Programme for International Student Assessment

PISA 2022

Insights and Interpretations

Andreas Schleicher

OECD
BETTER POLICIES FOR BETTER LIVES

Did you know...

... Around 690 000 students took the PISA assessment in 2022, representing about 29 million 15-year-olds from schools in 81 participating countries and economies.

What is PISA?

Up to the end of the 1990s, the OECD primarily used years of schooling as a basis for comparing education outcomes, an approach which is not a reliable reflection of what people know and can do. The Programme for International Student Assessment (PISA) changed this. PISA aimed to test the knowledge and skills of students directly, using an internationally agreed metric to collect data from students, teachers, schools and systems to understand performance differences. This could be used to create shared points of reference, to leverage peer pressure and spur collaboration to act on the data.

The goal of PISA was to help schools and policy makers shift from looking inward at each other within the same education system to looking outward: to teachers, schools and policy makers across the world.

Unlike traditional assessments, PISA sought to assess not just students' ability to reproduce learned material but also their capacity to apply knowledge creatively in novel scenarios, think critically across disciplines, and demonstrate effective learning strategies. By emphasising these skills, PISA aimed to equip students with the ability to navigate an ever-evolving world.

Some critics argued that PISA tests were unfair as they might present students with unfamiliar problems. But then, life is full of unforeseen challenges. In the real world, people must solve problems that they have not anticipated; it is not just about remembering lessons in a classroom.

The greatest strength of PISA lies in its working methods. Most assessments are centrally planned and then contracted to engineers who build them. PISA turned that on its head. The idea of PISA attracted the world's leading minds and mobilised hundreds of experts, educators and scientists from the participating countries to build an assessment that is valid across countries, cultures and languages. This collaborative effort engendered a sense of ownership that was critical to its success.

Subject-matter experts, practitioners and policy makers from the participating countries worked tirelessly to build consensus on which learning outcomes are

important to measure and how to measure them best; to design and validate assessment tasks that can reflect those measures adequately and accurately across countries and cultures; and to find ways to compare the results meaningfully and reliably. The OECD co-ordinated this effort and worked with countries to make sense of the results and compile the reports.

PISA 2022 was the eighth round of the assessment since its launch in 2000. Every PISA test assesses students' knowledge and skills in mathematics, science and reading, and focuses on one of these subjects and provides a summary assessment of the other two. In 2022, the focus was on mathematics.

The test assesses 15-year-olds as this is the last point at which most children are still enrolled in formal education. All students are eligible to sit the PISA assessment, regardless of whether they study in public or private schools, in academic or vocational settings, or in full-time or part-time education. Students are selected after a two-stage sampling procedure. First, a representative sample of at least 150 schools is chosen that considers factors such as rural or city location. Then, roughly 42 15-year-old students are randomly selected from each school to sit the assessment. Most countries assess between 4 000 and 8 000 students. The samples are weighted to reflect the total 15-year-old student population.

This strict sampling criteria are just one of the reasons why PISA has become the world's premier yardstick for comparing quality, equity and efficiency in learning outcomes across countries. By providing an opportunity for countries to learn from each other, PISA has developed into an influential force for education reform.

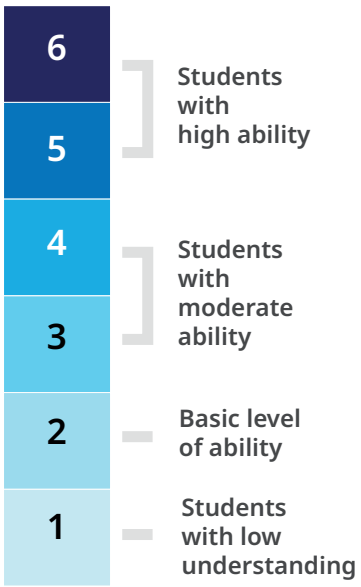
PISA has helped policy makers lower the cost of political action by backing difficult decisions with evidence – but it has also raised the political cost of inaction by exposing shortcomings in policy and practice. This aids the development of education systems that can deliver high-quality instruction, equitable learning opportunities for all and nurture student well-being.

This brochure summarises some of the initial findings from PISA 2022 and puts them into context. The full set of results can be accessed in several published volumes. In conjunction with this round of PISA, the OECD has captured a wider range of cognitive, social and emotional student outcomes as part of the new PISA Happy Life Dashboard. The dashboard considers nine pivotal aspects to student well-being including engagement with school, openness to diversity, psychological well-being, social relationships and study-life balance.

PISA Levels

Level 2 is considered the minimum level of proficiency that all students should acquire by the end of secondary education. Level 2 students can, in practical terms, use basic algorithms, simple scientific knowledge and interpret simple texts. Students who attain Level 5 or Level 6 are top performers. For example, they can work effectively with mathematical models for complex situations, comprehend abstract texts, and interpret and evaluate complex experiments.

Top performers



Lowest performers

Comparing countries' and economies' performance in mathematics

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

		Math score 2022	Math score change from 2018
Above the OECD average	Singapore	575	6
	Macao (China)	552	-6
	Chinese Taipei	547	16
	*Hong Kong (China)**	540	-11
	Japan	536	9
	Korea	527	1
	Estonia	510	-13
	Switzerland	508	-7
	Canada*	497	-15
	Netherlands*	493	-27
	Ireland*	492	-8
	Belgium	489	-19
	Denmark*	489	-20
	United Kingdom*	489	-13
	Poland	489	-27
	Austria	487	-12
	Australia*	487	-4
	Czech Republic	487	-12
	Slovenia	485	-24
	Finland	484	-23
	Latvia*	483	-13
	Sweden	482	-21
	New Zealand*	479	-15
No difference	Lithuania	475	-6
	Germany	475	-25
	France	474	-21
	Spain	473	N.A
	Hungary	473	-8
	Portugal	472	-21
	Italy	471	-15
	Viet Nam	469	N.A
	Norway	468	-33
Below	Malta	466	-6
	United States*	465	-13
	Slovak Republic	464	-22
	Croatia	463	-1
	Iceland	459	-36
	Israel	458	-5
	Türkiye	453	0
	Brunei Darussalam	442	12

		Math score 2022	Math score change from 2018
Below the OECD average	*Ukrainian regions (18 of 27)*	441	N.A
	Serbia	440	-8
	United Arab Emirates	431	-4
	Greece	430	-21
	Romania	428	-2
	Kazakhstan	425	2
	Mongolia	425	N.A
	Bulgaria	417	-19
	Moldova	414	-6
	Qatar	414	0
	Chile	412	-6
	Uruguay	409	-9
	Malaysia	409	-32
	Montenegro	406	-24
	Baku (Azerbaijan)	397	-23
	Mexico	395	-14
	Thailand	394	-25
	Peru	391	-9
	Georgia	390	-8
	Saudi Arabia	389	16
	North Macedonia	389	-6
	Costa Rica	385	-18
	Colombia	383	-8
	Brazil	379	-5
	Argentina	378	-2
	Jamaica*	377	N.A
	Albania	368	-69
	Palestinian Authority	366	N.A
	Indonesia	366	-13
	Morocco	365	-3
	Uzbekistan	364	N.A
	Jordan	361	-39
	Panama*	357	4
	Kosovo	355	-11
	Philippines	355	2
	Guatemala	344	10
	El Salvador	343	N.A
	Dominican Republic	339	14
	Paraguay	338	11
	Cambodia	336	12

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

Source: OECD, PISA 2022 Database, Volume I Table I.B1.2.1 and Table I.B1.5.4.

Comparing countries' and economies' performance in reading

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

		Reading score 2022	Reading score change from 2018
Above the OECD average	Singapore	543	-7
	Ireland*	516	-2
	Japan	516	12
	Korea	515	1
	Chinese Taipei	515	13
	Estonia	511	-12
	Macao (China)	510	-15
	Canada*	507	-13
	United States*	504	-1
	New Zealand*	501	-5
	*Hong Kong (China)**	500	-25
	Australia*	498	-5
	United Kingdom*	494	-10
	Finland	490	-30
	Denmark*	489	-12
	Poland	489	-23
	Czech Republic	489	-2
	Sweden	487	-19
	Switzerland	483	-1
	Italy	482	5
No difference	Austria	480	-4
	Germany	480	-18
	Belgium	479	-14
	Portugal	477	-15
	Norway	477	-23
	Croatia	475	-3
	Latvia*	475	-4
	Spain	474	N.A
	France	474	-19
	Israel	474	3
	Hungary	473	-3
	Lithuania	472	-4
Below	Slovenia	469	-27
	Viet Nam**	462	N.A
	Netherlands*	459	-26
	Türkiye	456	-10
	Chile	448	-4
	Slovak Republic	447	-11
	Malta	445	-3
	Serbia	440	1

		Reading score 2022	Reading score change from 2018
Below the OECD average	Greece	438	-19
	Iceland	436	-38
	Uruguay	430	3
	Brunei Darussalam	429	21
	Romania	428	1
	Ukrainian regions (18 of 27)	428	N.A
	Qatar	419	12
	United Arab Emirates	417	-14
	Mexico	415	-5
	Costa Rica	415	-11
	Moldova	411	-13
	Brazil	410	-3
	Jamaica*	410	N.A
	Colombia	409	-4
	Peru	408	8
	Montenegro	405	-16
	Bulgaria	404	-16
	Argentina	401	-1
	Panama*	392	15
	Malaysia	388	-27
	Kazakhstan	386	-1
	Saudi Arabia	383	-17
	Thailand	379	-14
	Mongolia	378	N.A
	Guatemala	374	5
	Georgia	374	-6
	Paraguay	373	3
	Baku (Azerbaijan)	365	-24
	El Salvador	365	N.A
	Indonesia	359	-12
	North Macedonia	359	-34
	Albania	358	-47
	Dominican Republic	351	10
	Palestinian Authority	349	N.A
	Philippines	347	7
	Kosovo	342	-11
	Jordan	342	N.A
	Morocco	339	-20
	Uzbekistan	336	N.A
	Cambodia	329	8

** 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).

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

Source: OECD, PISA 2022 Database, Volume I Table I.B1.2.2 and Table I.B1.5.5.

Comparing countries' and economies' performance in science

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

		Science score 2022	Science score change from 2018
Above the OECD average	Singapore	561	10
	Japan	547	17
	Macao (China)	543	0
	Chinese Taipei	537	22
	Korea	528	9
	Estonia	526	-4
	*Hong Kong (China)**	520	4
	Canada*	515	-3
	Finland	511	-11
	Australia*	507	4
	New Zealand*	504	-4
	Ireland*	504	8
	Switzerland	503	7
	Slovenia	500	-7
	United Kingdom*	500	-5
	United States*	499	-3
	Poland	499	-12
	Czech Republic	498	1
	Latvia*	494	7
	Denmark*	494	1
	Sweden	494	-6
	Germany	492	-11
	Austria	491	1
	Belgium	491	-8
No difference	Netherlands*	488	-15
	France	487	-6
	Hungary	486	5
	Spain	485	N.A
	Lithuania	484	2
	Portugal	484	-7
	Croatia	483	10
Below	Norway	478	-12
	Italy	477	9
	Türkiye	476	8
	Viet Nam	472	N.A
	Malta	466	9
	Israel	465	3
	Slovak Republic	462	-2
	Ukrainian regions (18 of 27)	450	N.A
	Serbia	447	8

		Science score 2022	Science score change from 2018
Below the OECD average	Iceland	447	-28
	Brunei Darussalam	446	15
	Chile	444	0
	Greece	441	-11
	Uruguay	435	10
	Qatar	432	13
	United Arab Emirates	432	-2
	Romania	428	2
	Kazakhstan	423	26
	Bulgaria	421	-3
	Moldova	417	-12
	Malaysia	416	-21
	Mongolia	412	N.A
	Colombia	411	-2
	Costa Rica	411	-5
	Mexico	410	-9
	Thailand	409	-17
	Peru	408	4
	Argentina	406	2
	Montenegro	403	-12
	Brazil	403	-1
	Jamaica*	403	N.A
	Saudi Arabia	390	4
	Panama*	388	23
	Georgia	384	1
	Indonesia	383	-13
	Baku (Azerbaijan)	380	-18
	North Macedonia	380	-33
	Albania	376	-41
	Jordan	375	N.A
	El Salvador	373	N.A
	Guatemala	373	8
	Palestinian Authority	369	N.A
	Paraguay	368	10
	Morocco	365	-11
	Dominican Republic	360	25
	Kosovo	357	-8
	Philippines	356	-1
	Uzbekistan	355	N.A
	Cambodia	347	17

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

Source: OECD, PISA 2022 Database, Volume I Table I.B1.2.3 and Table I.B1.5.6.

“

Did you know...

... PISA assesses 15-year-olds as this is the last point at which most children are still enrolled in formal education.

The state of global education

In a world facing multiple crises, it is perhaps understandable that what's happening in schools, colleges and universities can sometimes be overlooked. But policymakers ignore education at their peril. Our schools today are our economies, societies and democracies of tomorrow. As artificial intelligence and digitalisation rapidly embed themselves in the global economy, it is vital teaching and learning innovate to ensure education stays relevant.

So how concerned should we be that 15-year-olds in 2022 are less likely to be proficient in maths, reading and science than those tested by PISA a decade ago? International comparisons are complex but PISA data point to a clear global trend: average student performance in these subjects is heading in the wrong direction.

Some 25% of 15-year-olds in OECD member countries – representing 16 million children – are estimated to be low performers in maths, reading and science, including students not covered by PISA. This means they have not attained Level 2 proficiency; they can struggle to do tasks such as use basic algorithms or interpret simple texts. The situation is even worse among many non-OECD members. In 18 countries and economies more than 60% of 15-year-olds are low performers in all three subjects.

This is not the case for everyone. Singaporean students can work effectively with mathematical models for complex situations, comprehend abstract texts, and interpret and evaluate complex experiments. Singapore came top in maths, scoring 575 points, in reading (543 points) and in science (561 points). These results suggest that on average Singaporean students are the equivalent of almost three to five years of schooling ahead of peers who score the OECD average of 472 in maths, 476 in reading and 485 in science.

Singapore was also one of the few countries that kept improving in reading and science since 2018, while remaining stable in mathematics performance. And it is noteworthy that this impressive educational performance has happened in a relatively short period of time. Older adults in Singapore assessed separately by the OECD perform far worse compared to younger generations. For example, less

than 17% of 55-65-year-old Singaporeans scored at Level 3 or higher in literacy in the OECD Survey of Adult Skills (part of a product like PISA but for adults) – one of the smallest proportions amongst participating countries – while 63% of 16-24-year-olds did so, one of the largest proportions. This shows that educational progress can be rapid.

Elsewhere in PISA 2022, five other East Asian education systems outperformed everyone else in mathematics: Macao (China), Chinese Taipei, Hong Kong (China)*, Japan and Korea, in order of performance. These same countries and economies were the next highest performers in science, along with Estonia and Canada*. In reading, Ireland* performed as well as Japan, Korea, Chinese Taipei and Estonia (in descending order). In Ireland* and Japan's case that is even though their expenditure per student is at or lower than the OECD average.

Test scores are only one measurement of success. Many countries have made significant progress towards the goal of universal secondary education; crucial to enabling everyone to participate fully in the 21st century world. Cambodia, Colombia, Costa Rica, Indonesia, Morocco, Paraguay and Romania are among the countries that have rapidly expanded education to previously marginalised populations compared with past PISA assessments.

Giving all students a fair chance to succeed regardless of their background is also a vital component of good schooling. PISA shows that disadvantaged students are often held back by social mobility hurdles that their more advantaged peers do not face. However, in most countries, some of the most disadvantaged students and schools are excelling and thus demonstrate academic resilience. On average, across the OECD, one in ten disadvantaged students was able to score in the top quarter of maths performers. This clearly indicates that a disadvantaged background does not determine destiny. In fact, in 11 countries and economies - Albania, Cambodia, Hong Kong (China)*, Indonesia, Jamaica*, Kazakhstan, Kosovo, Macao (China), Morocco, the United Kingdom* and Uzbekistan - more than 15% of disadvantaged students were academically resilient.

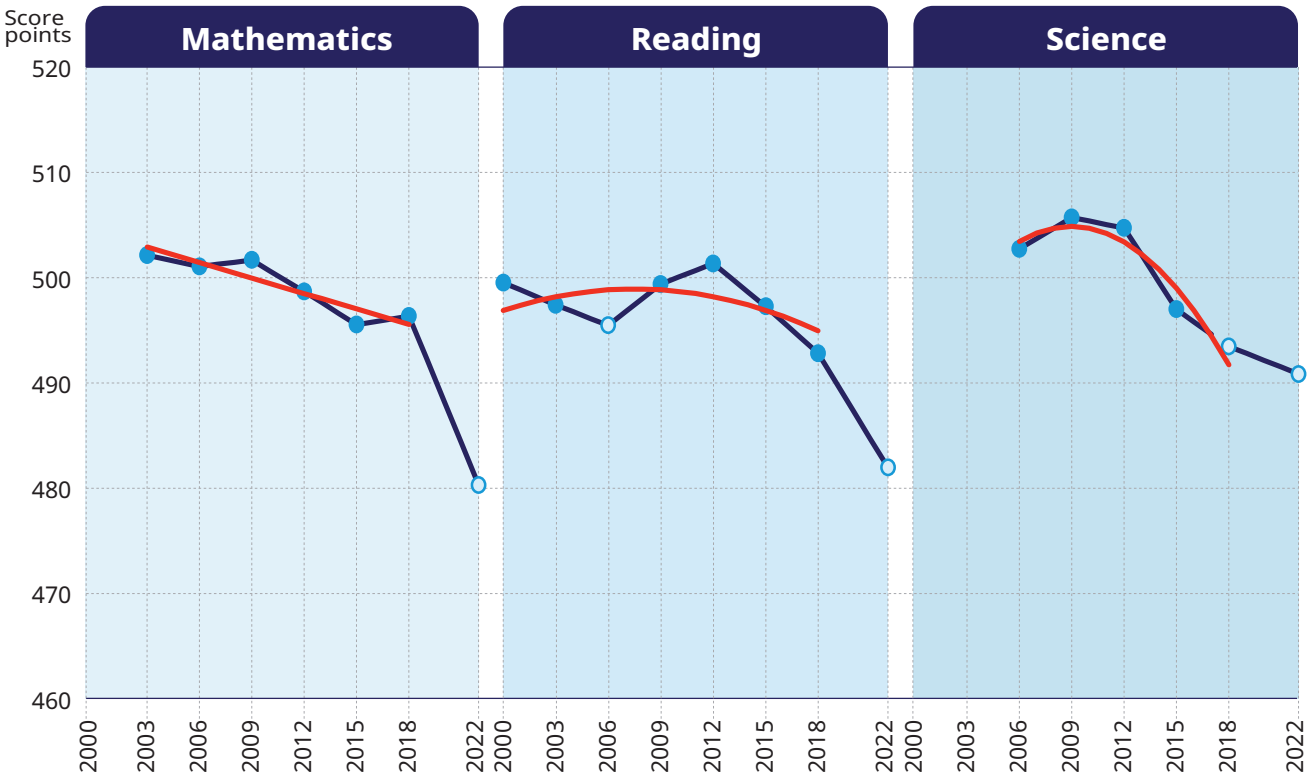
In the same way as social disadvantage does not automatically lead to poor educational performance, the world is no longer strictly divided between rich and well-educated nations and poor and badly educated ones. While there is some correlation between spending and academic performance, history shows that countries determined to build a first-class education system can achieve this even in adverse economic circumstances. Korea and Singapore are prominent examples of countries which many decades ago had low incomes but focused on education and have achieved top performance.

While it is evident that some countries and economies are performing very well in education, the overall picture is more worrying. In more than two decades of global PISA tests, the OECD average score has not changed drastically between consecutive assessments. But this cycle saw an unprecedented drop in performance. Compared to 2018, mean performance in OECD countries fell by 10 score points in reading and almost 15 score points in maths – the latter is nearly treble any prior consecutive change. This downturn was particularly significant in a handful of countries. For example, from the OECD, Germany, Iceland, the Netherlands*, Norway and Poland all saw a drop of 25 score points or more in mathematics between 2018 and 2022. The dramatic fall in maths and reading scores points to a negative shock affecting many countries simultaneously.

The COVID-19 pandemic seems an obvious factor that may have impacted results in this period. However, take a closer look at the data. In reading, for example, many countries such as Finland, Iceland, the Netherlands*, the Slovak Republic and Sweden have seen students scoring lower marks for some time – in some cases for a decade or more. Educational trajectories were negative well before the pandemic hit. This indicates that long term issues in education systems are also to blame for the drop in performance. It is not just about COVID.

