

CO3.4: Literacy scores by gender at age 15

Definitions and methodology

This indicator presents information on educational performance by gender at age 15. Data for the indicator come from the OECD's *Programme for International Student Assessment (PISA)*, an international survey that provides cross-nationally comparable data on the performance of 15-year-old students in reading, mathematics and science. The survey started in 2000 and is conducted every three years, with one of the three education domains covered in depth in each round on a rotational basis. Reading was the primary assessment domain in 2000, as it also was in 2009. In 2003 and 2012 the focus was on mathematics, while in 2006 and 2015, the focus of study was on scientific literacy. In 2018, the focus was on reading literacy and global competence – their ability to understand and appreciate the perspectives and worldviews of others. The latest published results are those for 2022, putting the focus back in mathematics. The 2022 edition was also the first to collect data on student performance, well-being and equity before and after the COVID-19 pandemic.

Data on student performance in the PISA tests are presented here through two main measures:

- *Country mean average PISA scores in reading, in mathematics, and in science*
- *Gender differences in country mean average PISA scores in reading, in mathematics, and in science, with the gender difference calculated as the male mean average score minus the female mean average score, both in 2022 and overtime.*

In addition to these main measures, one further measure captures differences in PISA reading scores across socio-economic groups:

- *Country mean average PISA reading scores by students' scores on PISA's index of economic, social and cultural status (ESCS), or more specifically country mean average PISA reading scores for students who score in the top and bottom quarters of the ESCS. The ESCS is a PISA-specific composite index based on information about the students' home and background.*

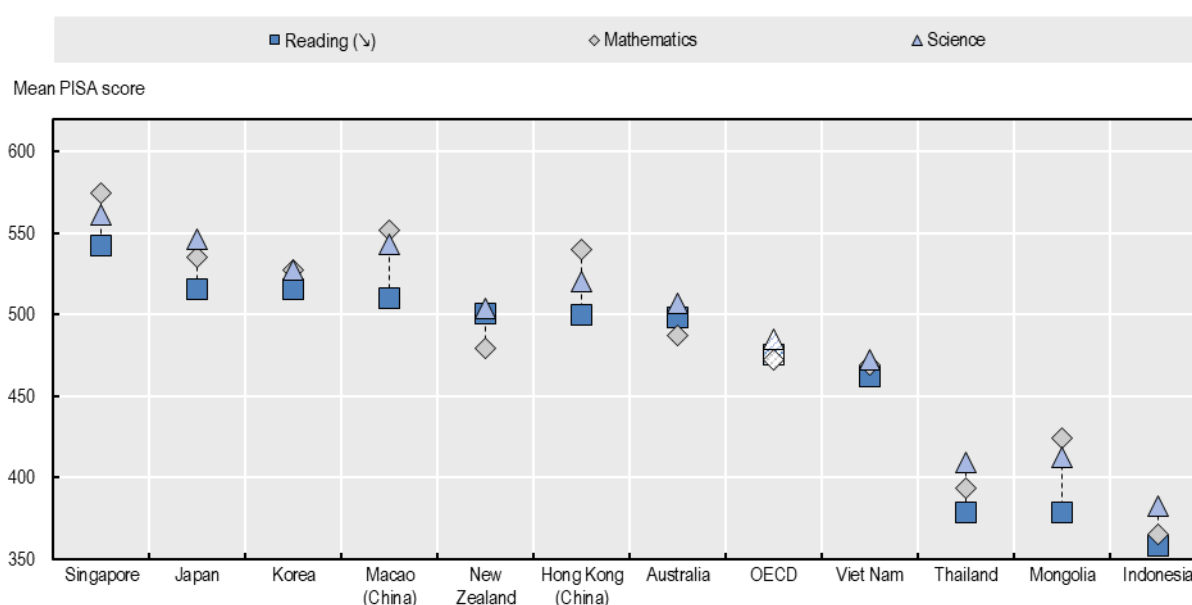
Importantly, as the OECD PISA surveys are based on probability samples, any differences in results between groups must be interpreted alongside measures of uncertainty in the difference. In OECD PISA, all estimates are accompanied by an associated standard error and all differences between groups by a test of statistical significance, that is, by a test of whether a given difference of a given size would be observed less than a certain number of times – here, less than 5% of the time – if there were no true difference between the groups in the overall population. When looking at differences in student performance between groups, the following highlights where differences in mean scores are statistically significant and where they are not. Any differences between groups that are not statistically significant should be interpreted with caution.

