | 14.1 | (2.0) | 24.8 | (2.6) |
| | Lithuania | 479 | (2.6) | 89 | (1.4) | 479 | (2.8) | 479 | (3.0) | 0 | (2.4) | 26.0 | (1.2) | 8.1 | (0.6) |
| | Macao-China | 538 | (1.0) | 94 | (0.9) | 540 | (1.4) | 537 | (1.3) | 3 | (1.9) | 10.8 | (0.5) | 24.3 | (0.6) |
| | Malaysia | 421 | (3.2) | 81 | (1.6) | 416 | (3.7) | 424 | (3.7) | **-8** | (3.8) | 51.8 | (1.7) | 1.3 | (0.3) |
| | Montenegro | 410 | (1.1) | 83 | (1.1) | 410 | (1.6) | 410 | (1.6) | 0 | (2.4) | 56.6 | (1.0) | 1.0 | (0.2) |
| | Peru | 368 | (3.7) | 84 | (2.2) | 378 | (3.6) | 359 | (4.8) | **19** | (3.9) | 74.6 | (1.8) | 0.6 | (0.2) |
| | Qatar | 376 | (0.8) | 100 | (0.7) | 369 | (1.1) | 385 | (0.9) | **-16** | (1.4) | 69.6 | (0.5) | 2.0 | (0.2) |
| | Romania | 445 | (3.8) | 81 | (2.2) | 447 | (4.3) | 443 | (4.0) | 4 | (3.6) | 40.8 | (1.9) | 3.2 | (0.6) |
| | Russian Federation | 482 | (3.0) | 86 | (1.6) | 481 | (3.7) | 483 | (3.1) | -2 | (3.0) | 24.0 | (1.1) | 7.8 | (0.8) |
| | Serbia | 449 | (3.4) | 91 | (2.2) | 453 | (4.1) | 444 | (3.7) | **9** | (3.9) | 38.9 | (1.5) | 4.6 | (0.7) |
| | Shanghai-China | 613 | (3.3) | 101 | (2.3) | 616 | (4.0) | 610 | (3.4) | 6 | (3.3) | 3.8 | (0.5) | 55.4 | (1.4) |
| | Singapore | 573 | (1.3) | 105 | (0.9) | 572 | (1.9) | 575 | (1.8) | -3 | (2.5) | 8.3 | (0.5) | 40.0 | (0.7) |
| | Chinese Taipei | 560 | (3.3) | 116 | (1.9) | 563 | (5.4) | 557 | (5.7) | 5 | (8.9) | 12.8 | (0.8) | 37.2 | (1.2) |
| | Thailand | 427 | (3.4) | 82 | (2.1) | 419 | (3.6) | 433 | (4.1) | **-14** | (3.6) | 49.7 | (1.7) | 2.6 | (0.5) |
| | Tunisia | 388 | (3.9) | 78 | (3.1) | 396 | (4.3) | 381 | (4.0) | **15** | (2.7) | 67.7 | (1.8) | 0.8 | (0.4) |
| | United Arab Emirates[2] | 434 | (2.4) | 90 | (1.2) | 432 | (3.8) | 436 | (3.0) | -5 | (4.7) | 46.3 | (1.2) | 3.5 | (0.3) |
| | Uruguay | 409 | (2.8) | 89 | (1.7) | 415 | (3.5) | 404 | (2.9) | **11** | (3.1) | 55.8 | (1.3) | 1.4 | (0.3) |
| | Viet Nam | 511 | (4.8) | 86 | (2.7) | 517 | (5.6) | 507 | (4.7) | **10** | (3.0) | 14.2 | (1.7) | 13.3 | (1.5) |

**Note:** Differences that are statistically significant are indicated in bold.

1. OECD average 2003 compares only OECD countries with comparable mathematics scores since 2003.

2. In the United Arab Emirates, Dubai took the PISA 2009 assessment in 2009 and the rest of the United Arab Emirates in 2010 as part of PISA 2009+. Results are thus reported separately for the trends. Mathematics performance in 2012 for Dubai and the rest of United Arab Emirates are respectively: 464 (1.2) and 423 (3.2).