OECD average trends in mathematics, reading and science

In 23 OECD countries up to 2022



Notes: White dots indicate mean-performance estimates that are not statistically significantly above/below PISA 2022 estimates. Red lines indicate the best-fitting trend lines (see PISA Results Volume I Annex A3).

Source: OECD, PISA 2022 Database, Volume I Tables I.B1.5.4, I.B1.5.5 and I.B1.5.6 (Figure I.5.2).

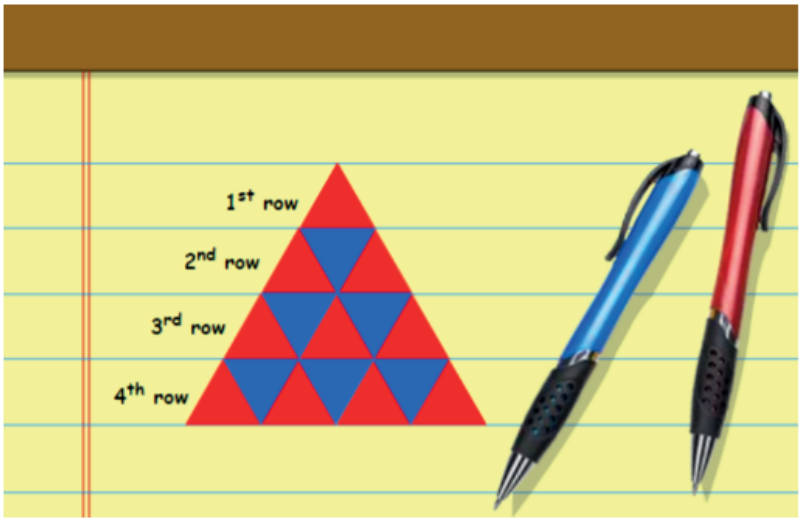
Try a PISA question

This is an example of the kind of problem-solving and critical thinking skills that PISA aims to measure on a global scale.

Triangular pattern

Refer to the triangular pattern below to answer the question.

Alex drew the following pattern of red and blue triangles. The first four rows of the pattern are shown below:



If Alex were to extend the pattern to a fifth row, what would be the percentage of blue triangles in all five rows of the pattern?

Choose 1 answer:

- (A) 40.0%
- (B) 50.0%
- (C) 60.0%
- (D) 66.7%

Notes: See the answer to the question at the bottom of page 68.

For the full set of publicly released mathematics items, see PISA Results Volume I Annex C.

Education during the COVID-19 pandemic

At its height, the COVID-19 pandemic forced a wave of school shutdowns across the globe. Thousands of educational institutions switched to full remote learning; students had to quickly adjust to new teaching and learning techniques; and teacher shortages, mental health challenges and high rates of student absenteeism were among the many challenges.

But PISA results suggest that the pandemic does not provide the sole explanation for the drop in student performance.

Yes, average performance in maths and reading fell compared to previous PISA rounds. In many cases, the drop exceeded 20 score points in 2022 – roughly a year's worth of education. For example, in mathematics, in Denmark*, France, Greece, Portugal and Sweden the average 15-year-old in 2022 scored at the level expected of a 14-year-old in 2018. More than a dozen other countries and economies saw an even greater fall in performance. At first glance this suggests COVID probably had a big impact. However, look at the results in science. Average global scores were down slightly yet remained relatively stable in 2022.

Long-term trends are also an important factor to consider, and scores in reading and science have been falling for some time. In fact, average OECD performance in these subjects peaked between 2009 and 2012. In many countries test scores began to drop well before the disruption caused by COVID-19 in 2020. For example, negative trends in maths performance were already apparent prior to 2018 in Belgium, Canada*, the Czech Republic, Finland, France, Hungary, Iceland, the Netherlands*, New Zealand*, and Slovak Republic.

The issue of school closures also paints a more nuanced picture. Across the OECD, around 50% of students experienced closures for more than three months. However, PISA results show no clear difference in recent performance trends between education systems with limited school closures such as Iceland, Sweden and Chinese Taipei and systems that experienced longer lasting school closures, such as Brazil, Ireland* and Jamaica*.

Analysing the impact of school closures on students is complex. Many other factors impacted learning during this period, such as the quality of remote teaching and levels of support granted to struggling students.

According to the data, most students across OECD countries reported they rarely had technical problems learning remotely during school closures. However, almost one in two students reported facing motivational challenges to doing schoolwork at least once a week. One in three students struggled to understand school assignments in the same period. And the same proportion reported they did not receive regular extra support from their teachers in 2022.

The prevalence of problems reported by students varied across countries. In Australia* and the United Kingdom*, six out of ten students reported having frequent problems motivating themselves to do schoolwork – more than double the share of students in Iceland, Kazakhstan, Guatemala, Korea, Indonesia, Chinese Taipei and Moldova who reported the same issue.

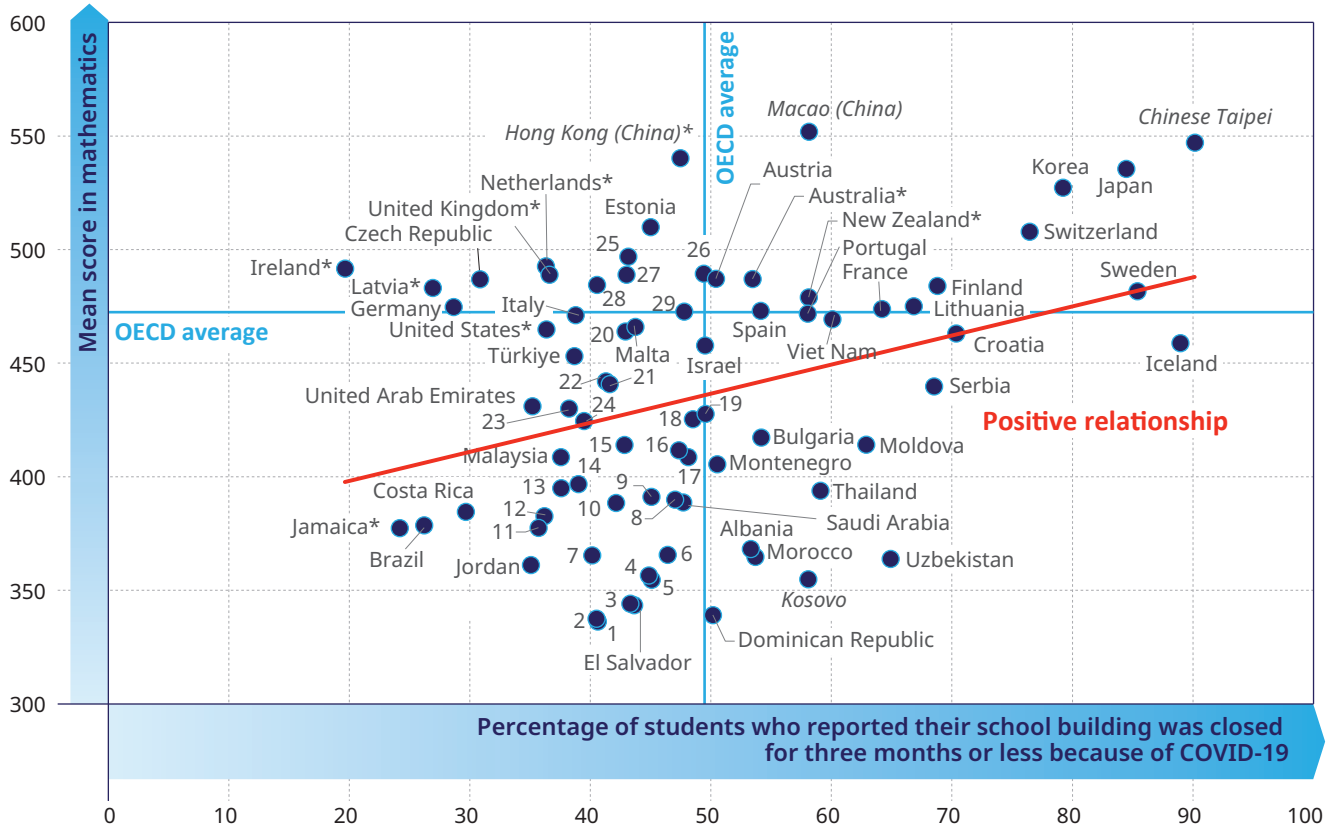
Other studies have linked school closures to adverse health effects like anxiety, loneliness and depression. The PISA results concur with many of these findings. They also show that countries and economies where less students reported to experience school closures longer than three months showed stable or improving trends in their sense of belonging at school. In Japan, for example, where most student reported not experiencing prolonged school shutdowns, 86% of students agreed or strongly agreed that they felt they belonged at school; 6 percentage points higher than in 2018.

One other area where there appears to be a change is students' job aspirations. In many countries, the data shows a shift in students' interest in working in the health sector. The number of students wanting to become a nurse or doctor decreased in countries which experienced higher COVID-19 cases and deaths between 2020 and 2022. In contrast, other job sectors such as information technology followed a steady trend. Years from now, could one of the legacies of the pandemic be recruitment issues for certain health care systems? PISA results point to possible wide-reaching consequences that may yet emerge.

PISA in the pandemic

This edition of PISA was originally planned to take place in 2021 but was delayed by one year due to the COVID-19 pandemic. The exceptional circumstances throughout this period, including lockdowns and school closures in many places, led to occasional difficulties in collecting some data. While the vast majority of countries and economies met PISA's technical standards, a small number did not. Given the unprecedented situation, PISA 2022 results include data from all participating education systems, including those where there were issues such as low response rates. An asterisk (*) is used to highlight where this may be an issue for certain countries and economies.

COVID-19 school closures and mathematics performance



1. Cambodia
2. Paraguay
3. Guatemala
4. Panama*
5. Philippines
6. *Palestinian Authority*
7. Indonesia
8. Georgia
9. Peru
10. North Macedonia
11. Argentina
12. Colombia
13. Mexico
14. *Baku (Azerbaijan)*
15. Qatar
16. Chile
17. Uruguay
18. Kazakhstan
19. Romania
20. Slovak Republic
21. *Ukrainian regions (18 of 27)*
22. Brunei Darussalam
23. Greece
24. Mongolia
25. Canada*
26. Belgium
27. Poland
28. Slovenia
29. Hungary

Source: OECD, PISA 2022 Database, Volume I Annex B1; and Volume II Annex B1, Chapter 2 (Figure II.2.2).

“

Did you know...

... Students who attain PISA Level 5 or Level 6 are top performers; for example, they can work effectively with mathematical models for complex situations, comprehend abstract texts, and interpret and evaluate complex experiments.

Who bucks the trend?

While the overall direction of travel in global educational performance is largely going in reverse, some countries and economies have bucked the trend. For example, while more than half of PISA-participating education systems saw unprecedented declines in maths scores, 24 countries and economies managed to maintain their performance at the same level as PISA 2018. However, many of the education systems with stable performance remained relatively low performing. Only Singapore, Japan, Korea, Switzerland and Australia* maintained high levels of student performance, with scores ranging from 487 to 575 points.

Encouragingly, seven countries or economies managed to achieve some jumps in performance. Saudi Arabia, Brunei Darussalam, Chinese Taipei, Cambodia, Guatemala, Paraguay and the Dominican Republic all saw maths scores improve by at least 9 score points. However, except for Chinese Taipai, many of these average scores were from a relatively low performance level. The countries and economies should be commended for making improvements, but they can still make a lot of progress.

Why did some systems maintain or improve their performance? Some may have adapted more promptly to COVID-19 related issues. Other factors, like differences in the severity and duration of COVID-19 and pandemic-related measures could have impacted performance. And there is also potential that the turmoil caused by school closures did not, in fact, have major repercussions as some education systems were not particularly effective already prior to the pandemic.

The period requires further assessment, but PISA scores are not the only definition for success. Another way to assess education systems is to consider their resilience; in other words, their effectiveness to maintain and promote learning, equity and well-being. Out of all PISA-participants, just four education systems were identified as showing overall resilience: Japan, Korea, Lithuania and Chinese Taipei. These systems were resilient in mathematics performance, maintained good outcomes for all social groups, and their students reported a continuing strong sense of belonging at school.

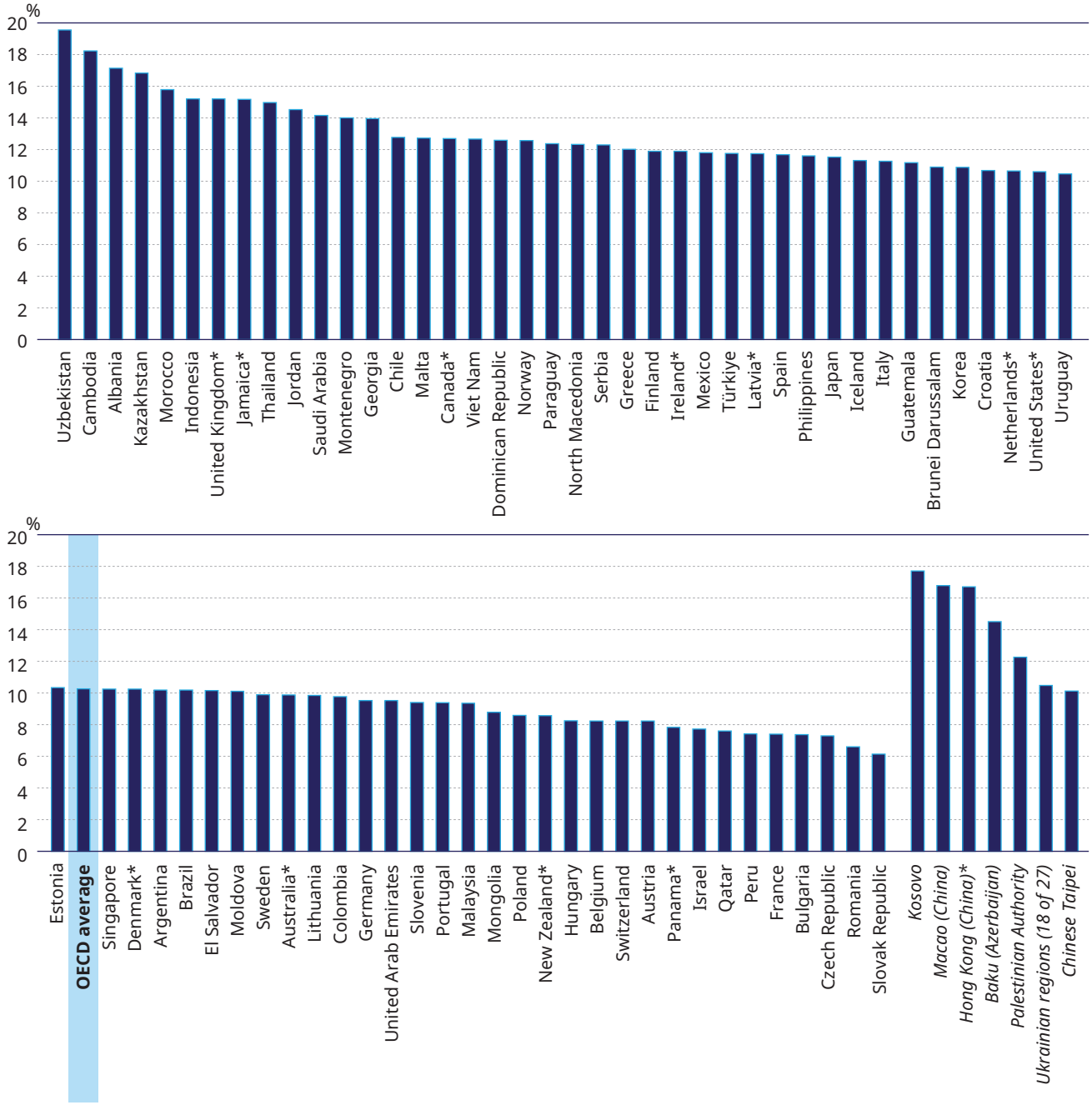
Out of other education systems, 21 were resilient in some of these aspects. For example, Singapore was resilient in both mathematics performance and equity, but not in terms of well-being. Switzerland demonstrated resilience in mathematics and students' well-being, but not in equity. Common factors of resilient systems included largely avoiding longer school closures (three months or more) and ensuring students could learn remotely effectively. Students in resilient systems also benefitted from increased parental support and teachers who continued to inform parents about their children's progress.

Overall, resilient systems have invested in a solid foundation for student learning and well-being, provided better qualified staff and high-quality digital resources. Most also increased peer-to-peer tutoring in school during the years of the pandemic more so than the average. For example, in Lithuania four out of five students had peers tutoring them in 2022, up from three out of five students four years earlier.

There is no single answer to why certain systems were more resilient than others but, taken together, many of these components seem associated with stronger, more durable education systems. Similar to how business leaders draw insights from their counterparts for success, it is helpful for education policy makers to leverage international comparisons to enhance their strategies. By gauging how schools are performing internationally, and how prepared students are to participate in a globalised society, it helps judge education systems performance and enact effective policy reform.

Resilient students in mathematics

Percentage of socio-economically disadvantaged students who scored in the top quarter of mathematics performance in their own country/economy

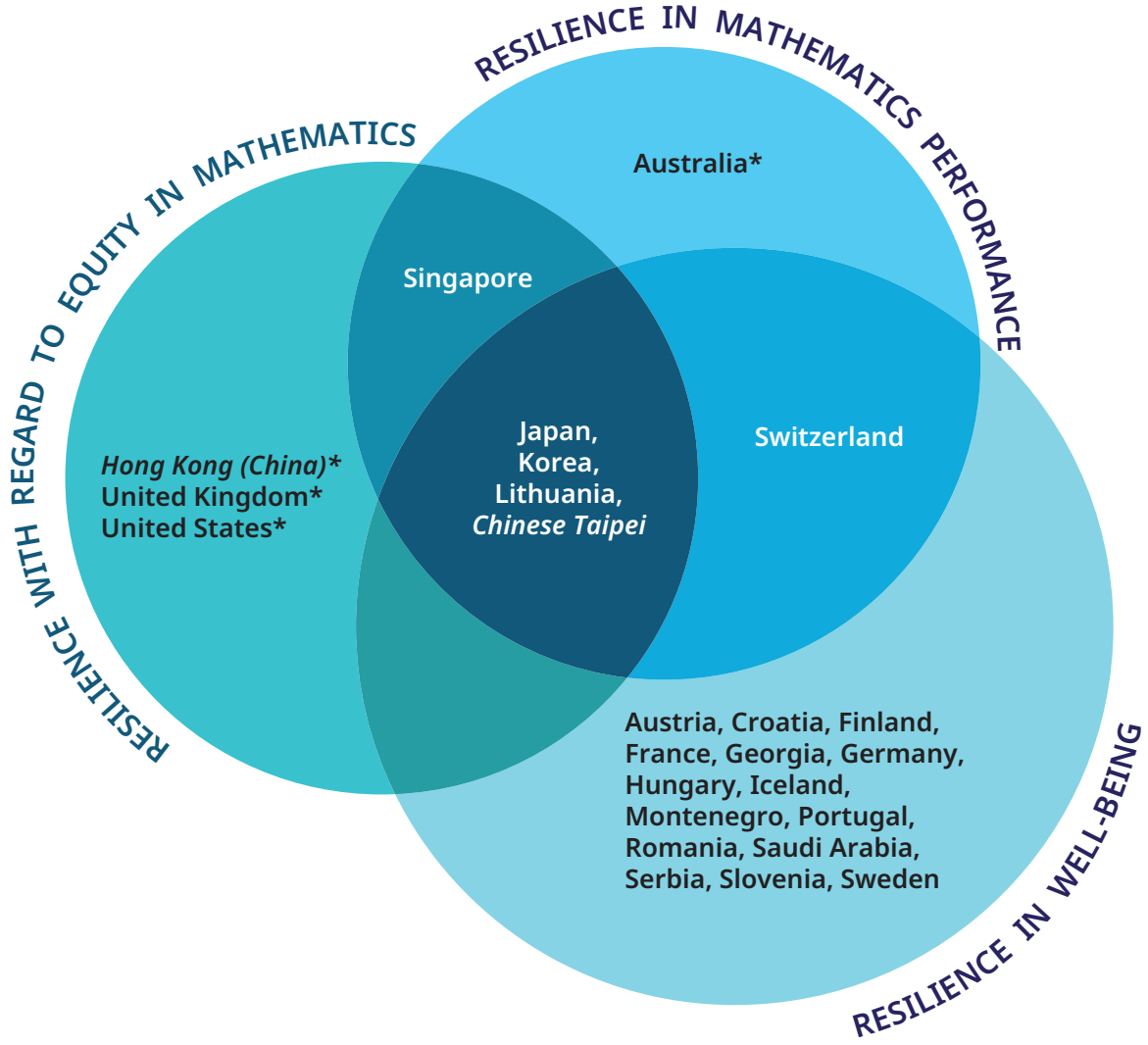


Notes: Only countries and economies with available data are shown.
Socio-economic status is measured by the PISA index of economic, social and cultural status.

