

2 How does the performance of students in Türkiye compare to international benchmarks?

This chapter provides an overview of student performance in Türkiye in the International Association for the Evaluation of Educational Achievement (IEA) Trends in International Mathematics and Science Study (TIMSS) and the OECD Programme for International Student Assessment (PISA) international assessments from 2003 until 2019 in Grades 4 and 8, and at 15 years old. It explores how students performed on average in the latest round of each assessment – PISA 2018 and TIMSS 2019 – and then looks at how performance was spread across the student population, in particular across groups of low and high performers. Using data from previous cycles of PISA and TIMSS, it also looks at how student performance in Türkiye has evolved over time.

This chapter examines the performance of students in Türkiye in the IEA TIMSS (Grades 4¹ and 8) and OECD PISA (15-year-olds) international assessments from 2003 until 2019. It focuses on average performance across the different test domains – mathematics, science and reading (PISA) and mathematics and science (TIMSS) – as well as students’ proficiency across different levels of performance and on trends in performance over time. The chapter compares the performance of students in Türkiye to the OECD average and to that of students in the selected benchmark countries – Germany, Poland and Russia (see Chapter 1 for an explanation of how benchmark countries were selected).

Box 2.1. What the data tell us

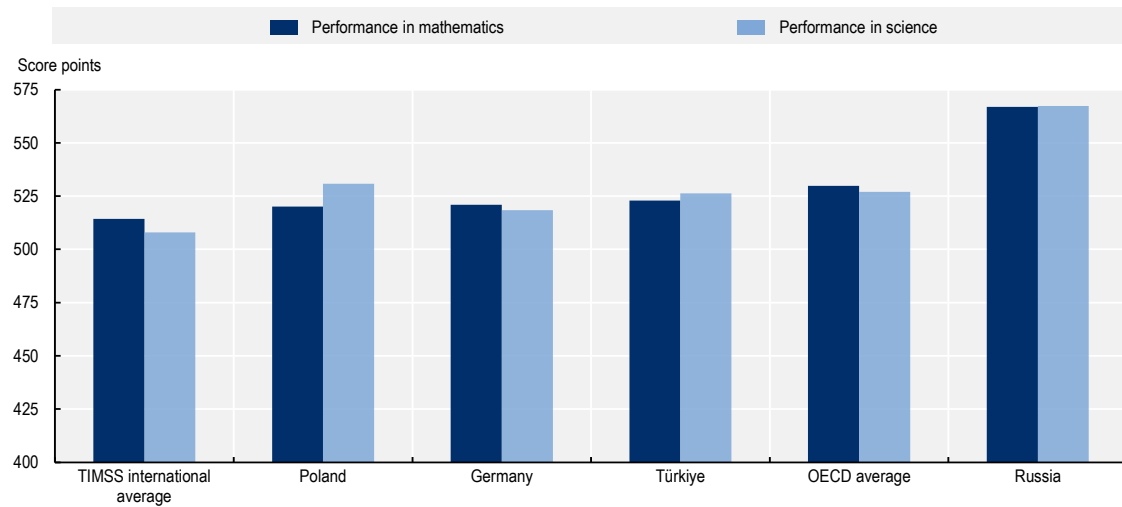
- Students’ average performance in mathematics and science in TIMSS Grades 4 and 8 and in reading, mathematics and science in PISA has improved substantially over time.
- The improvement in performance was driven by a significant decline in the share of low performers in all grades, subjects and both assessments.
- At the same time as improving performance, the participation of 15-year-olds also increased significantly, with a rise in the PISA sample coverage from 36% in 2003 to 73% in 2018.²
- In TIMSS Grade 4 in 2019, average performance in mathematics and science exceeded the TIMSS international average and was equal to the average of OECD countries in science and slightly below the average of OECD countries in mathematics.³
- In TIMSS Grade 8 in 2019, average performance in mathematics was close to the TIMSS international average but below that of the OECD countries while, in science, it exceeded the average of TIMSS-participating countries but remained below that of OECD countries.
- At age 15 in PISA 2018, the average performance of students in Türkiye was below the average of OECD countries in all three subjects of assessment.

All students and adults require proficiency in mathematics, science and reading in order to thrive in modern societies. Proficiency in the different domains is not only needed in the labour market but also for performing basic daily tasks and for understanding the world surrounding us. By the end of compulsory education, students should have a solid mastery of mathematics, science and languages and be able to apply their knowledge to solve problems that they encounter in their daily lives. The proficiency levels used by the PISA and TIMSS assessments are fully described in Chapter 1.

Students’ performance in mathematics and science in TIMSS Grade 4

In 2019, Grade 4 students performed at or above international averages

In 2019, for the first time in Türkiye’s participation in TIMSS, Grade 4 students performed above the international average (i.e. average of all TIMSS-participating countries in 2019)⁴ in both mathematics and science (Figure 2.1). Grade 4 students in Türkiye also performed very close to the OECD average in mathematics and at the same level as the OECD average in science. Statistically, Türkiye’s performance was similar to many countries, including some countries that historically score above the OECD average, such as Germany, Poland and Sweden in mathematics, and Croatia, Hungary and Ireland in science.

Figure 2.1. Grade 4 students' performance in mathematics and science, TIMSS 2019

Note: Countries are ranked in ascending order of the average performance score in mathematics.

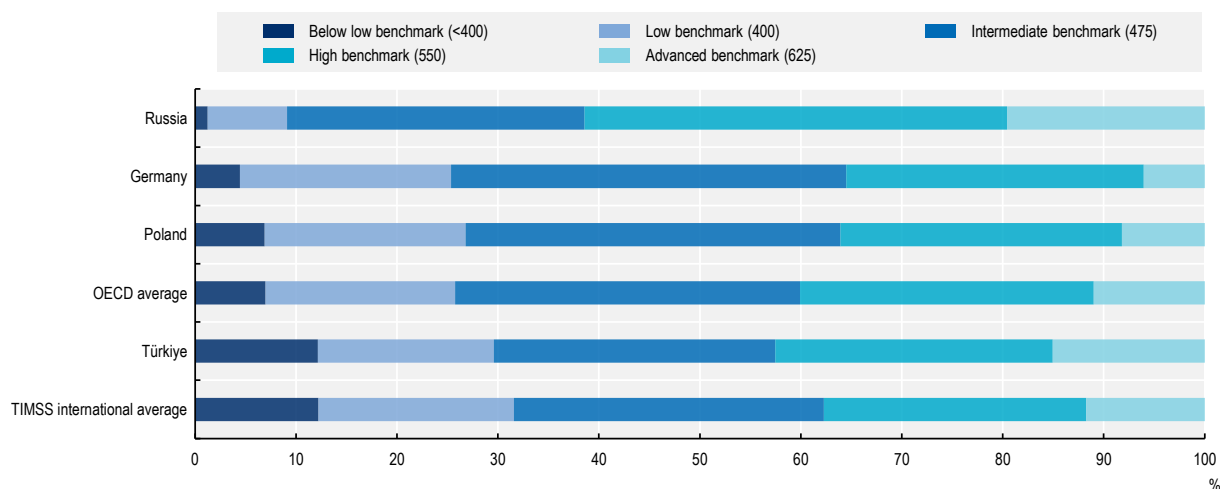
Source: IEA (2020^[1]), *TIMSS 2019 International Results in Mathematics and Science*, <https://timssandpirls.bc.edu/timss2019/international-results/> (accessed on 21 May 2021).

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In mathematics, Türkiye had relatively high shares of low and high performers with fewer students at intermediate levels

In 2019, almost a third (29.6%) of students in Türkiye performed at or below the low benchmark in mathematics (Figure 2.2). Students below the low benchmark are not able to use basic mathematics concepts or solve simple problems while those at the low benchmark can add, subtract, multiply and divide but struggle with more complex questions (see Chapter 1). While the share of students performing at or below the low benchmark in Türkiye was similar to the international average, it was higher than the OECD average (25.8%) and all of the benchmark countries.

Figure 2.2. Grade 4 students' proficiency levels in mathematics, TIMSS 2019



Note: Countries are ranked in ascending order of the percentage of students in Grade 4 who performed below 400 score points in mathematics.

Source: IEA (2020^[1]), *TIMSS 2019 International Results in Mathematics and Science*, <https://timssandpirls.bc.edu/timss2019/international-results/> (accessed on 21 May 2021).

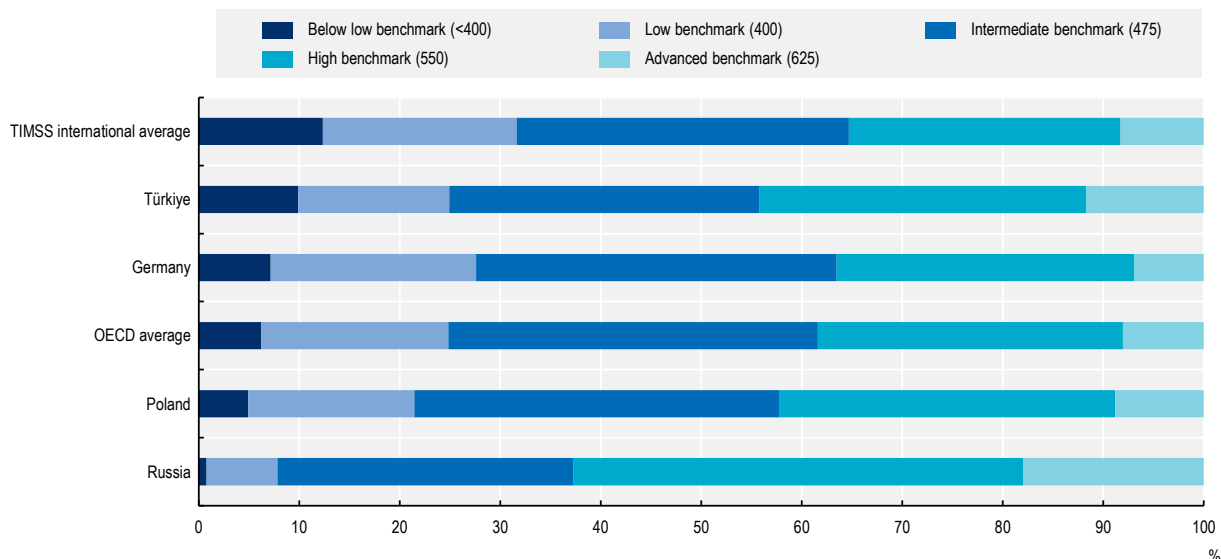
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In contrast, 42.5% of students in Türkiye performed at the high and advanced benchmarks. Students at the high benchmark can apply conceptual understanding to solve problems while those at the advanced benchmark can find solutions in a variety of relatively complex situations and explain their reasoning. The share of students performing at the highest levels in Türkiye was greater than both the international and OECD averages.

