



The twin challenge of equity and excellence in basic skills in the EU

An EU comparative analysis of the PISA 2022 results



European
Education Area

EUROPEAN COMMISSION

Directorate-General for Education, Youth, Sport and Culture
Directorate A — Policy Strategy and Evaluation
Unit A.4 — Evidence-Based Policy and Evaluation

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Manuscript December 2023

Luxembourg: Publications Office of the European Union, 2024

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Print
PDF

ISBN 978-92-68-11373-8
ISBN 978-92-68-11374-5

doi 10.2766/042013
doi 10.2766/881521

NC-02-24-007-EN-C
NC-02-24-007-EN-N

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Foreword

EU Member States have committed to a crucial target on basic skills for young people. By 2030, not more than 15% of 15-year-olds should be below a minimum competence level in mathematics, reading and science. Basic skills empower individuals and enable them to participate in modern society, but they are also crucial for sustaining a competitive economy. Without adequate basic skills, people cannot adapt to a fast-changing and dynamic labour market.

The OECD's Programme for International Student Assessment (PISA) regularly tests these skill levels. The results of the recently published PISA 2022 study, analysed in this report from an EU perspective, are deeply worrying. In the EU, around 30% of young people fail to reach the minimum competence level in mathematics, and around 25% in reading and science. This significant - and growing - deviation from the 15% target underscores a serious concern.

EU's future hinges on nurturing young people with excellent skills to drive innovation and maintain competitiveness. However, there is a reason for concern also in this respect: the EU average is sliding down with less than 10% of young people achieving a high level of competence.

The imperative of equity and excellence in basic skills becomes even more critical in light of EU's comparative performance against other advanced economies. They outperform the EU, which poses a substantial threat to our long-term competitive edge.

Addressing this challenge requires concerted action. The PISA results affirm that equity and excellence are not mutually exclusive. The content and structure of education systems is a national competence, but the European Commission continues to be committed to substantially support Member States in their reform and investment efforts.

This report is a first attempt to assess PISA 2022 results in an EU perspective. The Commission will continue analysing data in order to support national policymaking. But it is clear that we need to continue the close and fruitful cooperation with the Member States under the European Education Area.

Initiatives such as the Recommendation on Pathways to School Success and major research projects on learning outcomes in basic skills, funded by Horizon Europe, may inspire Member States in developing their strategies towards school success. In addition to these efforts, the Recovery and Resilience Facility has made available EUR 73 billion for investment in education and skills between 2021 and 2026.

The magnitude of the challenge necessitates more joined up action. To better understand "what works" in education, the Commission has set up a Learning Lab on Investing in Quality Education and Training. I would like to encourage the Member States to use these resources, particularly for enhancing basic skills.

Only through these collective actions can we equip our young people with a solid foundation for adult life.

Iliana Ivanova
European Commissioner for Innovation, Research,
Culture, Education and Youth



Executive Summary

The OECD Programme for International Student Assessment (PISA) measures competences in basic skills (mathematics, reading and science) of 15-year-olds across the world. The results from the PISA 2022 study were published on 5 December 2023, four years after its last edition. The main focus of PISA 2022 is on students' proficiency in mathematics. In the context of the European Education Area, the EU set a target on basic skills (as measured by PISA): the underachievement rate of 15-year-olds (i.e. the share of students who are not able to reach a minimum competence benchmark, called PISA Level 2) in reading, mathematics and science should be less than 15%, by 2030.

PISA 2022 results are worrying for the EU. The underachievement rate has largely increased in mathematics and reading, and more moderately in science, in most countries compared to the previous PISA 2018. At EU level, the underachievement rate now reaches 29.5% in mathematics, 26.2% in reading and 24.2% in science (vs 22.9%, 22.5% and 22.3%, respectively, in 2018). At the same time, the top performance rate (i.e. the share of students reaching a high level of competence) has declined across the board in mathematics and reading compared to PISA 2018, while in science it has remained broadly stable in most countries. In 2022, only 7.9% of EU students reached a high level of competence in mathematics, 6.5% in reading and 6.9% in science (vs 11%, 8.1% and 6.3%, respectively, in 2018).

Socioeconomic background continues to be a strong predictor of student performance. Underachievement is much more frequent among disadvantaged students than among their advantaged peers. For instance, half of disadvantaged students (48%) in the EU underachieve in mathematics. The size of this socioeconomic gap has even increased compared to PISA 2018 results.

Covid-19 has likely played a role in the performance drop observed between 2018 and 2022, but this is only part of the story. Recent research at national level has shown that in many EU countries the Covid-19 pandemic worsened educational outcomes and increased educational inequalities. Moreover, those pandemic-related learning losses are likely to persist if not countered by effective remedial policy action. However, several countries were already experiencing declining performance trends in one or more PISA domains already before the pandemic. Further research and reflection are needed to identify the full set of causes for these results, considering the specificities of national education systems in the EU.

The present situation challenges both the equity and the excellence dimension of the EU education systems and may affect future EU competitiveness, as well as economic and social cohesion. Basic skills are the foundation for more complex tasks and are crucial for personal, academic, and professional success. They serve as the building blocks for enabling individuals to navigate the complexities of life, engage with their communities, and contribute meaningfully to society. They are also key for economic competitiveness. High levels of underachievement in basic skills are a major risk for the employability and productivity of the future workforce. At the same time, declining top performance represents a threat to the EU's future innovation capacity.

The twin challenge of equity and excellence becomes even more pressing when comparing the EU results with those of other large advanced economies such as Canada, Japan, the UK and the US. The EU has the highest underachievement rate in reading and science, and the second highest (after the US) in mathematics. A mirror image appears for the top performance rate: the EU has the lowest one in reading and science, and the second lowest (after the US) in mathematics. This highlights important risks for the long-term competitiveness of the EU economy in a challenging global geopolitical context. However, a positive message has constantly come out of PISA studies: equity and excellence can be promoted together. EU countries with lower levels of underachievement tend to reach higher levels of top performance too.

In addition, PISA gathers data about the learning context, providing valuable information to complement the analysis of the test results. For instance, many students felt their teachers' support, and think they improved their digital skills during the Covid-19 pandemic. The intensity of using digital devices for learning activities at school varies considerably across EU countries. A moderate use of digital resources for learning at school is usually associated with better performance, while the opposite holds true for more intense use. Concerning student well-being, the sense of belonging at school is rather high, but a sizeable proportion of students is exposed to bullying, with possible negative effects on their educational performance.

The European Commission has anticipated a possible decline in educational outcomes due to Covid-19 and has worked with Member States since the onset of the pandemic to tackle its negative effects on the EU education systems. The Recovery and Resilience Facility has made available EUR 73 billion for investment in education and skills between 2021 and 2026. The Learning Lab on Investing in Quality Education and Training will help improve the understanding of “what works” in fostering basic skills, by strengthening the expertise on rigorous evaluation methods among policy makers and sharing knowledge about properly evaluated policies. Furthermore, in November 2022 the EU Education Ministers adopted a Council Recommendation on Pathways to School Success, which proposes a new framework for systemic action to inspire Member States when developing their strategies towards school success. Ongoing Horizon Europe research projects will support implementing this Council Recommendation.

Introduction

The OECD [Programme for International Student Assessment](#) (PISA) is a large-scale international study which measures competences of 15-year olds in the three domains of mathematics, reading and science. Since its launch in 2000, the study has been repeated every three years. The previous study took place in 2018, with its results released in 2019. The data collection for the current cycle, originally scheduled for 2021, was postponed to 2022 because of Covid-19 disruptions to the normal functioning of education systems. The OECD released the first results of PISA 2022 in two volumes on 5 December 2023 (OECD, 2023a; OECD, 2023b).

PISA 2022 involved 690 000 students,¹ representative of about 29 million 15-year-olds across 81 countries and economies. All EU countries (except for Luxembourg) participated in it. PISA 2022 focused on students' proficiency in mathematics² and introduced an updated framework to reflect large-scale social changes with a greater emphasis on mathematical reasoning. In addition, as a result of the pandemic, students and school principals were also asked about their experiences during this period.

The primary goal of PISA is to assess how well students can apply their skills and knowledge to real-life problems, think critically across disciplines and demonstrate effective learning strategies rather than just to measure their ability to memorise information and reproduce learnt material. PISA also collects data on various contextual factors, such as students' attitudes toward learning, their socioeconomic background, and the learning environment in schools.

PISA has gained significant attention globally as a benchmark for informing policy decisions and for enacting effective policy reforms. PISA provides a valuable tool for policymakers and educators to compare educational systems and identify good practices. It can be used to create shared points of reference, leverage peer pressure and help countries improve their education policies and outcomes by learning from the experiences of high-performing systems. Nevertheless, PISA only measures competences in mathematics, reading and science, and it should not be used to assess the quality of the entire education system, which has to provide a wider range of competences (e.g. digital, foreign languages, civic, etc.).

The OECD applies the most rigorous scientific standards to make sure that PISA results are fully comparable across countries. However, it recommends caution when interpreting 2022 data for Denmark, Ireland, Latvia and the Netherlands because one or more PISA sampling standards were not met (see OECD, 2023a, Annexes A2 and A4).³

¹ The sample of students who sit the PISA assessment include both those who study in public or private schools, as well as in academic or vocational tracks.

² Each PISA study assesses one domain more in depth than the other two. PISA 2018 focused on reading, while PISA 2015 had focused on science.

³ The OECD adds a further caveat for Ireland and the Netherlands because they 'tested students between October and December 2022 (previously, in March and April 2018). [...] While the age-based definition of the target population implies that neither the average age nor the average amount of schooling of students in the PISA sample changes, test-period changes do affect the grade composition of the PISA cohort; furthermore, it is possible that students' motivation and test performance are subject to seasonal patterns, which may confound differences over time' (OECD, 2023a, p. 172).

This report is composed of three main sections and an Annex. Section 1 analyses the PISA 2022 main findings for the EU, also in a global context, and then breaks them down by students' socioeconomic background, migrant background and gender. Section 2 zooms in on some important contextual factors for learning (the adaptation to the Covid-19 pandemic, the use of digital resources for learning at school and student well-being) and their association with mathematics performance. Section 3 concludes by presenting the work that the European Commission is conducting with Member States to improve young people's basic skills. The Annex provides concise overviews of the main country-level indicators and policy action for all the 26 Member States participating in PISA 2022.

This report is a first attempt to assess PISA 2022 results in an EU perspective. Further to the present report, the European Commission's Joint Research Centre will perform econometric analyses of microdata from the PISA 2022 questionnaires to improve the understanding of policy-relevant findings for the EU education systems.



Part 1 - Student performance in basic skills



Basic skills are the foundation for more complex tasks and are crucial for personal, academic, and professional success. They serve as the building blocks for enabling individuals to navigate the complexities of life, engage with their communities, and contribute meaningfully to society. They are also key to economic competitiveness (Box 1).

Ensuring that all young people reach an adequate level of basic skills to be able to participate successfully in our societies and economies is key to promoting equity.⁴ In the context of the European Education Area, the EU set an EU-level target on basic skills, as measured by PISA: the share of underachieving 15-year-olds in reading, mathematics and science should be less than 15%, by 2030 (Council of the European Union, 2021).⁵ At the same time, the EU also needs a large number of young people with excellent levels of basic skills to sustain its future innovation capacity. PISA defines those students as “top performers”.⁶ This section will analyse the underachievement rates and the top performance rates over time and across different student groups.⁷

Box 1. Basic skills and competitiveness

Basic skills acquired through education boost labour productivity and support the innovation pace required by the digital transition and an increasingly knowledge-based economy (Égert et al., 2022; Thum-Thyssen et al., 2021; Woessmann, 2014). Higher productivity and stronger innovation will translate into faster GDP growth. Hanushek and Woessmann (2019) simulate the possible macroeconomic impact of increasing young people’s basic skill achievement. In their most favourable scenario, by 2100 the EU GDP could be 30% higher than the level projected with 2015 skill levels. At macroeconomic level, it has also been shown that countries endowed with better-skilled population recover faster from economic shocks and have better economic resilience (Algan et al., 2021).

Moreover, with an expected decline in working-age population over the coming decades, higher employment rates, especially in countries where current employment rates are still relatively low, would help to ensure sustained economic growth. Better-skilled young people have better employment prospects, while the low-skilled are more at risk of leaving education with low qualifications, having worse employment chances (European Commission, 2022c) and less likely to participate in adult learning. Consequently, reducing underachievement in basic skills would increase the pool of young people employable in decent jobs.