Countries and economies are ranked in descending order of the percentage of resilient students.

Source: OECD, PISA 2022 Database, Volume I Table I.B1.4.3 (Figure I.4.5).

Resilient education systems



Note: Fifteen countries/economies were missing data for one or more aspects of resilience: Cambodia, Costa Rica, El Salvador, Guatemala, Israel, Jamaica*, Kosovo, Mongolia, North Macedonia, the Palestinian Authority, Paraguay, Spain, Ukrainian regions (18 of 27), Uzbekistan and Viet Nam (see PISA Results Volume II Table II.1).

Source: OECD, PISA 2022 Database, Volume II Chapter 1 (Figure II.1.1).

Mind the socio-economic gap

For those with the right knowledge and skills, digitalisation and globalisation have been liberating and exciting; but for others, they often mean vulnerable and insecure work. As economies shift towards regional hubs of production connected by global chains of information and goods, the equitable distribution of knowledge and wealth is crucial, and that is linked to educational opportunities.

Equity in education ensures that everyone has access to a quality education regardless of their background, socio-economic status, or any other personal characteristic. In effect, all students should have equal opportunities to succeed and achieve their full potential.

The motivation for this approach is simple: Children from wealthier families often have numerous opportunities that pave the way to a successful life. Children from underprivileged backgrounds regularly face closed doors; their shot at success often depends on a good teacher and school.

So, it is stating the obvious that truly effective school systems need to deliver high-quality education to all. Out of the 81 countries and economies assessed by PISA, ten saw a large share of all 15-year-olds gain basic proficiency in maths, reading and science and have high levels of socio-economic fairness: Canada*, Denmark*, Finland, Hong Kong (China)*, Ireland*, Japan, Korea, Latvia*, Macao (China) and the United Kingdom*. This does not mean that fairness has been fully achieved as socio-economic status remains a significant predictor of performance in most of these countries and economies. However, the majority are highly equitable compared to others.

There is huge scope for most education systems to improve in this area. In 2022, analysis consistently shows that advantaged students performed better than their disadvantaged peers in all countries and economies. In some places, students' socio-economic status is particularly related to academic performance, accounting for 20% or more of the variation in maths scores in Belgium, Czech Republic, France, Hungary, Panama*, Romania, the Slovak Republic and Switzerland.

In contrast, students' socio-economic status accounts for less than 7% of the variation in maths performance in 14 countries and economies: Albania, Baku (Azerbaijan), Cambodia, Hong Kong (China)*, Indonesia, Jamaica*, Jordan, Kazakhstan, Kosovo, Macao (China), Philippines, Saudi Arabia, United Arab Emirates and Uzbekistan. The results for Hong Kong (China)* and Macao (China) are particularly impressive, as students from all social groups have better chances of being high performers compared to other countries and economies with high average maths performance.

Some expected that the pandemic would disproportionally affect students from disadvantaged backgrounds, considering they might have found it most difficult to find alternative learning opportunities during school closures. However, PISA data do not support this. Why? In most countries, both advantaged and disadvantaged students' performance has spiralled downhill at a similar pace.

Looking at this from a longer-term perspective, trend analysis shows that the socio-economic gap in student performance has remained stable across most countries and economies. This is, at least, not going in the wrong direction. However, in eight countries and economies the gap has grown – seven of which are European. Estonia, Finland, the Netherlands*, Norway, Romania, Sweden and Switzerland saw the divide widen by between 15 and 39 score points.

Why is this happening? There needs to be further analysis, but a lot of factors are likely at play. For example, if schools are popular, house prices in their catchment areas can rise, further segregating the population. People with fewer assets, income and education end up finding housing where education and social opportunities are poorer. The result is that, in most countries, differences in education outcomes related to social inequalities are stubbornly persistent, and too much talent remains latent.

A lack of social diversity in schools also implies that disadvantaged students are more likely to share learning environments with other socio-economically disadvantaged students, which may negatively affect their performance. Unless disadvantaged schools are allocated sufficient resources to compensate for their shortfalls, social and academic segregation between schools may widen the performance gaps linked to socio-economic disparities.

When it comes to allocating material resources, much progress has been achieved. According to PISA, some school systems succeed in providing sufficient material and staff resources to all schools, including disadvantaged schools. In Bulgaria, Poland and Switzerland, instruction appeared not to be hindered by shortages of educational material or staff, according to school principals, and there was no significant difference in reports between principals of advantaged schools and those of disadvantaged schools.

Many countries have introduced formula-based approaches to funding whereby the resources allocated to a school depend on its socio-economic context. But OECD analyses show that it is not as simple as paying teachers who work in disadvantaged schools more; it requires holistic approaches in which teachers feel supported in their professional and personal life when they take on additional challenges, and when they know that additional effort will be valued and publicly recognised.

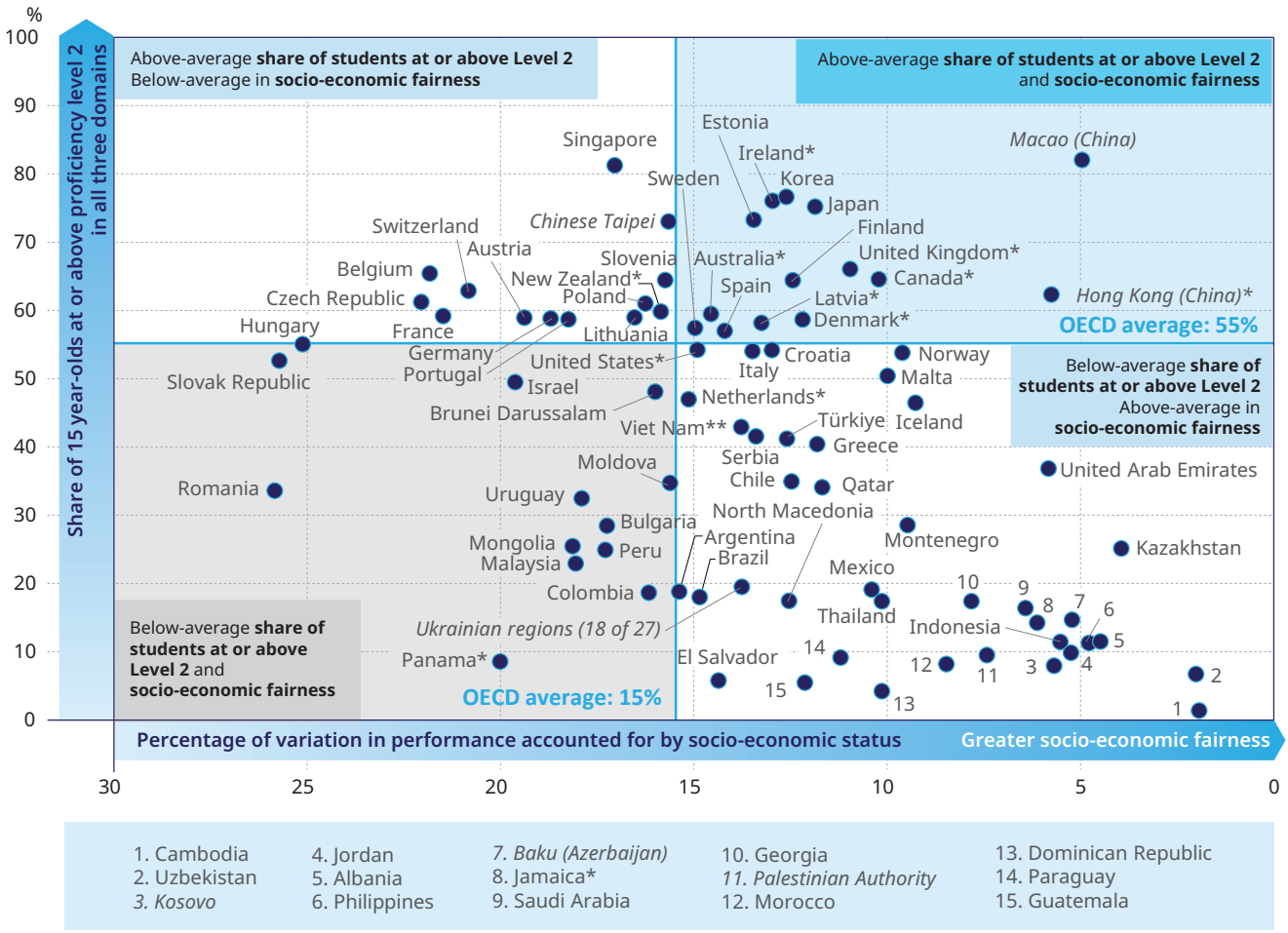
Some education systems have been moving in this direction. Singapore sends its best teachers to work with students in the greatest need. In Japan, officials in the prefectural offices will transfer effective teachers to schools with weak faculties. Shanghai transfers financial payments to schools serving disadvantaged students and has established career structures that incentivise high-performing teachers to teach in disadvantaged schools.

All this being said, it is often difficult for teachers to allocate scarce additional time and resources to the children with the greatest needs. It is sometimes challenging to convince socio-economically

advantaged parents that everyone is better off when classes are socially diverse. And policy makers, too, may find it hard to allocate resources where the challenges are greatest. Poor children usually do not have someone lobbying for them.

In sum, all countries have excellent students, but too few countries have enabled all of their students to fulfil their potential. Achieving greater equity in education is not only a social justice imperative, it is also a way to use resources more efficiently, increase the supply of skills that fuel economic growth, and promote social cohesion. Not least, how we treat the most vulnerable students and citizens shows who we are as a society

Which education systems have socio-economic fairness and achieve inclusion by attaining at or above Level 2 proficiency?



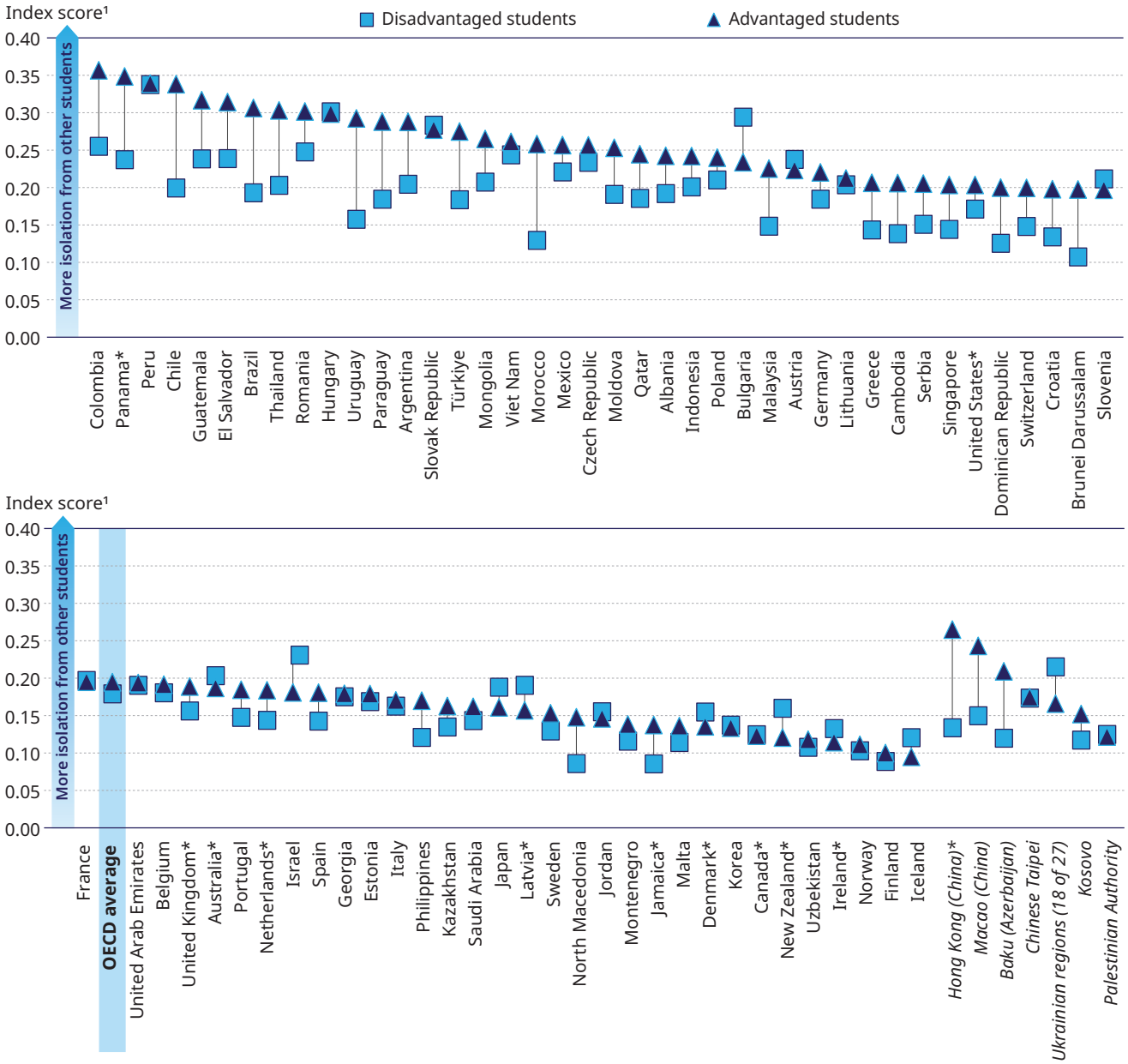
1. Cambodia
2. Uzbekistan
3. Kosovo
4. Jordan
5. Albania
6. Philippines
7. Baku (Azerbaijan)
8. Jamaica*
9. Saudi Arabia
10. Georgia
11. Palestinian Authority
12. Morocco
13. Dominican Republic
14. Paraguay
15. Guatemala

** 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).

Note: Only countries and economies with available data are shown.
The socio-economic status is measured by the PISA index of economic, social and cultural status.

Source: OECD, PISA 2022 Database, Volume I Tables I.B1.4.3 and I.B1.4.45 (Figure I.4.20).

Concentration of socio-economically advantaged and disadvantaged students in schools



1. The isolation index measures the extent to which certain types of students (e.g. disadvantaged students) are isolated from other all other types of students, or from a specific group of students (e.g. advantaged students), based on the schools they attend. It ranges from 0 to 1 where 0 corresponds to full exposure and 1 to full isolation.

Countries and economies are ranked in descending order of the extent to which socio-economically advantaged students were isolated from all other students (i.e. non-advantaged students).

Source: OECD, PISA 2022 Database, Volume II Annex B1, Chapter 4 (Figure II.4.13).

Bridging the gap for underperforming students

The rising bar for educational success in the digital age puts even greater pressure on education systems to secure strong foundations. The great risk is that technology will super-empower those with strong knowledge and skills while leaving weaker performers further behind. Across OECD countries, an estimated 25% of students aged 15 are low performers in maths, reading and science. As mentioned earlier, this means they are below Level 2 proficiency, the baseline standard for PISA tests.

In certain education systems, these low performers are spread across many different schools. In others, they tend to be clustered in specific or certain types of schools, often compounded by social disadvantage. This is an in-built feature of some school systems; we see the concentration of lower academic performing students in maths in countries and economies including Hungary, Netherlands*, Slovak Republic, Austria and France (in descending order). If countries want to promote equity and opportunity, then ensuring that those schools receive adequate resources and support is especially important.

PISA also shows that immigrant students were more than twice as likely as their native-born peers to score below the baseline level of proficiency in mathematics, on average across OECD countries. This is partly due to their socio-economic profile; immigrant students are typically not as well-off. However, look closer at the data and a more interesting story emerges. When comparing the results of immigrant and native-born students of similar socio-economic and language background, there is less of a performance gap between immigrant and non-immigrant students. This suggests that it is important to provide additional support for disadvantaged students which, as mentioned, often include immigrant students.

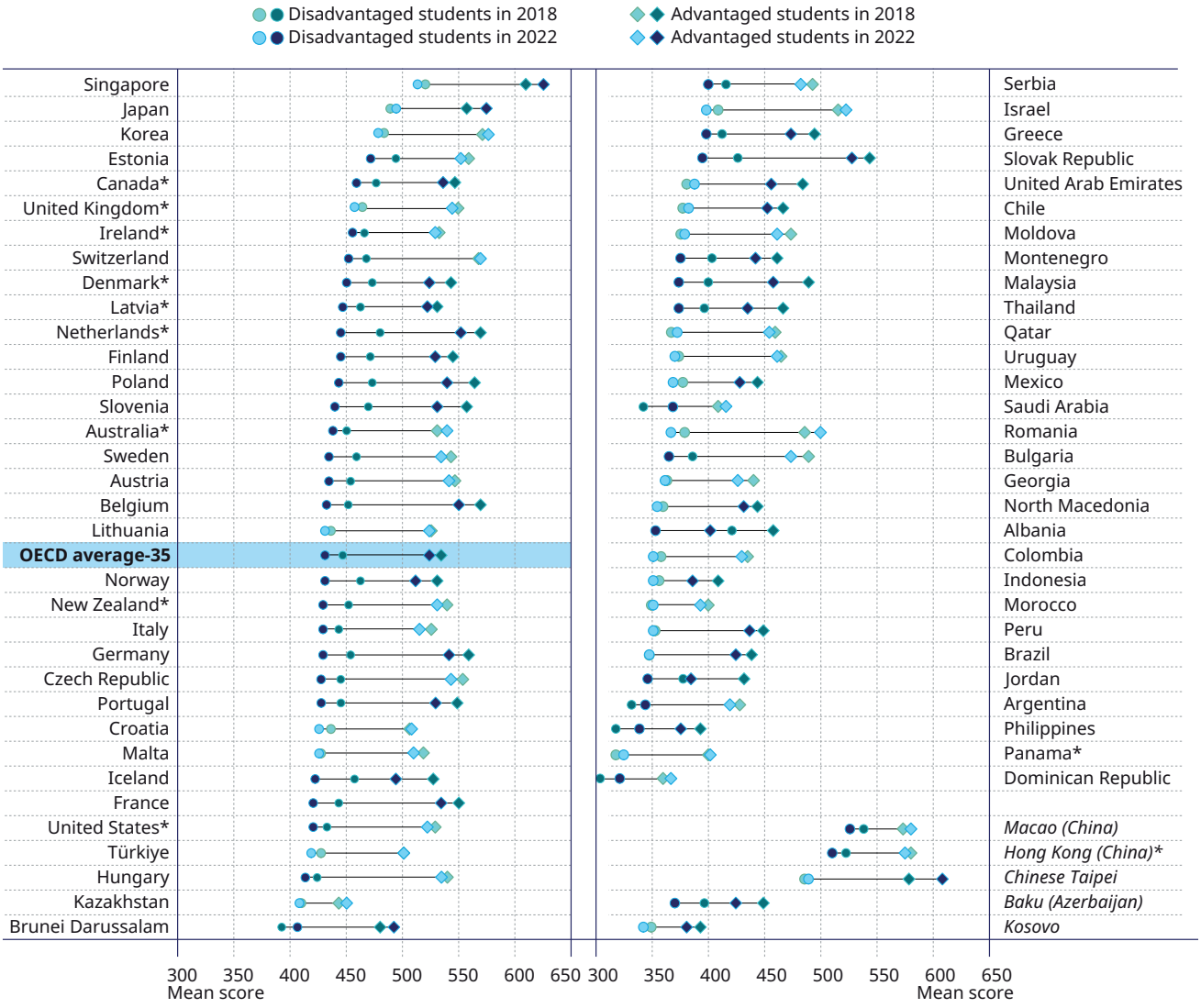
Some worry that directing efforts and resources towards low-performing students might come at the expense of high-performing students. However, PISA results show that countries can pull up low performers without adversely affecting others. Macao (China), Peru and Qatar are all systems that have had some success in elevating underperforming students without negatively impacting high achievers.