**Source:** OECD, PISA 2012 Database.

StatLink http://dx.doi.org/10.1787/888933116756

A9

## Table A9.1c. Change between 2003 and 2012 in student performance in mathematics

| | | Change between 2003 and 2012 (PISA 2012 - PISA 2003) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | All students | | | | Gender differences | | | | | | Proficiency levels | | | |
| | | Mathematics performance | | Annualised change in mathematics across PISA assessments[1] | | Boys | | Girls | | Difference (B - G) | | Below Level 2 (less than 420.07 score points) | | Level 5 or above (above 606.99 score points) | |
| | | Score dif. | S.E. | Annual change | S.E. | Score dif. | S.E. | Score dif. | S.E. | Score dif. | S.E. | % dif. | S.E. | % dif. | S.E. |
| | | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) |
| OECD | Australia | **-20** | (3.3) | **-2.2** | (0.3) | **-17** | (4.3) | **-24** | (3.9) | 7 | (4.9) | **5.3** | (1.1) | **-5.0** | (1.1) |
| | Austria | 0 | (4.6) | 0.0 | (0.5) | 7 | (5.9) | -7 | (5.5) | **15** | (7.3) | -0.1 | (1.6) | 0.0 | (1.4) |
| | Belgium | **-15** | (3.7) | **-1.6** | (0.4) | **-13** | (4.9) | **-16** | (4.6) | 4 | (5.7) | **2.5** | (1.2) | **-6.9** | (1.3) |
| | Canada | **-14** | (3.2) | **-1.4** | (0.3) | **-18** | (3.5) | **-17** | (3.4) | -1 | (3.0) | **3.7** | (0.9) | **-3.9** | (1.1) |
| | Chile | m | m | **1.9** | (0.9) | m | m | m | m | m | m | m | m | m | m |
| | Czech Republic | **-17** | (4.9) | **-2.5** | (0.5) | **-19** | (6.0) | **-16** | (6.0) | -3 | (6.7) | **4.4** | (1.8) | **-5.4** | (1.5) |
| | Denmark | **-14** | (4.1) | **-1.8** | (0.4) | **-16** | (4.8) | **-13** | (4.2) | -3 | (4.4) | 1.4 | (1.4) | **-5.9** | (1.2) |
| | Estonia | m | m | 0.9 | (0.7) | m | m | m | m | m | m | m | m | m | m |
| | Finland | **-26** | (3.3) | **-2.8** | (0.3) | **-31** | (4.1) | **-20** | (3.6) | **-10** | (4.0) | **5.5** | (0.9) | **-8.1** | (1.2) |
| | France | **-16** | (4.0) | **-1.5** | (0.4) | **-16** | (5.3) | **-16** | (4.3) | 0 | (5.6) | **5.7** | (1.5) | -2.2 | (1.3) |
| | Germany | **11** | (4.8) | **1.4** | (0.5) | **12** | (5.4) | 8 | (5.5) | 5 | (5.3) | **-3.9** | (1.6) | 1.2 | (1.4) |
| | Greece | 8 | (5.0) | **1.1** | (0.5) | 2 | (6.1) | **13** | (5.0) | **-11** | (4.9) | -3.3 | (2.5) | -0.1 | (0.7) |
| | Hungary | **-13** | (4.7) | **-1.3** | (0.5) | **-12** | (5.4) | **-13** | (5.3) | 1 | (5.1) | **5.1** | (1.8) | -1.4 | (1.5) |
| | Iceland | **-22** | (2.9) | **-2.2** | (0.3) | **-18** | (3.8) | **-27** | (3.7) | **9** | (4.4) | **6.5** | (1.1) | **-4.3** | (1.0) |
| | Ireland | -1 | (3.8) | -0.6 | (0.4) | -1 | (4.8) | -2 | (4.7) | 1 | (5.7) | 0.1 | (1.5) | -0.7 | (1.0) |