Employability can translate into higher earnings. There is usually a strong relationship between education and earnings. For instance, a meta-analysis based on 139 countries over several years showed that, on a global level, the private rate of return on one extra year of schooling is on average about 7% in Europe and 9% at a global level (Psacharopoulos and Patrinos, 2018). Therefore, higher levels of education also benefit public finances via higher revenues from direct taxation.

⁴ Equity in education ensures that everyone has access to a quality education regardless of their background, socioeconomic status, or any other personal characteristic.

⁵ Students are underachievers if they do not reach the PISA competence Level 2, considered as the minimum standard for active participation in society. Level 2 students can, in practical terms, use basic algorithms, apply simple scientific knowledge and interpret simple texts.

⁶ Students are top performers if they reach the PISA competence Level 5 or 6. Level 6 is the highest competence benchmark in PISA. For example, they can work effectively with mathematical models for complex situations, comprehend abstract texts, and interpret and evaluate complex experiments. Level 6 is the highest competence benchmark in PISA.

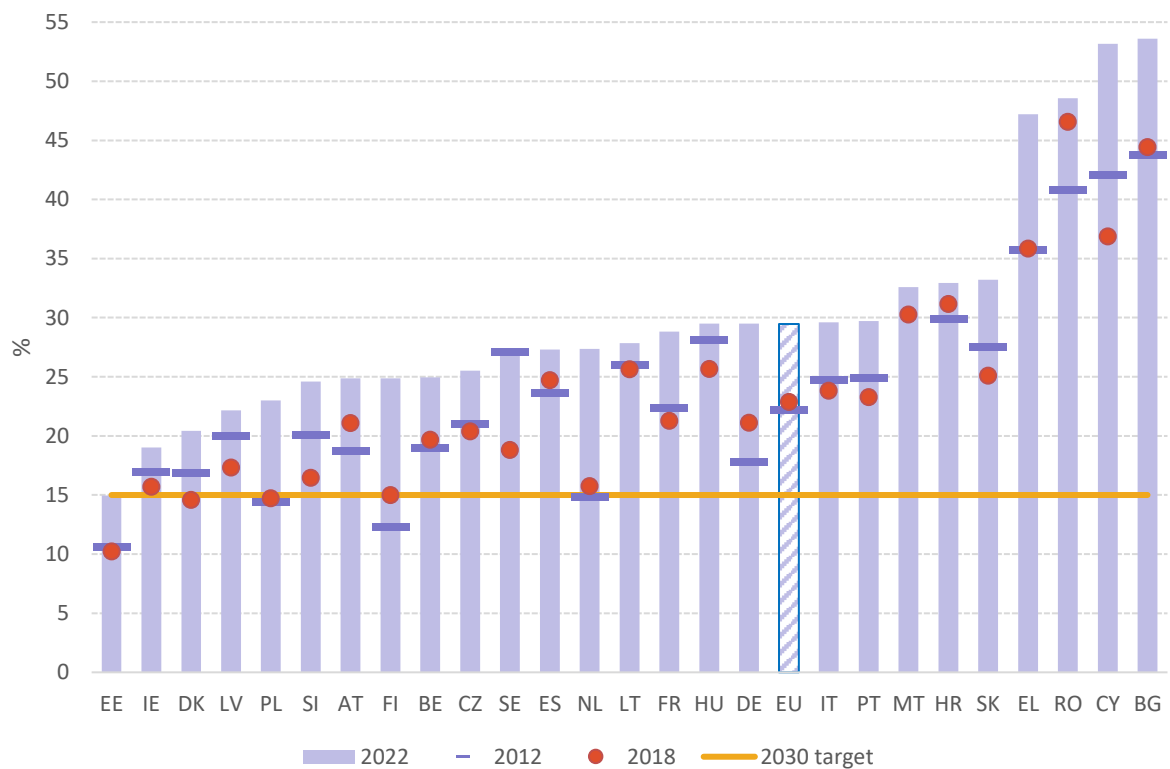
⁷ All EU averages are weighted by the total population of 15-year-olds in each EU country (see OECD, 2023a, Table I.A2.1, pp. 256-57).

1.1. How do students perform in mathematics, reading and science?

Underachievement is on the rise, especially in mathematics and science

The underachievement rate in mathematics stands at 29.5% in the EU as a whole in 2022. Among Member States, only Estonia would reach the 2030 target. The spread between the best and worst performing countries is wide, as the underachievement rate exceeds 45% in Bulgaria, Cyprus, Romania and Greece (Figure 1). Underachievement in mathematics in the EU increased considerably over the past decade, i.e. by 7.3 percentage points since 2012. However, most of the change took place between 2018 and 2022 (+6.6 percentage points). A similar pattern is visible in most Member States: the deterioration in mathematics competence mostly happened between 2018 and 2022, and in some countries it reverted a previous positive trend observed between 2012 and 2018 (Figure 2).

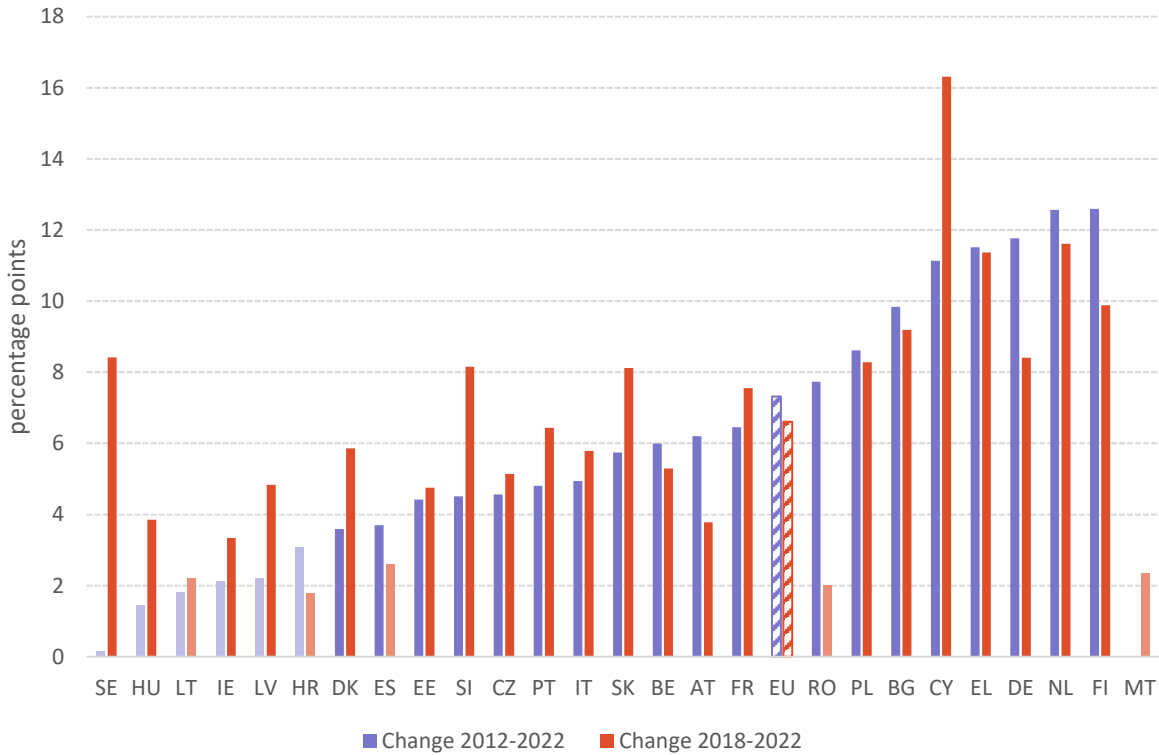
Figure 1. Underachievement rate in mathematics



Notes: Caution is required when interpreting 2022 data for Denmark, Ireland, Latvia and the Netherlands because one or more PISA sampling standards were not met (see OECD, 2023a, Annexes A2 and A4). 2012 data is not available for Malta.

Source: OECD, 2023a (Table I.B1.5.1).

Figure 2. Change in the underachievement rate in mathematics (2012-2022 and 2018-2022)

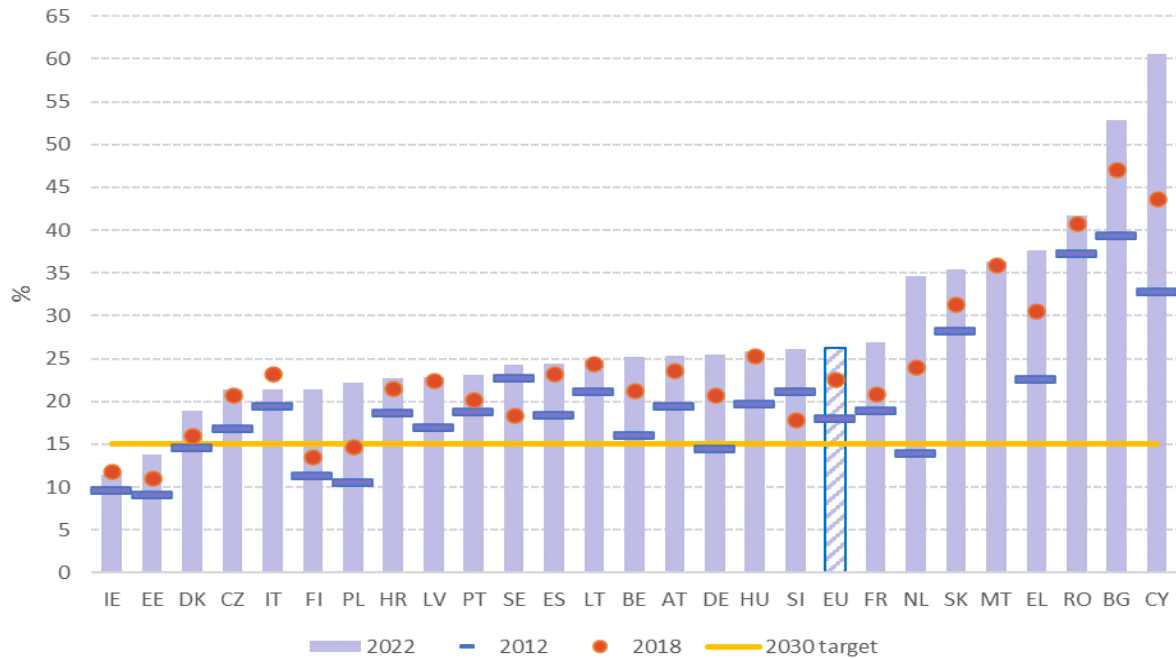


Notes: Caution is required when interpreting 2022 data for Denmark, Ireland, Latvia and the Netherlands because one or more PISA sampling standards were not met (see OECD, 2023a, Annexes A2 and A4). Statistically significant values are in darker tone. 2012 data is not available for Malta. Countries are shown in ascending order according to the change in the underachievement rate between 2012 and 2022.

Source: OECD, 2023a (Table I.B1.5.1).

The EU-average underachievement rate in reading reached 26.2% in 2022. Only Ireland and Estonia would meet the 2030 target. Similar to mathematics, the gap between the best performing and the worst performing Member States is staggering (up to almost 50 percentage points) and a clear worsening in performance is visible over the last decade (Figure 3). However, the trend in reading was already negative between 2012 and 2018, and it became more entrenched between 2018 and 2022 (Figure 4). At EU level, the underachievement rate rose by 4.5 percentage points in 2012-2018 and then by additional 3.7 percentage points between 2018 and 2022 (i.e. an overall 8.2 percentage point increase in 2012-2022). In all countries (except for Cyprus and Slovenia), the performance decline between 2018 and 2022 was larger in mathematics than in reading.