Interventions can also be targeted at socio-economically disadvantaged students and schools, where students' access to resources, opportunities and support systems can be more limited. These limitations create disparities in educational quality and hinder academic performance. On average, socio-economically disadvantaged schools were more likely to have poor quality or limited digital resources and materials. In comparison, advantaged students often have access to better support at home and to superior educational resources, including technological tools.

The disparity in educational opportunities faced by disadvantaged students can perpetuate cycles of inequality. In almost all countries and economies that participated in PISA 2022, disadvantaged students were less likely to attain the minimum level of proficiency in mathematics compared with peers in their country. However, the strength of the relationship between a student's socio-economic status and his or her performance varied greatly across countries and economies.

Actions that foster social mobility can help break cycles of poverty. By helping disadvantaged students transcend their circumstances, you give them a means to create a better future for themselves. This contributes to a skilled and educated workforce that support long-term economic growth and development.

Change between 2018 and 2022 in mean performance in mathematics by advantaged and disadvantaged students

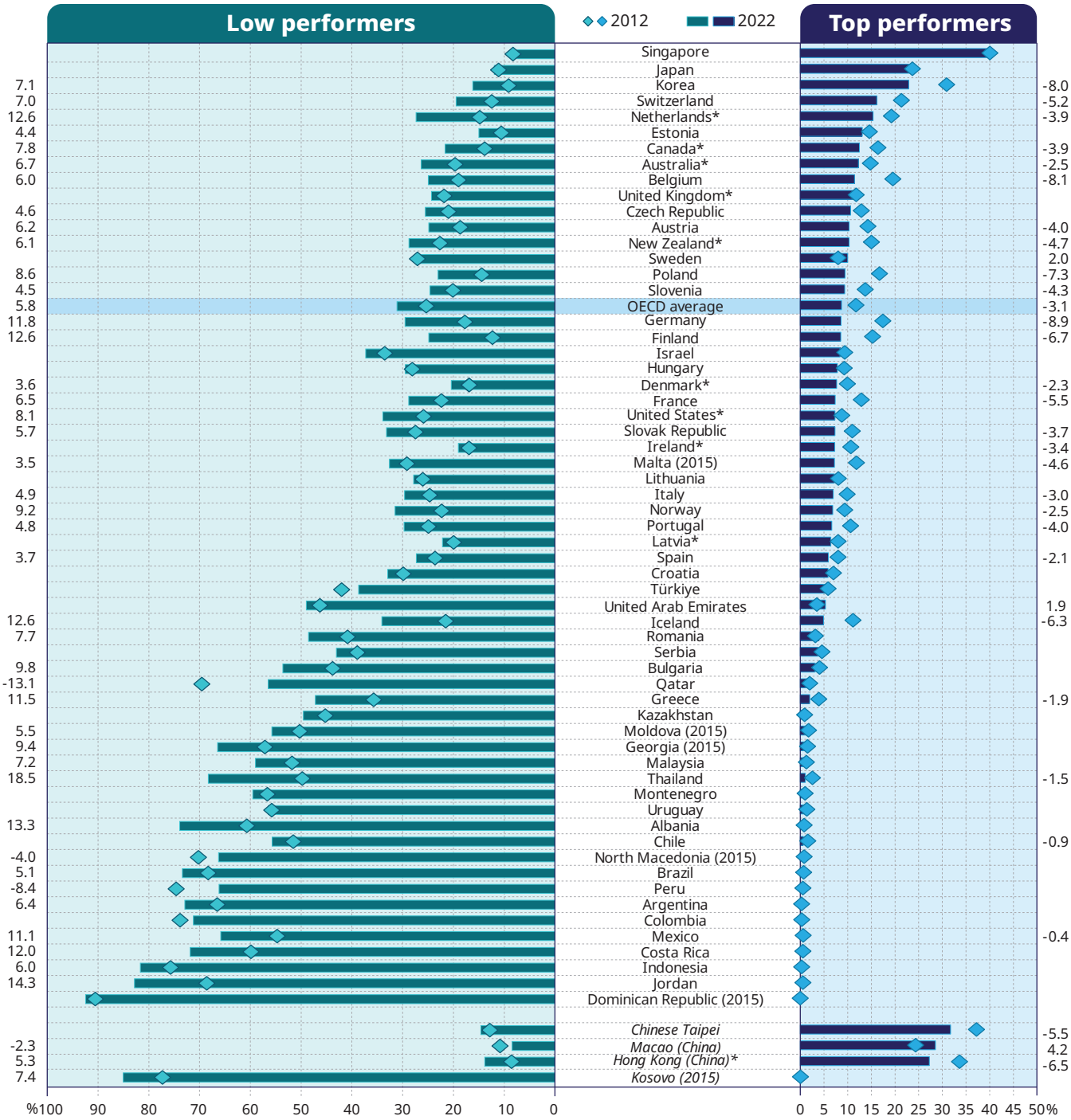


Notes: Only countries and economies that can compare PISA 2018 and 2022 results are shown.
Statistically significant differences are shown in a darker tone (see PISA Results Volume I Annex A3).
Socio-economic status is measured by the PISA index of economic, social and cultural status.
OECD average-35 refers to the average across OECD countries, excluding Costa Rica, Luxembourg and Spain.

Countries and economies are ranked in descending order of the mean score in mathematics of socio-economically disadvantaged students in 2022.

Source: OECD, PISA 2022 Database, Volume I Table I.B1.5.19 (Figure I.5.5).

Percentage of low and top performers in mathematics in 2012 and 2022



Notes: Only countries/economies that participated in the 2022 and either the 2012 or 2015 PISA assessments are shown.
When the base year is 2015, this is indicated next to the country/economy name.
The numbers on the left hand side indicate statistically significant changes between the base year and 2022 in the share of students performing below Level 2 in mathematics; the numbers on the right hand side indicate statistically significant changes in the share of students performing at or above Level 5.

Countries and economies are ranked in descending order of the percentage of students who scored at or above Level 5 in 2022.

Source: OECD, PISA 2022 Database, Volume I Table I.B1.5.1 (Figure I.6.5).

Equity and integration for migrant students

In recent years, millions of asylum – seekers – including an unprecedented number of children – have braved rough seas and barbed-wire barricades to find safety and a better life in other countries. Over two million new applications were lodged in OECD countries in 2022 alone. At the same time, permanent migration to OECD countries reached 6.1 million in 2022 – its highest level since at least 2005.

This has helped address significant labour and skills shortages but also led to many challenges, including strained social cohesion within some communities. Children with an immigrant background often encounter obstacles at school, including adjusting to new academic expectations, learning in a different language, and coping with pressures from family and peers. These difficulties are magnified when immigrants are segregated in poor neighbourhoods with disadvantaged schools.

PISA data show that in Austria, Denmark*, Finland, France, Germany, Greece, Iceland, Italy, the Netherlands*, Norway, Slovenia, Spain, Sweden, Chinese Taipei and Thailand about half of the immigrant students face socio-economic disadvantage.

So it should come as no surprise that there is a performance gap between students with an immigrant background and native-born students in most countries. The average maths performance difference across OECD countries in 2022 of immigrant versus native-born students was 29 score points. However, the gap reduced to 15 score points after considering socio-economic status and fell to just 5 score points when also considering the language spoken at home. This shows that much of the performance gap is reflecting social and language background rather than immigration history per se.

Are schools prepared to help immigrant students integrate into their new communities? And will they succeed in preparing all students for a world in which people are willing and able to collaborate with others from different cultural backgrounds? Many believe it is challenging do so.

But consider the following: results from PISA show no relationship between the share of students with an immigrant background in a country and the overall performance of students in that country. In fact, while they often face economic hardship, many immigrants bring a strong drive for education and valuable skills. This demonstrates their potential to contribute significantly to their host countries.

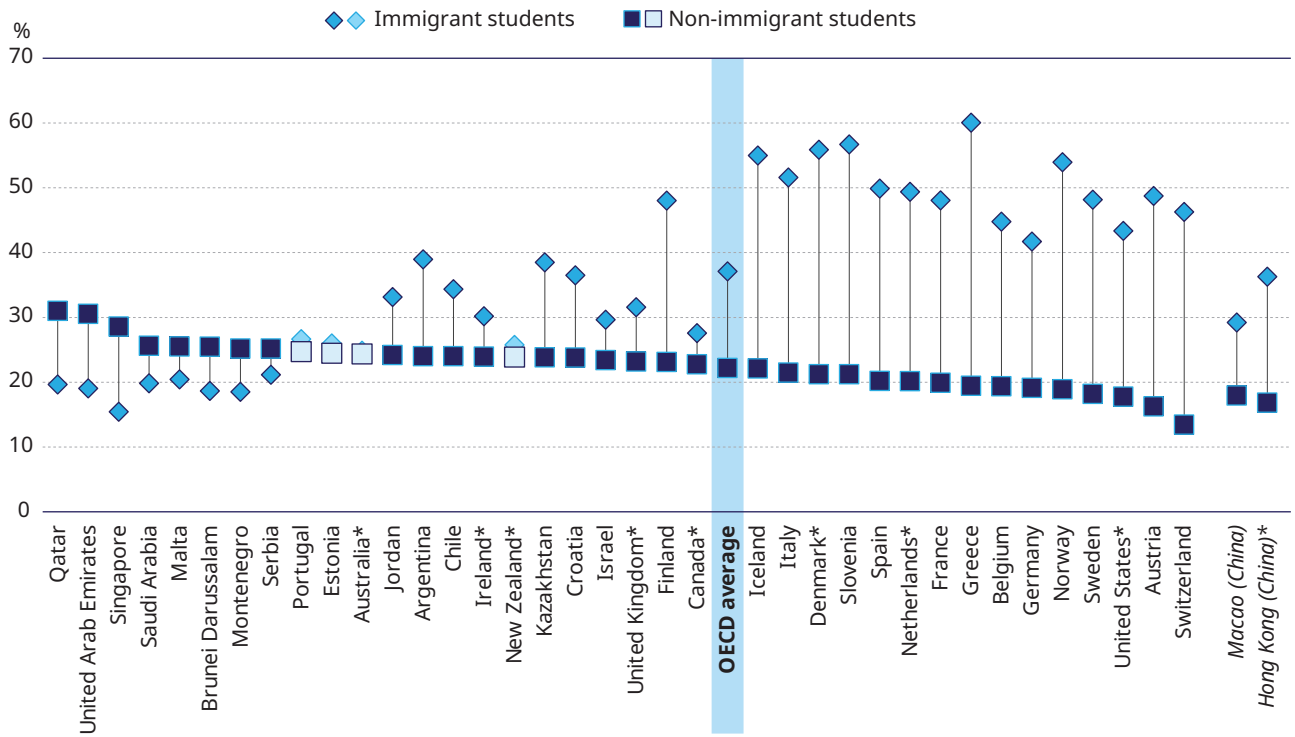
Even students with the same migration history and background show very different performance levels across countries. The education immigrants had acquired before migrating matters, but where immigrant students settle seems to matter much more. Country-level results for PISA 2022 have not yet been computed but analyses from PISA 2015 showed that children of Arab-speaking immigrants who settled in the Netherlands* scored 77 points – or the equivalent of over three school years – higher in science than students from the same countries who had settled in Qatar, even after accounting for socio-economic differences between the students. They also scored 56 points higher than their peers who had settled in Denmark*.

Students born in China who move elsewhere did better in PISA 2015 than their native peers in virtually every destination country; but here, too, the destination country matters. In Australia*, first-generation Chinese immigrants scored 502 points, similarly to their Australian peers, but second-generation Chinese immigrants scored 592 score points, well over two school years ahead of their Australian peers. In other words, and to the extent that social background adequately captures cohort effects, these immigrant students were able to benefit more from the Australian school system than Australian students without an immigrant background, even after accounting for the students' socio-economic status.

Overall, the large variation in performance between immigrant and non-immigrant students in different countries, even after accounting for socio-economic background and country of origin, suggests that policy can play a significant role in minimising those disparities.

The key is to dismantle the barriers that usually make it harder for immigrant students to succeed at school. Policy makers can choose to provide language support and high-quality early childhood education tailored to language development. Schools can avoid concentrating immigrant students in underachieving schools. They can also employ strategies such as attracting more advantaged students to these schools and offering extra support and guidance for immigrant parents. Simplifying access to information on school selection can also empower immigrant parents in supporting their children's education. This will help create a more just, cohesive, and prosperous society that values the contributions of all people.

Percentage of disadvantaged students by immigrant background



Notes: Statistically significant differences in share of disadvantaged students are shown in a darker tone (see PISA Results Volume I Annex A3).

Countries/Economies where less than 5% of students have an immigrant background are not represented in the figure.
Socio-economic status is measured by the PISA index of economic, social and cultural status.

Countries and economies are ranked in descending order of the share of disadvantaged students among non-immigrant students.

Source: OECD, PISA 2022 Database, Volume I Table I.B1.7.5 (Figure I.7.3).

Did you know...

...45% of students reported feeling nervous or anxious if their phones were not near them, on average across OECD countries.

Unlocking the potential of the digital world

While people have different views on the role of digital technology in schools, we cannot ignore how digital tools have fundamentally transformed the world. Everywhere, digital technologies are offering firms new business models and opportunities to enter markets and transform their production processes. Mobile apps enable people to track their health, computers help with boring or dangerous tasks, and games allow us to travel into virtual worlds.

Those who cannot navigate through this digital landscape are increasingly unable to participate fully in social, economic and cultural life. So it is good news that PISA shows the majority of students have embraced learning through digital technologies. On average across OECD countries, about three out of four students reported being confident using various technology, including learning-management systems, school learning platforms and video communication programmes.

This was not true of all countries and economies. For example, in Jordan, Morocco, the Philippines, the Palestinian Authority and Thailand, only half or less of students felt confident or very confident about using a video communication programme. But overall, in most parts of the world, students are largely using mobiles, computers and other devices as part of their educational experience.

Much of this change has occurred due to the pandemic, with schools forced to wake up to the power of digital technology. Remote lessons, digital tools and educational apps have radically transformed learning. One of the most visible benefits has been greater personalisation. For example, when students study maths on a computer, the computer can analyse how they learn and make their learning experience more granular, adaptive and interactive. Game-based learning can also make learning more fun. Computer simulations let students do things that are difficult or costly to do in the real world. It is more insightful to do an experiment in a virtual laboratory than simply listen to a teacher explain the results of a scientific experiment.

These and other innovations point towards new educational pathways. Nonetheless, it is crucial to acknowledge that adept reading skills remain indispensable for effective learning in digital settings, as most digital learning materials are text-based. Estonia, Finland, Italy, Sweden and Switzerland stand out as having students with reading skills above the OECD average and confidence in learning autonomously with digital devices. This indicates that these systems provide students with a solid foundation for effective remote and autonomous learning. Overall, students who were more self-assured in their ability to learn independently and remotely scored higher in all studied subjects; an advantage of 10 score points compared to their less confident peers.

Learning analytics hold perhaps the greatest promise of digital technologies. Teachers can now get a real sense of how different students learn, what interests them in lessons, and where they get bored or stuck. This helps teachers improve the overall quality of their teaching and gives them a much better sense of which students need extra support.

This is important as three out of ten students did not feel confident about completing schoolwork independently. This rose to more than 50% of students in Japan and Malaysia. A similar proportion of students, almost one in two, indicated they had problems motivating themselves to do schoolwork at least once a week. This was worse in certain countries and economies; for instance, in Australia* and the United Kingdom* six out of ten students reported having frequent problems to motivate themselves – more than double the share of students in Guatemala, Iceland, Indonesia, Kazakhstan, Korea, Moldova and Chinese Taipei.

Students need to take responsibility for their own development, but it is self-evident that some students will always need more support than others. Technology can assist students in their learning, but teachers need to be ready to lend an ear to students who need help or want to share their problems.

How smart phones and tablets can impact learning

The use of digital devices in schools is a contentious issue in many countries. While PISA shows a positive relationship between the intentional integration of technology in school education and student performance, devices used for leisure such as smart phones can distract from learning, expose students to cyber bullying and compromise their privacy. They are also highly addictive. On average across OECD countries, 45% of students reported feeling nervous or anxious if their phones were not near them.

The use of phones and other digital devices can also impact classroom learning. On average across OECD countries, 65% of students reported being distracted by using digital devices in at least some maths lessons. The proportion topped 80% in Argentina, Brazil, Canada*, Chile, Finland, Latvia*, Mongolia, New Zealand* and Uruguay. Just as importantly, across the OECD, 59% of students said their attention was diverted due to other students using phones, tablets or laptops in at least some maths lessons. Interestingly, only 18% of students in Japan and 32% in Korea reported this level of distraction.

Tellingly, digital distraction has a strong association with learning outcomes. Students who reported being distracted by other students using digital devices in some, most or every maths class scored 15 points lower in PISA maths tests than those who barely experienced this. This represents the equivalent of three-quarters of a year's worth of education, even after accounting for students' and schools' socio-economic profile.

The amount of time spent on digital devices at school also seems to have an effect. While learning outcomes were often better for students who used digital devices for learning between one to five hours a day than for those who never used them, students who used them more than an hour a day for leisure – social media apps, browsing the internet or games – saw a big drop in maths scores. On average across OECD countries, students who spent up to one hour a day at school on digital devices for leisure scored 49 points higher in maths than students whose

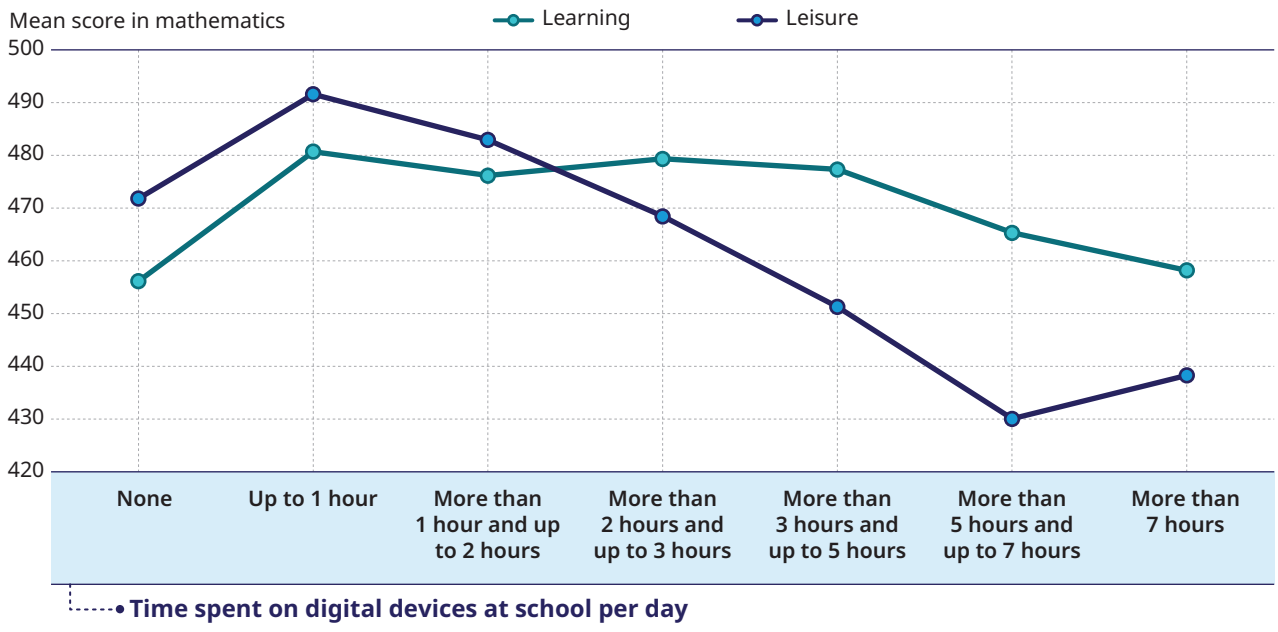
eyes were glued to their screens for between five and seven hours per day, after taking into account students' and schools' socio-economic profile.

So what can schools do? The challenge is to foster the purposeful and productive integration of digital technology into learning environments, while minimising their potential to distract. One option is to ban phones. PISA data show that in 13 countries and economies more than two-thirds of students attend schools where cell phone use is prohibited. These are Albania, Brunei Darussalam, Greece, Hong Kong (China)*, Jordan, Kosovo, Malta, Morocco, the Palestinian Authority, Saudi Arabia, Spain, United Arab Emirates and Qatar. Analysis shows that distractions in these countries are lower. However, on average across OECD countries, 29% of students in such schools reported using a smartphone several times a day. A further 21% reported using a phone nearly daily or on a daily basis at school. It seems schools can ban phones, but they are not always effectively enforced.