Students performed particularly well in science, with a high share of top performers

In science, one-fourth of students performed below or at the low benchmark (Figure 2.3). Students below the low benchmark lack basic knowledge and understanding of physical and life sciences, while those at the low benchmark have some basic scientific knowledge. The share of students performing at the lowest two levels in Türkiye was smaller than the international average and similar to the OECD average (24.8%). It was also lower than the share of low performers (i.e. at or below the low benchmark) in mathematics.

In Türkiye, 44% of students reached the high and advanced proficiency benchmarks. At these levels, students are able to apply scientific knowledge in everyday and abstract contexts. The share of students performing at these levels was higher than both the international and OECD averages. In general, students in Türkiye often perform higher in science than in other domains, suggesting it is an area of national strength.

Figure 2.3. Grade 4 students' proficiency levels in science, TIMSS 2019

Note Countries are ranked in ascending order of the percentage of students in Grade 4 who performed below 400 score points in science. Source: IEA (2020^[1]), *TIMSS 2019 International Results in Mathematics and Science*, <https://timssandpirls.bc.edu/timss2019/international-results/> (accessed on 21 May 2021).

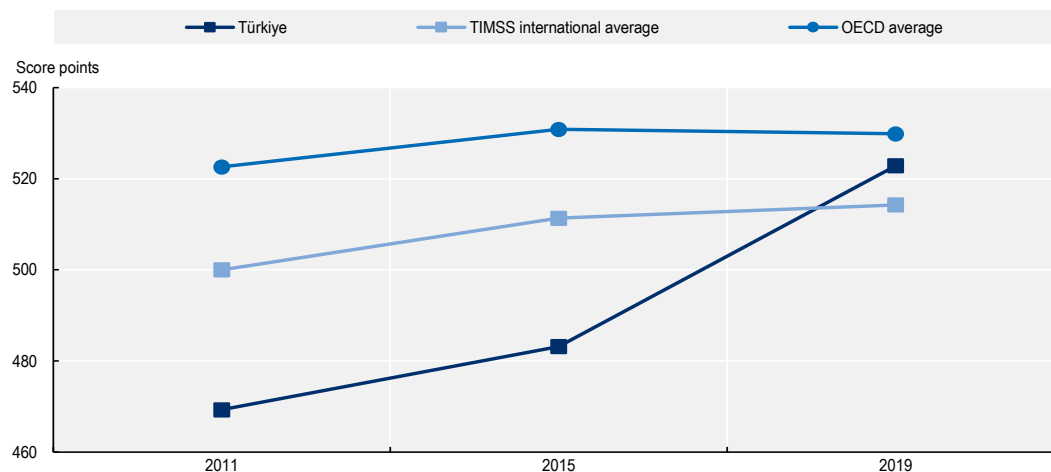
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Grade 4 students' performance in mathematics and science show significant improvement over time


Students' performance in mathematics rose considerably by 54 score points between 2011 and 2019

The trend in Türkiye's Grade 4 mathematics scores between 2011 and 2019 shows marked improvement (Figure 2.4). Average performance rose by 14 score points between 2011 and 2015 and a further 40 points between 2015 and 2019, surpassing the international average and bringing Türkiye very close to the OECD average. The improvement in Türkiye's performance was substantial especially in the last cycle (between 2015 and 2019).

In general, in TIMSS, countries that made substantial improvements like Türkiye started from a position below the international average, with few exceptions. This was the case of Poland which experienced the largest rise among all countries between 2011 and 2015, moving from significantly below the international average to significantly above it. In contrast, countries that showed stability or minor declines were those that started near or above the international average (e.g. Germany, whose performance remained stable).

Figure 2.4. Trends in students' mathematics performance in Grade 4

Source: IEA (2012^[2]), *About TIMSS 2011*, <https://timssandpirs.bc.edu/timss2011/>, (accessed on 21 May 2021); IEA (2016^[3]), *TIMSS 2015 International Reports*, <https://timss2015.org/timss-2015/about-timss-2015/> (accessed on 21 May 2021); IEA (2020^[1]), *TIMSS 2019 International Results in Mathematics and Science*, <https://timssandpirs.bc.edu/timss2019/international-results/> (accessed on 21 May 2021).

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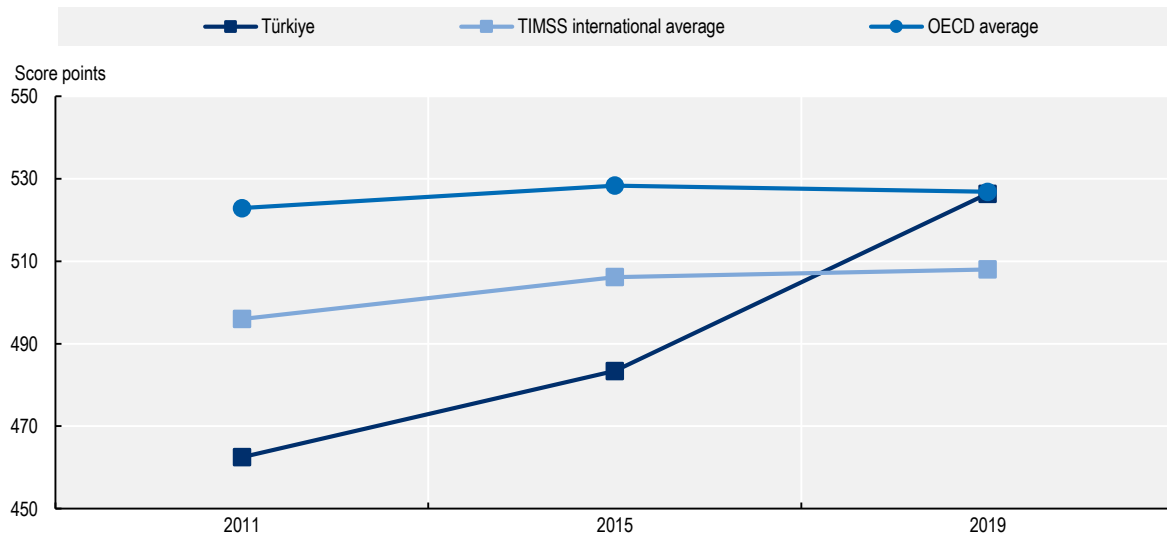
The improvement in science performance was even larger than in mathematics

The performance in science of Grade 4 students also improved with a rise of 20 score points between 2011 and 2015 followed by a substantial rise of 43 score points between 2015 and 2019 (Figure 2.5. Trends in students' science performance in Grade 4). This rise brought Türkiye's average above the international average and closed the gap with the OECD average. Only Poland had a similar improvement over time with a rise of 42 score points between 2011 and 2015. This rise was followed by a drop of 16 score points between 2015 and 2019, while Germany experienced a drop of ten score points between 2011 and 2019.

Improvements have been driven by a major decline in the share of low performers and an increase in the share of high performers

In mathematics, between the two TIMSS cycles of 2011 and 2019, the share of students performing at or below the low benchmark declined substantially (Figure 2.6). In 2011, half (49%) of the students performed at or below the low benchmark. By 2019, just less than a third of students performed at the two lowest levels (i.e. below and at the low benchmark) and the share of students performing below the low benchmark almost halved. In contrast, the share of students performing at high and advanced levels doubled over the same period. A similar pattern was observed in Poland between 2011 and 2015. Over that period, Poland's results were marked by a substantial rise in the number of students in the high and advanced benchmarks of about 27 percentage points and an equivalent decline in the proportion of low achievers (at or below the low benchmark).

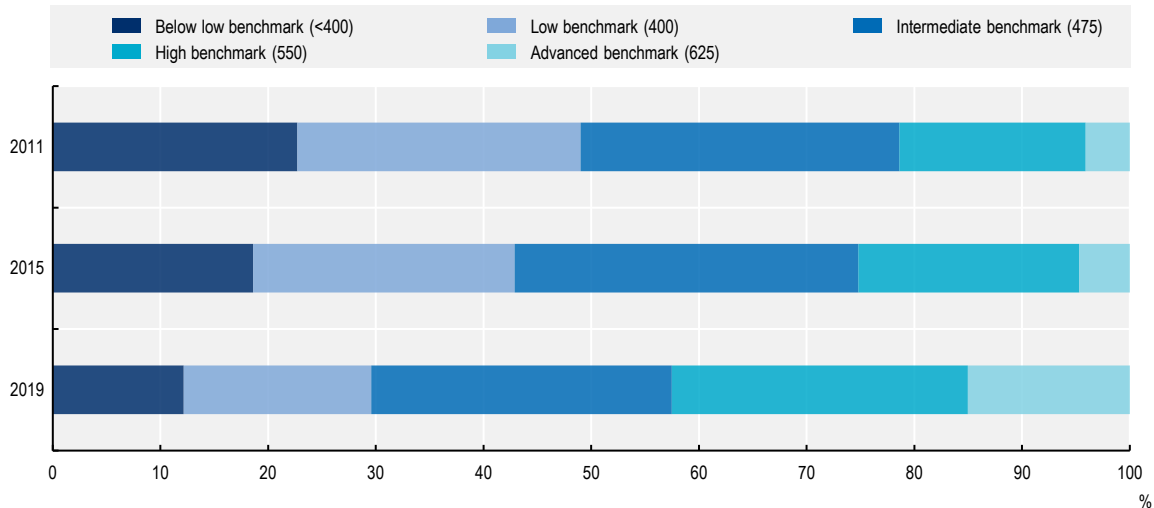
Figure 2.5. Trends in students' science performance in Grade 4



Source: IEA (2012^[2]), *About TIMSS 2011*, <https://timssandpirls.bc.edu/timss2011/>, (accessed on 21 May 2021); IEA (2016^[3]), *TIMSS 2015 International Reports*, <https://timss2015.org/timss-2015/about-timss-2015/> (accessed on 21 May 2021); IEA (2020^[1]), *TIMSS 2019 International Results in Mathematics and Science*, <https://timssandpirls.bc.edu/timss2019/international-results/> (accessed on 21 May 2021).