Other relevant indicators: CO3.1 Educational attainment by gender; CO3.3 Literacy scores by gender at age 10; CO3.6 Proportion of immigrant students and their educational outcomes

Key findings

In most of the covered Asia/Pacific countries, students tend to perform relatively well on the PISA reading, mathematics, and science tests (Chart CO3.4.A). Except for average scores by students in Indonesia, Mongolia, Thailand, and Viet Nam, students in the Asia/Pacific countries covered in the OECD PISA perform better across all three subjects than students in the OECD, on average. Student performance is highest in Singapore, particularly in mathematics and science. It is lowest, by some margin, in Indonesia, Mongolia, and Thailand.

Chart CO3.4.A. **Student performance in reading, mathematics and science, 2022**
 Country mean average PISA scores



Notes:

For Australia, New Zealand and Hong Kong (China), caution is required when interpreting the estimates for reading, mathematics, and science because one or more PISA sampling standards were not met (see Reader's Guide, Annexes A2 and A4). For Viet Nam, caution is required when comparing reading estimates based on PISA 2022 with other countries/economies as a strong linkage to the international PISA reading scale could not be established (see Reader's Guide and Annex A4);

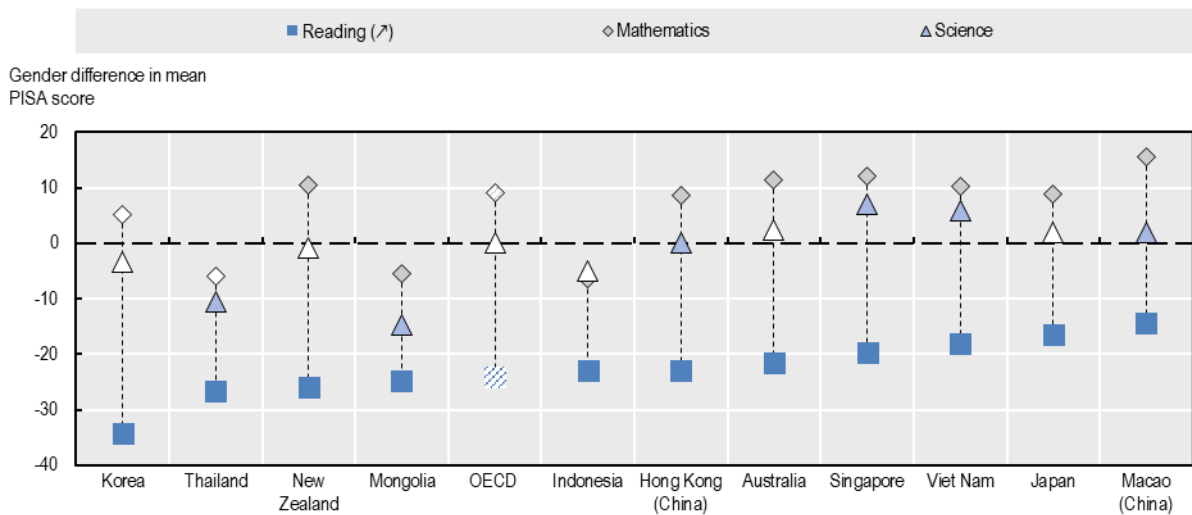
Sources: [OECD \(2023\), PISA 2022 Results \(Volume I\): The State of Learning and Equity in Education.](#)

In Asia/Pacific countries as also across OECD countries, girls tend to perform much better than boys in reading but sometimes slightly less well at mathematics and science (Chart CO3.4.B). In all selected countries girls perform significantly better than boys on the PISA reading tests, with the gender difference being largest in Korea and smallest in Macao (China). Gender differences on the PISA science test are non-significant across OECD countries (on average and in Australia, Japan, Korea, and New Zealand) and Indonesia. On the contrary, in Thailand and Mongolia there is a gender gap in favour of girls. OECD countries, Hong Kong (China), Macao (China), Singapore, and Viet Nam also record boys performing significantly better than girls on the PISA mathematics test.