| | Israel | m | m | **4.2** | (1.1) | m | m | m | m | m | m | m | m | m | m |
| | Italy | **20** | (4.2) | **2.7** | (0.4) | **19** | (5.5) | **19** | (4.8) | 1 | (6.7) | **-7.3** | (1.8) | **2.9** | (0.8) |
| | Japan | 2 | (5.7) | 0.4 | (0.6) | 6 | (7.7) | -3 | (5.7) | 9 | (7.3) | -2.3 | (1.6) | -0.6 | (2.2) |
| | Korea | 12 | (5.9) | 1.1 | (0.6) | 10 | (7.5) | **16** | (7.7) | -5 | (9.4) | -0.4 | (1.3) | **6.1** | (2.4) |
| | Luxembourg | -3 | (2.4) | -0.3 | (0.3) | 0 | (3.1) | **-8** | (2.8) | **8** | (3.3) | **2.6** | (1.0) | 0.4 | (0.8) |
| | Mexico | **28** | (4.3) | **3.1** | (0.5) | **30** | (4.9) | **26** | (4.7) | 3 | (4.2) | **-11.2** | (2.2) | 0.3 | (0.1) |
| | Netherlands | **-15** | (5.1) | **-1.6** | (0.6) | **-12** | (5.7) | **-17** | (5.6) | 5 | (5.6) | **3.9** | (1.8) | **-6.3** | (1.9) |
| | New Zealand | **-24** | (3.7) | **-2.5** | (0.4) | **-24** | (4.7) | **-24** | (4.7) | 1 | (6.2) | **7.6** | (1.3) | **-5.7** | (1.2) |
| | Norway | -6 | (4.1) | -0.3 | (0.5) | -8 | (4.4) | -4 | (4.9) | -4 | (4.4) | 1.5 | (1.6) | **-2.0** | (1.0) |
| | Poland | **27** | (4.8) | **2.6** | (0.5) | **27** | (5.5) | **28** | (5.1) | -2 | (4.4) | **-7.7** | (1.5) | **6.7** | (1.6) |
| | Portugal | **21** | (5.5) | **2.8** | (0.6) | **20** | (6.2) | **21** | (5.6) | -1 | (4.4) | **-5.2** | (2.4) | **5.3** | (1.0) |
| | Slovak Republic | **-17** | (5.2) | **-1.4** | (0.5) | **-21** | (6.0) | **-12** | (5.7) | -9 | (5.3) | **7.5** | (2.0) | -1.7 | (1.3) |
| | Slovenia | m | m | -0.6 | (0.4) | m | m | m | m | m | m | m | m | m | m |
| | Spain | -1 | (3.6) | 0.1 | (0.4) | 3 | (4.6) | -5 | (3.5) | **8** | (3.8) | 0.6 | (1.4) | 0.1 | (0.9) |
| | Sweden | **-31** | (3.9) | **-3.3** | (0.4) | **-35** | (4.6) | **-26** | (4.4) | **-9** | (3.9) | **9.8** | (1.6) | **-7.8** | (1.0) |
| | Switzerland | 4 | (4.9) | 0.6 | (0.5) | 3 | (6.2) | 7 | (5.2) | -4 | (5.2) | -2.1 | (1.2) | 0.2 | (2.0) |
| | Turkey | **25** | (8.5) | **3.2** | (0.8) | **22** | (9.6) | **29** | (9.0) | -7 | (8.0) | **-10.2** | (3.4) | 0.4 | (1.9) |
| | United Kingdom | m | m | -0.3 | (0.6) | m | m | m | m | m | m | m | m | m | m |
| | United States | -2 | (5.0) | 0.3 | (0.6) | -2 | (5.4) | -1 | (5.4) | -2 | (3.9) | 0.1 | (2.0) | -1.3 | (1.1) |
| | OECD average 2003[2] | **-3** | (0.9) | **-0.3** | (0.1) | **-3** | (1.0) | **-4** | (1.0) | 0 | (1.0) | **0.7** | (0.3) | **-1.6** | (0.3) |
| Partners | Albania | m | m | **5.6** | (1.7) | m | m | m | m | m | m | m | m | m | m |
| | Argentina | m | m | 1.2 | (1.3) | m | m | m | m | m | m | m | m | m | m |