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Figure 2.6. Grade 4 students' proficiency in mathematics over time



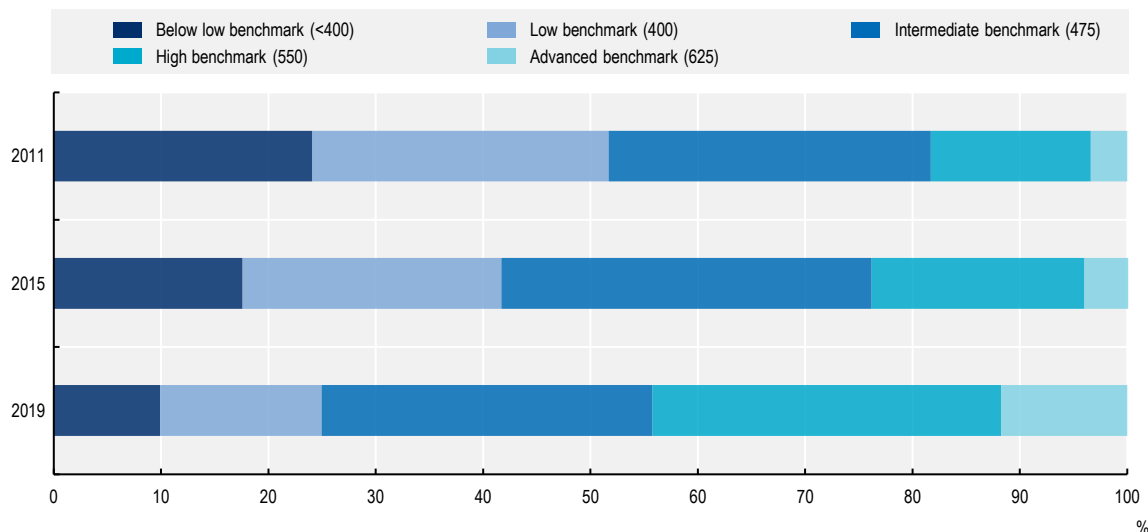
Source: IEA (2012^[2]), *About TIMSS 2011*, <https://timssandpirls.bc.edu/timss2011/>, (accessed on 21 May 2021); IEA (2016^[3]), *TIMSS 2015 International Reports*, <https://timss2015.org/timss-2015/about-timss-2015/> (accessed on 21 May 2021); IEA (2020^[1]), *TIMSS 2019 International Results in Mathematics and Science*, <https://timssandpirls.bc.edu/timss2019/international-results/> (accessed on 21 May 2021).

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The evolution of proficiency in science over time was similar (Figure 2.7). Between 2011 and 2019, there was a clear drop in the share of students scoring below the low benchmark (decline of 14 percentage points) and the share of students in the low benchmark (decline of 13 percentage points combined with a rise in the high (18 percentage points) and advanced proficiency benchmark (8 percentage points).

Comparatively, a similar trend was observed in Poland with the share of students below the low, low and intermediate benchmarks declining and the share of students in the high and advanced benchmarks rising by 14 percentage points.

Figure 2.7. Grade 4 students' proficiency in science over time



Source: IEA (2012^[2]), *About TIMSS 2011*, <https://timssandpirls.bc.edu/timss2011/>, (accessed on 21 May 2021); IEA (2016^[3]), *TIMSS 2015 International Reports*, <https://timss2015.org/timss-2015/about-timss-2015/> (accessed on 21 May 2021); IEA (2020^[1]), *TIMSS 2019 International Results in Mathematics and Science*, <https://timssandpirls.bc.edu/timss2019/international-results/> (accessed on 21 May 2021).

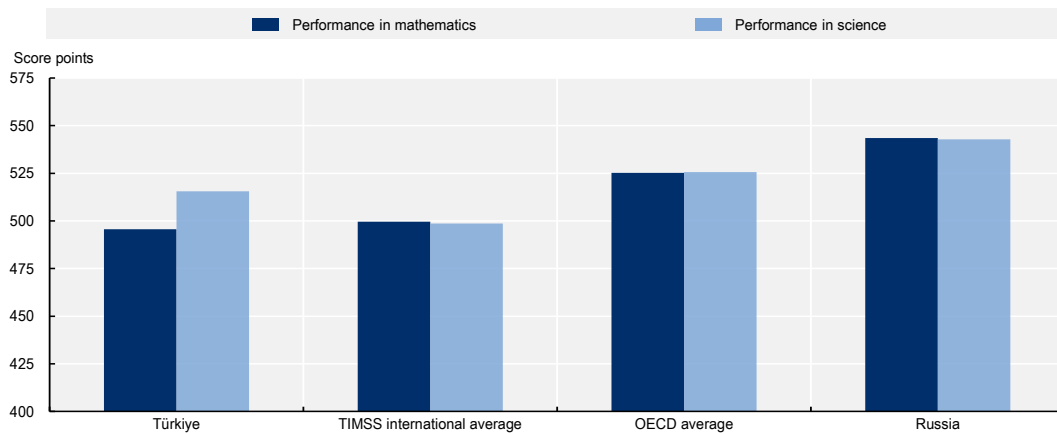
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Students' performance in mathematics and science in TIMSS Grade 8

In 2019, students performed at the international average in mathematics and above it in science

In mathematics in 2019, Grade 8 students in Türkiye had an average performance that was similar to the international average of TIMSS countries but below the average of OECD countries (Figure 2.8). Statistically, the performance of students in Türkiye in mathematics was similar to that of students in Italy, Norway and Sweden, while in science it was similar to that of students in England (United Kingdom) and Israel.

Figure 2.8. Grade 8 students' performance in mathematics and science, TIMSS 2019



Note: Countries are ranked in ascending order of the average performance score in mathematics.

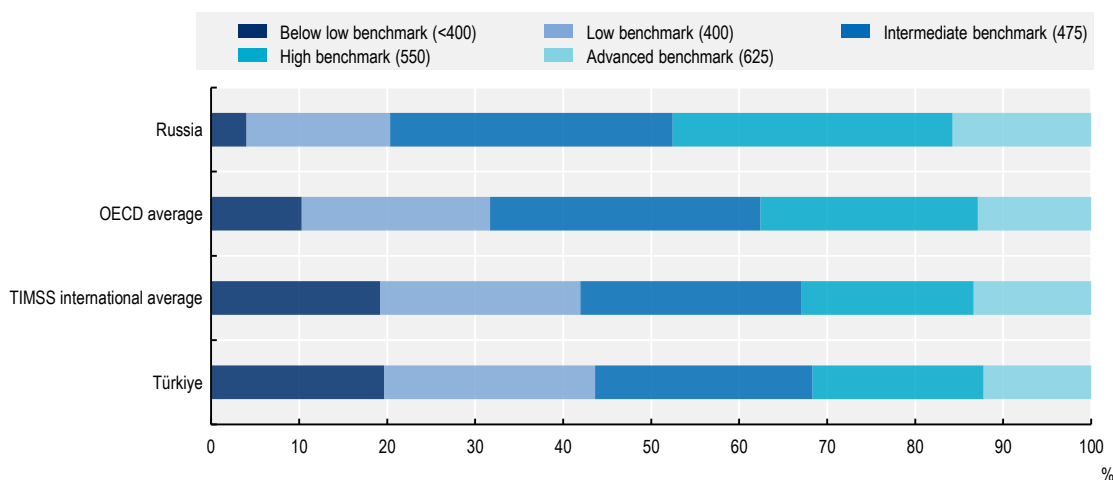
Source: IEA (2020^[11]), *TIMSS 2019 International Results in Mathematics and Science*, <https://timssandpirls.bc.edu/timss2019/international-results/> (accessed on 21 May 2021).

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In 2019, the share of students performing at lower levels was higher in mathematics than science

About 20% of Grade 8 students scored below the low proficiency benchmark in mathematics (Figure 2.9). This was similar to the international average of 19% but higher than the OECD average of 10%. Students at this level are unable to perform basic mathematics tasks. In contrast, a larger proportion of students – 32% in mathematics – performed at the high or advanced benchmarks.

Figure 2.9. Grade 8 students' proficiency levels in mathematics, TIMSS 2019



Note: Countries are ranked in ascending order of the percentage of students in Grade 8 who performed below 400 score points in mathematics.

Source: IEA (2020^[11]), *TIMSS 2019 International Results in Mathematics and Science*, <https://timssandpirls.bc.edu/timss2019/international-results/> (accessed on 21 May 2021).


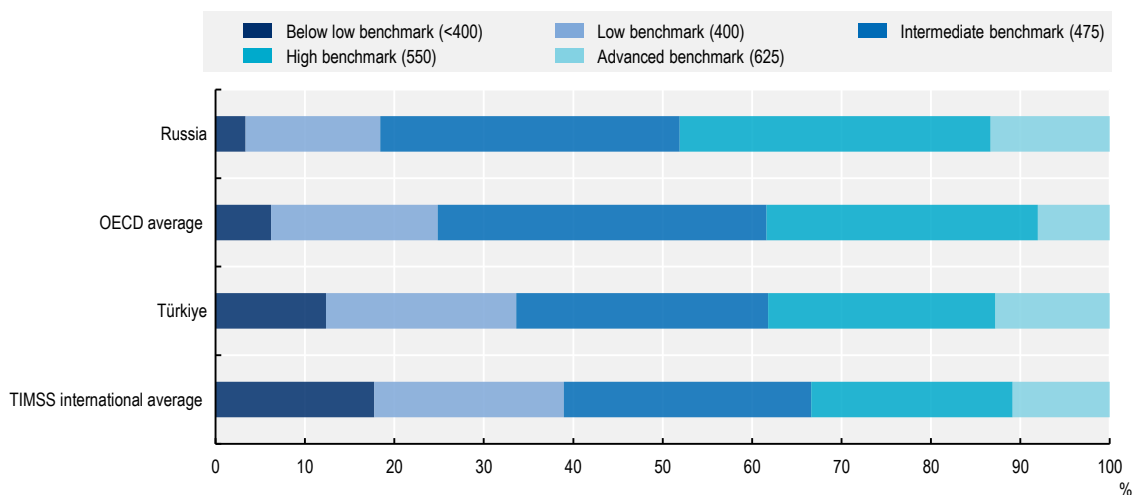

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Figure 2.10. Grade 8 students' proficiency levels in science, TIMSS 2019



Note: Countries are ranked in ascending order of the percentage of students in Grade 8 who performed below 400 score points in science. Source: IEA (2020^[1]), *TIMSS 2019 International Results in Mathematics and Science*, <https://timssandpirls.bc.edu/timss2019/international-results/> (accessed on 21 May 2021).