Interestingly, students in schools with phone bans in some countries were less likely to turn off their notifications from social networks and apps when going to sleep. One explanation is that prohibiting mobiles at schools might lead to students being less capable of adopting responsible behaviour in regard to phone use.

Time spent on digital devices at school and mathematics performance

Based on students' reports; OECD average

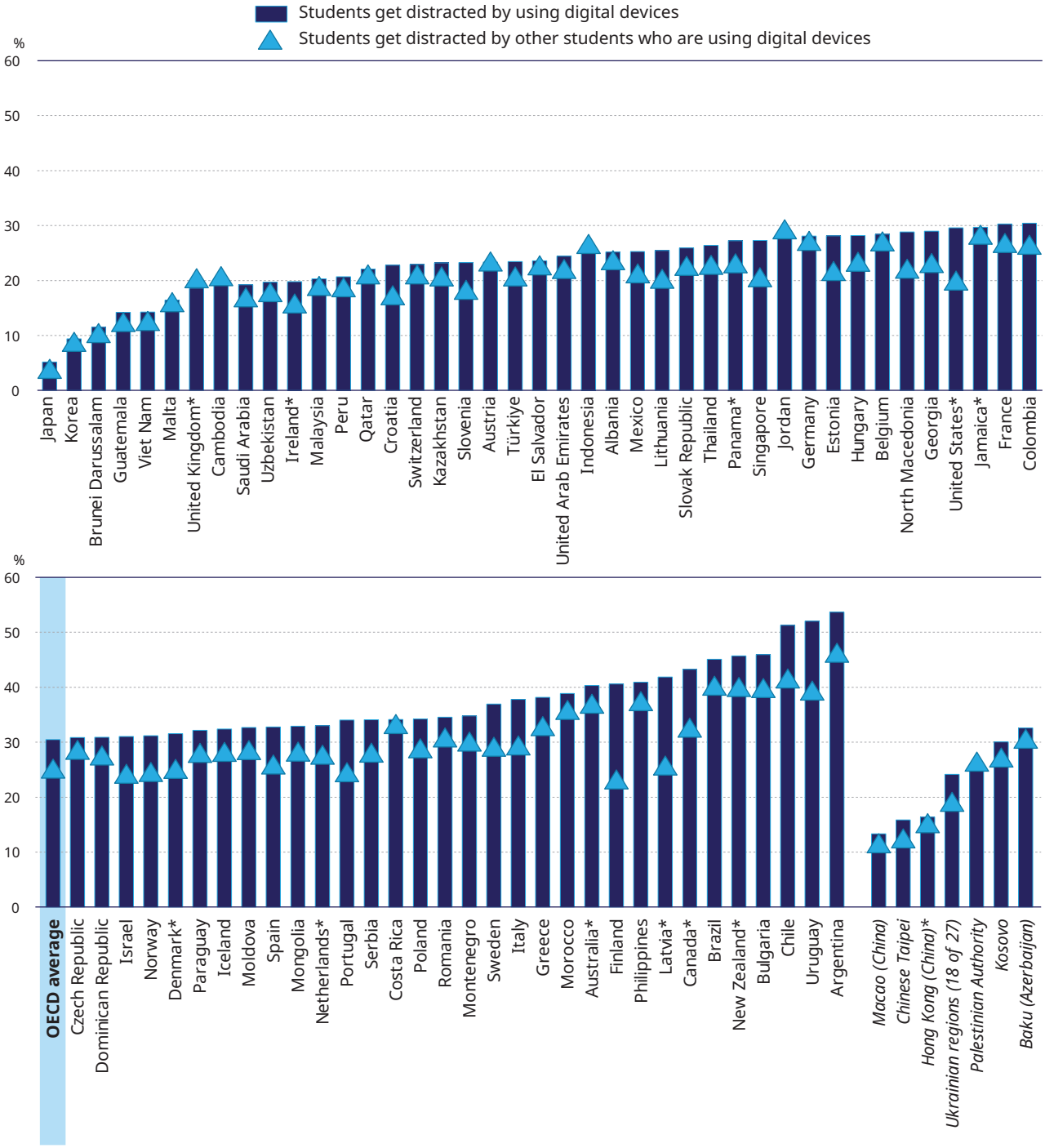


Note: Differences between categories are all statistically significant (see PISA Results Volume II Annex A3).

Source: OECD, PISA 2022 Database, Volume II Annex B1, Chapter 5 (Figure II.5.14).

Distraction from digital devices in mathematics lessons

Percentage of students who reported that the following happens in every or in most of their mathematics lessons



Countries and economies are ranked in ascending order of the percentage of students who reported that they get distracted by using digital devices.

Source: OECD, PISA 2022 Database, Volume II Annex B1, Chapter 3 (Figure II.3.4).

Did you know...

...Seven out of ten students reported that they regularly received extra help from teachers in 2022, while 22% of students reported getting help in some lessons. Around 8% never or almost never received additional support, across the OECD.

Are teachers doing enough to support children?

The amount of time a teacher can dedicate to individual children's needs is an important component of effective teaching. But PISA data show that teacher support has deteriorated over the last decade, at least in the perception of students. On average across OECD countries, the share of 15-year-olds who reported that students get extra help from their teacher when needed in most or every lesson dropped by an average of three percentage points.

It is not clear why. Is it the result of teachers not having enough time? Is the problem with certain teachers, who simply do not do as good a job as their colleagues? Or is it because the needs of students, real or perceived, have increased?

Overall, seven out of ten students reported that they regularly received extra help from teachers in 2022, while 22% of students reported getting help in some lessons. Around 8% never or almost never received additional support. Related to this, more than 35% of students reported that teachers did not regularly show an interest in every student's learning, on average across OECD countries, and failed to ensure all students understood the content.

The effectiveness of education can never exceed the quality of teaching and teacher support. PISA data show that this is particularly true in times of disruption: The availability of teachers to help students in need had the strongest relationship to mathematics performance across the OECD, compared to other experiences linked to COVID-19 school closures. Maths score were 15 points higher on average in places where students agreed they had good access to teacher help. These students were also more confident than their peers to learn autonomously and remotely. In a pandemic with numerous school closures, access to a supportive teacher who takes the time to give individual instruction can make a huge difference. The data suggest that far too many teachers failed to give students adequate support.

This is backed up by other PISA findings. Maths results declined between 2018 and 2022, on average across the OECD, in education systems where principals reported a rise in teaching hindrance due to inadequate or poorly qualified teaching staff. In contrast, systems where more teachers were fully certified by an appropriate authority tended to score higher in mathematics, even after accounting for per capita GDP, across OECD countries.

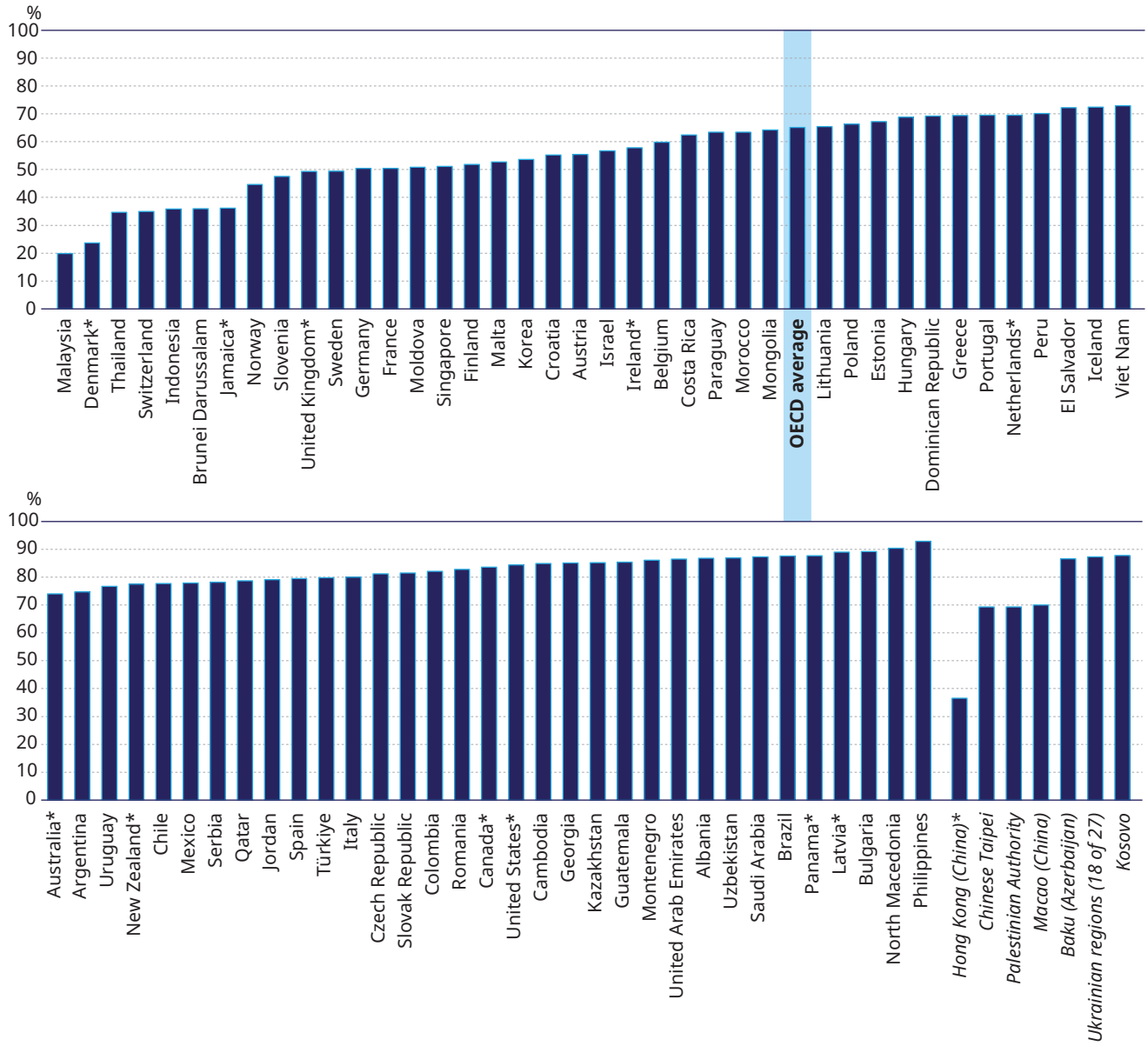
In 32 countries and economies, students' maths scores were lower in schools whose principal reported staff shortages compared to schools without staffing issues. However, 35 countries and economies saw no statistically significant difference between schools with or without shortages.

Paradoxically, even though principals in 2022 perceived a greater shortage of teachers, PISA data show that between 2018 and 2022, student-teacher ratios and class sizes actually decreased on average across OECD countries and remained mostly stable elsewhere.

What does this mean going forward? It is important for education systems to examine this apparent contradiction: the sense that there are more teacher shortages even though the number of teachers per student has often risen or at least remained stable. Other notions or phenomena might be feeding this perception. Teacher absenteeism, the idea that teachers are not sufficiently qualified, or the changing role of teachers could all be a factor. Given the fast pace of change in education, expectations for teachers may also have changed. In turn, this could have altered the standards against which teacher supply and performance are measured.

Percentage of students whose parents receive information about their child's performance and school at least once a month

Based on principals' reports

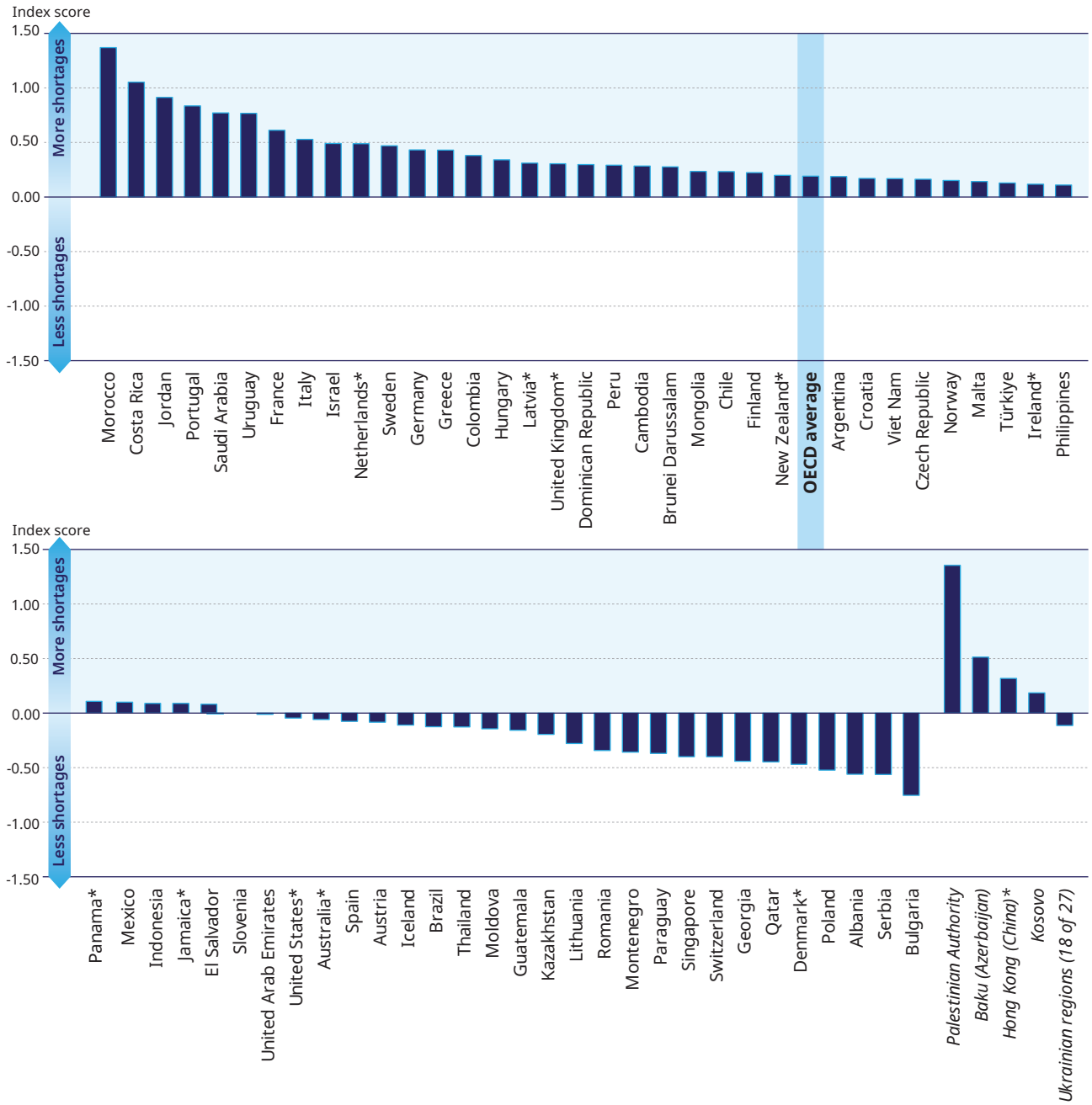


Countries and economies are ranked in ascending order.

Source: OECD, PISA 2022 Database, PISA Results Volume II Annex B1, Chapter 6 (Table II.6.2).

Shortages of education staff

Based on principals' reports



Notes: Higher values in the index indicate greater shortages of education staff.

Countries and economies are ranked in descending order of the index of shortage of education staff.

Source: OECD, PISA 2022 Database, Volume II Annex B1, Chapter 5 (Figure II.5.4).

Too hungry to learn?

Many parts of the world are experiencing a food crisis with families struggling to put food on the table. PISA results show that millions of students, including from some of the richest countries, are often struggling to get fed.

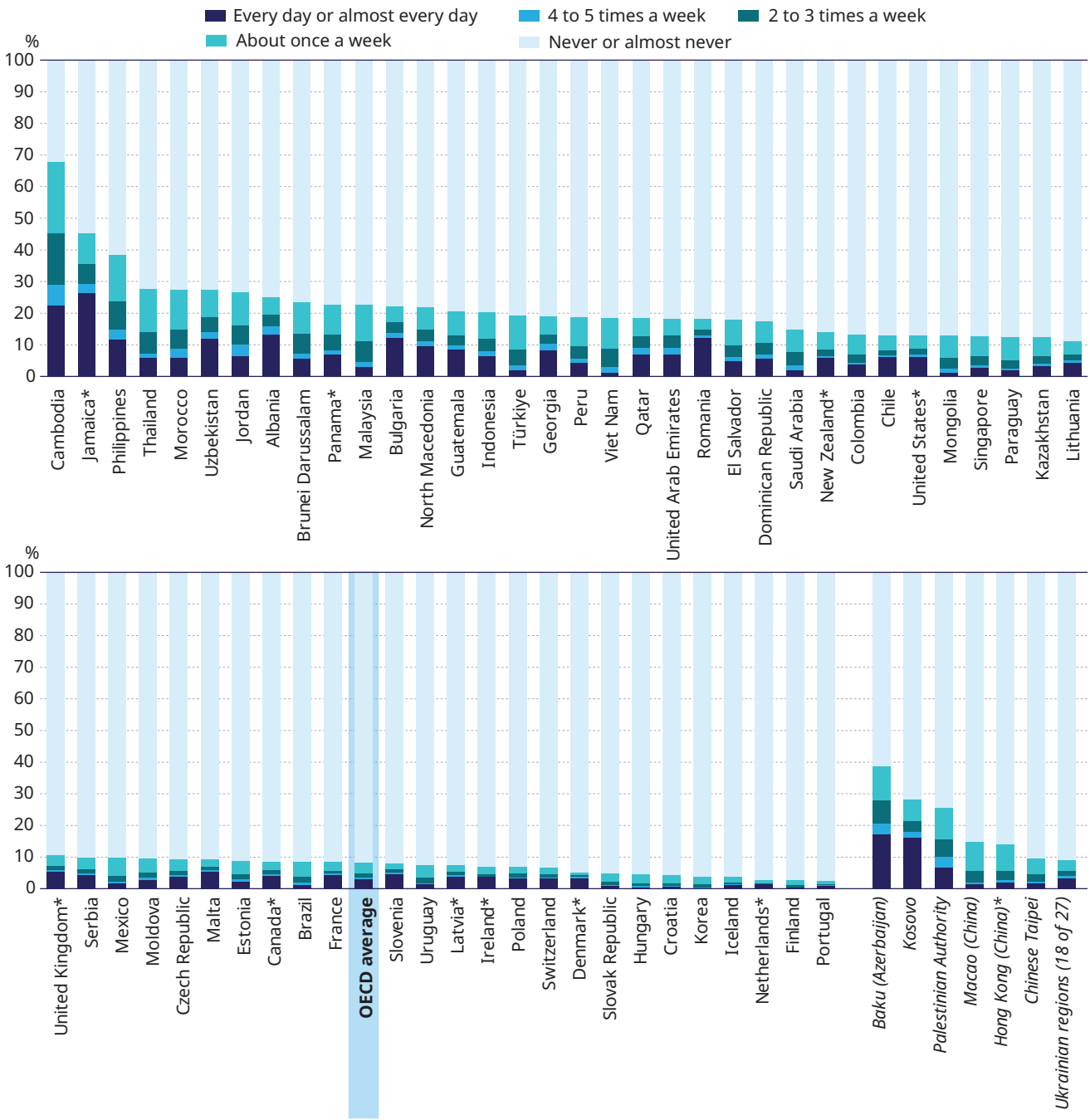
On average across OECD countries, 8% of students reported not eating at least once a week in the past 30 days due to lack of money to buy food. Some OECD countries have far lower proportions, notably Portugal, Finland and the Netherlands* were all below 3%. However, elsewhere food insecurity was much higher. In the United Kingdom* and Lithuania 11% of students said they were forced to skip meals. The figures were even more elevated in other OECD members, for example the United States*, Chile, and Colombia (all 13%), New Zealand* (14%) and Türkiye (19%).

If students' bellies are rumbling, they are unlikely to learn as effectively. As millions turn to food banks and community programmes to help put food on the table, schools can help.

Many countries already provide school meal programmes. They are a safety net for vulnerable children and households. Policy makers should consider the potential significance of providing a regular, nutritious meal as a cost-effective way of ensuring students get the food they need.