| | Brazil | **35** | (5.6) | **4.1** | (0.6) | **36** | (6.7) | **34** | (5.3) | 2 | (4.8) | **-8.1** | (2.2) | -0.4 | (0.5) |
| | Bulgaria | m | m | **4.2** | (1.3) | m | m | m | m | m | m | m | m | m | m |
| | Colombia | m | m | 1.1 | (0.9) | m | m | m | m | m | m | m | m | m | m |
| | Costa Rica | m | m | -1.2 | (2.3) | m | m | m | m | m | m | m | m | m | m |
| | Croatia | m | m | 0.6 | (0.8) | m | m | m | m | m | m | m | m | m | m |
| | Hong Kong-China | 11 | (5.9) | **1.3** | (0.6) | 16 | (8.2) | 5 | (6.3) | 11 | (8.6) | -1.9 | (1.4) | 3.0 | (2.2) |
| | Indonesia | **15** | (5.9) | 0.7 | (0.6) | **16** | (6.2) | **14** | (6.6) | 1 | (4.3) | -2.4 | (2.8) | 0.0 | (0.2) |
| | Jordan | m | m | 0.2 | (0.8) | m | m | m | m | m | m | m | m | m | m |
| | Kazakhstan | m | m | **9.0** | (1.5) | m | m | m | m | m | m | m | m | m | m |
| | Latvia | 7 | (5.0) | 0.5 | (0.5) | 4 | (6.2) | **10** | (5.1) | -7 | (4.7) | -3.8 | (1.9) | 0.0 | (1.2) |
| | Liechtenstein | -1 | (6.0) | 0.3 | (0.6) | -4 | (9.6) | 2 | (8.7) | -6 | (13.9) | 1.8 | (2.7) | -0.8 | (4.4) |
| | Lithuania | m | m | -1.4 | (0.8) | m | m | m | m | m | m | m | m | m | m |
| | Macao-China | **11** | (3.6) | **1.0** | (0.4) | 1 | (5.4) | **20** | (4.0) | **-18** | (6.4) | -0.4 | (1.3) | **5.7** | (1.7) |
| | Malaysia | m | m | **8.1** | (2.1) | m | m | m | m | m | m | m | m | m | m |
| | Montenegro | m | m | **1.7** | (0.5) | m | m | m | m | m | m | m | m | m | m |
| | Peru | m | m | 1.0 | (2.1) | m | m | m | m | m | m | m | m | m | m |
| | Qatar | m | m | **9.2** | (0.4) | m | m | m | m | m | m | m | m | m | m |
| | Romania | m | m | **4.9** | (1.0) | m | m | m | m | m | m | m | m | m | m |
| | Russian Federation | **14** | (5.5) | 1.1 | (0.6) | 8 | (6.7) | **20** | (5.5) | **-12** | (5.3) | **-6.3** | (2.3) | 0.8 | (1.2) |
| | Serbia | m | m | **2.2** | (0.9) | m | m | m | m | m | m | m | m | m | m |
| | Shanghai-China | m | m | **4.2** | (1.7) | m | m | m | m | m | m | m | m | m | m |
| | Singapore | m | m | **3.8** | (1.0) | m | m | m | m | m | m | m | m | m | m |
| | Chinese Taipei | m | m | 1.7 | (0.9) | m | m | m | m | m | m | m | m | m | m |
| | Thailand | **10** | (5.0) | 1.0 | (0.6) | 4 | (5.7) | **14** | (5.6) | -10 | (5.4) | -4.2 | (2.6) | 0.9 | (0.6) |
| | Tunisia | **29** | (5.0) | **3.1** | (0.5) | **31** | (5.5) | **28** | (5.4) | 3 | (3.7) | **-10.2** | (2.3) | 0.6 | (0.4) |
| | United Arab Emirates[3] | m | m | m | m | m | m | m | m | m | m | m | m | m | m |
| | Uruguay | **-13** | (4.7) | **-1.4** | (0.5) | **-13** | (5.6) | **-12** | (5.2) | -1 | (4.9) | **7.7** | (2.2) | **-1.4** | (0.5) |
| | Viet Nam | m | m | m | m | m | m | m | m | m | m | m | m | m | m |