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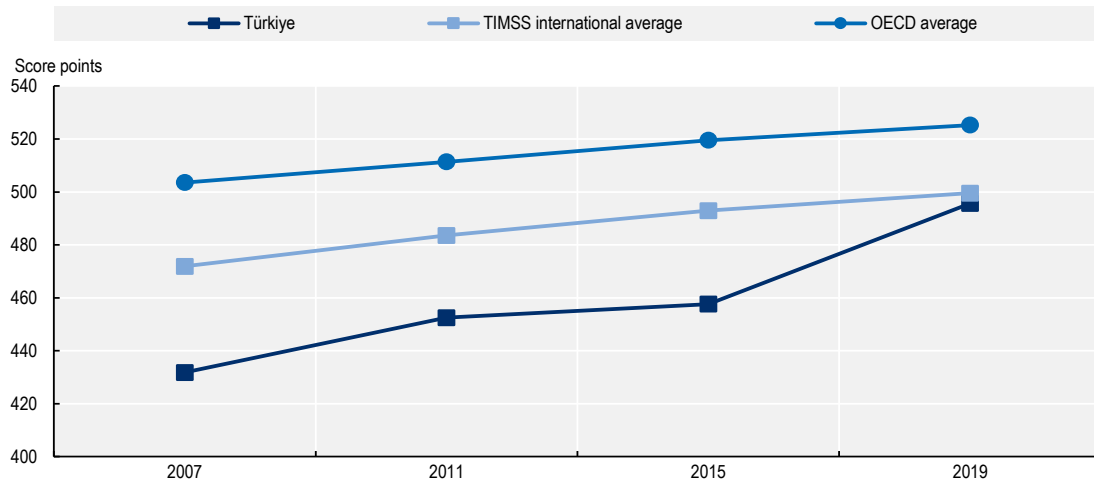
In science, 12% of students did not reach the low benchmark against an international average of 18% (OECD average of 9%). In contrast, a larger proportion (38% of students) performed at the high or advanced benchmarks. Türkiye's comparatively stronger performance in science compared with mathematics reflects the relative strength of the country's performance in this domain.

A positive and significant improvement in Grade 8 mathematics and science performance was observed over time in Türkiye

The improvement in Grade 8 mathematics and science performance was even stronger than in Grade 4

The improvement trend in Grade 4 was mirrored by a similar and even stronger trend (in terms of absolute points) in Grade 8 in both mathematics and science (Figure 2.11). Achievements in mathematics improved over the period of 2007 to 2018 with a rise of 64 score points, bringing Türkiye to the international average and closer to the OECD average. The bulk of this improvement took place between 2015 and 2019 (rise of 38 score points).

Figure 2.11. Trends in students' mathematics performance in Grade 8



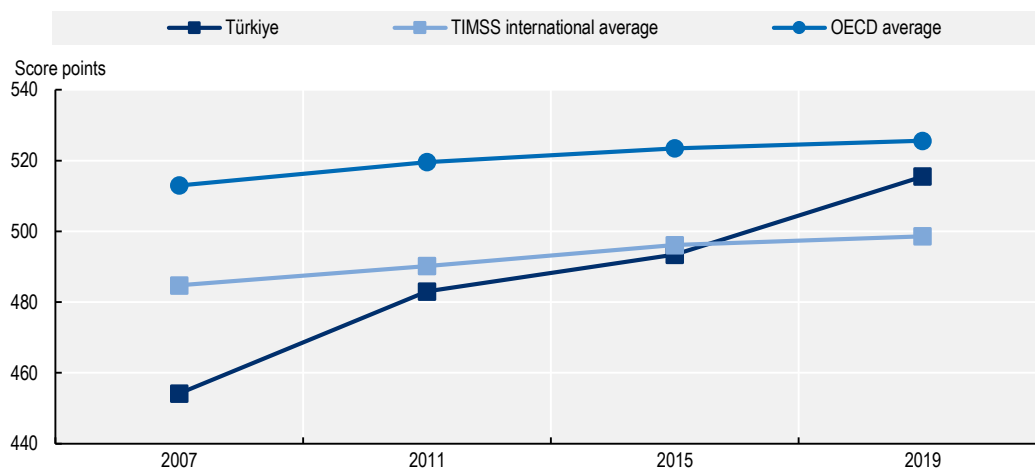
Source: IEA (2012^[2]), *About TIMSS 2011*, <https://timssandpirls.bc.edu/timss2011/>, (accessed on 21 May 2021); IEA (2016^[3]), *TIMSS 2015 International Reports*, <https://timss2015.org/timss-2015/about-timss-2015/> (accessed on 21 May 2021); IEA (2020^[1]), *TIMSS 2019 International Results in Mathematics and Science*, <https://timssandpirls.bc.edu/timss2019/international-results/> (accessed on 21 May 2021).

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Improvements in science were stronger than in mathematics relative to international averages.

A major improvement in students' science achievements in Grade 8 was observed between 2011 and 2019 (Figure 2.12). Average performance rose by 61 score points with the bulk of improvement happening between 2007 and 2011 (29 score points), and between 2015 and 2019 (22 score points). This rise brought Türkiye's average performance above the international average of 499 (but just below the OECD average of 526) and closed the gap with high performing countries.

Figure 2.12. Trends in students' science performance in Grade 8



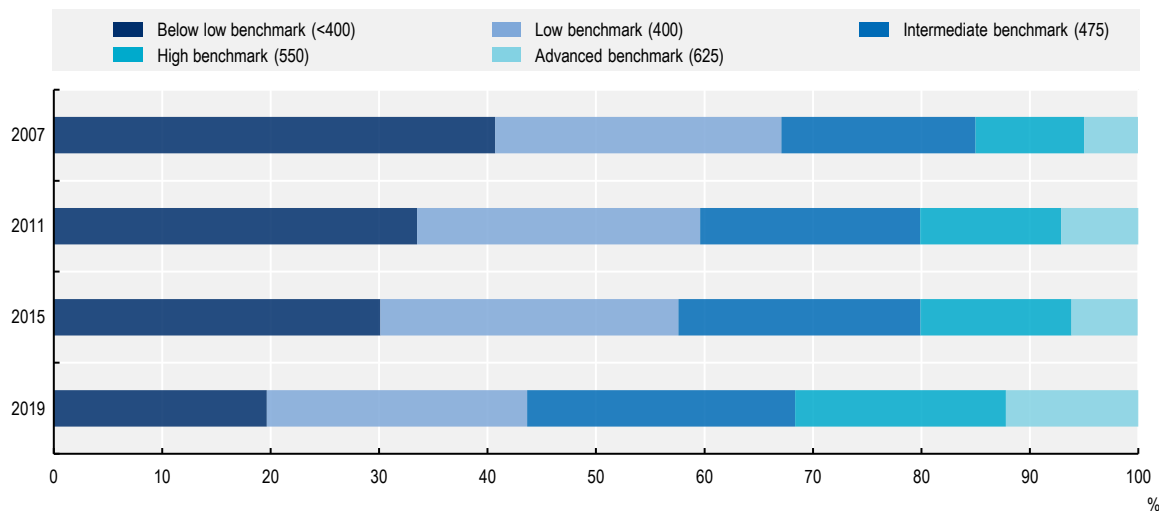
Source: IEA (2012^[2]), *About TIMSS 2011*, <https://timssandpirls.bc.edu/timss2011/>, (accessed on 21 May 2021); IEA (2016^[3]), *TIMSS 2015 International Reports*, <https://timss2015.org/timss-2015/about-timss-2015/> (accessed on 21 May 2021); IEA (2020^[1]), *TIMSS 2019 International Results in Mathematics and Science*, <https://timssandpirls.bc.edu/timss2019/international-results/> (accessed on 21 May 2021).

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This improvement was driven by a decline in the share of students not reaching the low mathematics and science proficiency benchmarks and a rise in the share of students performing in the top three benchmarks

In 2007 in mathematics, more than two-thirds of students (67.1%) performed at or below the low proficiency benchmark. Between 2007 and 2019, there was a major and consistent decline in the share of students performing at those levels with a fall of more than 20 percentage points (Figure 2.13). This drop was accompanied by a rise in the share of students in the intermediate, high and advanced proficiency benchmarks. The largest improvements were observed in the high and advanced benchmarks, with a doubling of the share of students in each benchmark by 2019.

Figure 2.13. Grade 8 students' proficiency in mathematics over time

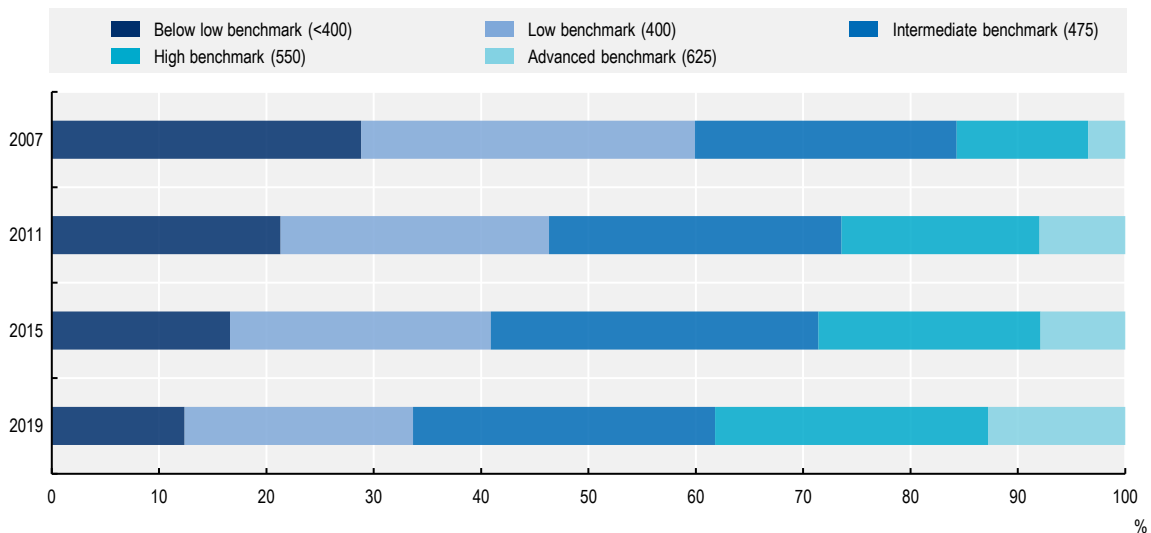


Source: IEA (2012^[2]), *About TIMSS 2011*, <https://timssandpirls.bc.edu/timss2011/>, (accessed on 21 May 2021); IEA (2016^[3]), *TIMSS 2015 International Reports*, <https://timss2015.org/timss-2015/about-timss-2015/> (accessed on 21 May 2021); IEA (2020^[1]), *TIMSS 2019 International Results in Mathematics and Science*, <https://timssandpirls.bc.edu/timss2019/international-results/> (accessed on 21 May 2021).