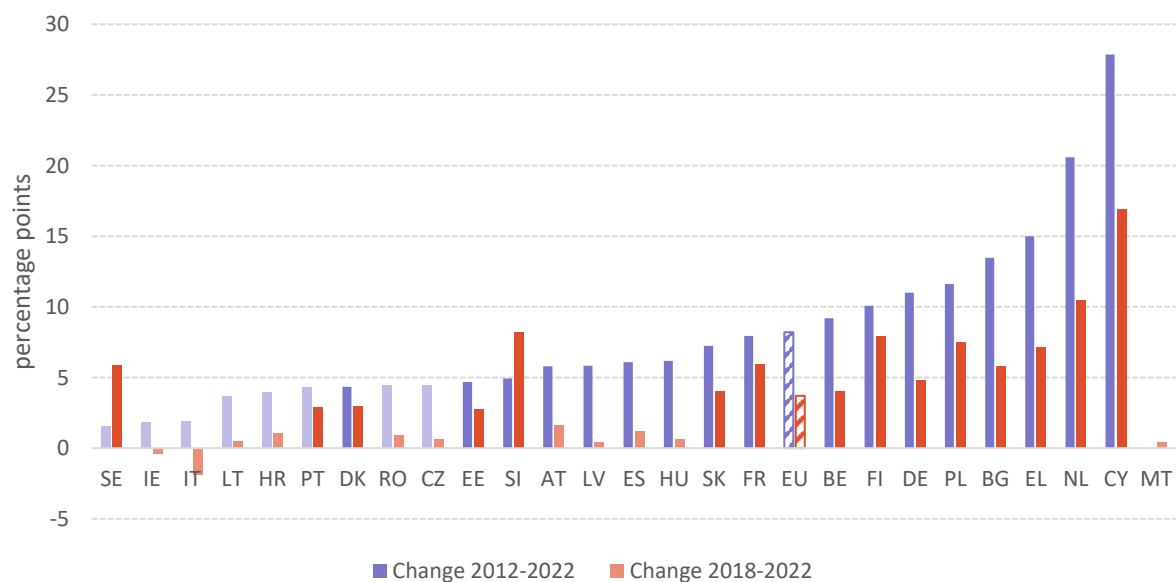
Figure 3. Underachievement rate in reading



Notes: Caution is required when interpreting 2022 data for Denmark, Ireland, Latvia and the Netherlands because one or more PISA sampling standards were not met (see OECD, 2023a, Annexes A2 and A4). 2012 data is not available for Malta.

Source: OECD, 2023a (Table I.B1.5.2).

Figure 4. Change in the underachievement rate in reading (2012-2022 and 2018-2022)

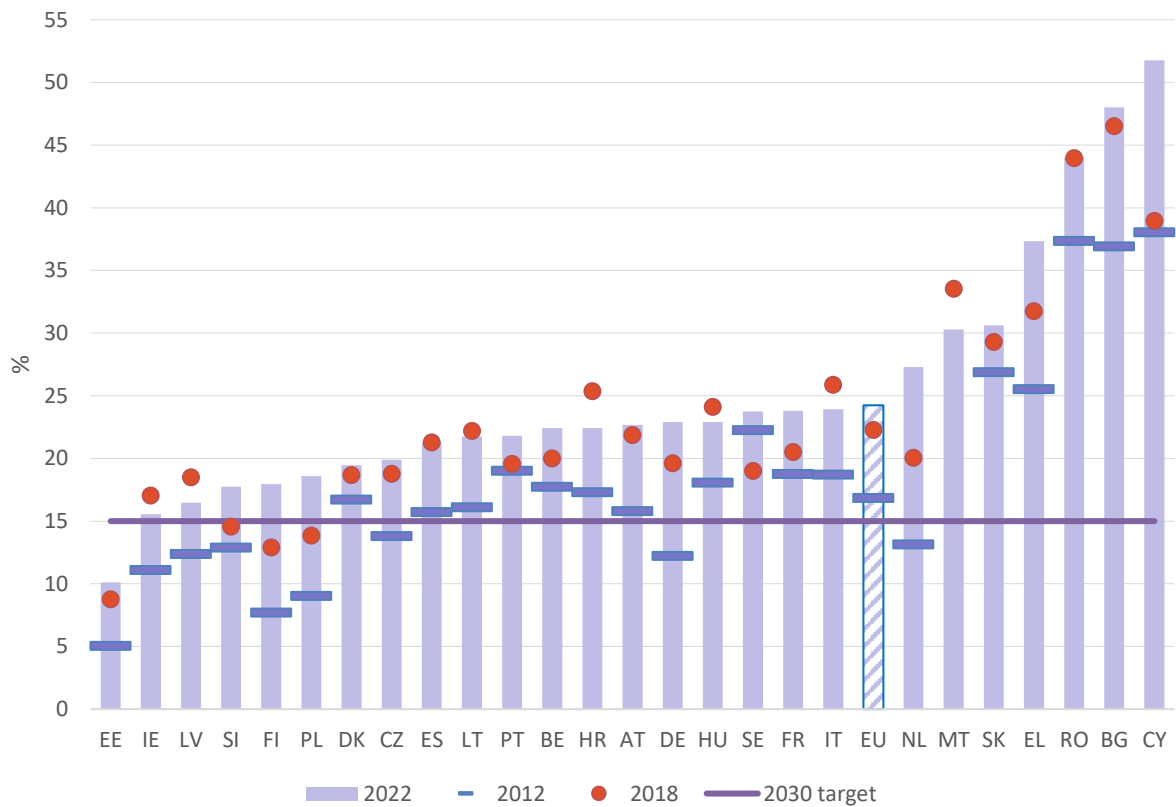


Notes: Caution is required when interpreting 2022 data for Denmark, Ireland, Latvia and the Netherlands because one or more PISA sampling standards were not met (see OECD, 2023a, Annexes A2 and A4). Statistically significant values are in darker tone. 2012 data is not available for Malta. Countries are shown in ascending order according to the change in the underachievement rate between 2012 and 2022.

Source: OECD, 2023a (Table I.B1.5.2).

The underachievement rate in science is somewhat lower than in the other two domains in 2022, at 24.2% in the EU as a whole (Figure 5). Only Estonia would meet the 2030 target. The size of the gap between the best performing and the worst performing Member States is quite similar to the other two domains (up to 40 percentage points). The rise in underachievement over the past decade was also similar to the ones recorded for mathematics and reading (7.4 percentage points between 2012 and 2022). However, most of it took place between 2012 and 2018 (+5.4 percentage points) and consequently the increase between 2018 and 2022 was lower than in mathematics and reading (+2.0 percentage points). At country level, the increase in underachievement between 2018 and 2022 was statistically significant only in 10 cases. Malta even experienced a statistically significant decline in underachievement over the same period (Figure 6).

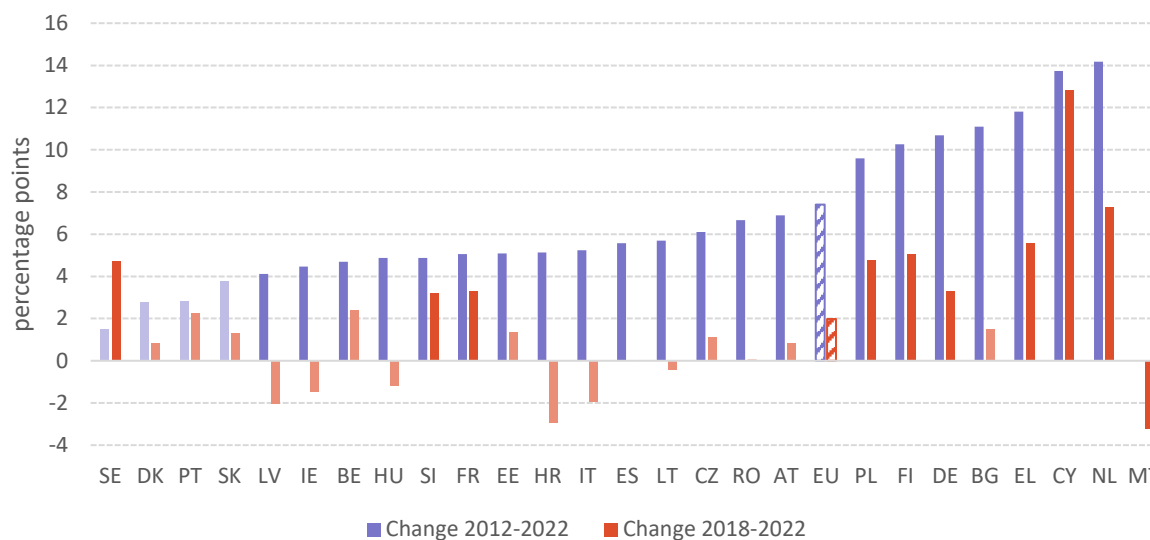
Figure 5. Underachievement rate in science



Notes: Caution is required when interpreting 2022 data for Denmark, Ireland, Latvia and the Netherlands because one or more PISA sampling standards were not met (see OECD, 2023a, Annexes A2 and A4). 2012 data is not available for Malta.

Source: OECD, 2023a (Table I.B1.5.3).

Figure 6. Change in the underachievement rate in science (2012-2022 and 2018-2022)



Notes: Caution is required when interpreting 2022 data for Denmark, Ireland, Latvia and the Netherlands because one or more PISA sampling standards were not met (see OECD, 2023a, Annexes A2 and A4). Statistically significant values are in darker tone. 2012 data is not available for Malta. Countries are shown in ascending order according to the change in the underachievement rate between 2012 and 2022.

Source: OECD, 2023a (Table I.B1.5.3).

Recent research at national level has shown that in many EU countries the Covid-19 pandemic worsened educational outcomes (De Witte and François, 2023) and those pandemic-related learning losses are likely to persist without effective remedial policy action (Di Pietro, 2023). Moreover, learning losses appear to be larger in mathematics than in reading (Betthäuser et al., 2023; Di Pietro, 2023). PISA 2022 results are consistent with all these findings. This suggests that Covid-19 played a role in the performance drop observed between 2018 and 2022.

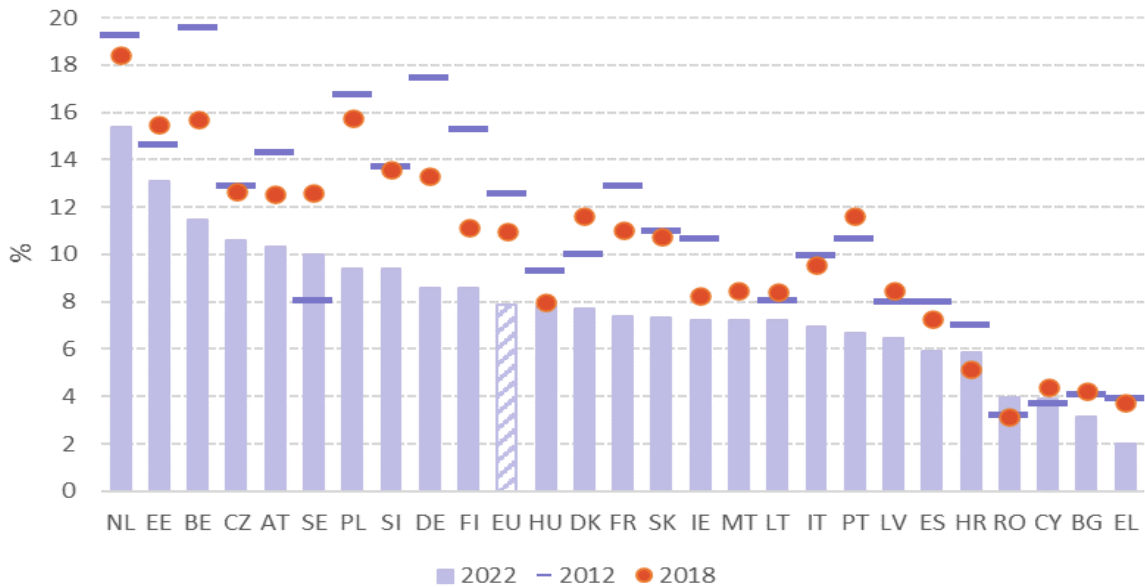
However, several countries were already experiencing declining performance trends in one or more PISA domains already before the pandemic, as shown in the Figures above. Further research and reflection are needed to identify the full set of causes for these results, considering the specificities of national education systems in the EU. What is already clear is that the present situation, where around 25-30% of all EU students (and a much higher share among students from a disadvantaged socioeconomic background; see Section 1.2 below) cannot reach a minimum competence level in basic skills, seriously challenges the equity dimension of the EU education systems, as well as future economic and social cohesion.

