1 The state of learning and equity in education in 2022

This chapter summarises the major findings of PISA 2022, whose main subject was mathematics. It begins with countries'/economies' performance results, and situates 2022 results against longer-term trends in PISA performance. The chapter discusses PISA's definition of equity in education from the perspective of inclusiveness and fairness; how equitable education systems are in 2022; and how equity has evolved over the past decade, highlighting countries that have successfully combined strong performance with fair and inclusive systems. The chapter also comments on performance from the standpoint of students' gender and immigrant background.

For Australia, Canada, Denmark, Hong Kong (China), Ireland, Jamaica, Latvia, the Netherlands, New Zealand, Panama, the United Kingdom and the United States, caution is required when interpreting estimates because one or more PISA sampling standards were not met (see Reader's Guide, Annexes A2 and A4).

This is the first PISA assessment of 15-year-old students since the COVID-19 pandemic severely disrupted education around the world.

How did countries/economies perform? Eighteen countries and economies scored above the OECD average in PISA's three core subjects of mathematics, reading and science (Australia*, Canada*, the Czech Republic, Denmark*, Estonia, Finland, Hong Kong (China)*, Ireland*, Japan, Korea, Macao (China), New Zealand*, Poland, Singapore, Sweden, Switzerland, Chinese Taipei and the United Kingdom*).

In terms of top performance, Singapore, Macao (China), Chinese Taipei, Hong Kong (China)*, Japan and Korea (in order of performance) outdid all other countries and economies in mathematics, which was the focus subject of PISA 2022. Reading performance was led by Singapore, Ireland*, Japan, Korea, Chinese Taipei, Estonia and Macao (China) (in order of performance). In science, the highest-performing education systems are Singapore, Japan, Macao (China), Canada*, Chinese Taipei, Korea, Estonia and Hong Kong (China)* (in order of performance). Singapore scored significantly higher than all other countries/economies in mathematics (575 points), reading (543 points) and science (561 points).

The gap in performance between the highest- and lowest-performing countries is 153 score points in mathematics among OECD countries and 238 points among *all* education systems that took part in PISA 2022. Within education systems themselves, the score gap that separates the highest- and lowest-performing students (i.e. the difference between the 90th and the 10th percentile of performance) is 235 points on average across OECD countries. At 137 points, the gap is smallest in the Dominican Republic and widest in Chinese Taipei at 294.

PISA 2022: an unprecedented performance drop

The PISA 2022 results are unprecedented. Mean performance in OECD countries fell by 15 points in mathematics and by 10 score points in reading. This is roughly the same as half a year's worth of learning in reading and three-quarters of a school year in mathematics. In contrast, average performance in science did not alter significantly.

It is important to look at the context. In two decades of PISA tests, the OECD average score has never changed by more than four points in mathematics or five points in reading between consecutive assessments. This is what makes 2022 PISA results so unique. The dramatic fall in performance suggests a negative shock affecting many countries at the same time COVID-19 would appear to be an obvious factor.

However, take a closer look at the data. Trend analysis of PISA results before 2018 reveal that performance in reading and science began to decline well before the pandemic. In these subjects, performance peaked in 2012 and 2009, respectively, before dipping. This indicates that longer-term issues are also at play.

It is worth mentioning that some countries are bucking the trend of long-term decline: Colombia, Macao (China), Peru and Qatar improved in all three subjects on average since they began to take part in PISA. In many other countries/economies, student performance has remained stable over time.

A level playing field for all students: inclusive and fair learning

PISA 2022 is about much more than educational excellence. It is also about equity in education, namely, that all students, regardless of background, are given a fair chance to reach their full potential.

In a highly *inclusive* education system all students can access good-quality education and achieve at least the baseline level of skills in mathematics, reading and science. How many 15-year-olds reached at least PISA's basic proficiency level in these subjects (Level 2)? Across OECD countries, an average of 69% of students have at least basic proficiency in math as well as about 75% of students in reading and science – 61% of students reached basic proficiency in all three core subjects. If 15-year-olds who are not covered by the PISA sample (e.g. because they were not enrolled in school or were held back before Grade 7) are included, an average of 55% of 15-year-olds achieved baseline proficiency in all three core PISA subjects in OECD countries.