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In science in 2007, almost two-thirds (59.9%) of students performed at or below the low benchmark, falling to just over a third (34%) by 2019 (Figure 2.14). At the other end of the scale, there was an improvement in all other three benchmarks (i.e. intermediate, high and advanced), especially at the high and advanced benchmarks where the share of students in these top benchmarks more than doubled.

Figure 2.14. Grade 8 students' proficiency in science over time



Source: IEA (2012^[2]), *About TIMSS 2011*, <https://timssandpirls.bc.edu/timss2011/>, (accessed on 21 May 2021); IEA (2016^[3]), *TIMSS 2015 International Reports*, <https://timss2015.org/timss-2015/about-timss-2015/> (accessed on 21 May 2021); IEA (2020^[1]), *TIMSS 2019 International Results in Mathematics and Science*, <https://timssandpirls.bc.edu/timss2019/international-results/> (accessed on 21 May 2021).

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How do students' performances across Grades 4 and 8 compare?

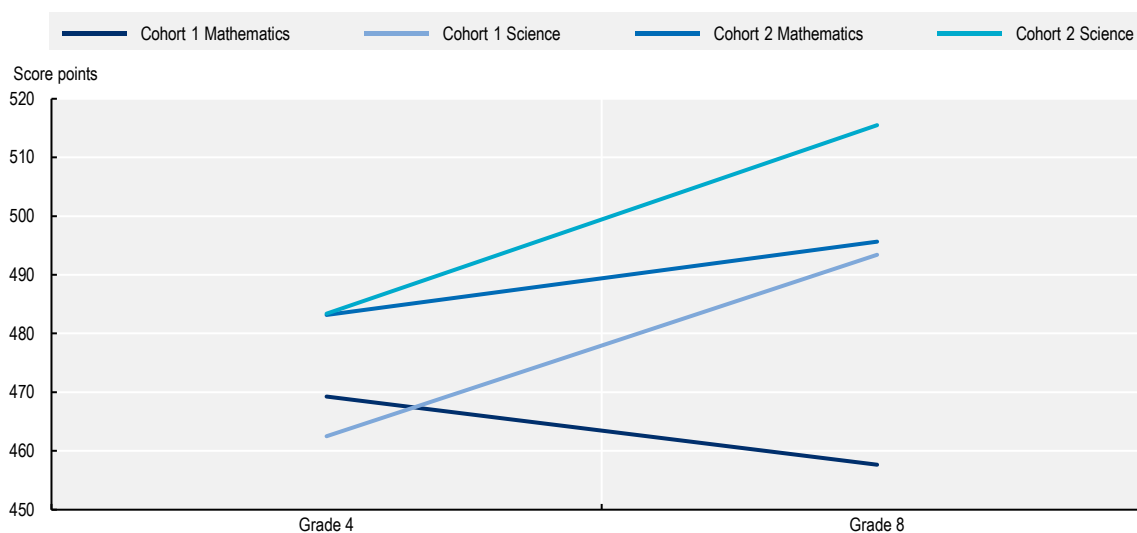
As the target Grade 4 cohort in 2011 is the same as the one in Grade 8 in 2015, and the one in Grade 4 in 2015 is the same as the one in Grade 8 in 2019, TIMSS allows for comparison of relative progress achieved by the cohort between these grades. It should, however, be noted that due to the fact that TIMSS is a quasi-longitudinal survey, it is possible to compare the performance of the same cohort at different points in time but not that of individual students. Therefore, what does TIMSS tell us about students' progress in mathematics and science between Grades 4 and 8?

Most cohorts showed an improvement in score points between Grades 4 and 8

The first cohort that was assessed in Grade 4 in 2011 and then in Grade 8 in 2015 ("Cohort 1") showed a decline in mathematics performance and an improvement in science performance between Grades 4 and 8. In mathematics, the average performance of this cohort declined by 11 score points between Grades 4 and 8, while in science, performance improved by 30 score points between the two grades (Figure 2.15).

The second cohort, which was first assessed in Grade 4 in 2015 and then in Grade 8 in 2019 ("Cohort 2") improved in both subjects across grades. In mathematics, performance improved by 13 score points and by 32 score points in science. Another country that had major progress for Cohort 2 in science and mathematics is Bahrain.

Figure 2.15. Students' progress between Grades 4 and 8 in TIMSS



Note: Cohort 1: 2011-15; Cohort 2: 2015-19.

Source: IEA (2012^[2]), *About TIMSS 2011*, <https://timssandpirls.bc.edu/timss2011/>, (accessed on 21 May 2021); IEA (2016^[3]), *TIMSS 2015 International Reports*, <https://timss2015.org/timss-2015/about-timss-2015/> (accessed on 21 May 2021); IEA (2020^[1]), *TIMSS 2019 International Results in Mathematics and Science*, <https://timssandpirls.bc.edu/timss2019/international-results/> (accessed on 21 May 2021).

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There was a fall in the share of low performers and rise in the share of high performers across both cohorts

Moreover, between Grades 4 and 8, the proportion of students not reaching the low proficiency benchmark in science declined by about five percentage points. This decline was mirrored by a rise in the proportion of students reaching the high and advanced benchmarks. In mathematics, the proportion of students not reaching the low proficiency benchmark rose by one percentage point between 2015 (Grade 4) and 2019 (Grade 8).

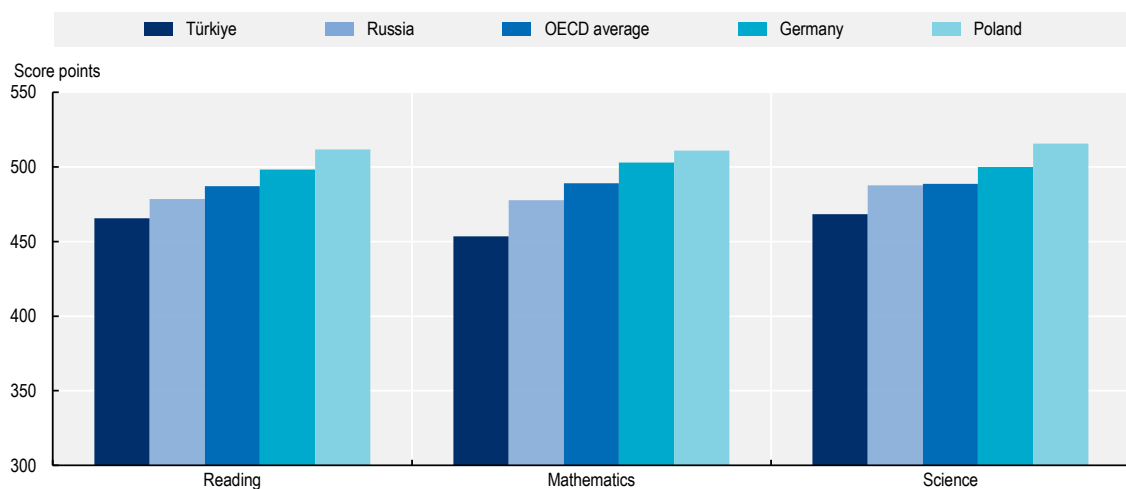
Students' performance in upper secondary education

Performance on the PISA assessment can be reported in a variety of ways. In this section, average performance on the PISA test for Türkiye and benchmark countries is presented, in addition to proficiency in the three domains of assessment: mathematics, science and reading. When considering Türkiye's PISA results, it is important to bear in mind that performance improved at the same time as the rapid expansion of the education system (see Chapter 1 and below).

In Türkiye in 2018, students performed below the OECD average in all three PISA domains

In 2018, 15-year-old students in Türkiye scored below the OECD average in all domains of assessment: reading, mathematics and science; however, the gap between Türkiye's performance and the OECD average was smaller in science than in mathematics (Figure 2.16). Statistically, performance in reading was similar to that of Greece, Israel, Luxembourg and Ukraine, science was similar to that of Belarus, Croatia, Israel, Italy, Slovak Republic and Ukraine, and mathematics was similar to that of Cyprus, Greece, Serbia and Ukraine.

Figure 2.16. Students' performance in reading, mathematics and science, PISA 2018



Note: Countries are ranked in ascending order of the average performance score in each subject.

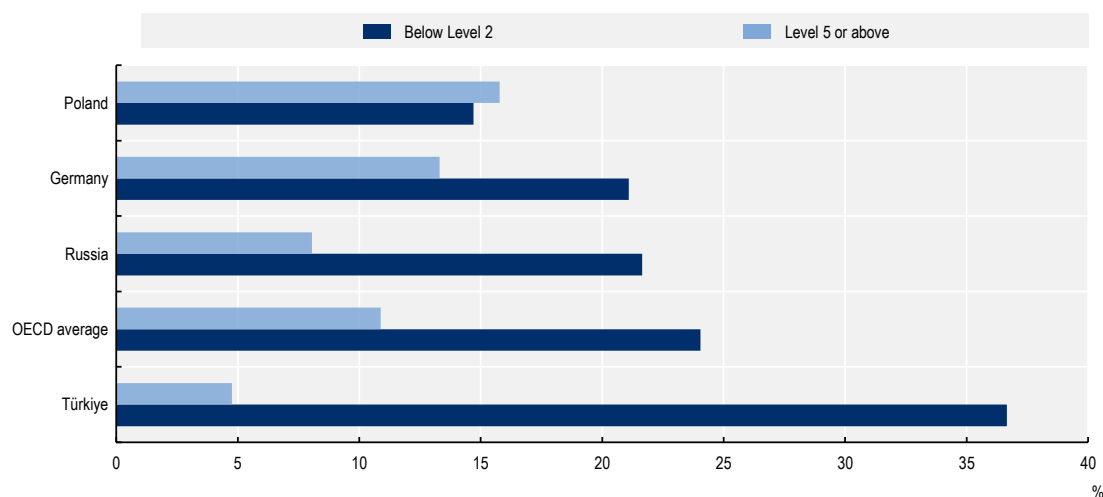
Source: OECD (2021^[4]), "PISA: Programme for International Student Assessment", <https://dx.doi.org/10.1787/data-00365-en>.