**Note:** Differences that are statistically significant are indicated in bold.

1. The annualised change is the average annual change in PISA score points from a country's/economie's earliest participation in PISA to PISA 2012. For countries/economies with more than one available measurement, the annualised change is calculated with a linear regression model. This model considers that Costa Rica, Malaysia and the United Arab Emirates (with the exception of Dubai) implemented the PISA 2009 assessment in 2010 as part of PISA 2009+.

2. OECD average 2003 compares only OECD countries with comparable mathematics scores since 2003.

3. In the United Arab Emirates, Dubai took the PISA 2009 assessment in 2009 and the rest of the United Arab Emirates in 2010 as part of PISA 2009+. Results are thus reported separately. Annualised change for Dubai and the rest of United Arab Emirates are significant and are respectively: **3.8** (0.9) and **5.9** (2.6).

*Please refer to the Reader's Guide for information concerning the symbols replacing missing data.*

**Source:** OECD, PISA 2012 Database.

StatLink http://dx.doi.org/10.1787/888933116775

A9

## Table A9.2. Relationship between performance in mathematics and socio-economic status

*Results based on students' self-reports*

| | | PISA 2012 | | | | | | | | | | Change between 2003 and 2012 (PISA 2012 - PISA 2003) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | PISA index of economic, social and cultural status (ESCS) | | Variability in the ESCS | | Mathematics performance adjusted by the mean ESCS | | Strength of the relationship between mathematics performance and ESCS[1] | | Slope of the socio-economic gradient for mathematics[1] | | Strength of the relationship between ESCS and mathematics performance | | Slope of the socio-economic gradient for mathematics[1] | |
| | | Mean score | S.E. | S.D. | S.E. | Mean score | S.E. | Percentage of explained variance in mathematics performance | S.E. | Score-point difference in mathematics associated with one-unit increase in ESCS | S.E. | Change in the percentage of explained variance in mathematics performance | S.E. | Change in the score-point difference in mathematics associated with one-unit increase in ESCS | S.E. |
| | | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (23) | (24) | (25) | (26) |
| OECD | Australia | 0.25 | (0.01) | 0.79 | (0.01) | 496 | (1.6) | **12.3*** | (0.8) | **42*** | (1.3) | -1.6 | (1.3) | 2 | (2.2) |
| | Austria | 0.08 | (0.02) | 0.85 | (0.01) | 503 | (2.5) | **15.8** | (1.5) | **43** | (2.2) | 0.8 | (2.1) | 2 | (3.1) |
| | Belgium | 0.15 | (0.02) | 0.91 | (0.02) | 510 | (1.8) | **19.6*** | (1.4) | **49*** | (1.7) | -3.4 | (1.9) | -2 | (2.6) |
| | Canada | 0.41 | (0.02) | 0.86 | (0.01) | 508 | (1.6) | **9.4*** | (0.7) | **31*** | (1.2) | -0.8 | (1.1) | 1 | (1.8) |