With rising food, rent and energy bills in many parts of the world, families are forced to make tough choices. Free lunches can attract more children to attend school, enable them to learn better and help maintain their health.

Percentage of students not eating in the past 30 days because not enough money to buy food

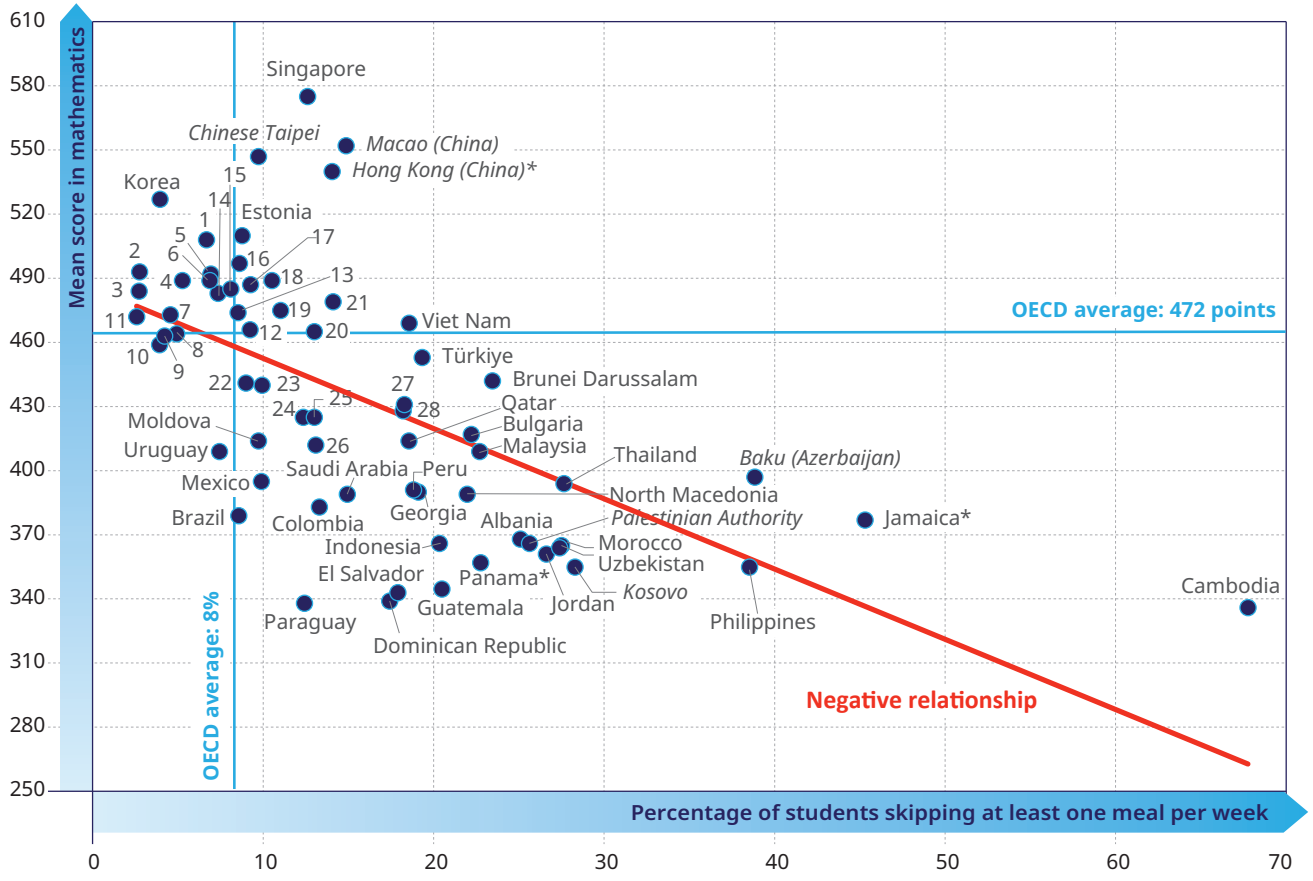


Notes: Only countries and economies with available data are shown.

Countries and economies are ranked in descending order of the percentage of students who did not eat at least once a week in the past 30 days, because there was not enough money to buy food.

Source: OECD, PISA 2022 Database, Volume I Table I.B1.4.46 (Figure I.4.6).

Students' average mathematics scores compared to the percentage skipping at least one meal per week



1. Switzerland
2. Netherlands*
3. Finland
4. Denmark*
5. Ireland*
6. Poland
7. Hungary
8. Slovak Republic
9. Croatia
10. Iceland
11. Portugal
12. Malta
13. France
14. Latvia*
15. Slovenia
16. Canada*
17. Czech Republic
18. United Kingdom*
19. Lithuania
20. United States*
21. New Zealand*
22. *Ukrainian regions (18 of 27)*
23. Serbia
24. Kazakhstan
25. Mongolia
26. Chile
27. United Arab Emirates
28. Romania

Note: Only countries and economies with available data are shown.

Source: OECD, PISA 2022 Database, Tables I.B1.2.1 and I.B1.4.46.

“

Did you know...

... PISA uses real life problems to assess students' abilities through multiple-choice and open-ended questions. Students also answer a background questionnaire about themselves, their learning attitudes and their homes.

Money matters, up to a point

Debates about educational funding and in what areas the money is spent have raged for decades. The data consistently show that student performance can be influenced by how poor or rich a country is, and that a base level of spending in education gives a better chance of having an effective education system. In effect, spending more per student will lead to better results. However, this correlation only works up to a point. There is a positive relationship between investment in education and average performance up to a threshold of USD 75 000 in cumulative spending per student from age 6 to 15. After this level, there is almost no relationship between extra investment and student performance.

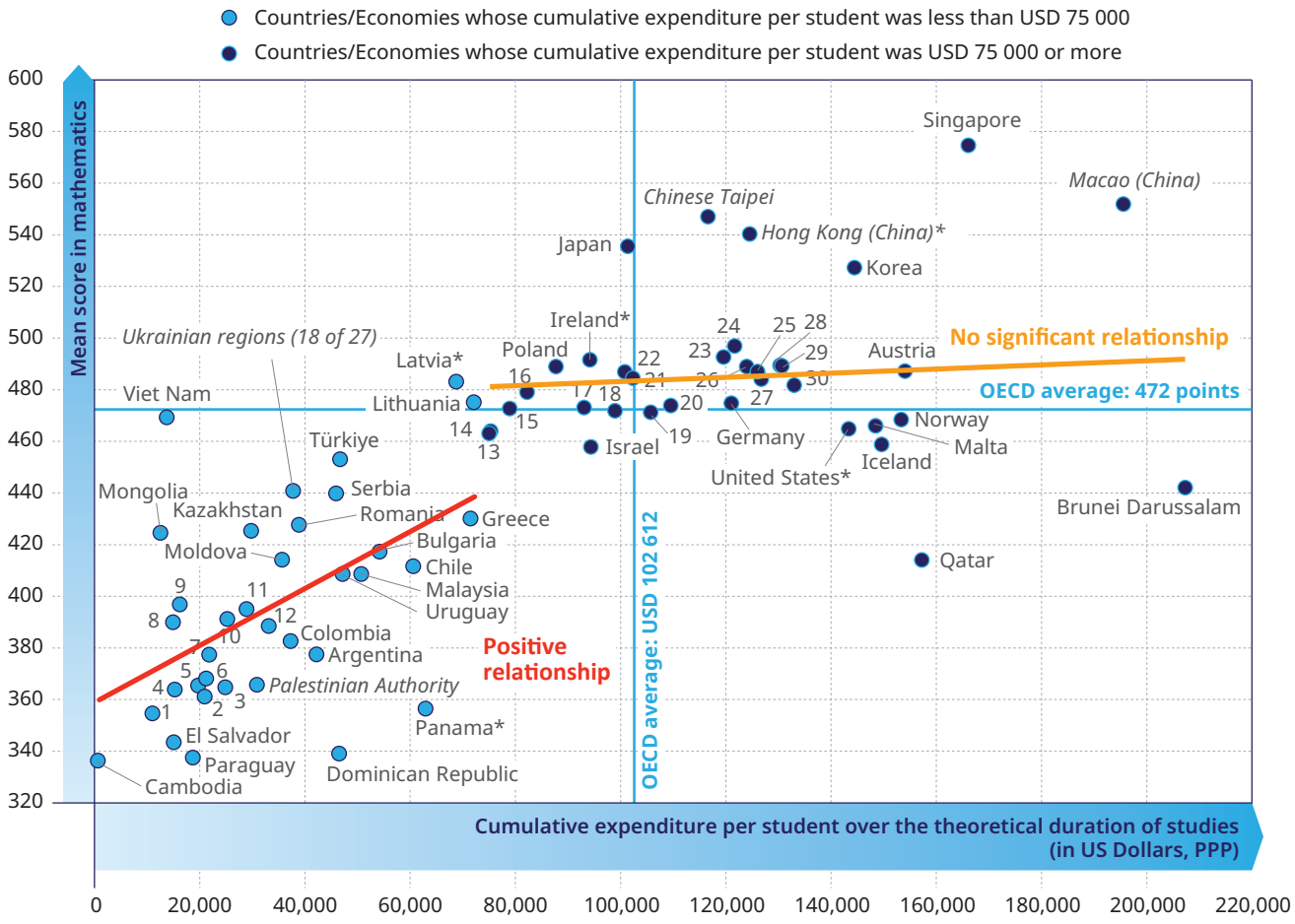
For example, in the United States* the cumulative expenditure per student, over ten years between ages 6 to 15, was equivalent to about USD 143 400. Yet its maths, reading and science scores are behind Japan, which spends almost 40% less.

What should policymakers learn from this? It is self-evident: simply throwing money at schools is not going to fix education. How you spend the money, is far more important. Countries committed to establishing a top-tier education system can attain this objective, even amidst challenging economic conditions. Typically, they prioritise the quality of teaching over the size of classes and provide funding mechanisms that align resources with needs.

It is also important to point out that, contrary to some views, spending on education has increased in recent years while outcomes have largely not improved. Despite competing demands for resources, expenditure per student from primary to tertiary education grew at an average annual rate of 1.7% in real terms across OECD countries between 2012 and 2019. A year later, from 2019-2020, average total expenditure increased by 0.4%

The bottom line: average student ability in maths, reading and science has gone down across the OECD during a period when expenditure on schooling has been on the rise. While the debate about where to focus educational resources and the outcomes they achieve will continue, perhaps more attention should be paid to ensuring education systems deliver greater value for money.

Mathematics performance and spending on education



1. Philippines	6. Albania	11. Mexico	16. New Zealand*	21. Slovenia	26. Australia*
2. Jordan	7. Jamaica*	12. North Macedonia	17. Spain	22. Czech Republic	27. Finland
3. Morocco	8. Georgia	13. Croatia	18. Portugal	23. Netherlands*	28. Belgium
4. Uzbekistan	*9. Baku (Azerbaijan)*	14. Slovak Republic	19. Italy	24. Canada*	29. Denmark*
5. Indonesia	10. Peru	15. Hungary	20. France	25. United Kingdom*	30. Sweden

Notes: Only countries and economies with available data are shown.
PPP means Purchasing power parity.

Source: OECD, PISA 2022 Database, Volume I Tables I.B1.2.1 and I.B3.2.2 (Figure II.5.2).

Why parents and families matter

Parents are the first educators of children. From potty training to learning how to read, they play a crucial role in a child's early development and learning. However, sending them off to school should not be the end of parental involvement. Far from it. PISA data show that students who were supported at home had more positive attitudes towards school and learning.

Across OECD countries, higher-performing students who reported regularly eating a main meal with their family, whose family members spend time talking to them and asking about their school day, were more likely to have high test scores. They scored 16 to 28 points higher in maths than students who reported that their family do not engage in those activities at least once or twice a week. This takes into account students' and schools' socio-economic profile and shows that while family income and social status can have an impact, the level of active support that parents offer their children might have a decisive effect.

Other PISA data back this up. Overall, education systems with positive trends in parental engagement in student learning between 2018 and 2022 showed greater stability or improvement in maths. This was particularly true for disadvantaged students.

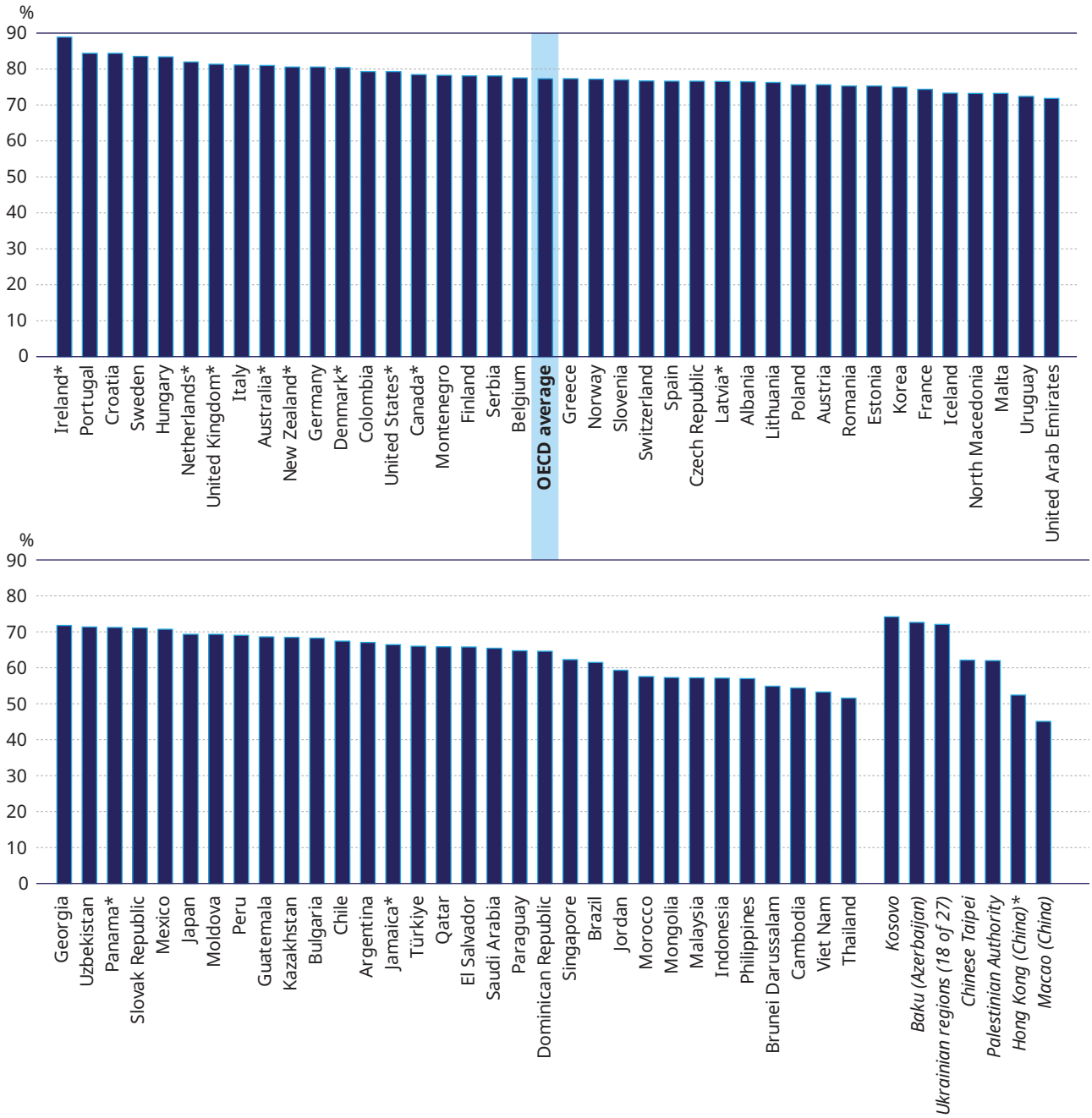
This being said, in most education systems parental involvement in students' learning at school decreased substantially between 2018 and 2022. On average across OECD countries, the share of students in schools where most parents independently initiated discussion about their child's progress with a teacher shrank by 10 percentage points. Similarly, teacher-initiated talks about students' progress decreased by eight percentage points. In most countries and economies there is less, not more, parental engagement.

A few places buck the trend. In Macao (China), Mexico and Romania, parent-initiated discussions with teachers went up. More parents were involved in teacher-initiated discussions in Brunei Darussalam, the Dominican Republic, Georgia, Qatar, Saudi Arabia and the United Arab Emirates.

But the overall picture is worrying. Parents must avoid the misconception that their children's education solely relies on the efforts of teachers. Meanwhile, schools should ensure that teachers consistently engage with parents on a more regular basis. By building stronger family-school partnerships, children will benefit. When parents and teachers work together in harmony, it can foster a more comprehensive and effective learning environment.

Percentage of students whose family regularly asks about school

Percentage of students who reported that at least once or twice a week their parents or someone in their family asks them what they did in school that day



Countries and economies are ranked in descending order of the percentage of students.

Source: OECD, PISA 2022 Database, Volume II Annex B1, Chapter 3 (Figure II.3.18).

Boys top at maths, girls lead in reading

For decades, the gender gap in education has slowly narrowed in OECD countries. However, that has not translated into equal pay. Women earn 11.9% less than men, on average, across the OECD. This means a woman working full-time makes around 88 cents for every dollar or euro a full-time working man makes at median earnings.

Why is the gap so big? One factor is educational choices. Girls often choose subjects that lead to lower-paid jobs and less prestigious jobs. The fact is careers involving maths and science are often associated with significantly higher wages, but these are still very much male-dominated domains.

Conventional wisdom asserts that boys are better than girls at mathematics; but boys outperformed girls in maths by only nine score points on average across OECD countries. Looking at the broader global picture, boys were less dominant: they managed to outperform girls in maths in around half of the 81 countries and economies that participated in PISA. In 17 countries and economies, girls came out on top. Girls scored higher than boys on average in Albania, Baku (Azerbaijan), Brunei Darussalam, Cyprus, the Dominican Republic, Finland, Indonesia, Jamaica*, Jordan, Malaysia, Mongolia, Morocco, North Macedonia, the Palestinian Authority, Philippines, Qatar and the United Arab Emirates. So it is a mixed picture and the gender gap itself has not significantly changed compared to 2018. Fifty-seven out of 72 countries and economies with comparable data saw no change in the gender gap in maths performance.

This is not true in all places. The biggest change was in Israel, where boys' performance remained the same but girls dropped by 15 score points. The gender gap also widened in Chile, Hong Kong (China)*, Macao (China) and Malta because girls' performance declined while boys' performance did not change.

In contrast, girls performed better than boys in reading by 24 score points. In fact, girls outshone boys in reading almost everywhere, apart from Costa Rica and Chile, where the difference in reading scores was not statistically significant.