StatLink  <https://stat.link/s56ifr>

There was both a higher share of low and high performers in mathematics in comparison with other domains of assessment


Across the three domains assessed by PISA in 2018, mathematics was the domain where there was the greatest share (37%) of students who did not attain the baseline level of proficiency at which students are considered to have the basic skills and knowledge they will need for success in life and work (i.e. Level 2) (see Chapter 1 for further information about proficiency levels). The share of low achievers (i.e. performing below Level 2) in science was more than ten percentage points lower (25.5%) and much closer to the OECD average (22%). In reading, the share of low performers was also closer to the OECD average (Figure 2.17).

Figure 2.17. Percentage of low and high achievers in mathematics, PISA 2018



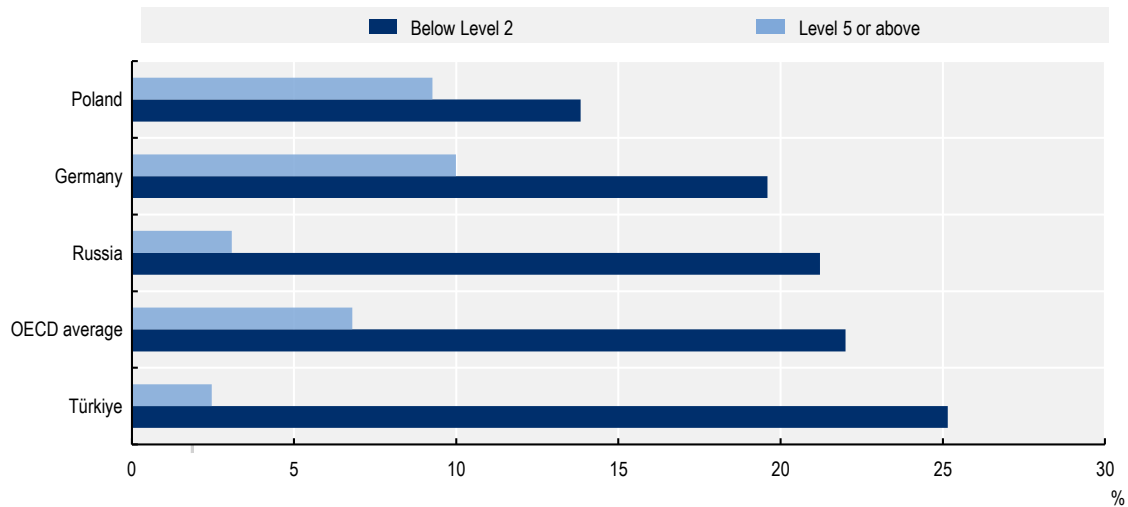
Note: Countries are ranked in ascending order of the percentage of students who perform below Level 2 in mathematics.

Source: OECD (2021^[4]), "PISA: Programme for International Student Assessment", <https://dx.doi.org/10.1787/data-00365-en>.

StatLink  <https://stat.link/3or7nu>

In contrast, the share of high performers (i.e. Level 5 or above) was the greatest in mathematics (4.8%) and the closest to the OECD average (10.8%). In contrast, the share of high performers in science (2.5%) and reading (3.3%) was lower and further away from the OECD average.

Figure 2.18. Percentage of low and high achievers in science, PISA 2018

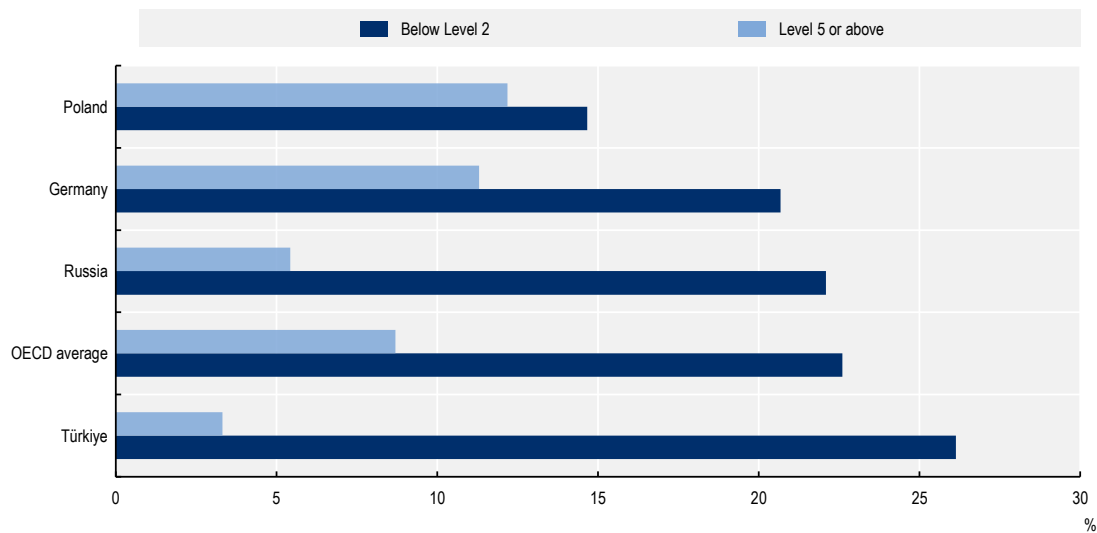


Note: Countries are ranked in ascending order of the percentage of students who perform below Level 2 in science.

Source: OECD (2021^[4]), "PISA: Programme for International Student Assessment", <https://dx.doi.org/10.1787/data-00365-en>.


StatLink  <https://stat.link/0p3gts>

Figure 2.19. Percentage of low and high achievers in reading, PISA 2018



Note: Countries are ranked in ascending order of the percentage of students who perform below Level 2 in reading.

Source: OECD (2021^[4]), "PISA: Programme for International Student Assessment", <https://dx.doi.org/10.1787/data-00365-en>.

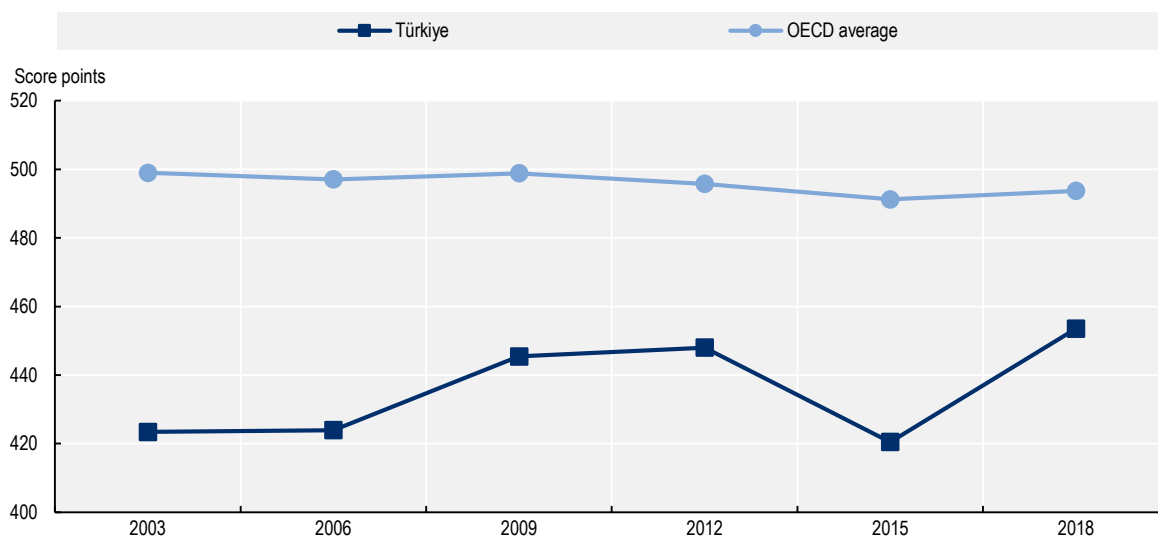
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A positive and significant improvement in the performance of 15-year-old students was observed in Türkiye since 2003


The PISA data show that both the participation and performance of 15-year-olds in Türkiye has improved over time. While there has been a general trend of improvement, average scores in all domains dropped

unexpectedly in 2015. Box 2.2 discusses possible reasons for this decline. Since 2003, in mathematics, average performance has risen by 30 score points with a substantial increase between 2006 and 2009 and later between 2015 and 2018 (Figure 2.20). Türkiye's improving performance was the largest among all three benchmark countries. In general, countries that did well on the PISA test in earlier cycles tended to have stable performances or more modest improvements than countries like Türkiye that started from a lower position with greater room for growth. The two other countries that experienced major improvements between 2003 and 2018 are Poland and Portugal.

Figure 2.20. Trend in PISA mean mathematics performance, 2003 through 2018

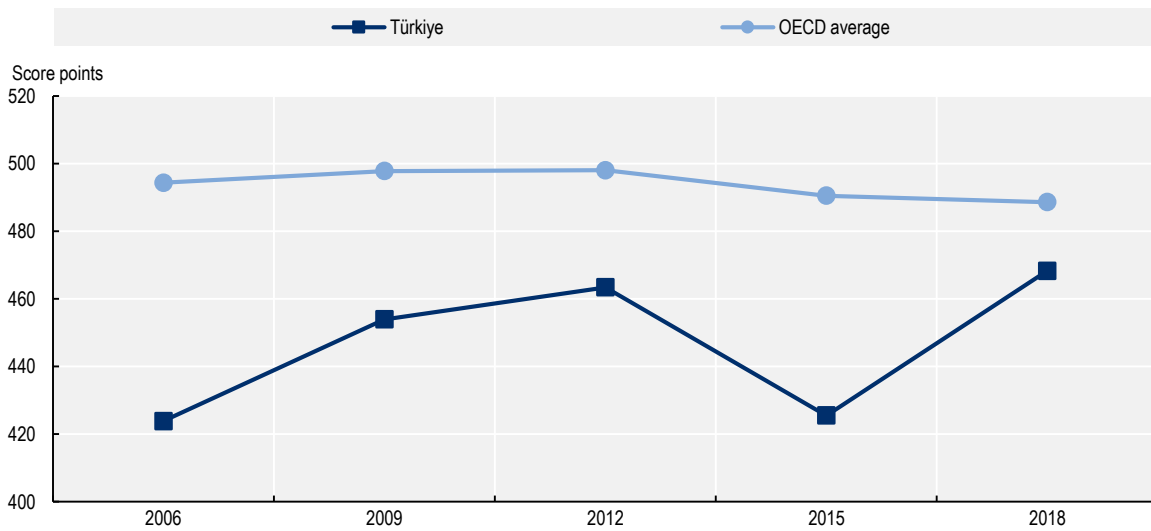


Source: OECD (2021^[4]), "PISA: Programme for International Student Assessment", <https://dx.doi.org/10.1787/data-00365-en>.