| | Chile | -0.58 | (0.04) | 1.13 | (0.02) | 443 | (2.7) | **23.1*** | (1.9) | **34*** | (1.6) | m | m | m | m |
| | Czech Republic | -0.07 | (0.02) | 0.75 | (0.01) | 503 | (2.5) | **16.2** | (1.5) | **51*** | (2.7) | -2.3 | (2.0) | 5 | (3.4) |
| | Denmark | 0.43 | (0.02) | 0.84 | (0.01) | 485 | (1.7) | **16.5** | (1.4) | **39** | (1.7) | -0.8 | (2.0) | 1 | (2.5) |
| | Estonia | 0.11 | (0.01) | 0.81 | (0.01) | 518 | (1.9) | **8.6*** | (0.9) | **29*** | (1.7) | m | m | m | m |
| | Finland | 0.36 | (0.02) | 0.77 | (0.01) | 508 | (1.9) | **9.4*** | (0.9) | **33*** | (1.8) | -1.1 | (1.4) | **5** | (2.3) |
| | France | -0.04 | (0.02) | 0.80 | (0.01) | 500 | (2.2) | **22.5*** | (1.3) | **57*** | (2.2) | 2.2 | (2.3) | **14** | (3.1) |
| | Germany | 0.19 | (0.02) | 0.93 | (0.01) | 511 | (2.6) | **16.9** | (1.4) | **43** | (2.0) | **-6.9** | (2.0) | -1 | (2.5) |
| | Greece | -0.06 | (0.03) | 1.00 | (0.01) | 456 | (1.9) | **15.5** | (1.5) | **34*** | (1.8) | -0.5 | (2.4) | -2 | (2.8) |
| | Hungary | -0.25 | (0.03) | 0.96 | (0.02) | 490 | (2.8) | **23.1*** | (2.3) | **47*** | (2.8) | -2.6 | (2.9) | -3 | (3.5) |
| | Iceland | 0.78 | (0.01) | 0.81 | (0.01) | 470 | (2.1) | **7.7*** | (1.0) | **31*** | (2.1) | 0.6 | (1.3) | 5 | (2.6) |
| | Ireland | 0.13 | (0.02) | 0.85 | (0.01) | 497 | (2.0) | **14.6** | (1.2) | **38** | (1.8) | -1.1 | (1.9) | 2 | (2.5) |
| | Israel | 0.17 | (0.03) | 0.85 | (0.02) | 460 | (3.8) | **17.2** | (1.5) | **51*** | (2.6) | m | m | m | m |
| | Italy | -0.05 | (0.01) | 0.97 | (0.01) | 487 | (1.8) | **10.1*** | (0.6) | **30*** | (1.2) | -2.2 | (1.4) | -1 | (2.2) |
| | Japan | -0.07 | (0.02) | 0.71 | (0.01) | 541 | (3.3) | **9.8*** | (1.6) | **41** | (3.9) | -2.0 | (2.6) | -2 | (6.0) |
| | Korea | 0.01 | (0.03) | 0.74 | (0.01) | 553 | (3.9) | **10.1*** | (1.4) | **42** | (3.3) | -4.4 | (2.4) | 5 | (4.3) |
| | Luxembourg | 0.07 | (0.01) | 1.10 | (0.01) | 488 | (1.3) | **18.3*** | (1.1) | **37*** | (1.2) | 1.7 | (1.5) | 2 | (1.7) |
| | Mexico | -1.11 | (0.02) | 1.27 | (0.01) | 435 | (1.4) | **10.4*** | (0.8) | **19*** | (0.8) | **-6.8** | (2.2) | **-11** | (2.0) |
| | Netherlands | 0.23 | (0.02) | 0.78 | (0.01) | 515 | (3.2) | **11.5*** | (1.7) | **40** | (3.1) | **-6.8** | (2.4) | 0 | (3.8) |
| | New Zealand | 0.04 | (0.02) | 0.82 | (0.01) | 500 | (2.2) | **18.4*** | (1.3) | **52*** | (1.9) | 1.8 | (1.8) | **8** | (2.5) |
| | Norway | 0.46 | (0.02) | 0.76 | (0.01) | 476 | (2.8) | **7.4*** | (1.0) | **32*** | (2.4) | **-4.7** | (1.5) | **-8** | (3.1) |
| | Poland | -0.21 | (0.03) | 0.90 | (0.01) | 526 | (3.2) | **16.6** | (1.7) | **41** | (2.4) | 0.2 | (2.0) | 1 | (2.9) |
| | Portugal | -0.48 | (0.05) | 1.19 | (0.02) | 506 | (2.6) | **19.6*** | (1.8) | **35*** | (1.6) | 1.1 | (2.4) | **7** | (2.0) |