Top performance has declined in mathematics and reading

Top performance in mathematics steadily declined over the past decade in the EU as a whole, in particular between 2018 and 2022, reaching 7.9% in 2022. At country level, the top performance rate ranges from 15.4% in the Netherlands to 2.0% in Greece (Figure 7). Between 2018 and 2022, no country improved its figures⁸ and many experienced a sizeable deterioration (Figure 8).

⁸ The increase in the top performance rate in Croatia and Romania is non-statistically significant.

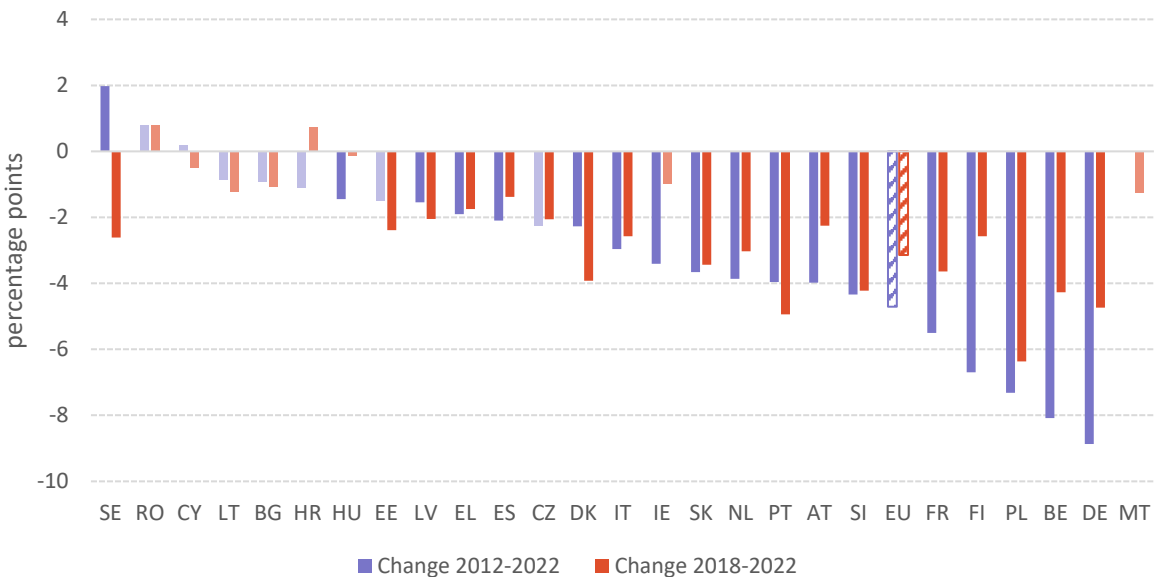
Figure 7. Top performance rate in mathematics



Notes: Caution is required when interpreting 2022 data for Denmark, Ireland, Latvia and the Netherlands because one or more PISA sampling standards were not met (see OECD, 2023a, Annexes A2 and A4). 2012 data is not available for Malta.

Source: OECD, 2023a (Table I.B1.5.1).

Figure 8. Change in the top performance rate in mathematics (2012-2022 and 2018-2022)

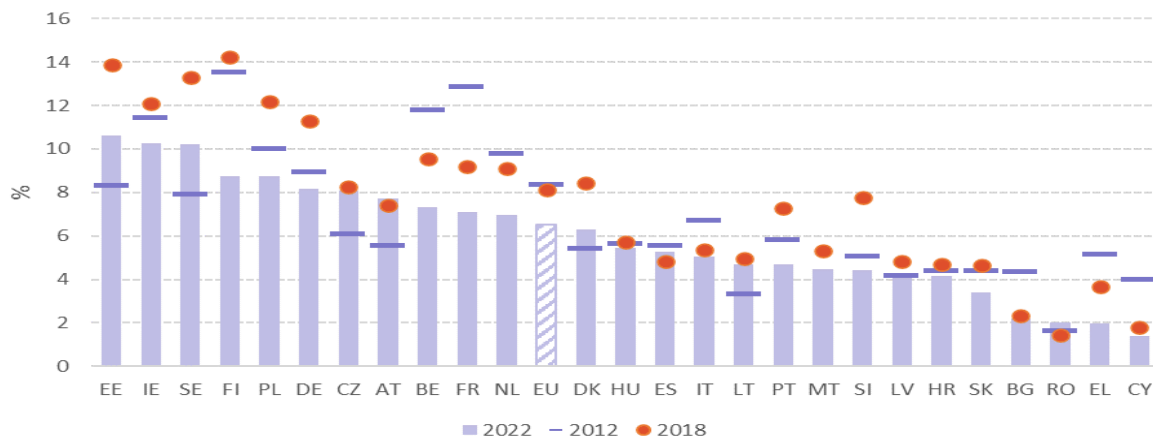


Notes: Caution is required when interpreting 2022 data for Denmark, Ireland, Latvia and the Netherlands because one or more PISA sampling standards were not met (see OECD, 2023a, Annexes A2 and A4). Statistically significant values are in darker tone. 2012 data is not available for Malta. Countries are shown in descending order according to the change in the top performance rate between 2012 and 2022.

Source: OECD, 2023a (Table I.B1.5.1).

The EU-average top performance rate in reading is the lowest of the three PISA subjects, at 6.5% in 2022 (Figure 9). It mirrors the trend observed in mathematics, but the size of its decline is smaller (-1.8 percentage points over 2012-2022, compared with -4.7 percentage points in mathematics). The differences at country level are somewhat smaller than in mathematics. Similarly to mathematics, no country improved its situation between 2018 and 2022 (Figure 10).⁹

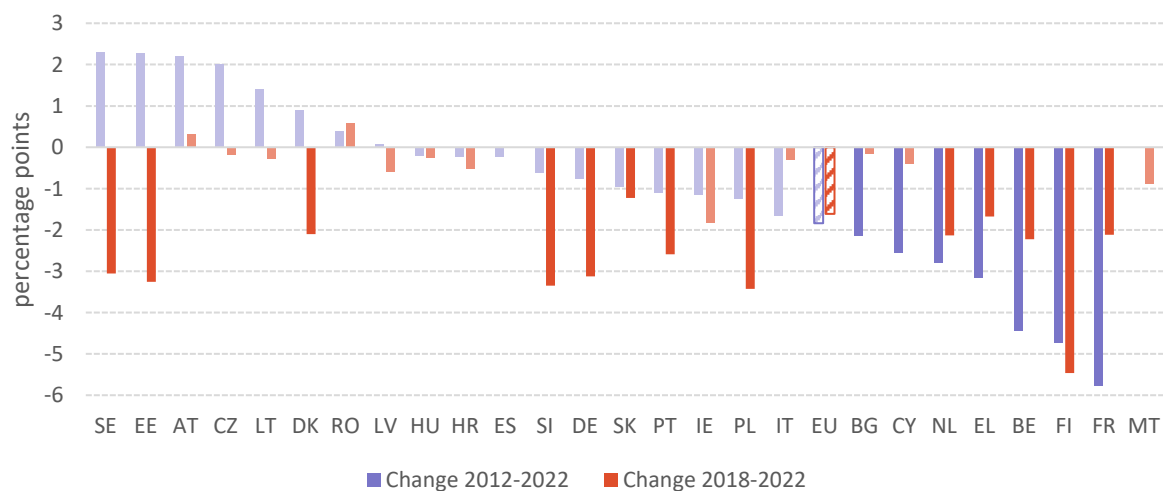
Figure 9. Top performance rate in reading



Notes: Caution is required when interpreting 2022 data for Denmark, Ireland, Latvia and the Netherlands because one or more PISA sampling standards were not met (see OECD, 2023a, Annexes A2 and A4). 2012 data is not available for Malta. 2018 data is not available for Spain.

Source: OECD, 2023a (Table I.B1.5.2).

Figure 10. Change in the top performance rate in reading (2012-2022 and 2018-2022)



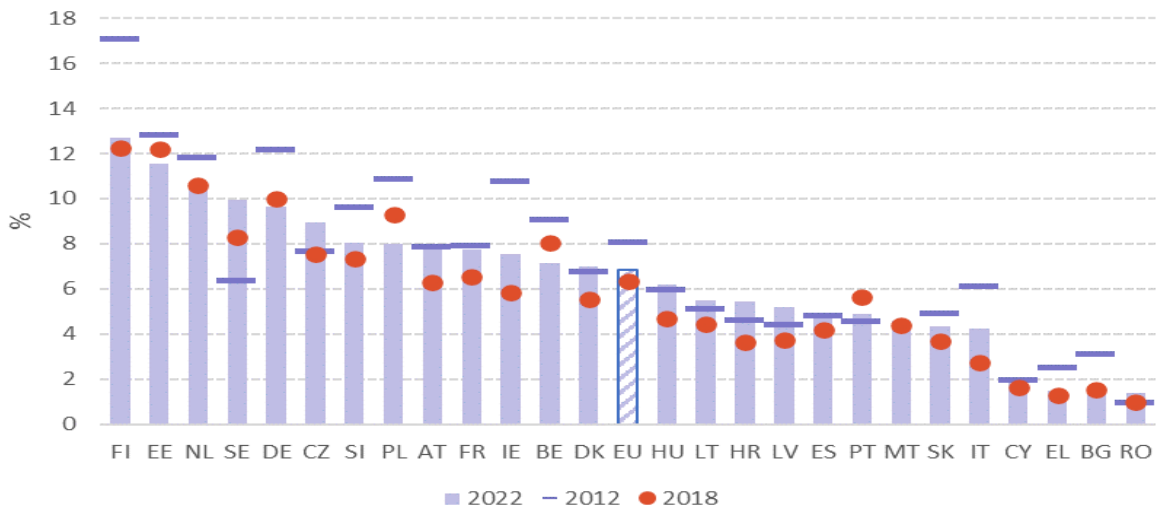
Notes: Caution is required when interpreting 2022 data for Denmark, Ireland, Latvia and the Netherlands because one or more PISA sampling standards were not met (see OECD, 2023a, Annexes A2 and A4). Statistically significant values are in darker tone. 2012 data is not available for Malta. 2018 data is not available for Spain. Countries are shown in descending order according to the change in the top performance rate between 2012 and 2022.

Source: OECD, 2023a (Table I.B1.5.2).

⁹ The increase in the top performance rate in Austria and Romania is non-statistically significant.

Top performance in science has followed a different trend compared with mathematics and reading over the past decade. The top performance rate decreased from 8.0% in 2012 to 6.3% in 2018, then it remained broadly stable at 6.9% in 2022 (Figure 11). Five countries recorded a statistically significant rise in their top performance rate between 2018 and 2022 (Croatia, Ireland, Austria, Italy and Latvia). Over 2012-2022, however, only Sweden recorded a statistically significant increase, while several countries experienced a significant decline (Figure 12).

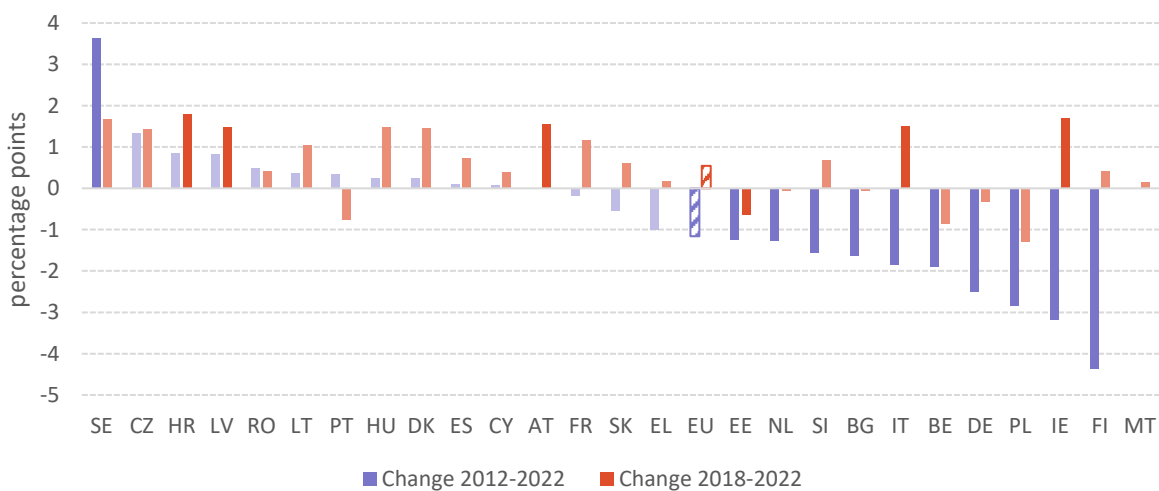
Figure 11. Top performance rate in science



Notes: Caution is required when interpreting 2022 data for Denmark, Ireland, Latvia and the Netherlands because one or more PISA sampling standards were not met (see OECD, 2023a, Annexes A2 and A4). 2012 data is not available for Malta.