Gender differences in PISA scores have not changed much in Asia/Pacific countries in recent years (Chart CO3.4.C). Chart CO3.4.C shows changes in gender differences in PISA reading scores (Panel A), PISA mathematics scores (Panel B), and PISA science scores (Panel C) since 2018. For reading, Hong Kong (China), Indonesia, Macao (China), Japan, Singapore, Thailand, have seen the gender gap decline since 2018. For mathematics, Indonesia, Hong Kong (China), Korea, Macao (China), and Singapore have seen the gender gap decline somewhat since 2018. For science, the gender gap decreased in Macao (China), Singapore, and Thailand.

Chart CO3.4.B. Gender differences in student performance in reading, mathematics and science, 2022

Male-less-female country mean average PISA scores

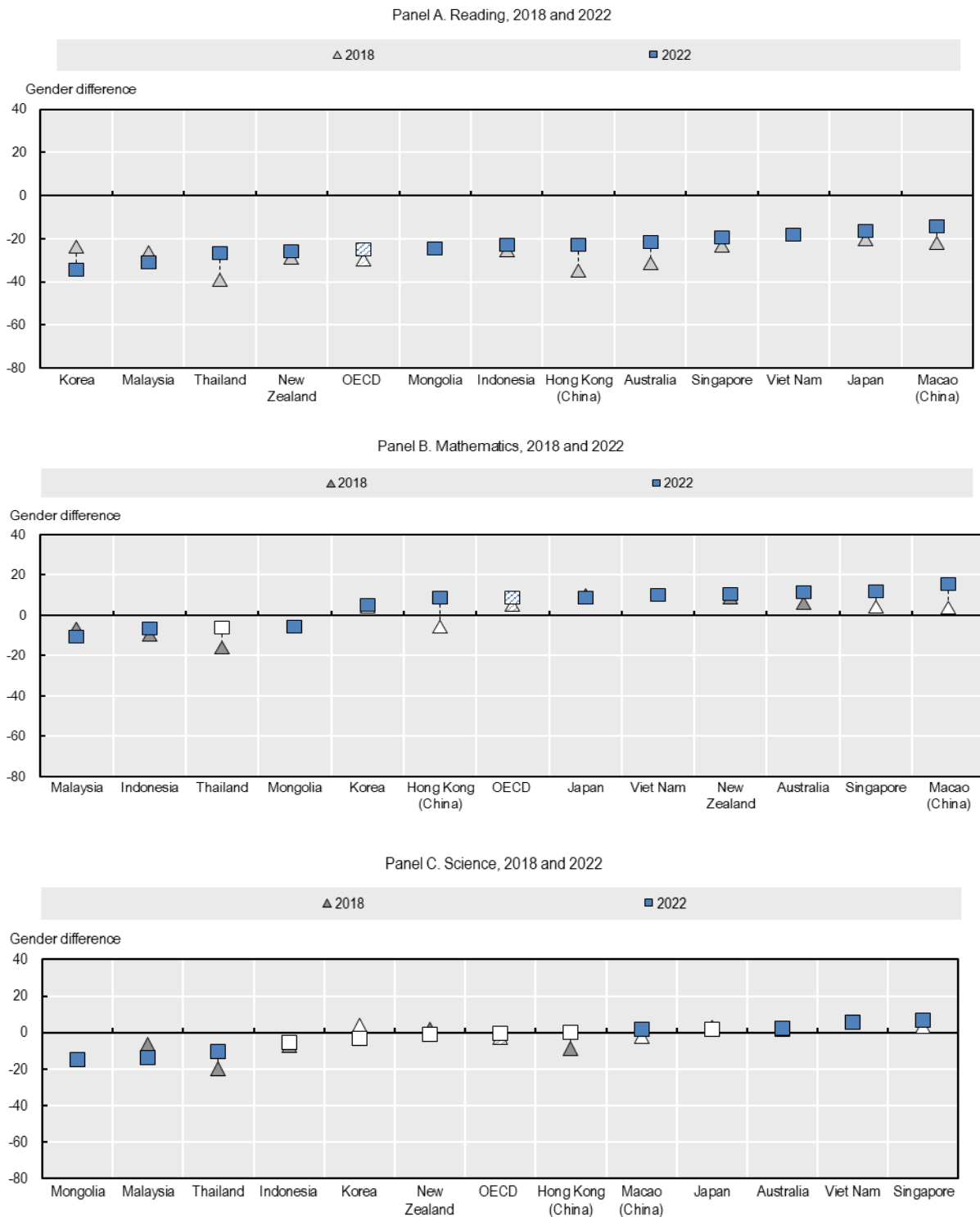


Notes: Countries ranked in ascending order according to the gender difference in mean scores in reading. Shaded markers represent statistically significant gender differences and white markers non-statistically significant gender differences. For Australia, New Zealand and Hong Kong (China), caution is required when interpreting the estimates for reading, mathematics, and science because one or more PISA sampling standards were not met (see Reader's Guide, Annexes A2 and A4). For Vietnam, caution is required when comparing reading estimates based on PISA 2022 with other countries/economies as a strong linkage to the international PISA reading scale could not be established (see Reader's Guide and Annex A4).