The *fairness* of an education system lies in the extent to which students, irrespective of their backgrounds, have an equal opportunity to reach their full potential. Because the focus subject of PISA 2022 is mathematics, it measures fairness by the difference in students' mathematics performance that can be explained by their socio-economic status. Fairness can also be captured by looking at gender or immigration gaps in performance.

PISA 2022 finds that the country or economy students are educated in makes a difference in how they perform. Some 31% of differences in student performance are due to differences in countries' education systems – mainly in how they are organised, financed and use their resources.

Analysis consistently shows that advantaged students performed better than their disadvantaged peers in all countries/economies in 2022. However, some systems are doing a better job at supporting widespread student success. For example, disadvantaged students in Macao (China) outperformed even the most advantaged students in many other PISA-participating countries and economies.

Per capita GDP gives a rough sense of the magnitude of financing education systems can call upon: Some 62% of the difference in countries'/economies' mean scores is related to per capita GDP (47% in OECD countries). Even more pertinently, spending per student accounts for 54% of the gap in mean performance between countries/economies (51% in OECD countries).

As spending per student increases, so does a country's mean performance. But only up to a point. Above USD 75 000 per student, the two begin to decouple. Top-performing countries and economies in PISA 2022 differ markedly in their spending per student. What an education system does with its money is important.

Student socio-economic background and performance

Turning to the students themselves, what insights has PISA 2022 revealed about their backgrounds that can explain their performances? First off, socio-economically advantaged students scored 93 points more in mathematics than their disadvantaged peers on average across OECD countries. The performance gap related to students' socio-economic status is widest in Romania and the Slovak Republic, followed by Hungary, Israel and Chinese Taipei.

Disadvantaged students in OECD countries are seven times more likely on average than advantaged students to *not* achieve basic mathematics proficiency. The same is true for science. When it comes to reading, the odds of low performance are more than five times higher for disadvantaged students than their advantaged peers.

Countries and economies have their work cut out in assisting students from disadvantaged backgrounds to excel academically. A close examination of academically resilient students, who are high-performing despite their disadvantages, could provide valuable insights. On average across OECD countries, 10% of disadvantaged students scored in the top quarter of mathematics performance in their own countries in PISA 2022, and 11% in reading and science. Uzbekistan, Cambodia and Kosovo have the highest shares of academically resilient students.

The long view

If we look at the relationship between students' socio-economic profiles and their PISA performance from a decade ago, we see something interesting: the share of disadvantaged low performers was more or less the same between 2012 and 2018, on average across OECD countries, but shot up by nine percentage points between 2018 and 2022.

Trend analysis shows that the socio-economic gap in student performance widened very little over the last decade on average in the OECD zone. However, in eight countries/economies the gap has grown – seven of which are European (Estonia, Finland, the Netherlands*, Norway, Romania, Sweden and Switzerland; the non-European economy is Macao [China]).

What is widening the performance gap in these systems that is attributable to students' socio-economic backgrounds? It is not an improvement in advantaged students' performance but, rather, a decline in the performance of their less privileged counterparts.

Gender and immigrant background

Regarding gender, boys outperformed girls in mathematics by nine score points in PISA 2022 but girls surpassed boys in reading by 24 score points on average across OECD countries.

The gender gap in mathematics performance did not change between 2018 and 2022 in most countries/economies, typically because performance declined for both boys and girls.

Turning to students' immigrant background, PISA 2022 reveals interesting insights in its relationship with performance. At first glance, non-immigrant students tended to outperform immigrant students in all PISA subjects in most (but not all) countries. But students with an immigrant background are typically not as well-off as their non-immigrant peers – the share of disadvantaged students is almost 37% among immigrant students compared to 22% among non-immigrant students on average across OECD countries. And, an average of 52% of immigrant students communicate in a language at home that differs from the language of the PISA assessment in OECD countries. This is the case for only 4% of non-immigrant students.