Source: OECD, 2023a (Table I.B1.5.3).

Figure 12. Change in the top performance rate in science (2012-2022 and 2018-2022)



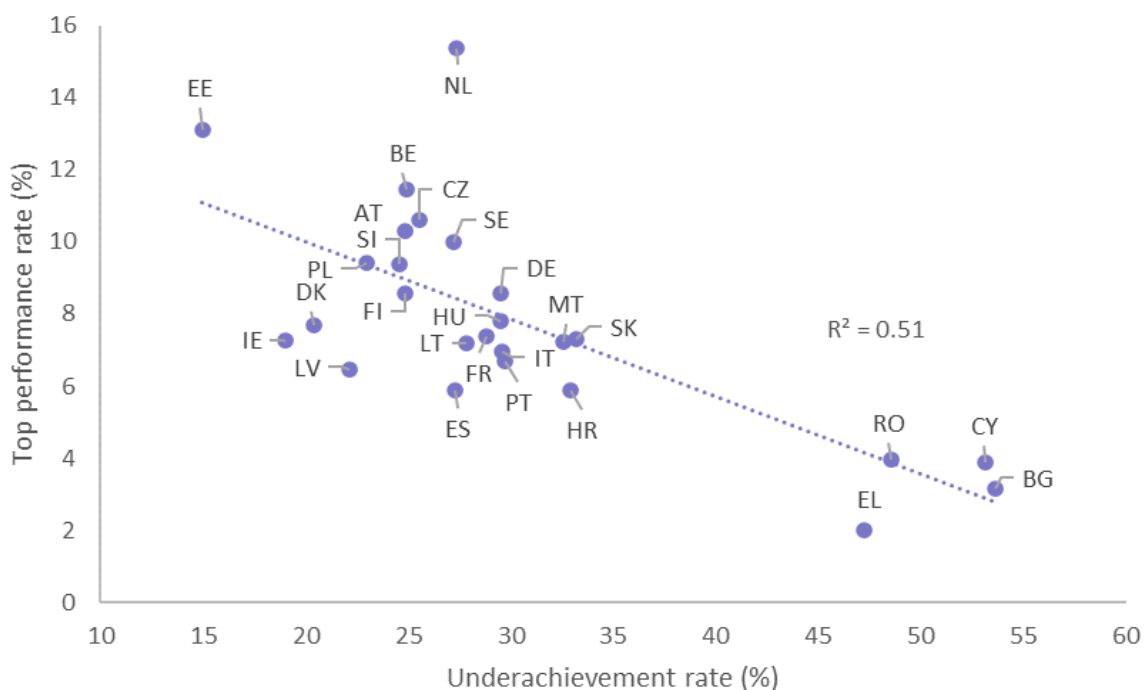
Notes: Caution is required when interpreting 2022 data for Denmark, Ireland, Latvia and the Netherlands because one or more PISA sampling standards were not met (see OECD, 2023a, Annexes A2 and A4). Statistically significant values are in darker tone. 2012 data is not available for Malta. Countries are shown in descending order according to the change in the top performance rate between 2012 and 2022.

Source: OECD, 2023a (Table I.B1.5.3).

The Covid-19 pandemic also affected the learning progress of top performing students, often exacerbating already existing negative trends (De Witte and François, 2023; Gambi and De Witte, 2021), and this finding is reflected in the PISA 2022 results in mathematics and reading. This adds a second challenge to the EU education systems: how to promote excellence in basic skills.

The twin challenge of equity and excellence becomes even more pressing when comparing the EU with other major advanced economies in terms of underachievement and top performance (Box 2). A positive message comes from the finding illustrated in Figure 13, which was constantly observable also in previous PISA studies (European Commission, 2017, 2019): equity and excellence can be promoted at the same time. Countries with a lower underachievement rate tend to have a higher top performance rate too. This association is rather strong, although obviously it is not a deterministic relationship. For instance, the Netherlands appears as an outlier, as it combines the highest top performance rate in mathematics with only a close-to-average underachievement rate.

Figure 13. Underachievement vs top performance in mathematics in 2022



Notes: Caution is required when interpreting 2022 data for Denmark, Ireland, Latvia and the Netherlands because one or more PISA sampling standards were not met (see OECD, 2023a, Annexes A2 and A4). Pearson correlation coefficient ($r=-0.71$) statistically significant at 1% level.

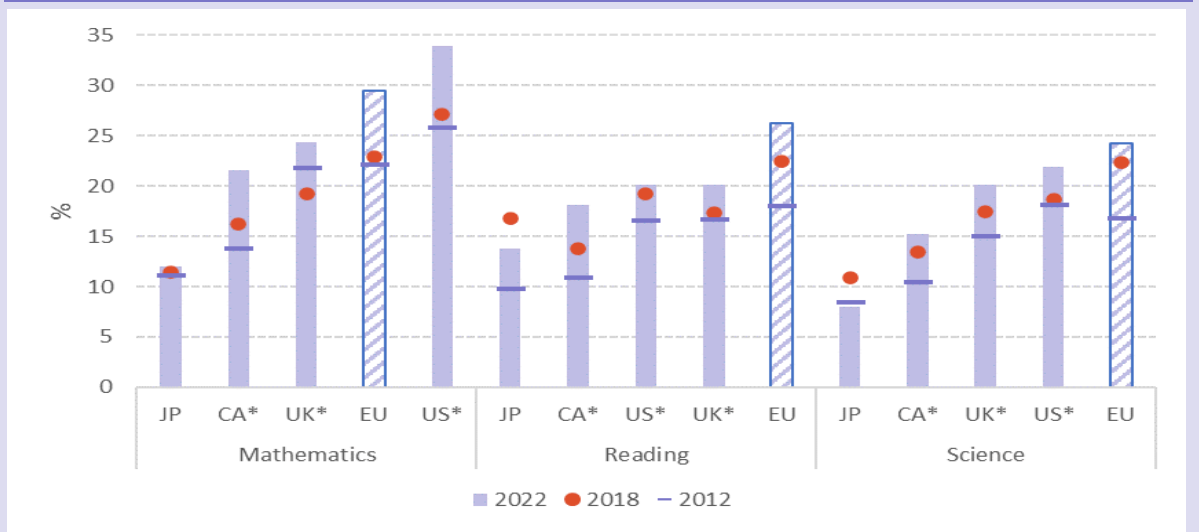
Source: DG EAC calculations based on OECD PISA 2022 data.

Box 2. The EU in the global context

Comparing the EU-average results in underachievement and top performance with the situation in the non-EU G7 countries (Canada, Japan, the United Kingdom and the United States) provides a quick overview of some potential future strengths and weaknesses of the EU economy vis-à-vis other large advanced economies.

Overall, the comparison looks rather unfavourable for the EU. The EU has the highest underachievement rate in reading and science, and the second highest (after the US) in mathematics (Figure 14). A mirror image appears for the top performance rate: the EU has the lowest one in reading and science, and the second lowest (after the US) in mathematics (Figure 15). Over 2012-2022, the EU trends have been quite similar to or slightly more negative than those of the non-EU G7 countries. In other words, the EU has not improved its relative performance compared to other large advanced economies.

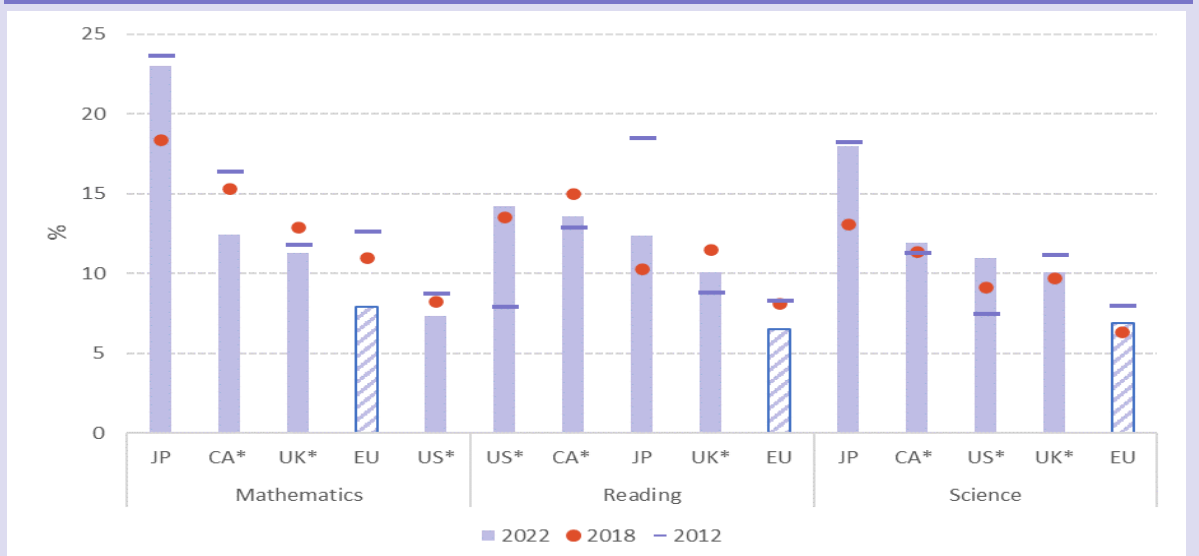
Figure 14. Underachievement rate in mathematics, reading and science: EU vs non-EU G7 countries



* Caution is required when interpreting 2022 data for Canada, the United Kingdom and the United States because one or more PISA sampling standards were not met (see OECD, 2023a, Annexes A2 and A4).

Source: OECD, 2023a (Tables I.B1.5.1 I.B1.5.2 and I.B1.5.3).

Figure 15. Top performance rate in mathematics, reading and science: EU vs non-EU G7 countries



* Caution is required when interpreting 2022 data for Canada, the United Kingdom and the United States because one or more PISA sampling standards were not met (see OECD, 2023a, Annexes A2 and A4).

Source: OECD, 2023a (Tables I.B1.5.1 I.B1.5.2 and I.B1.5.3).

1.2. How does student background affect school success?

Student socioeconomic background is a strong predictor of competence in mathematics.¹⁰ This reinforces the equity challenge to the EU education systems, as already mentioned in Section 1.1.¹¹ PISA measures socioeconomic background through the index of economic, social and cultural status (ESCS).¹²

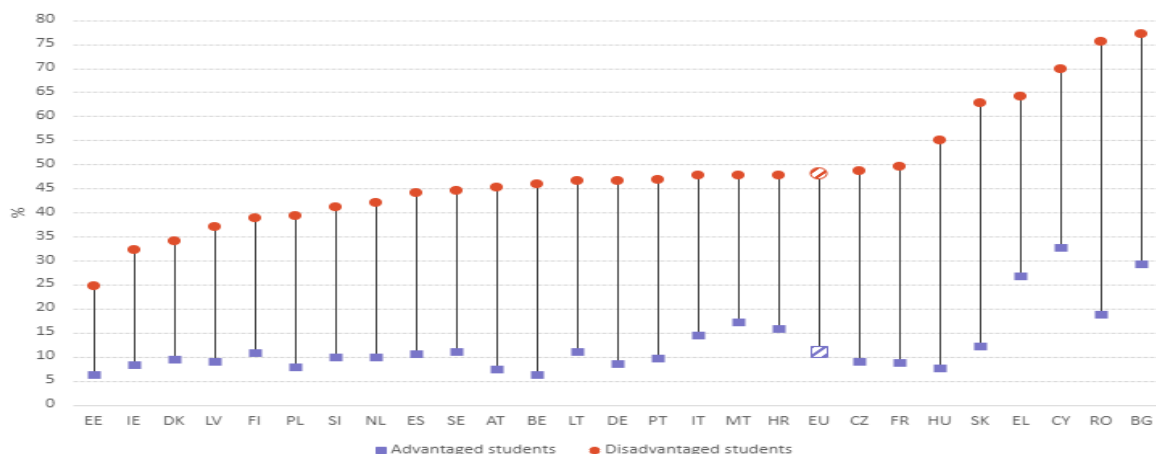
Around half of EU socioeconomically disadvantaged students underachieve in mathematics

In 2022, underachievement in mathematics is much more frequent among socioeconomically disadvantaged students (i.e. students in the bottom quarter of the ESCS) than among their socioeconomically advantaged peers (i.e. students in the top quarter of the ESCS) in all EU countries.