StatLink  <https://stat.link/n7354j>

Türkiye's average performance in science improved by more than 40 score points between 2006 (the first year when science was the main domain of assessment) and 2018 with an unexpected drop in 2015 (Figure 2.21). This rise brought Türkiye's performance closer to the OECD average and reduced the gap by more than a half (the gap shrunk from 40 score points to 20). In all three benchmark countries, performances were either stable (Poland and Russia) or declined over that period (Germany). The only country to experience a greater improvement in science between 2006 and 2018 was Qatar (increase of 70 score points).

Figure 2.21. Trend in PISA mean science performance, 2006 through 2018

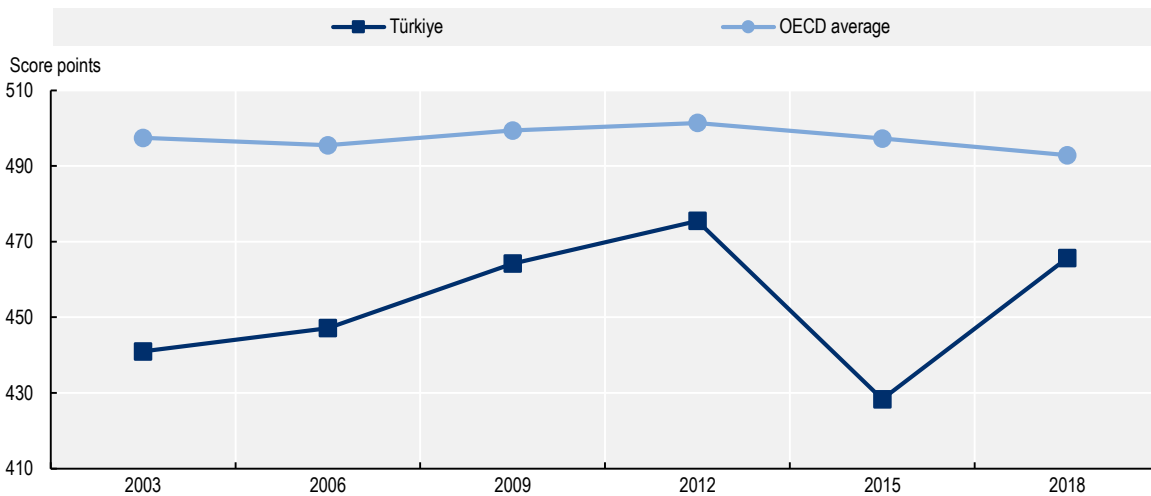


Source: OECD (2021^[4]), "PISA: Programme for International Student Assessment", <https://dx.doi.org/10.1787/data-00365-en>.

StatLink  <https://stat.link/g60cr5>

In reading, the average performance of students in Türkiye rose by 25 score points between 2003 and 2018, reaching its highest level in 2012 (Figure 2.22). Mexico was one of the only countries to experience a substantial rise in reading performance over the same period.

Figure 2.22. Trend in PISA mean reading performance, 2000 through 2018



Source: OECD (2021^[4]), "PISA: Programme for International Student Assessment", <https://dx.doi.org/10.1787/data-00365-en>.

StatLink  <https://stat.link/4bovhx>

Box 2.2. Possible explanations for the sudden drop in Türkiye's performance in PISA 2015

In PISA 2015, Türkiye experienced a sudden drop in the performance of its students across all domains. In PISA 2018, student performance returned to its previous trajectory. Even though conclusive reasons are difficult to identify, there are some possible scenarios. Such a sudden and significant fall in average performance followed by a swift return to previous levels is unlikely to be explained by changes in student performance alone. Although TIMSS does not assess the students of the same age or according to the same assessment framework, one would expect to see a similar pattern in Türkiye's performance in TIMSS across 2015 and 2019 if the drop in performance was related to systemic, school-wide factors, which is not the case.

National sources suggest that one possible explanation for the drop in performance is the shift from paper-based assessment in 2012 to computer-based assessment in 2015. Low levels of digital awareness and limited familiarity with the computer-based setting may have impacted student performance.

Another possible explanation is changes in Türkiye's PISA sampling procedures related to changing distribution of students across schools.

Starting in 2015, Türkiye embarked on a major school building campaign reaching a total of 67 835 classrooms made available to students. These new schools have provided additional places and helped reduce class size, especially in urban areas. The expansion of the number of schools also meant that new schools were eligible for sampling in the PISA assessment (see Chapters 4 and 11 in the PISA 2018 technical report). The largest type of high school to expand between 2015 and 2018 were Anatolian High Schools (with a rise of eight percentage points in the nationally representative Turkish PISA sample) and Science High Schools (rise of 1.5 percentage points over this period). This was mirrored by a decline in the share of vocational and technical Anatolian High Schools (drop of 4.8 percentage points) and Multi-Programme Anatolian High Schools (decline of 1.8 percentage points). The two types of schools that witnessed an expansion were on average better performing than the two types that witnessed a decline in the PISA sample. This expansion of the number of schools combined with a change in the composition of those schools is a plausible explanation for the recovery between 2015 and 2018.

At the end of Grade 8, since students in Türkiye are placed in different types of high schools with different levels of performance, changes in student numbers and school size impacted PISA performance but not TIMSS. In Grades 4 and 8, most students attend the same primary and lower secondary schools.

It is important to note that this is just one possible explanation, which is speculative. Forensic examination of the sampling procedure would be necessary to confirm if this explanation is correct. Moreover, changes to the assessment methods such as the move to computer-based testing in 2015 and the treatment of missing data (i.e. unanswered test questions) should be taken into account.

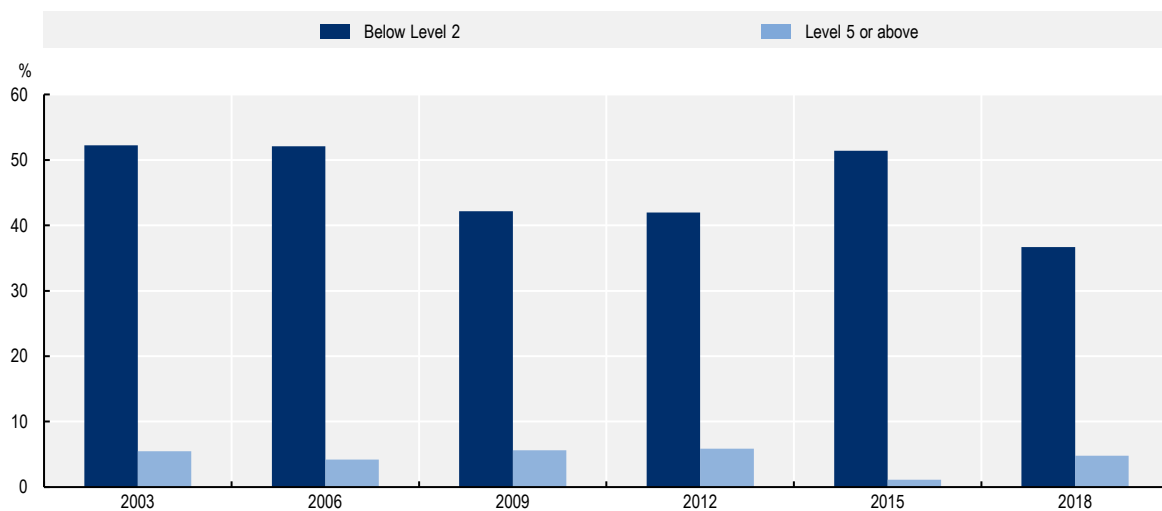
Note: In Türkiye, as well as following either vocational or academic pathways in upper secondary education, students also attend different types of upper secondary schools: Anatolian; Science; Social Sciences; Anatolian Imam and Preacher; Sports/Arts; Multi-Programme; and Vocational and Technical Anatolian High Schools. Codes to identify the different types of high schools in PISA 2015 data was shared with the OECD by the Ministry of National Education in Türkiye as part of the OECD Review of Evaluation and Assessment in Education: Student Assessment in Türkiye (Kitchen et al., 2019^[5]).

Source: World Bank (2017^[6]), "World Bank administers School Construction Projects under the Facility for Refugees in Türkiye", <https://www.worldbank.org/en/news/press-release/2017/01/30/world-bank-administers-school-construction-projects-under-the-facility-for-refugees-in-Türkiye> (accessed on 6 December 2021).

The improvements in average performance were driven by a decline in the proportion of low achievers in all three subjects

In mathematics in 2018, the proportion of low achievers (students performing below Level 2) declined by about 15 percentage points in comparison with previous cycles of PISA (i.e. 2003 and 2015) while the proportion of top achievers (students performing at Level 5 or above) slightly increased. On average across OECD countries, the proportion of high and low achievers did not change. This result is particularly encouraging because it shows that the improving trends in mathematics were driven by a rise in the performance of low achievers. It is particularly notable that the performance of low performers improved at the same time as previously out-of-school students remained in school longer (see following section on improving performance and rising participation among 15-year-olds). Among the three benchmark countries, Poland had similar trends over time with a decline in the proportion of low achievers.

Figure 2.23. Percentage of low and high achievers in mathematics, 2003 through 2018



Source: OECD (2021^[4]), "PISA: Programme for International Student Assessment", <https://dx.doi.org/10.1787/data-00365-en>.

StatLink  <https://stat.link/vjbawo>

In science, between 2006 and 2018, the proportion of low achievers declined by 20 percentage points while the share of high achievers rose by two percentage points (across all OECD countries, the proportions were stable). Most of the improvement in performance took place among the intermediate achievers. No other country, including the three benchmarks, had a similar decline in the share of low achievers over that period with the exception of Qatar (drop of 31 percentage points).