| | Slovak Republic | -0.18 | (0.03) | 0.92 | (0.02) | 492 | (2.6) | **24.6*** | (2.1) | **54*** | (2.9) | 1.0 | (2.9) | 6 | (3.8) |
| | Slovenia | 0.07 | (0.01) | 0.87 | (0.01) | 499 | (1.3) | **15.6** | (1.0) | **42** | (1.5) | m | m | m | m |
| | Spain | -0.19 | (0.03) | 1.03 | (0.01) | 492 | (1.6) | **15.8** | (1.0) | **34*** | (1.1) | **3.2** | (1.6) | **6** | (1.8) |
| | Sweden | 0.28 | (0.02) | 0.82 | (0.01) | 471 | (1.9) | **10.6*** | (1.1) | **36** | (1.9) | **-3.7** | (1.7) | -1 | (2.7) |
| | Switzerland | 0.17 | (0.02) | 0.89 | (0.01) | 525 | (2.7) | **12.8** | (1.2) | **38** | (1.8) | **-5.2** | (1.8) | -3 | (2.6) |
| | Turkey | -1.46 | (0.04) | 1.10 | (0.02) | 494 | (6.6) | **14.5** | (1.8) | **32*** | (2.4) | **-10.4** | (4.3) | **-18** | (5.6) |
| | United Kingdom | 0.27 | (0.02) | 0.80 | (0.01) | 486 | (2.6) | **12.5** | (1.2) | **41** | (2.4) | m | m | m | m |
| | United States | 0.17 | (0.04) | 0.97 | (0.02) | 476 | (2.7) | **14.8** | (1.3) | **35*** | (1.7) | **-4.2** | (1.8) | **-7** | (2.2) |
| | OECD average | 0.00 | (0.00) | 0.90 | (0.00) | 495 | (0.5) | **14.8** | (0.2) | **39** | (0.4) | m | m | m | m |
| | OECD average 2003[2] | 0.00 | (0.00) | 0.90 | (0.00) | 497 | (0.5) | **14.7** | (0.3) | **39** | (0.4) | **-2.0** | (0.4) | 0 | (0.6) |
| Partners | Albania | m | m | m | m | m | m | m | m | m | m | m | m | m | m |
| | Argentina | -0.72 | (0.04) | 1.11 | (0.02) | 409 | (3.0) | **15.1** | (1.5) | **26*** | (1.7) | m | m | m | m |
| | Brazil | -1.17 | (0.02) | 1.17 | (0.01) | 423 | (3.2) | **15.7** | (1.6) | **26*** | (1.7) | 0.7 | (2.8) | -5 | (3.2) |
| | Bulgaria | -0.28 | (0.04) | 1.05 | (0.03) | 451 | (3.2) | **22.3*** | (2.3) | **42** | (2.7) | m | m | m | m |
| | Colombia | -1.26 | (0.04) | 1.18 | (0.02) | 408 | (3.6) | **15.4** | (1.8) | **25*** | (1.7) | m | m | m | m |
| | Costa Rica | -0.98 | (0.04) | 1.24 | (0.02) | 431 | (3.1) | **18.9** | (2.1) | **24*** | (1.6) | m | m | m | m |
| | Croatia | -0.34 | (0.02) | 0.85 | (0.01) | 484 | (3.7) | **12.0*** | (1.4) | **36** | (2.6) | m | m | m | m |
| | Hong Kong-China | -0.79 | (0.05) | 0.97 | (0.02) | 584 | (3.1) | **7.5*** | (1.5) | **27*** | (2.6) | -0.4 | (2.0) | -3 | (3.8) |
| | Indonesia | -1.80 | (0.05) | 1.10 | (0.03) | 411 | (8.1) | **9.6** | (3.0) | **20*** | (3.4) | 2.4 | (3.4) | -1 | (4.3) |
| | Jordan | -0.42 | (0.02) | 1.02 | (0.01) | 397 | (3.4) | **8.4*** | (1.3) | **22*** | (2.2) | m | m | m | m |
| | Kazakhstan | -0.32 | (0.02) | 0.75 | (0.01) | 440 | (3.1) | **8.0*** | (1.7) | **27*** | (2.8) | m | m | m | m |
| | Latvia | -0.26 | (0.03) | 0.89 | (0.01) | 500 | (2.5) | **14.7** | (1.7) | **35** | (2.1) | 2.8 | (2.2) | 1 | (2.9) |
| | Liechtenstein | 0.30 | (0.05) | 0.91 | (0.03) | 528 | (4.5) | **7.6*** | (3.1) | **28** | (5.8) | **-14.9** | (5.1) | **-19** | (7.5) |