This socioeconomic gap in underachievement ranges from 18 percentage points in Estonia to 57 percentage points in Romania. In the EU as a whole, it reaches 37 percentage points. In 20 countries, advantaged students would already meet the 2030 EU-level target on underachievement, while in no country disadvantaged students are even close to that target. Their underachievement rate varies widely, from 24.6% in Estonia to 77.2% in Bulgaria, with an EU average of 48% (Figure 16).

Large socioeconomic gaps exist in top performance too. In all countries, less than 5% of disadvantaged students are top performers in mathematics (with the exception of the Netherlands, where the top performance rate reaches 5.7%). In Bulgaria, Romania, Greece and Cyprus, the top performance rate for disadvantaged students is below 1%. The top performance rate for advantaged students ranges from 5.2% in Greece to 30.7% in the Netherlands (Figure 17), with an EU average of 18.4%.

Figure 16. Underachievement rate in mathematics, by socioeconomic status (2022)



Notes: Caution is required when interpreting 2022 data for Denmark, Ireland, Latvia and the Netherlands because one or more PISA sampling standards were not met (see OECD, 2023a, Annexes A2 and A4). Disadvantaged students are students in the bottom quarter of the PISA ESCS; advantaged students are students in the top quarter of the PISA ESCS. Countries are shown in ascending order according to the underachievement rate among disadvantaged students.

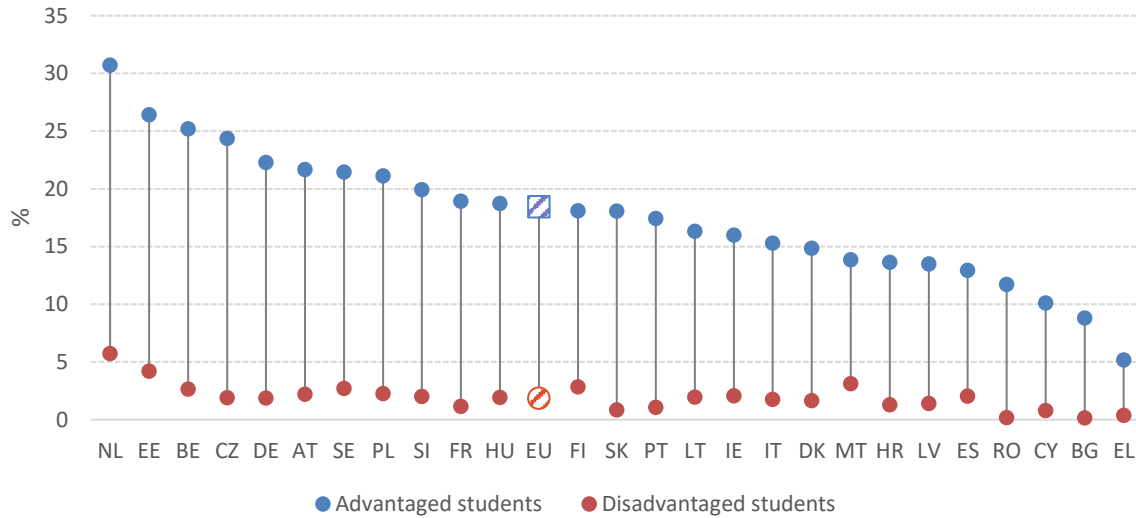
Source: OECD, 2023a, Table I.B1.4.14.

¹⁰ The analysis in this subsection focusses on mathematics because it is the main subject tested in PISA 2022.

¹¹ See European Commission (2022b) for a detailed discussion about equity in education in the EU.

¹² The ESCS is a composite score that combines information from three components: parents' highest level of education; parents' highest occupational status; and home possessions (as a proxy for family wealth). Information about these three components for each student was collected via the PISA student questionnaire. The higher the value of ESCS, the higher the student socioeconomic status. The ESCS scale has a mean of 0 and a standard deviation of 1 across OECD countries. See OECD (2023a, p.114) for more details.

Figure 17. Top performance rate in mathematics, by students' socioeconomic status (2022)



Notes: Caution is required when interpreting 2022 data for Denmark, Ireland, Latvia and the Netherlands because one or more PISA sampling standards were not met (see OECD, 2023a, Annexes A2 and A4). Disadvantaged students are students in the bottom quarter of the PISA ESCS; advantaged students are students in the top quarter of the PISA ESCS. Countries are shown in descending order according to the top performance rate among advantaged students.

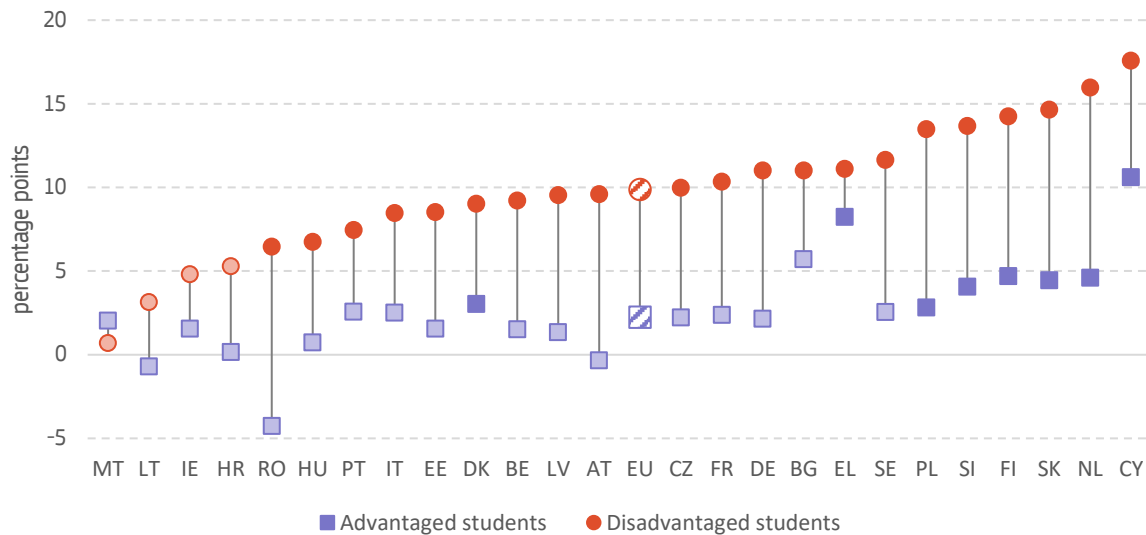
Source: OECD, 2023a, Table I.B1.4.14.

Recent meta-analyses of the research on the impact of Covid-19 on learning outcomes show that on average, socioeconomically disadvantaged students suffered larger learning losses during the pandemic compared with their advantaged peers (Betthäuser et al., 2023; Di Pietro, 2023). This finding is reflected in the change in underachievement in mathematics between PISA 2018 and PISA 2022 (Figure 18). In all countries, except for Malta, the socioeconomic gap in underachievement has increased (i.e. the underachievement rate has risen faster for disadvantaged students than for advantaged ones), although this increase is not always statistically significant. In several cases, the socioeconomic gap widened by around 10 percentage points compared to 2018.

Socioeconomic gaps in top performance in mathematics have often remained stable

Changes in the top performance rate between 2018 and 2022 were non-statistically significant in many countries, both for disadvantaged and advantaged students. However, in some countries the socioeconomic gap in top performance decreased somewhat, as the top performance rate for advantaged students showed a larger decrease than the top performance rate for disadvantaged students (Figure 19). Further research is needed on the drivers of growing inequalities in some education systems.

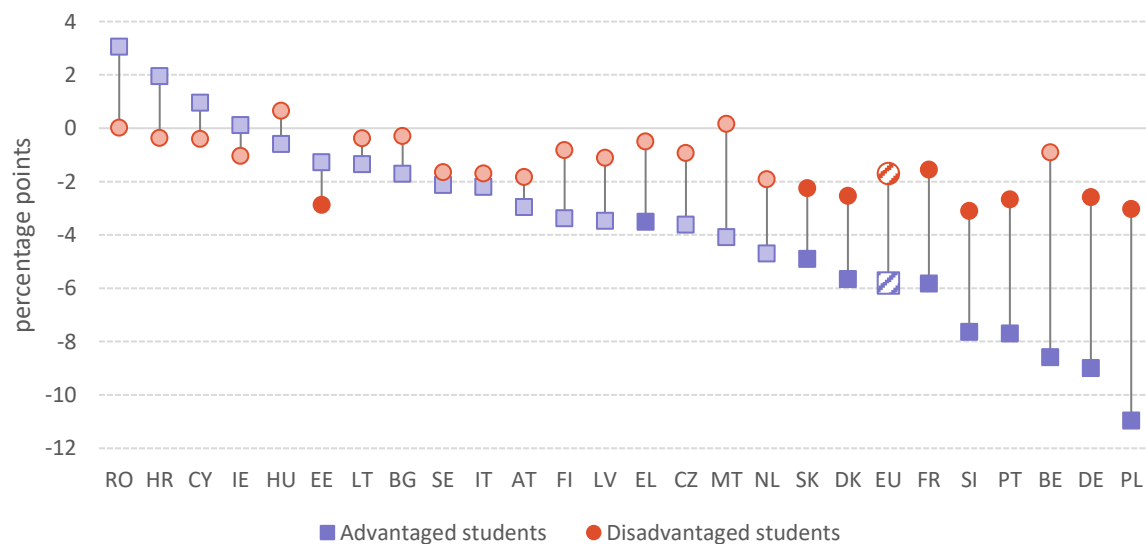
Figure 18. Change in the underachievement rate in mathematics, by socioeconomic status (2018-2022)



Notes: Caution is required when interpreting 2022 data for Denmark, Ireland, Latvia and the Netherlands because one or more PISA sampling standards were not met (see OECD, 2023a, Annexes A2 and A4). Disadvantaged students are students in the bottom quarter of the PISA ESCS; advantaged students are students in the top quarter of the PISA ESCS. Statistically significant values are in darker tone. Data is not available for Spain. Countries are shown in ascending order according to the change in underachievement rate among disadvantaged students.

Source: OECD, 2023a (Table I.B1.5.25).

Figure 19. Change in top performance rate in mathematics, by socioeconomic status (2018-2022)



Notes: Caution is required when interpreting 2022 data for Denmark, Ireland, Latvia and the Netherlands because one or more PISA sampling standards were not met (see OECD, 2023a, Annexes A2 and A4). Disadvantaged students are students in the bottom quarter of the PISA ESCS; advantaged students are students in the top quarter of the PISA ESCS. Statistically significant values are in darker tone. Data is not available for Spain. Countries are shown in descending order according to the top performance rate among advantaged students.

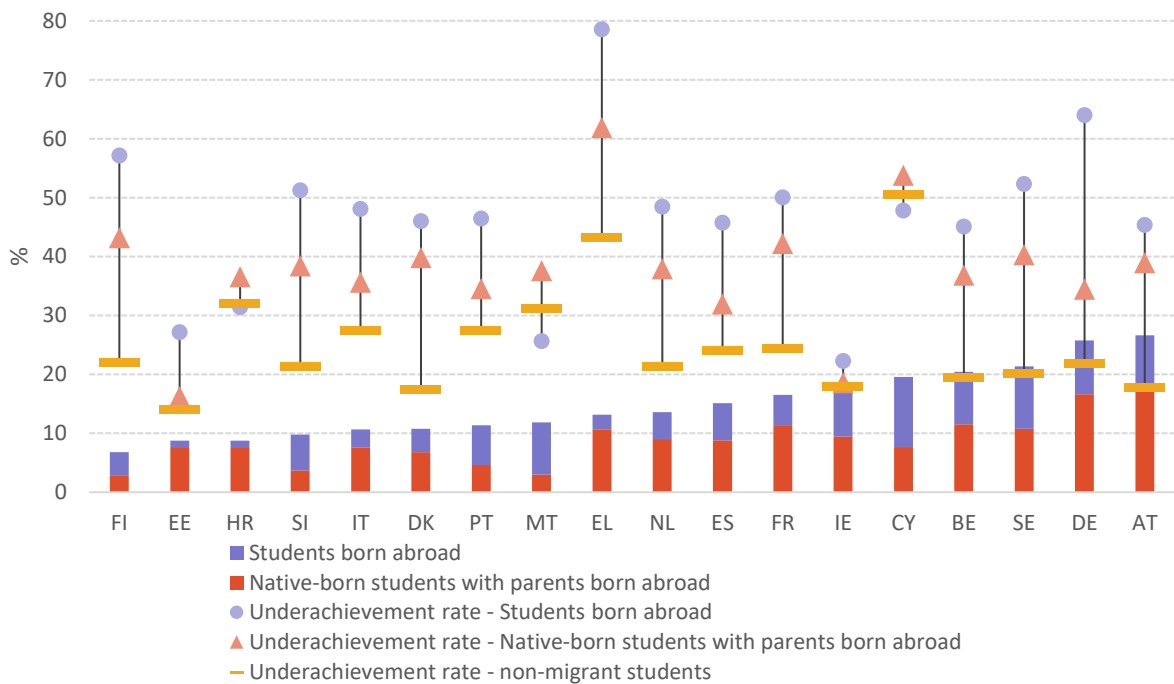
Source: OECD, 2023a (Table I.B1.5.27).