However, when results are compared between immigrant and non-immigrant students of similar socio-economic and language background, it turns out that immigrant students *outperform* non-immigrant students in more countries/economies than where the opposite is true (that is, in countries/economies where at least 5% of the student population has an immigrant background). If policy compensates for immigrant students' disadvantage and language barriers (for example, by targeting educational resources to socio-economically disadvantaged immigrant students), countries/economies can significantly boost the performance of their immigrant students.

Education systems that combine strong performance with equity in education

Countries and economies can learn from solidly performing education systems that have high levels of inclusion and fairness, such as in Canada*, Denmark*, Finland, Hong Kong (China)*, Ireland*, Japan, Korea, Latvia*, Macao (China) and the United Kingdom*.

In all these countries/economies, the strength of the relationship between student socio-economic status and performance is weaker than the OECD average, meaning these systems have high fairness by socio-economic status. They are also highly inclusive in that their percentages of 15-year-olds reaching at least basic proficiency in mathematics, reading and science are above the OECD average. Furthermore, average mathematics, reading and science scores in all these countries are higher than the OECD average (except for Latvia* where the mean score in reading is not statistically significantly different from the OECD average).

Hong Kong (China)* and Macao (China) are particularly remarkable in being able to significantly overcome their students' socio-economic backgrounds to achieve very high levels of performance.

Volume II discusses resilient education systems and how they preserved equitable learning and students' well-being during the difficult years of the pandemic. PISA 2022 has found several features resilient systems have in common. These include shorter periods of school closure; fewer obstacles to remote learning; keeping schools safe; ensuring greater discipline; keeping parents involved in students' learning; tracking students later; reducing grade repetition; providing good-quality education staff and materials; encouraging peer-to-peer tutoring; and combining school autonomy with quality-assurance mechanisms.

Student performance and equity in education as covered in this volume

The first of five volumes reporting the main results of PISA 2022, this volume covers how students performed, and how fair and inclusive education systems in PISA-participating countries and economies are. The success of an education system is based on several key education outcomes. This volume focuses on two of these outcomes – performance and equity – and reports on whether education systems were able to combine high levels of student performance with equity in education. Figure I.1.1 summarises how student performance is covered in this volume and Figure I.1.2 summarises how equity in education is covered. As in previous PISA assessments, results from PISA 2022 show that strong performance and greater equity in education are not mutually exclusive. Successful education systems that achieve excellence and equity continue to be found in PISA 2022 despite the challenges that the COVID-19 pandemic brought to education all over the world.