Sources: [OECD \(2023\), PISA 2022 Results \(Volume I\): The State of Learning and Equity in Education.](#)

Chart CO3.4.C. **Changes in gender differences in student performance in reading, mathematics, and science, 2018-2022**

Change in male-less female mean average PISA scores over time



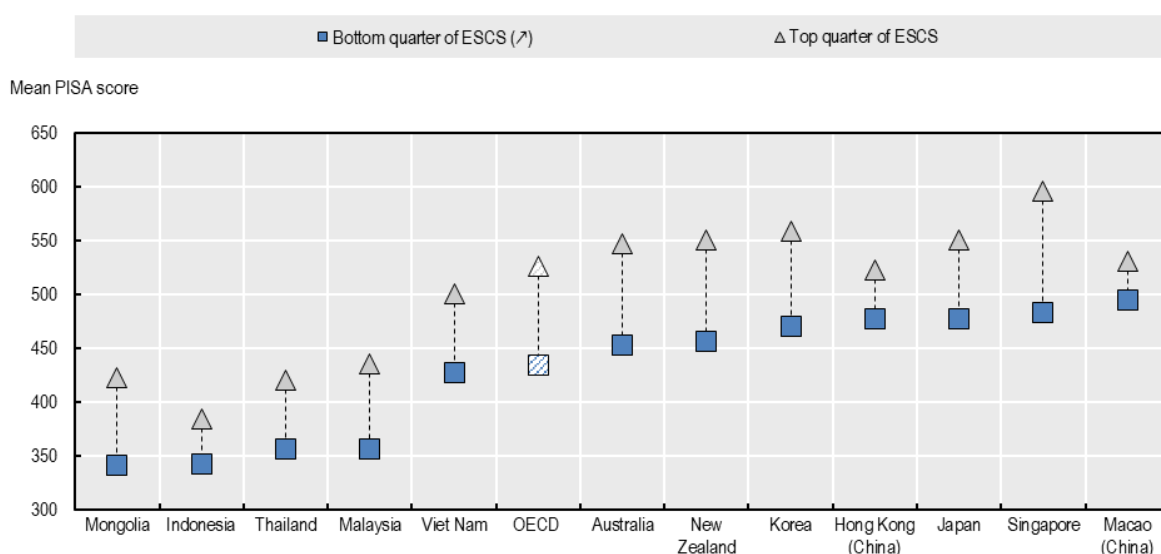
Notes: Countries ranked in ascending order according to the gender difference in 2022. Shaded markers represent statistically significant changes in gender differences and white markers non-statistically significant changes in gender differences. The OECD average is computed with data for 35 OECD countries (for which data are available in both 2018 and 2022). For Australia, New Zealand and Hong Kong (China), caution is required when interpreting the estimates for reading, mathematics, and science because one or more PISA sampling standards were not met (see Reader's Guide, Annexes A2 and A4). For Vietnam, caution is required when comparing reading estimates based on PISA 2022 with other countries/economies as a strong linkage to the international PISA reading scale could not be established (see Reader's Guide and Annex A4).