Students with a migrant background are more at risk of underachieving

Migrant background is also associated with underachievement in mathematics, similarly to previous PISA studies (European Commission, 2019). Figure 20 shows the breakdown between students with a non-migrant background, students born abroad (called “first-generation immigrant students” by the OECD) and native-born students with parents born abroad (called “second-generation immigrant students” by the OECD), in EU countries where the sum of the last two categories of students corresponds to more than 5% of total students.¹³ In 10 countries, the share of students with a migrant background is between 10% and 20%, and in Austria, Germany, Sweden and Belgium it exceeds 20%.

The most common pattern of underachievement in mathematics shows a large gap between students born abroad and students with a non-migrant background, while native-born students with parents born abroad partially catch-up. Only in a few countries (Croatia, Malta, Ireland and Cyprus), the differences among all these three groups of students are small.

Figure 20. Share of students with a migrant background and underachievement rate in mathematics by migrant background (2022)



Notes: Only countries where more than 5% of students have a migrant background are included in the figure. Caution is required when interpreting 2022 data for Denmark, Ireland and the Netherlands because one or more PISA sampling standards were not met (see OECD, 2023a, Annexes A2 and A4). Countries are shown in ascending order according to the share of students with a migrant background.

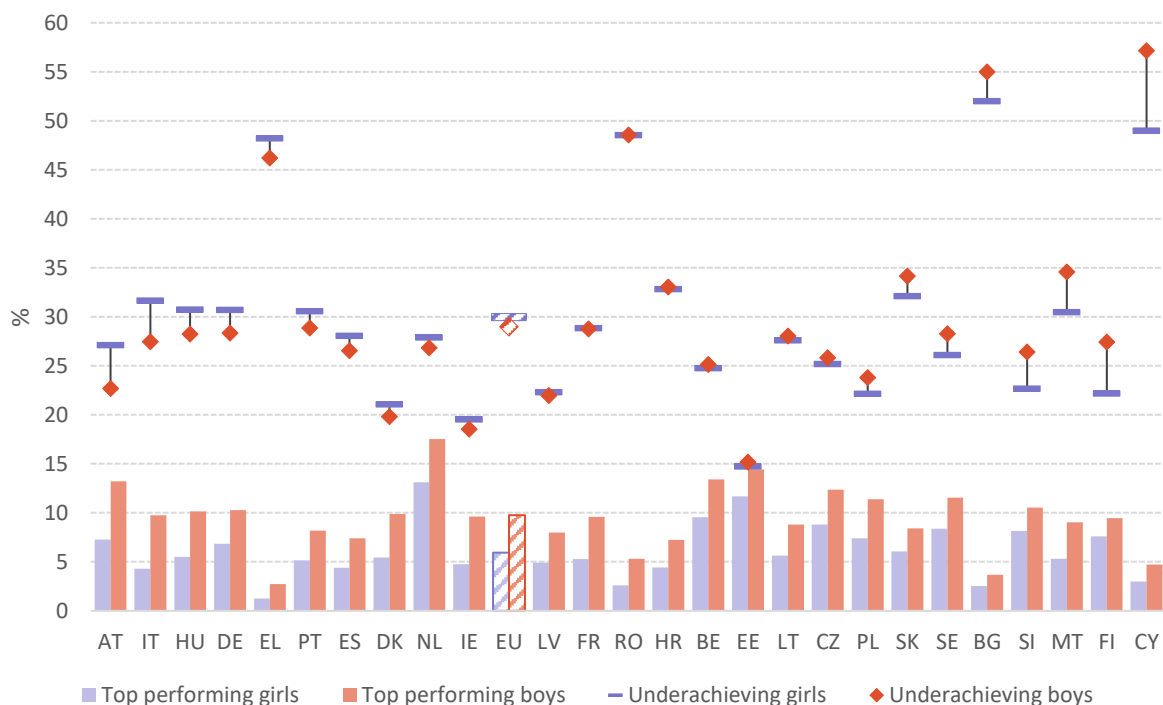
Source: OECD, 2023a (Tables I.B1.7.1 and I.B1.7.17).

¹³ A lower-than-5% share of students with a migrant background is too small for a meaningful analysis.

1.3 How large are gender differences?

Gender gaps in underachievement and top performance are much smaller than socioeconomic gaps across the board. Looking at specific subjects, underachievement in mathematics shows no clear gender patterns. The below-15% EU-level 2030 target on underachievement would only be met by girls in Estonia (with Estonian boys being just marginally above the target). Differences between boys and girls are often very small and non-statistically. Only in Cyprus and Finland, the underachievement rate for boys exceeds the rate for girls by more than 5 percentage points. By contrast, a clear pattern emerges as regards top performance. Boys are more frequently top performers than girls in all EU countries and the gender gap is always statistically significant (Figure 21).

Figure 21. Underachievement and top performance rates in mathematics, by gender (2022)

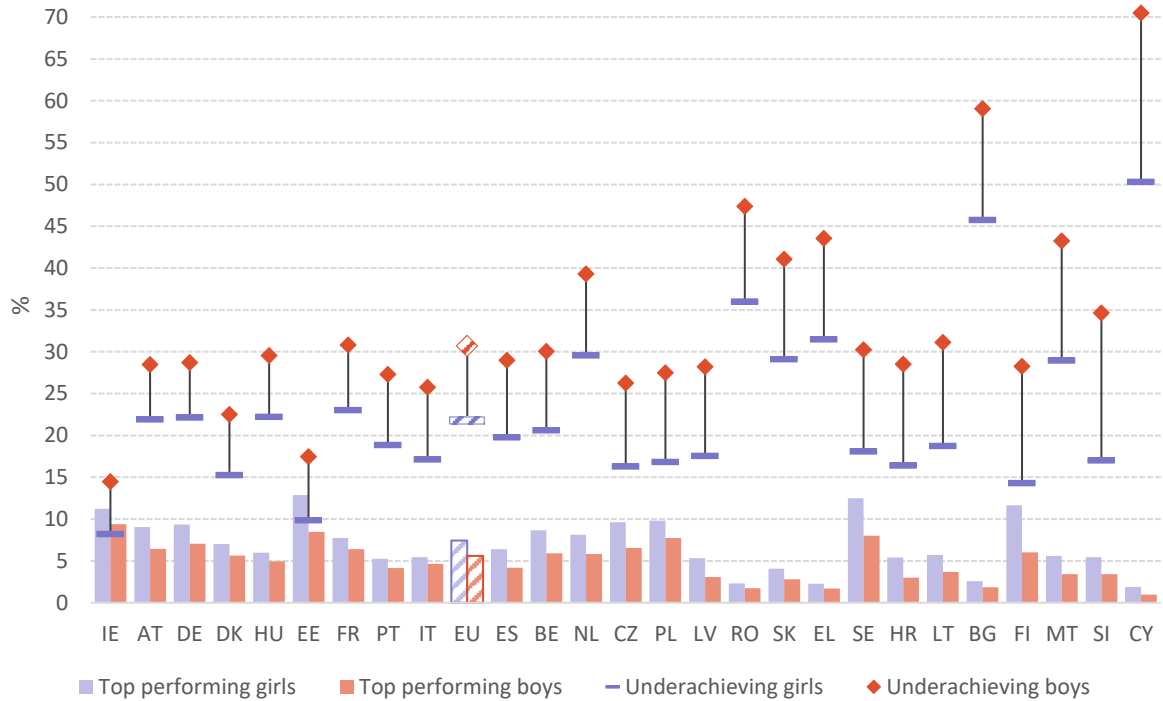


Notes: Caution is required when interpreting 2022 data for Denmark, Ireland, Latvia and the Netherlands because one or more PISA sampling standards were not met (see OECD, 2023a, Annexes A2 and A4). Underachievement: gender differences are statistically significant for Italy, Cyprus, Malta, Austria, Slovenia and Finland. Top performance: all gender differences are statistically significant. Countries are shown in ascending order according to the difference between the shares of underachieving boys and underachieving girls.

Source: OECD, 2023a (Table I.B1.4.31).

Gender differences in underachievement are much more evident in reading. Boys underperform girls by more than 5 percentage points in all countries; this difference even exceeds 10 percentage points in around half of the countries. Ireland is the only country where both girls and boys would meet the 2030 EU-level target on underachievement. Girls would also meet the target in Estonia. Similar patterns apply to top performance. Girls are more likely to be among the top performers than boys in all countries, although these gender differences are not always statistically significant (Figure 22).

Figure 22. Underachievement and top performance rates in reading, by gender (2022)

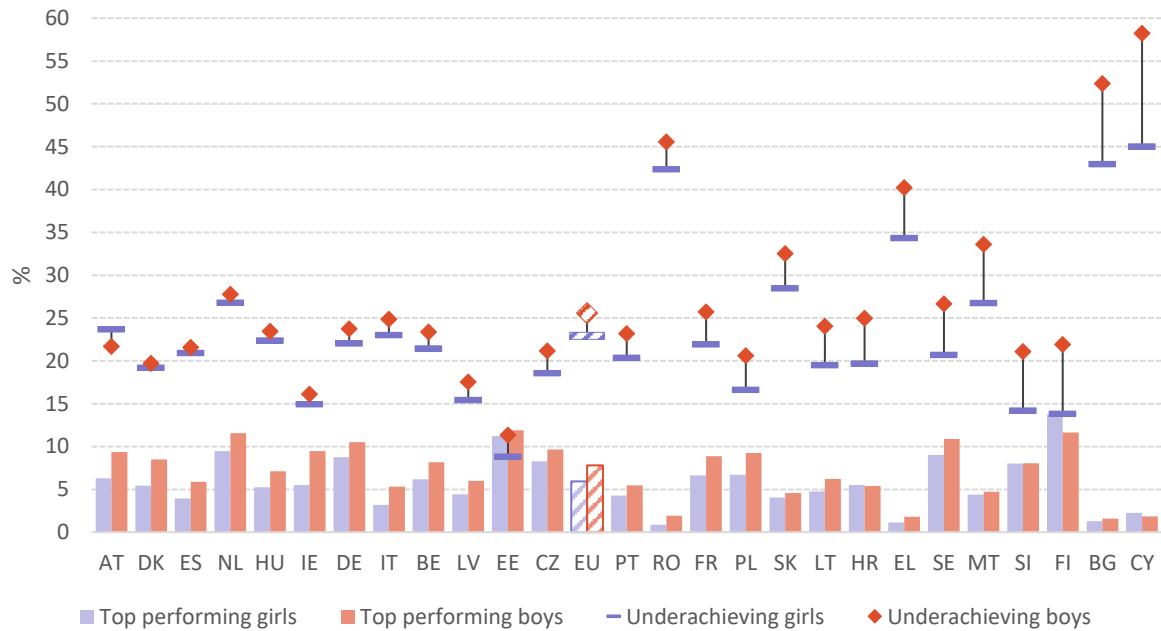


Notes: Caution is required when interpreting 2022 data for Denmark, Ireland, Latvia and the Netherlands because one or more PISA sampling standards were not met (see OECD, 2023a, Annexes A2 and A4). Underachievement: all gender differences are statistically significant. Top performance: gender differences are statistically significant for Belgium, Czechia, Germany, Estonia, Spain, Croatia, Cyprus, Latvia, Lithuania, Malta, Netherlands, Austria, Slovenia, Slovakia, Finland, Sweden. Countries are shown in ascending order according to the difference between the shares of underachieving boys and underachieving girls.