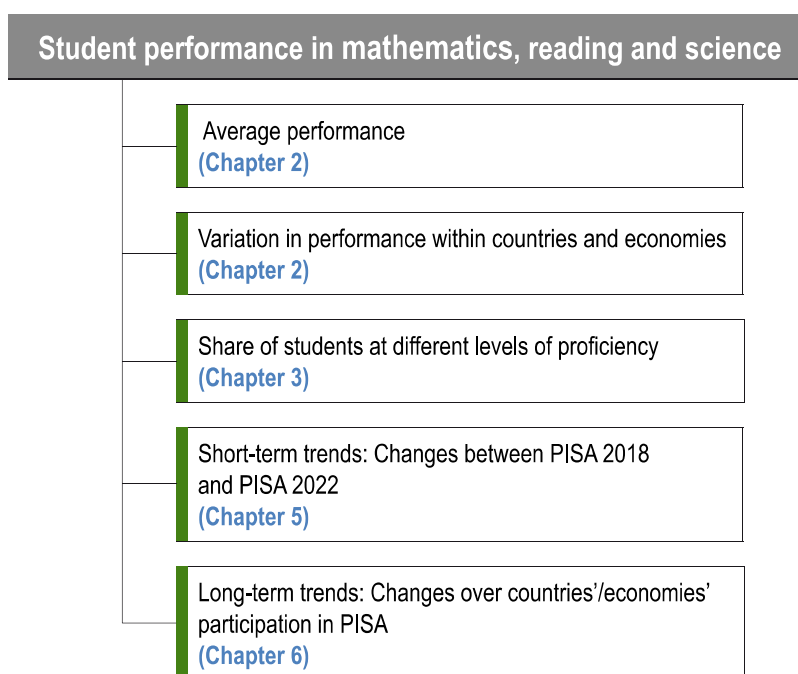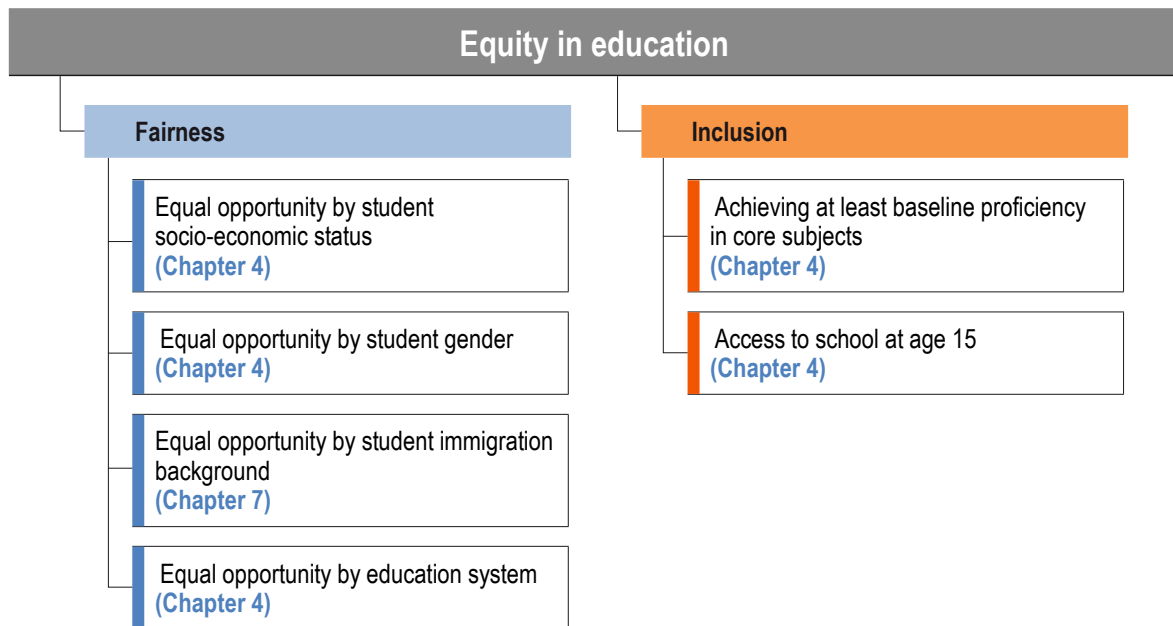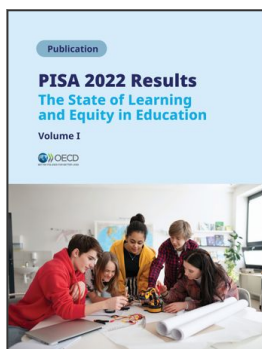### Figure I.1.1. Student performance as covered in this volume

Student performance in mathematics, reading and science

- Average performance
(Chapter 2)
- Variation in performance within countries and economies
(Chapter 2)
- Share of students at different levels of proficiency
(Chapter 3)
- Short-term trends: Changes between PISA 2018 and PISA 2022
(Chapter 5)
- Long-term trends: Changes over countries'/economies' participation in PISA
(Chapter 6)

Figure I.1.2. Equity in education as covered in this volume

Equity in education

Fairness

- Equal opportunity by student socio-economic status **(Chapter 4)**
- Equal opportunity by student gender **(Chapter 4)**
- Equal opportunity by student immigration background **(Chapter 7)**
- Equal opportunity by education system **(Chapter 4)**

Inclusion

- Achieving at least baseline proficiency in core subjects **(Chapter 4)**
- Access to school at age 15 **(Chapter 4)**

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