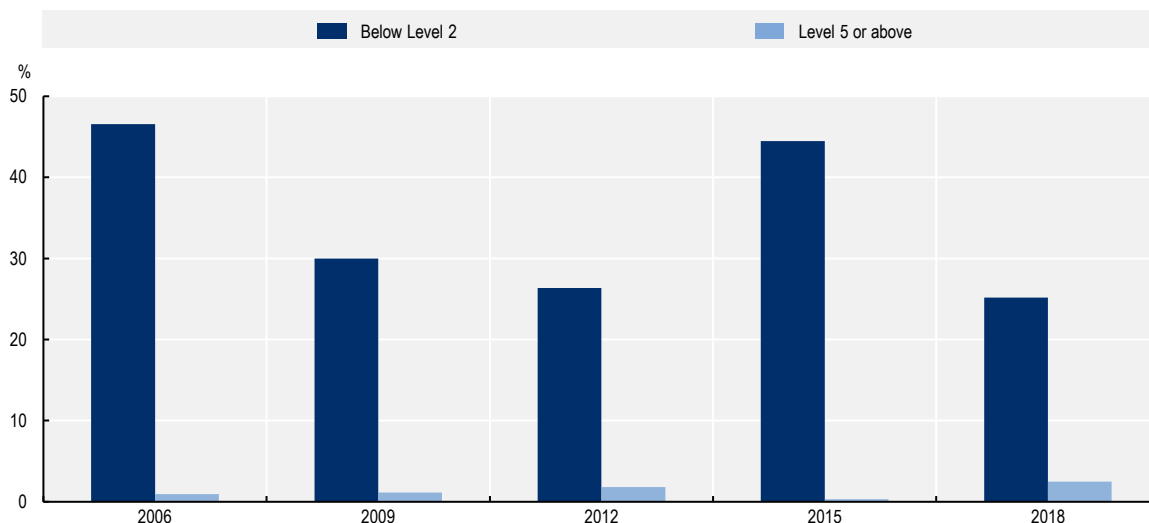
In reading, the proportion of low and high achievers was stable over the period of 2009 to 2015. However, between 2015 and 2018, the share of low achievers (performing below Level 2) declined by 14 percentage points while the share of high achievers (performing at Level 5 or above) increased by three percentage points. No changes were observed on average across OECD countries. Only North Macedonia had a similar decline in the proportion of low achievers over the same period of time as Türkiye.

Improving performance and rising participation among 15-year-olds

Over the period of 2003 to 2018, the average performance in reading of students in Türkiye improved by 25 score points. This improvement was accompanied by a rise in enrolment among 15-year-olds and a rise in the PISA sample coverage (see Chapter 1). School enrolment increased progressively between

2003 and 2012 with the largest rise taking place in 2012 when education became compulsory for this age group. Similarly, coverage of the PISA sample of the 15-year-old population improved over time (with the coverage index rising from 36% to 73%) as more students became eligible for sampling.⁵

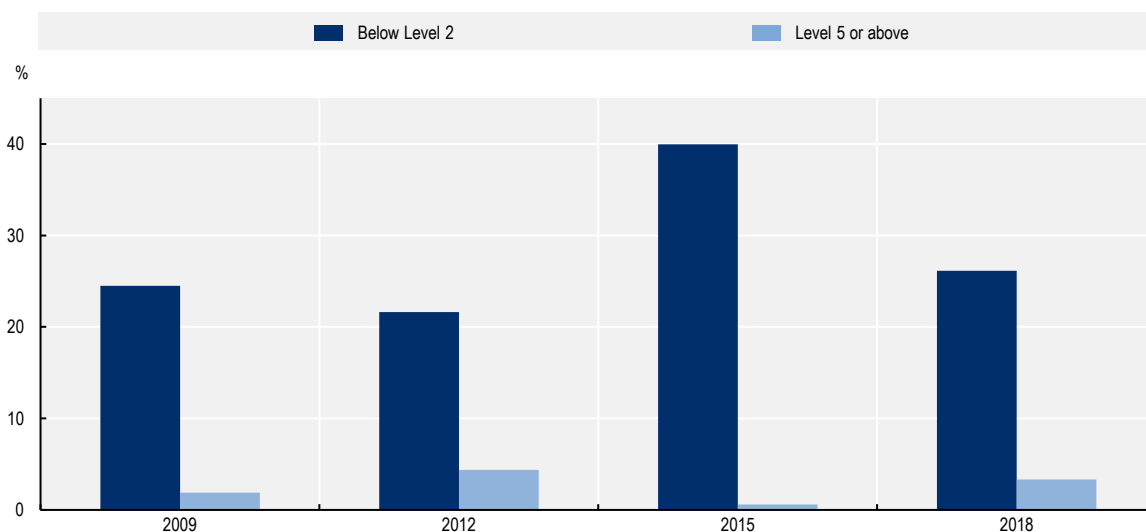
Figure 2.24. Percentage of low and high achievers in science, 2006 through 2018



Source: OECD (2021^[4]), "PISA: Programme for International Student Assessment", <https://dx.doi.org/10.1787/data-00365-en>.

StatLink  <https://stat.link/4q2deb>

Figure 2.25. Percentage of low and high achievers in reading, 2009 through 2018



Source: OECD (2021^[4]), "PISA: Programme for International Student Assessment", <https://dx.doi.org/10.1787/data-00365-en>.

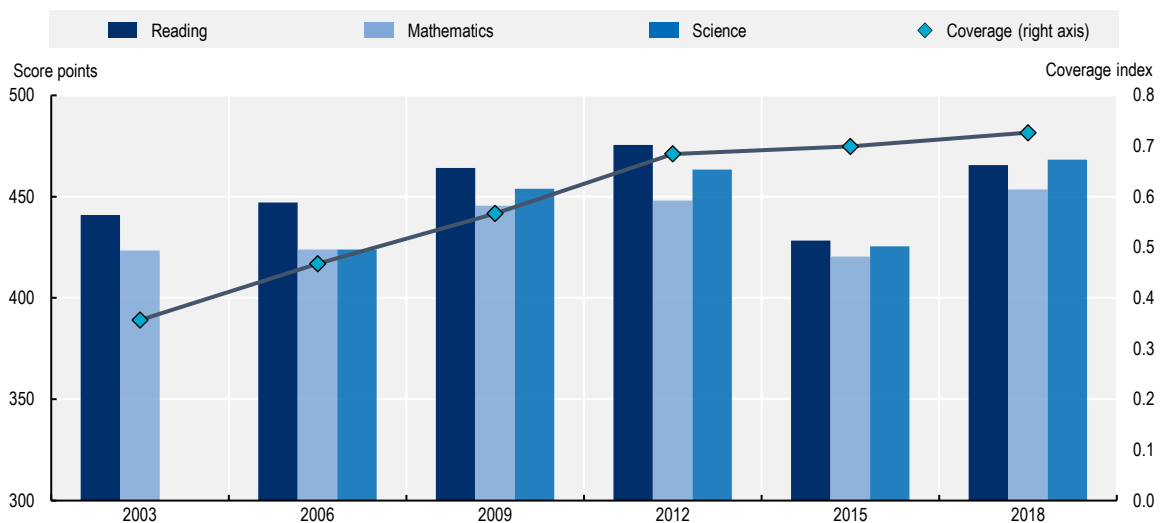
StatLink  <https://stat.link/vnmy71>

Assessment of out-of-school 15-year-olds in five countries by the OECD shows that they perform lower than those that are in school (Ward, 2020^[7]). One might therefore expect that as an education system


expands and participation increases, with previously out-of-school children starting to attend school, that average performance might decline. However, Türkiye's PISA results show that the country has been able to both increase participation and performance at the same time. Comparing the performance of the highest and lowest performing students over time shows that Türkiye has been able to improve the performance of both high and low performing students while participation has increased. The score of students at the 75th percentile of performance – who are most likely not to have been impacted by changes in enrolment – increased by 27 points in reading between 2003 and 2018. At the same time, the score of students at the 25th percentile of performance – the group of performers most likely affected by increasing enrolment – also increased by 27 score points. This suggests that Türkiye has been able to bring previously out-of-school young people into school and still improve performance for most of the student population including the newcomers (see Chapters 1 and 3).

Policies and initiatives undertaken by the Ministry of National Education and other actors over the last decade have contributed to improvements in both participation and quality at the same time. These include improvements in the school infrastructure, for example by increasing the number of classrooms, increasing teacher numbers and expanding access to a wider share of students, for example by providing transportation services for students living in remote areas may also have contributed to improvements in quality and access. In particular, the expansion of access among girls has been a major achievement in Türkiye. While girls were under-represented in PISA 2003, representing 45% of the PISA sample, more girls progressively joined the system to reach parity with boys by 2018 (in 2018, girls represented 49.6% of the PISA sample). Since girls score higher than boys on average in two out of three PISA domains (reading and science), the increase in girls' participation, relative to boys, may have helped to increase Türkiye's average score in PISA over time. It is also possible that in Türkiye, the rise in participation was achieved among the easier to reach population since only one-third of 15-year-olds were eligible to participate in PISA in 2003.

Figure 2.26. Participation and performance in Türkiye over time, PISA



Source: OECD (2021^[41]), "PISA: Programme for International Student Assessment", <https://dx.doi.org/10.1787/data-00365-en>.

StatLink  <https://stat.link/apjrg2>

Conclusions

This chapter paints a very positive picture of student performance in Türkiye. Average performance in Grades 4 and 8 and at age 15 has improved progressively over time and the gap between Türkiye's performance and the OECD average and that of TIMSS-participating countries has shrunk substantially. These improvements have been driven by a rise in the share of high performers and a decline in the share of low performers in all grades and across the two assessments (PISA and TIMSS). The improvements in PISA are particularly notable since they were accompanied by a rise in participation among 15-year-olds. However, it is important to note that since the 2018 PISA assessment only covered 73% of 15-year-olds, the data do not provide a full picture of the performance of all 15-year-olds in Türkiye.

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Notes

¹ In this report, the terminology of “TIMSS Grade 4” is used throughout since this is the official name of the assessment. However, the data refer to Grade 5 students in lower secondary education in Türkiye.

² While the PISA sample coverage has more than doubled since 2003, there remains one-fifth of 15-year-olds who were not covered by the assessment in 2018. Therefore, the results do not represent the performance of the entire population of 15-year-olds in Türkiye.

³ Refers to the average of OECD countries participating in TIMSS.

⁴ For consistency across the PISA analysis and in line with the OECD’s standard practice for comparative analysis, an average of TIMSS-participating countries (“TIMSS international average”) and OECD countries that participate in TIMSS (“OECD average”) are used throughout this report.

⁵ See Chapter 1 for a discussion on the difference between the PISA coverage index and national enrolment rates.



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