Sources: [OECD \(2023\)](#), [PISA 2022 Results \(Volume I\): The State of Learning and Equity in Education](#).

Students also tend to perform significantly better on the PISA reading tests when they score higher on the PISA index of economic, social and cultural status (ESCS) – a composite index that combines information on (i) the ISCED level of parents, (ii) the occupational status of parents, (iii) household possessions (Chart CO3.4.D). All countries see students in the top quarter of the ESCS score significantly better than students in the bottom quarter of the ESCS. The largest differences are recorded for Australia and especially in Singapore where, at 596 points, the mean PISA reading score for students in the top quarter of the ESCS is 113 points higher than the mean score for those in the bottom quarter (484).

Chart CO3.4.D. **Differences in student reading performance by socio-economic status, 2022**

Mean average PISA reading scores for students in the top and bottom quarters of the PISA index of economic, social and cultural status (ESCS)



Notes: ESCS refers to the PISA index of economic, social and cultural status. For Australia, New Zealand and Hong Kong (China), caution is required when interpreting the estimates because one or more PISA sampling standards were not met (see Reader's Guide, Annexes A2 and A4). For Vietnam, caution is required when comparing estimates based on PISA 2022 with other countries/economies as a strong linkage to the international PISA reading scale could not be established (see Reader's Guide and Annex A4).

Sources: [OECD \(2023\), PISA 2022 Results \(Volume I\): The State of Learning and Equity in Education.](#)

Comparability and data issues

The OECD PISA assessment programme devotes substantial efforts and resources to achieving cultural and linguistic balance in the assessment materials, so as to provide students with equal chances of successful performance. Stringent quality assurance mechanisms are applied in translation and data collection, and sample sizes are large – more than 600,000 students across 79 countries were assessed for the 2018 wave. If countries fail to meet sampling size requirements they are omitted from the published international comparisons (e.g., the Netherlands in 2000 and the United Kingdom in 2003).

Because the structure and stages of education differ across countries, OECD PISA targets students of a specific age – between 15 years and 3 months and 16 years and 2 months at the time of assessment – rather than students at a specific grade or point in the

education system. This allows for a better comparison of student performance internationally and ensures that across countries students are at a relatively similar stage of cognitive development. Similarly, to ensure that cross-national differences in education systems do not influence results, OECD PISA samples students from all and any types of institution (including public or private schools and foreign schools) and students on various types of course (academic or vocational, full-time or part-time). For a more detailed discussion of the methodology used, see OECD (2023) and the [OECD PISA](#) website.

Data collected by PISA for China refer to Hong Kong and Macao only, and not to the whole country. As a consequence, results for China (Hong Kong and Macao) should be taken as representative for students in these two Special Administrative Regions only, but not as representative for 15-year-old students across the country as a whole.

Sources and further reading: OECD (2023), PISA 2022 Assessment and Analytical Framework, PISA, OECD Publishing, Paris, <https://doi.org/10.1787/dfe0bf9c-en>. ; OECD (2023), PISA 2022 Results (Volume I): The State of Learning and Equity in Education, PISA, OECD Publishing, Paris, <https://doi.org/10.1787/53f23881-en>.