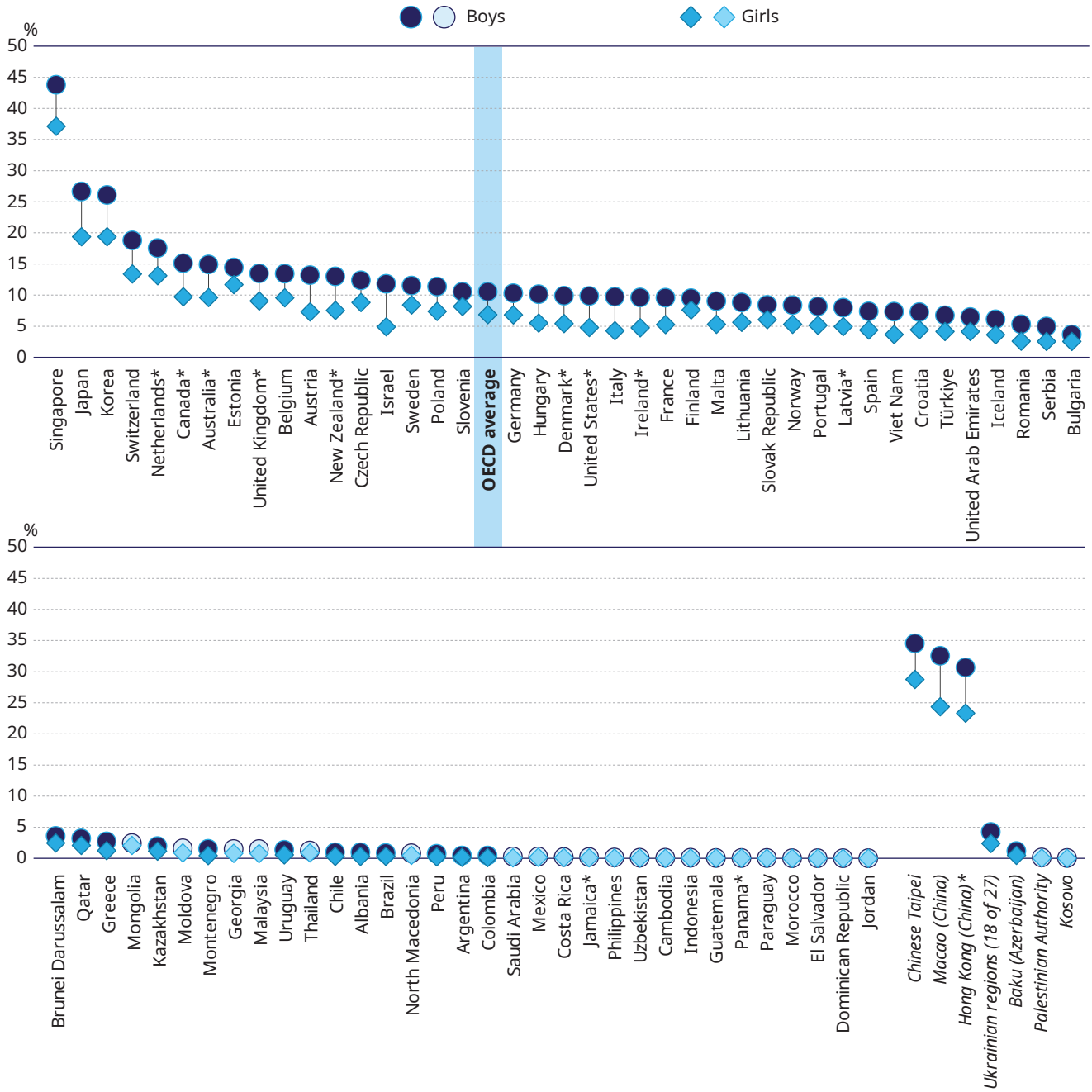
Girls' dominance in reading is across the board. The weakest-performing girls outperformed the weakest-performing boys by a large margin, by 34 score points on average across OECD countries. At the same time, the highest-performing girls also outperformed the highest-performing boys, by 14 score points. Similar gender gaps were seen in most other countries and economies.

So what does this mean for longer-term labour market trends? While, on average, young women in OECD countries are more likely to obtain higher educational attainment than young men, this is not translating to higher paying careers. The subjects they study in school is an important factor that must not be overlooked. Young men are still more likely than young women to graduate in Science, Technology, Engineering and Mathematics (STEM) studies, which often lead to more lucrative job prospects.

While it holds true that educational decisions are typically influenced by attitudes rather than inherent abilities, addressing the gender pay gap necessitates a focus on encouraging young women to explore diverse fields. Altering societal norms that impact educational choices is a gradual process. Yet, if more young women opt for STEM disciplines and subsequently pursue higher-paying careers, the goal of wage parity between genders might not be as distant as it seems.

Top performers in mathematics, by gender

Percentage of students who scored at proficiency Level 5 or above in mathematics, by gender



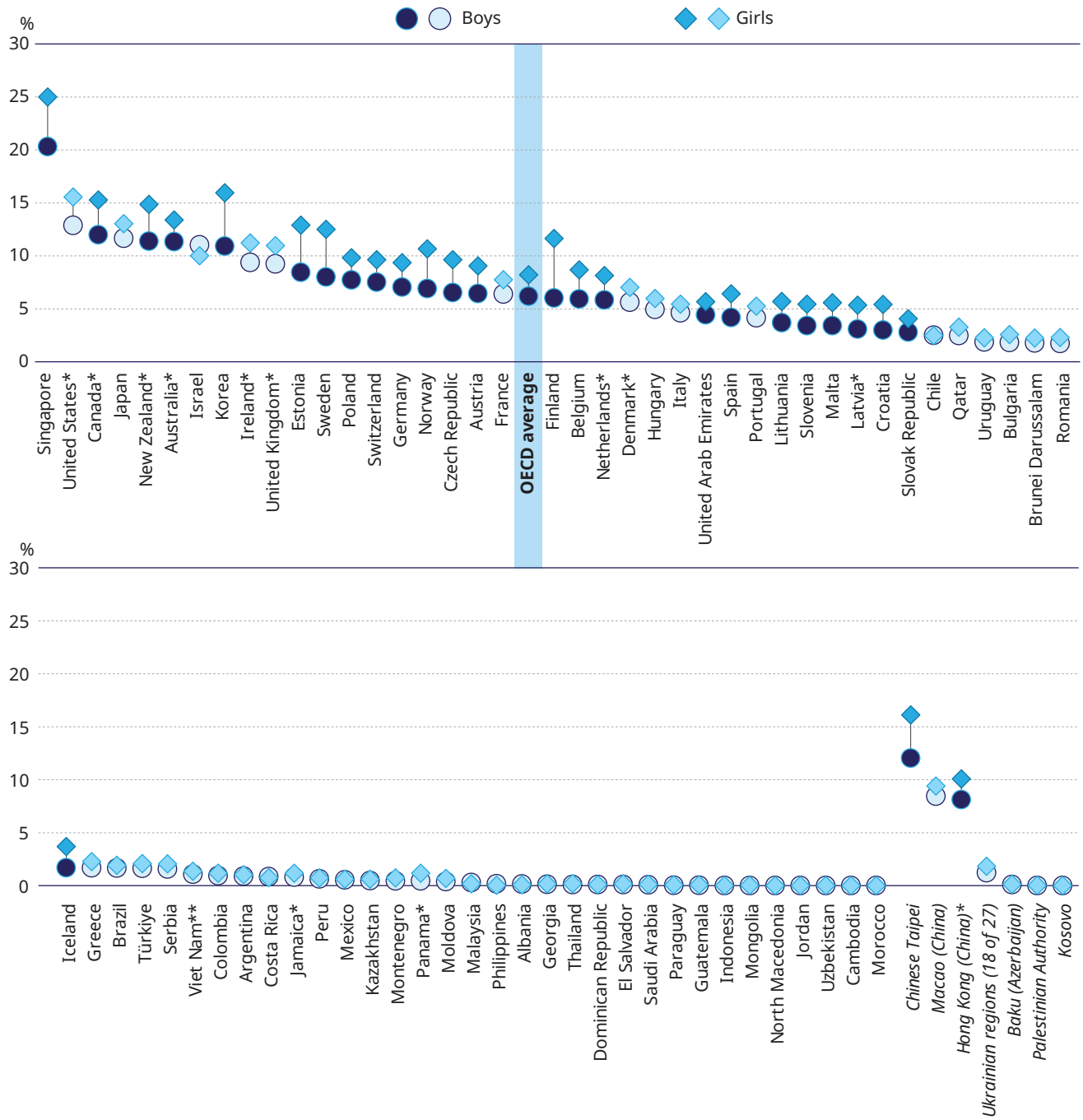
Notes: Statistically significant differences are shown in a darker tone (see PISA Results Volume I Annex A3).

Countries and economies are ranked in descending order of the percentage of top-performing boys in mathematics.

Source: OECD, PISA 2022 Database, Volume I Table I.B1.4.31 (Figure I.4.11).

Top performers in reading, by gender

Percentage of students who scored at proficiency Level 5 or above in reading, by gender



** 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).

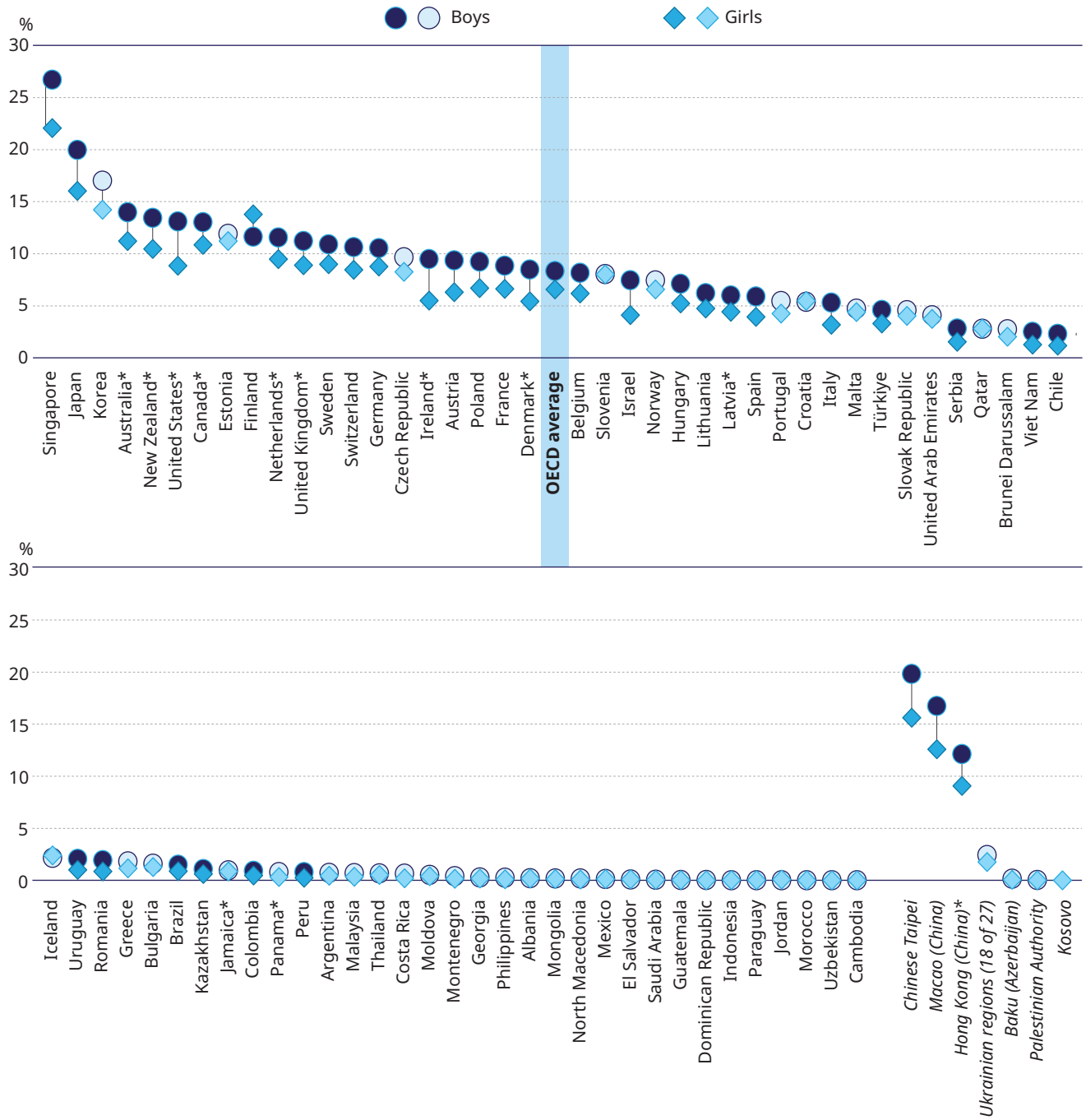
Notes: Statistically significant differences are shown in a darker tone (see PISA Results Volume I Annex A3).

Countries and economies are ranked in descending order of the percentage of top-performing boys in reading.

Source: OECD, PISA 2022 Database, Volume I Table I.B1.4.32 (Figure I.4.12).

Top performers in science, by gender

Percentage of students who scored at proficiency Level 5 or above in science, by gender



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

Countries and economies are ranked in descending order of the percentage of top-performing boys in science.

Source: OECD, PISA 2022 Database, Volume I Table I.B1.4.33.

“

Did you know...

... The average OECD scores in 2022 were 472 in maths, 476 in reading and 485 in science. These scores were at the upper end of PISA Level 2 in maths and reading while at the lower end of PISA Level 3 in science.

The impact of bullying on learning

Bullying can have a devastating impact on the mental and physical health of young people. It can also be a major barrier to learning, with bullied children more likely to miss lessons, be excluded from school and experience depression.

So policymakers should be concerned that in 2022 one in five students reported being bullied at least a few times a month, on average across OECD countries, with 8% being bullied regularly. In some places, the frequency was greater. More than 15% of students were regularly bullied in Brunei Darussalam, Jamaica*, Jordan, Morocco, the Palestinian Authority, the Philippines, Qatar and the United Arab Emirates. In contrast, Italy, Japan, Kazakhstan, Korea, the Netherlands*, Portugal and Chinese Taipei saw much lower percentages of frequent bullying behaviour (5% or less).

The type and frequency of bullying - from the spreading of nasty rumours, online abuse and violent attacks - varied greatly across countries. In the Philippines and Jamaica, for example, more than 10% of students reported being threatened by other students. In contrast, only 1% of students in Japan, Korea and Chinese Taipei reported the same.

One positive aspect of the data is the global trend. In recent years, the incidence of bullying has been on the rise. However, PISA results show a break in this upward momentum, with various forms of bullying dropping by two to three percentage points on average across OECD countries between 2018 and 2022.

This is obviously a good thing. However, there are big country differences. For example, bullying where students were made fun of dropped by ten percentage points in Baku (Azerbaijan), Brunei Darussalam and the Philippines. But the number of students being bullied in this manner in France, Moldova and Türkiye grew by two percentage points.

The impact of bullying on learning is potentially evident in the data. PISA results show that maths performance of students – particularly of disadvantaged students - improved in education systems where bullying decreased in contrast to other systems. For example, the percentage of students who reported being made fun of shrank by 5 to 12 percentage points in Brunei Darussalam, the Dominican Republic and Saudi Arabia. At the same time, average maths scores in these systems improved by 12 to 16 points. The improvement seen in disadvantaged students' performance was even better, going up 13 to 27 score points.

This again emphasises the potential detrimental effects of bullying on student learning. Students who are lonely, unhappy or frightened are unlikely to excel in a classroom. When schools successfully tackle bullying behaviour, it can have a positive academic impact. PISA data show that students in high-performing and cohesive education systems reported feeling safer and less exposed to risks and bullying at school.

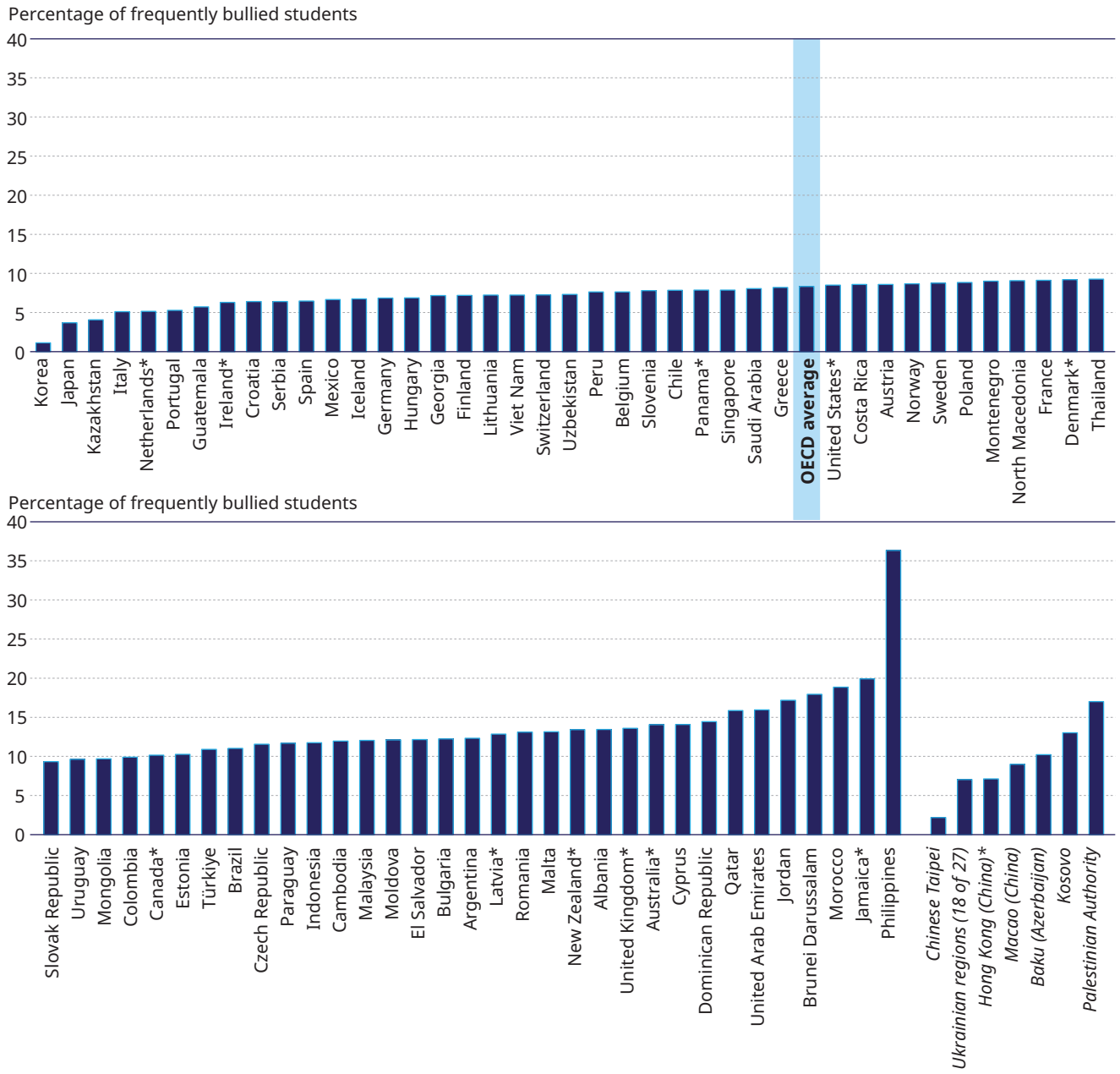
Bullying can have long-lasting effects on victims, which can include depression, physical illness and suicidal thoughts. In some cases, repeated bullying has led victims to kill themselves. That is why this problem still requires focused attention. Anti-bullying initiatives typically aim to raise awareness of bullying, improve surveillance of the problem, and engage teachers, students and parents to assist victims and deal with the bullies. Local factors will always need to be taken into account, but a consistent and committed approach to tackling bullying is vital for students' mental and physical heath which, if ignored, can have long term and far-reaching consequences.

As a result, policy makers, principals and teachers need to devise effective policies and practices to limit bullying. Previous OECD studies suggest, in particular, that:

- Early signs of bullying should not be overlooked.
- Students and teachers should be taught how to recognise and respond to bullying.
- All types of bullying need to be taken seriously, including the less "visible" ones, such as relational forms of bullying.
- Monitoring students' attitudes towards bullying can provide valuable insights into how to address bullying.
- Changing bystanders' reactions to bullying may be an effective way of reducing the number of bullying incidents.
- Establishing clear anti-bullying rules and creating a positive school climate, where students feel engaged and socially connected, is essential to preventing bullying.
- Communication with parents of the bullied students and the bully him/herself is important.

Students' exposure to bullying

Based on students' reports



Notes: A student is frequently bullied if he or she is in the top 10% of the index of exposure to bullying across all countries/economies.

Countries and economies are ranked in ascending order of the percentage of frequently bullied students.

Source: OECD, PISA 2022 Database, Volume II Table II.B1.3.30.

“

Did you know...

... That 20 points in PISA tests is roughly equivalent to one year of schooling.

The power of emotional intelligence

Social and emotional skills play a critical role in the development of children, nurturing their growth as well-rounded individuals. PISA data show that social and emotional aspects are also related to student performance in mathematics.

On average across OECD countries, students that were curious or persistent scored around 11 points more in maths. Students who were better able to control their emotions or were stress resistant also outperformed their peers by around six points. The findings highlight how cognition and emotion are intwined ingredients of academic success. While the relationship might be small, even limited effects can have a major impact on outcomes over time.