| | Lithuania | -0.13 | (0.02) | 0.92 | (0.01) | 484 | (2.2) | **13.8** | (1.2) | **36** | (1.8) | m | m | m | m |
| | Macao-China | -0.89 | (0.01) | 0.87 | (0.01) | 555 | (1.6) | **2.6*** | (0.4) | **17*** | (1.5) | 0.8 | (1.0) | 5 | (3.5) |
| | Malaysia | -0.72 | (0.03) | 0.99 | (0.02) | 442 | (3.6) | **13.4** | (1.6) | **30*** | (2.1) | m | m | m | m |
| | Montenegro | -0.25 | (0.01) | 0.89 | (0.01) | 419 | (1.2) | **12.7*** | (0.9) | **33*** | (1.3) | m | m | m | m |
| | Peru | -1.23 | (0.05) | 1.23 | (0.02) | 409 | (4.0) | **23.4*** | (2.4) | **33*** | (2.0) | m | m | m | m |
| | Qatar | 0.44 | (0.01) | 0.89 | (0.01) | 367 | (0.9) | **5.6*** | (0.5) | **27*** | (1.2) | m | m | m | m |
| | Romania | -0.47 | (0.04) | 0.94 | (0.03) | 463 | (3.5) | **19.3** | (2.4) | **38** | (2.9) | m | m | m | m |
| | Russian Federation | -0.11 | (0.02) | 0.76 | (0.01) | 487 | (3.0) | **11.4** | (1.7) | **38** | (3.2) | 0.8 | (2.1) | 7 | (3.7) |
| | Serbia | -0.30 | (0.02) | 0.90 | (0.01) | 459 | (3.2) | **11.7*** | (1.4) | **34*** | (2.4) | m | m | m | m |
| | Shanghai-China | -0.36 | (0.04) | 0.96 | (0.02) | 627 | (2.7) | **15.1** | (1.9) | **41** | (2.7) | m | m | m | m |
| | Singapore | -0.26 | (0.01) | 0.92 | (0.01) | 585 | (1.2) | **14.4** | (0.9) | **44*** | (1.4) | m | m | m | m |
| | Chinese Taipei | -0.40 | (0.02) | 0.84 | (0.01) | 583 | (2.5) | **17.9*** | (1.4) | **58*** | (2.5) | m | m | m | m |
| | Thailand | -1.35 | (0.04) | 1.17 | (0.02) | 457 | (4.9) | **9.9*** | (2.2) | **22*** | (2.4) | -1.5 | (2.9) | -1 | (3.2) |
| | Tunisia | -1.19 | (0.05) | 1.26 | (0.02) | 415 | (5.7) | **12.4** | (2.4) | **22*** | (2.6) | -1.4 | (3.4) | -3 | (3.5) |
| | United Arab Emirates | 0.32 | (0.02) | 0.85 | (0.01) | 424 | (2.0) | **9.8*** | (1.0) | **33*** | (1.9) | m | m | m | m |
| | Uruguay | -0.88 | (0.03) | 1.13 | (0.02) | 443 | (2.8) | **22.8*** | (1.9) | **37** | (1.8) | **6.9** | (2.5) | 3 | (2.6) |
| | Viet Nam | -1.81 | (0.05) | 1.12 | (0.03) | 565 | (6.3) | **14.6** | (2.3) | **29*** | (2.6) | m | m | m | m |

**Notes:** Values and changes that are statistically significant are indicated in bold. Values that are statistically significantly different from the OECD average are indicated with an asterisk.

Columns 11-22 are available for consultation on line (see *StatLink* below).

1. Single-level bivariate regression of performance on the ESCS. The slope is the regression coefficient for ESCS and the strength is r-squared x 100.

2. OECD 2003 average compares only OECD countries with comparable data since PISA 2003.

*Please refer to the Reader's Guide for information concerning the symbols replacing missing data.*

**Source:** OECD, PISA 2012 Database.

StatLink http://dx.doi.org/10.1787/888933116794