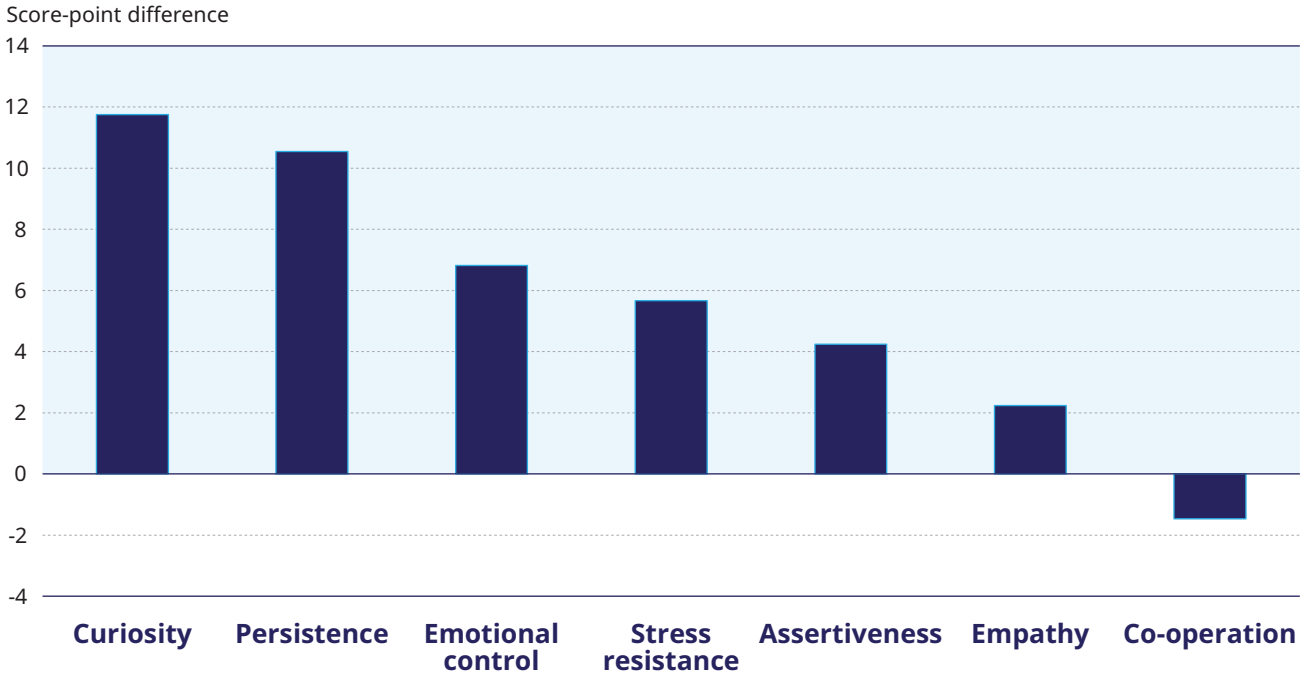
As well as performing better, students with high social and emotional skills were more engaged in remote learning, though the causal nature and direction of these effects cannot be discerned from the data. During a period such as the COVID-19 pandemic, where school shutdowns were common, this again can make a difference to student performance.

Engaging with all students is not necessarily easy. Adolescence is a time of rapid change, where teenagers are navigating the complex terrain of identity formation, peer relationships and academic challenges. But by cultivating social and emotional skills within the educational framework, schools can help support students' personal, academic and future professional success.

Beyond the classroom, these skills are increasingly valued in the modern workforce. Employers seek individuals who can collaborate, communicate effectively, and adapt to dynamic work environments. By fostering social and emotional skills, education equips 15-year-olds with the tools to manage stress, adapt to setbacks, and foster resilience and a positive mindset. All attributes and competencies necessary for success in the future job market.

Social and emotional skills, and mathematics performance

Change in mathematics performance associated with social and emotional skills



Notes: All values are statistically significant (see PISA Results Volume II Annex A3).

All linear regression models account for students' and schools' socio-economic profile. The socio-economic profile is measured by the PISA index of economic, social and cultural status (ESCS).

Items are ranked in descending order of the change in mathematics performance associated with a one-unit increase in the following indices.

Source: OECD, PISA 2022 Database, Volume II Chapter 2 (Figure II.2.6).

Alone with everybody

Many school children feel lonely at school. A lack of friends, feeling socially disconnected or isolated can have many negative impacts. These can include higher rates of anxiety, poorer sleep and lower motivation levels. Chronic loneliness can also impair learning, lead to depression and even early death.

So what can be done to help the 16% of students who reported feeling lonely, on average across OECD countries?

By bringing together students from different backgrounds, schools can help forge connections across social groups and support students by providing spaces and opportunities for friendships. This can also help strengthen social skills, nurture students' well-being, and ultimately help prevent feelings of loneliness and isolation.

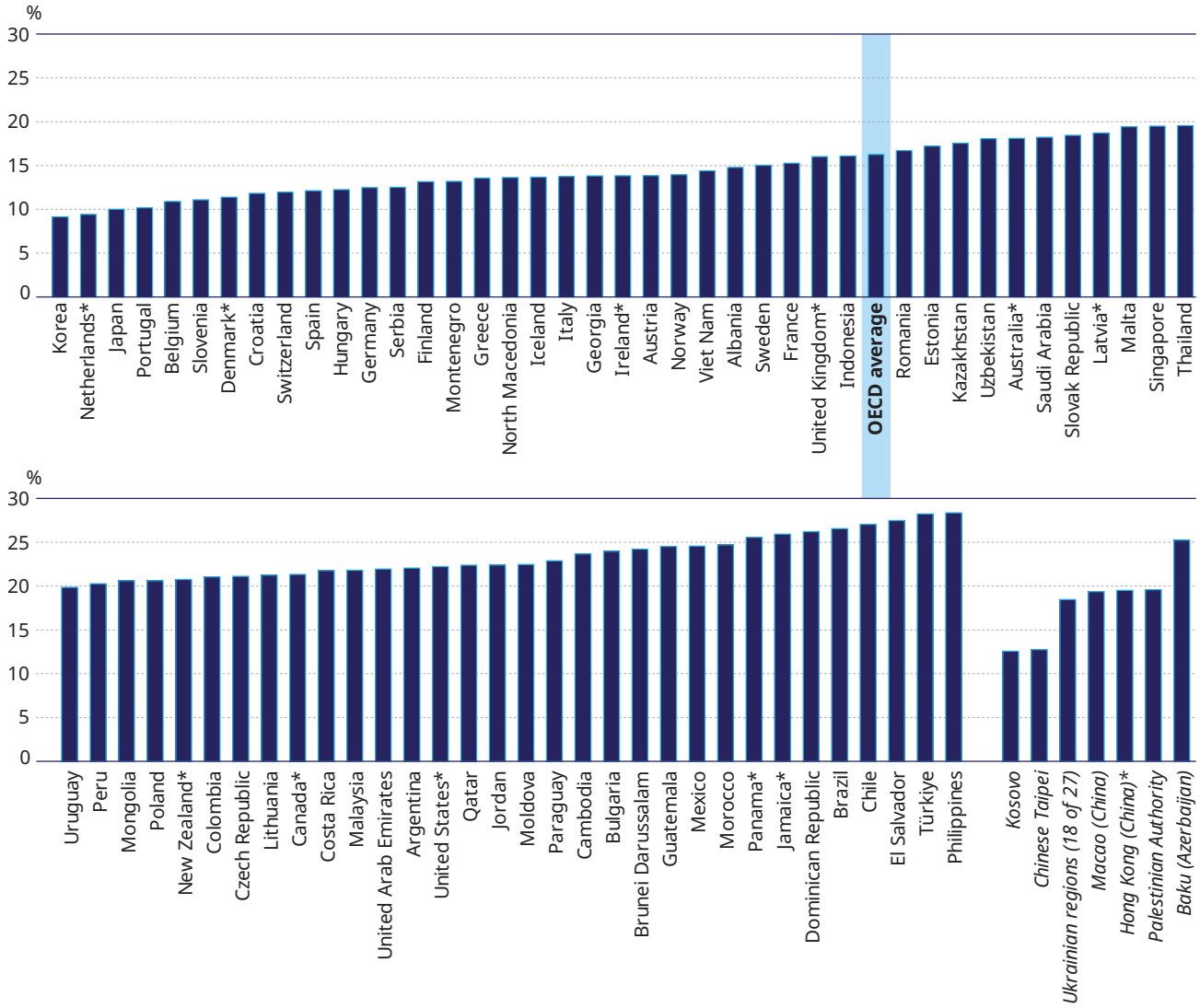
In certain countries, loneliness is a bigger issue than others. For example, in Chile, El Salvador, the Philippines and Türkiye at least 27% of students reported feeling lonely. In contrast, only 9% of students in the Netherlands* and Korea felt the same.

Regardless of the level of loneliness, schools can play an important role by helping students develop, socialise and connect with friends and peers. That important role is emphasised by the dramatic rise in loneliness during the pandemic. It is not surprising that after COVID-19 struck, when many schools shut down, students reported substantially higher rates of loneliness (38%).

Going forward, teachers should encourage children to talk about loneliness to help reduce the stigma associated with it. They should also raise awareness of warning signs and prevention strategies. This can help build the skills needed to counter the negative thought processes associated with chronic loneliness and remind people that they are not alone – virtually everyone experiences loneliness from time to time.

Percentage of students who feel lonely at school

Based on students' reports



Countries and economies are ranked in ascending order of the percentage of students who feel lonely at school.

Source: OECD, PISA 2022 Database, Volume II Table II.B1.1.1.

Is grade repetition linked to not attending pre-primary school?

Early learning lays the foundations for a child's future development. In particular, pre-primary education gives young children a bridge between a home and school-based environment. It allows them to get used to routines, to learn social and emotional skills, to play, be creative and so much more. So its importance has always been clear. But is there a link to grade repetition?

PISA data show that students who attended a creche, nursery, kindergarten or other pre-primary education for at least one year were considerably less likely to repeat a grade at any level of education compared to students who either did not go to pre-primary or attended for less than a year. This was true even after taking into consideration differences in their socio-economic backgrounds.

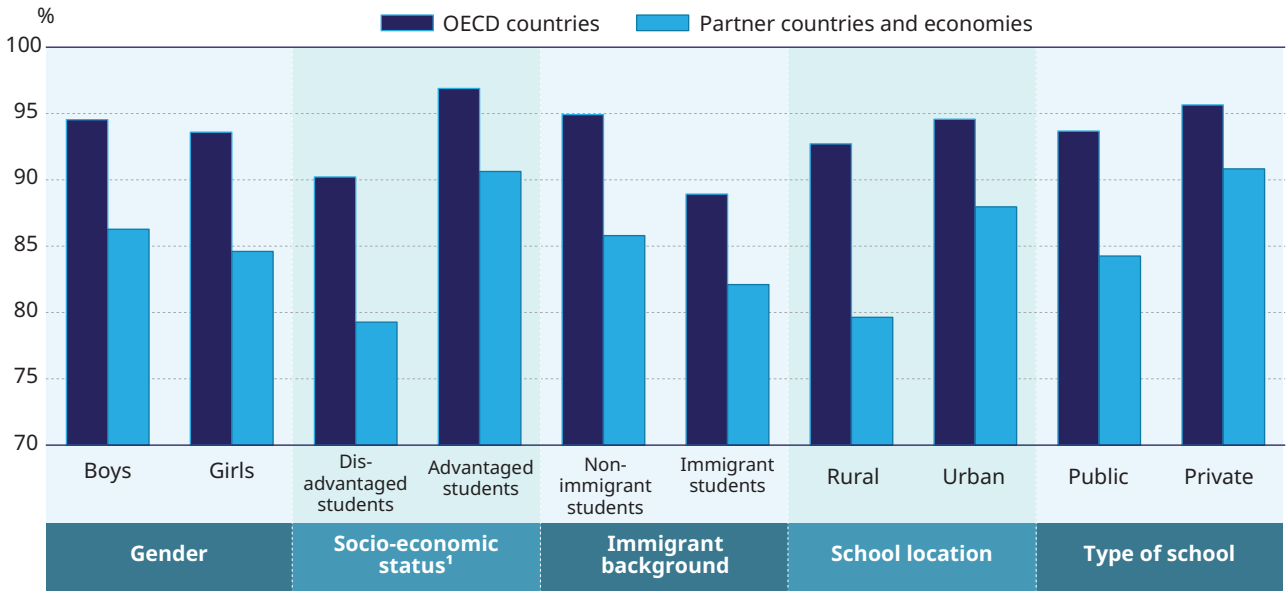
While the cross-sectional nature of PISA data cannot establish causality, it is worth further analysis and study. On average across the OECD, PISA data show that 91% of students never repeated a grade, 7% repeated a grade once, while 2% repeated a grade more than once. It is a bigger issue in certain OECD members. For example, in Colombia 13% of students repeated a grade multiple times. Around 4% of students in Israel, Belgium and Portugal also repeated a grade more than once.

The findings also clearly show grade repeaters have specific traits across OECD countries. They are more likely to be boys, to have skipped school and be low academic achievers. Disadvantaged students were three times as likely as advantaged students to repeat a grade at least once. Students with an immigrant background were also more likely to repeat a grade. Grade repeaters often reported a weaker sense of belonging at school and, contrary to some stereotypes, said they were bullied much more frequently than students who never repeated a grade.

In general, there are two camps in education who disagree over the grade repetition: those who think it is beneficial and those who believe it is detrimental. As schools and teachers grapple with this issue, it is important to reflect on these findings, and question whether grade repetition is effective or efficient in terms of students' academic and social development.

Differences in 15-year-old students' attendance at pre-primary school

Percentage of students who had attended pre-primary school; OECD average



1. The socio-economic profile is measured by the PISA index of economic, social and cultural status (ESCS).

Source: OECD, PISA 2022 Database, Volume II Annex B1, Chapter 4 (Figure II.4.4).

Beyond grades: assessing well-being in schools

Tomorrow's schools need to help students think for themselves, develop a strong sense of right and wrong, and interact in a globalised and increasingly digitalised world. Academic performance is the standard barometer for judging if an education system is performing strongly or poorly. While assessing student performance in end-of-year-exams offers valuable insights into educational effectiveness, they only reveal a portion of the bigger picture. Another crucial aspect of education that should not be overlooked is happiness.

Student well-being is obviously subject to a multitude of factors. But school policies and practices can have a big influence. Teachers and other educational staff help students become more resilient, support the building of friendships, and encourage young people to be the best they can be. So, happiness and overall quality of life can tell us a lot, and a lack of well-being in schools should be a major source of concern. Students who are psychologically depressed, experience stress and anxiety, or who feel demotivated to study and engage with others, are also unlikely to perform well at school and do well in life after school.

For the first time ever, PISA has compiled its data on student well-being in one single space. The PISA Happy Life Dashboard considers nine pivotal aspects that contribute to the quality of students' lives: academic performance, agency and engagement, engagement with school, material and cultural well-being, openness to diversity, psychological well-being, resilience, social relationships, and study-life balance.

Initial observations reveal that no single country consistently performs well across all nine dimensions. For example, in top PISA performing countries or economies in maths such as Singapore, Macao (China) and Chinese Taipei, many students reported a high fear of failure and limited engagement in extracurricular activities such as sports. More than 70% of respondents in these three Asian economies

were concerned about perceived failure; they agreed or strongly agreed that they worried about what others may think about them. In contrast, students in countries with lower average PISA test scores, such as Spain and Peru, often had lower levels of anxiety and a greater focus on sports.

What can we learn from this? Even countries that are top performers in the PISA test exhibit areas that can be enhanced. Factors like mental health, social interactions and exposure to diverse cultures can significantly mould student's well-being, readiness for the future and overall sense of happiness.

It is important to acknowledge that there are limitations to the information in the dashboard. For example, in some cultures, students are less likely to report themselves as successful or happy compared to others. However, going forward, the dashboard will allow users to compare and contrast specific data points to get a better sense of areas in potential need of attention. The dashboard can be a useful policy tool for understanding the complexities of student happiness and well-being.

What next?

The first two volumes of PISA 2022 results, published on 5 December 2023 and summarised in this brochure, provide the first findings from this latest instalment of the assessment. Three other volumes, focusing on creative thinking, financial literacy and students' readiness for lifelong learning, will be published in 2024.

The data included in these volumes is revealing but it will take some time until we fully understand the results.

Policy makers' hunger for immediate answers is always frustrated by the snail's pace at which the development of data, evidence and research advances; and the data collected by PISA alone leave many questions unanswered.

The results offer a snapshot of education systems at a certain moment in time; but they do not – they cannot – show how the school systems got to that point, or the institutions and organisations that might have helped or hindered progress.

In addition, the data do not really say much about cause and effect. While we are more aware of what successful systems are doing, that does not necessarily tell us how to improve less-successful systems.

That is where the OECD brings a range of other tools to bear to strengthen insights for policy and practice.

PISA is not only the world's most comprehensive and reliable international comparison of students' capabilities, it is also integrated with a range of methods and resources at the OECD, including country and thematic policy reviews, that countries can use to situate the results from PISA in the different contexts in which students learn, teachers teach and schools operate, and to fine-tune their education policies.

Education policy makers and practitioners can benefit from these tools in the same way that business leaders learn to steer their companies towards success: by taking inspiration from others, and then adapting lessons learned to their own situation.

That outward-looking perspective seems to be a common trait of many high-performing education systems: they are open to the world and ready to learn from and with the world's education leaders; they do not feel threatened by alternative ways of thinking. Sharing insights, across borders, to improve quality, equity and efficiency in education is more urgently needed than ever before.

In today's world, everyone needs to have advanced knowledge and skills, not just for economic reasons but also for social participation. The best-performing PISA countries show that high-quality and equitable education is an attainable goal. Countries have the power to deliver that goal; if they choose to do so, they can give millions of learners a better future.

PISA RESULTS 2022

PISA 2022 Results (Volume I): The State of Learning and Equity in Education

PISA 2022 Results (Volume II): Learning During – and From – Disruption

PISA 2022 Results (Volume III): Creative Thinking

PISA 2022 Results (Volume IV): Financial Literacy

PISA 2022 Results (Volume V): Students' Readiness for Lifelong Learning

Note: The answer to the triangular pattern question on page 10 is 40.0%.

Following OECD data regulations, a visual separation between countries and territories has been used in charts to reduce the risk of data misinterpretation.

Some of the graphs/charts in this brochure are adaptations from graphs/charts in PISA 2022 Volumes I and II.

An asterisk (*) by the name of a country or economy means that caution is required when interpreting estimates because one or more PISA sampling standards were not met (see Reader's Guide, Annexes A2 and A4).

- Australia
- Canada
- Denmark
- Hong Kong (China)
- Ireland
- Jamaica
- Latvia
- Netherlands
- New Zealand
- Panama
- United Kingdom
- United States

Note on Ukrainian regions (18 of 27)
The designation "Ukrainian regions (18 of 27)" refers to the 18 PISA-participating jurisdictions of Ukraine: Cherkasy Oblast, Kirovohrad Oblast, Poltava Oblast, Vinnytsia Oblast, Chernihiv Oblast, Kyiv Oblast, Sumy Oblast, the City of Kyiv, Zhytomyr Oblast, Odesa Oblast, Chernivtsi Oblast, Ivano-Frankivsk Oblast, Khmelnytskyi Oblast, Lviv Oblast, Rivne Oblast, Ternopil Oblast, Volyn Oblast and Zakarpattia Oblast. Due to Russia's large-scale aggression against Ukraine, the following nine jurisdictions were not covered: Dnipropetrovsk Oblast, Donetsk Oblast, Kharkiv Oblast, Luhansk Oblast, Zaporizhzhia Oblast, Kherson Oblast, Mykolaiv Oblast, the Autonomous Republic of Crimea and the city of Sevastopol.

The statistical data for Israel are supplied by and 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.

Note by the Republic of Türkiye

The information in this document with reference to "Cyprus" relates to the southern part of the Island. There is no single authority representing both Turkish and Greek Cypriot people on the Island. Türkiye recognises the Turkish Republic of Northern Cyprus (TRNC). Until a lasting and equitable solution is found within the context of the United Nations, Türkiye shall preserve its position concerning the "Cyprus issue".

Note by all the European Union Member States of the OECD and the European Union

The Republic of Cyprus is recognised by all members of the United Nations with the exception of Türkiye. The information in this document relates to the area under the effective control of the Government of the Republic of Cyprus.

Note on Kosovo:
This designation is without prejudice to positions on status, and is in line with United Nations Security Council Resolution 1244/99 and the Advisory Opinion of the International Court of Justice on Kosovo's declaration of independence.

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Corrigenda to publications may be found on line at: www.oecd.org/about/publishing/corrigenda.htm.

For more information, contact
Andreas Schleicher (Andreas.Schleicher@oecd.org)

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https://www.oecd.org/publication/pisa-2022-results/

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edu.contact@oecd.org

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