Source: OECD, 2023a (Table I.B1.4.32).

Underachievement in science too is more common among boys than girls in all countries (except for Austria), although gender differences are generally smaller than in reading. Estonia is the only country where both girls and boys would meet the 2030 EU-level target on underachievement. Girls would also meet the target in Ireland, Slovenia and Finland. An opposite pattern exists as regards top performance. Boys' top performance rates are somewhat higher than those of girls' in almost all countries (Figure 23).

Figure 23. Underachievement and top performance rates in science, by gender (2022)



Notes: Caution is required when interpreting 2022 data for Denmark, Ireland, Latvia and the Netherlands because one or more PISA sampling standards were not met (see OECD, 2023a, Annexes A2 and A4). Underachievement: gender differences are statistically significant for Bulgaria, Estonia, Greece, France, Croatia, Cyprus, Lithuania, Malta, Portugal, Romania, Slovenia, Slovakia, Finland, Sweden. Top performance: gender differences are statistically significant for Belgium, Denmark, Germany, Ireland, Spain, France, Italy, Latvia, Lithuania, Hungary, Netherlands, Austria, Romania, Finland, Sweden. Countries are shown in ascending order according to the difference between the shares of underachieving boys and underachieving girls.

Source: OECD, 2023a (Table I.B1.4.33).



Part 2 - The learning context



Basic skills are the foundation for more complex tasks and are crucial for personal, academic, and professional success. They serve as the building blocks for enabling individuals to navigate the complexities of life, engage with their communities, and contribute meaningfully to society. They are also key to economic competitiveness. This section aims to complement the previous analysis with information about the context which learning has taken place in. The PISA student questionnaire is a rich source of contextual information. It gathers data on various aspects of students' attitudes, beliefs, and experiences related to learning and schooling. In particular, this section will explore three dimensions: the adaptation to the Covid-19 pandemic, the use of digital resources for learning at school and student well-being. By associating those dimensions to student performance in mathematics,¹⁴ this will help obtain a more rounded picture of the PISA 2022 results.

The figures in this section will report the score point differences in mathematics between students who reported having experienced a certain situation and those who did not. All differences are expressed after accounting for students' and schools' socio-economic profile. Correcting for socioeconomic background helps ensure that the results more accurately reflect the educational system's effectiveness, rather than the advantages or disadvantages of students and schools. Minimising the impact of socioeconomic differences on the data also enhances the international comparability of results. These corrections usually reduce the size of score differences. Consequently, score differences that remain large and statistically significant point to strong associations between the variable of interest and mathematics performance, although they do not imply any causal relationships (see also 2.2 and 2.3 below).¹⁵

2.1 How did students cope with the pandemic?

Student learning experiences during the Covid-19 pandemic varied widely depending on factors such as the severity and the duration of the pandemic and the related measures taken in their region, government responses, the level of preparedness of educational institutions, access to supportive teachers and learning environment at home, and individual circumstances. Some students found new opportunities for learning during this time, while others faced significant hardships (Carretero et al., 2021). However, some common themes and challenges emerged (European Commission/EACEA/Eurydice, 2022; OECD, 2021; Gouëdard et al., 2020):

- Students experienced a sudden shift to online learning as schools were physically closed to curb the spread of the pandemic. This transition was challenging for some students, as it required adapting to new technologies and learning methods.
- The social distancing measures affected the social dimension of education, such as in-person interactions with teachers and other students.
- Despite the challenges, schools, teachers and students embraced innovative solutions to ensure learning continuity and maintain a sense of community.

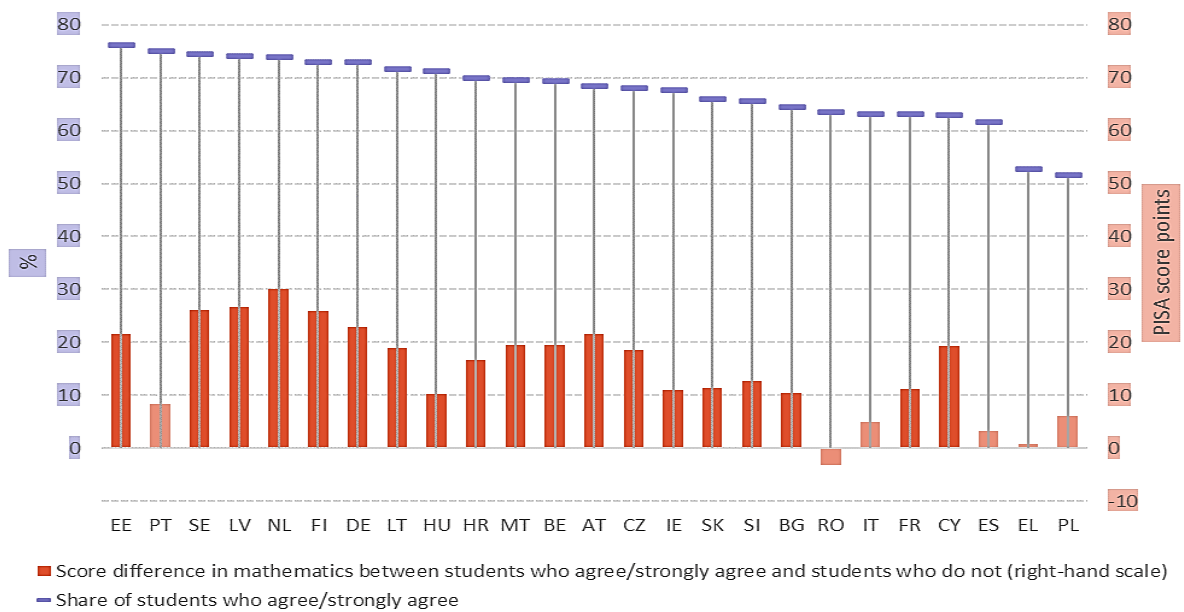
¹⁴ OECD (2023b) only provides the associations with mathematics because it is the main subject tested in PISA 2022.

¹⁵ Recent OECD work based on PISA 2015 and 2018 data for 18 countries and economies (Avvisati and Givord, 2021) suggests that on average, students' PISA scores increase by around 20 points over a school year, with larger gains in high-income than middle-income countries, but those estimates have large confidence intervals (i.e. they are not very precise). The authors conclude that 'while tempting, a simple conversion of any [score] difference to years-of-schooling equivalents should, however, be avoided. This would indeed require an extrapolation from the effect of a single grade, around the age of 15, and on average, to the cumulative effect of multiple years of schooling, for a particular group of students' (p. 33). Due to this large uncertainty in estimates, we will report the score point differences without linking them to any corresponding number of months or years of schooling.

PISA 2022 collected a rich set of information on learning experiences during the pandemic-related physical school closures through the student questionnaire, covering both positive and negative perceptions about how students coped with that unprecedented disruption to “normal” schooling.¹⁶

Between one-half and three-quarters of students in all EU countries argue that teachers were available when they needed help. The association between receiving help from teachers and mathematics performance is positive and statistically significant in most countries, with a score difference exceeding 20 points in some cases compared with students who did not receive help from teachers (Figure 24). Another positive experience reported by between one-half and three-quarters of students in all EU countries is an improvement in their digital skills for learning purposes during the pandemic.¹⁷ The association with mathematics performance is positive too, but it is statistically significant in only half of the countries and the related score difference (around 10-15 points in most cases) is usually smaller (Figure 25).

Figure 24. Students' agreement with the statement 'My teachers were available when I needed help' and association with mathematics performance



Notes: Caution is required when interpreting 2022 data for Ireland, Latvia and the Netherlands because one or more PISA sampling standards were not met (see OECD, 2023a, Annexes A2 and A4). The question refers to the time when the school building was closed because of Covid-19. The figure reports the score differences after accounting for students' and schools' socio-economic profile. Lighter columns indicate differences that are non-statistically significant. Data is not available for Denmark.

Source: OECD, 2023b (Tables II.B1.2.24 and II.B1.2.26).

¹⁶ The OECD recommends some caution in interpreting the results from the pandemic-related part of the student questionnaire: ‘Students answered the questions on school closures retrospectively, making it more difficult for some students to remember the details of their school’s closure if it occurred early in the pandemic. [...] The share of non-responses was particularly high for questions about COVID-19 school closures. This limits the representative nature of the data reported in this chapter and results in less precise estimates since standard errors are higher than for other parts of the questionnaire’ (OECD, 2023b, p. 65). This has to be considered when drawing conclusions from the findings presented in Section 2.1.

¹⁷ This is a self-reported indicator, not an objective measure of improvement in digital skills. Consequently, it may present some subjective biases, e.g. students may overestimate or underestimate both their initial level of digital skills and the level they reached during the pandemic.

Figure 25. Students' agreement with the statement 'I improved my skills in using digital devices for learning purposes' and association with mathematics performance



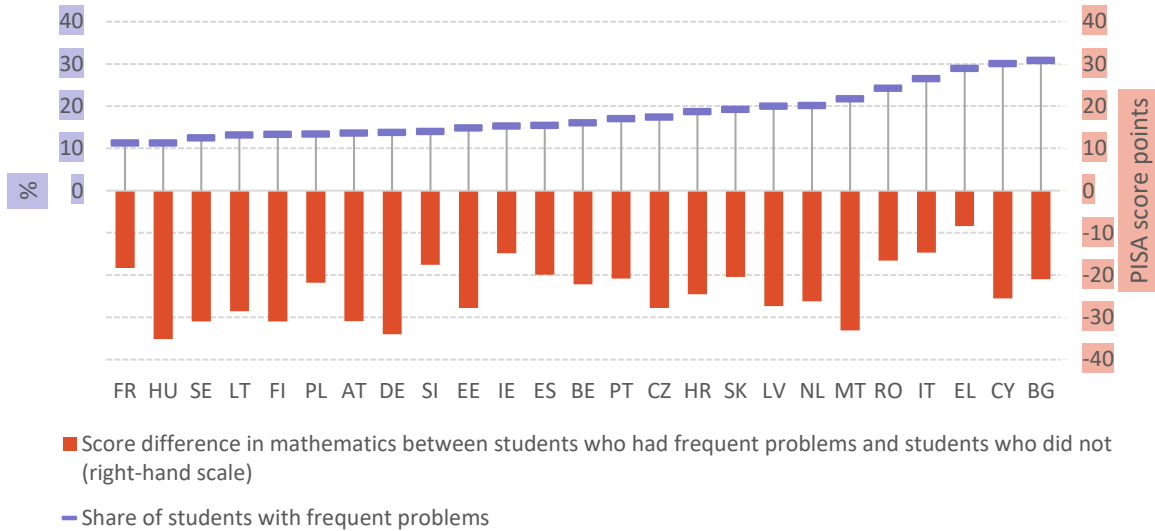
Notes: Caution is required when interpreting 2022 data for Ireland, Latvia and the Netherlands because one or more PISA sampling standards were not met (see OECD, 2023a, Annexes A2 and A4). The question refers to the time when the school building was closed because of Covid-19. The figure reports the score differences after accounting for students' and schools' socio-economic profile. Lighter columns indicate differences that are non-statistically significant. Data is not available for Denmark.

Source: OECD, 2023b (Tables II.B1.2.24 and II.B1.2.26).

Having access to a digital device was a key precondition for learning activities during physical school closures. Students without appropriate devices faced additional challenges in keeping up with their learning. Between around 10% and 30% of students report they experienced frequent problems with access to a digital device when they needed it. This has a clear negative association with mathematics performance. The score difference between students who had frequent problems and those who did not is statistically significant in all EU countries and exceeds -20 points in most cases (Figure 26).

Another important element for student learning during the pandemic was the availability of a quiet place to study, especially during periods of mobility restrictions, when most or all household members were at home at the same time. Similarly to the previous indicator, between around 10% and 30% of students report they had frequent problems in finding a quiet place to study, and the negative association with mathematics performance is statistically significant in all countries (except for Ireland) and of comparable magnitude (Figure 27).

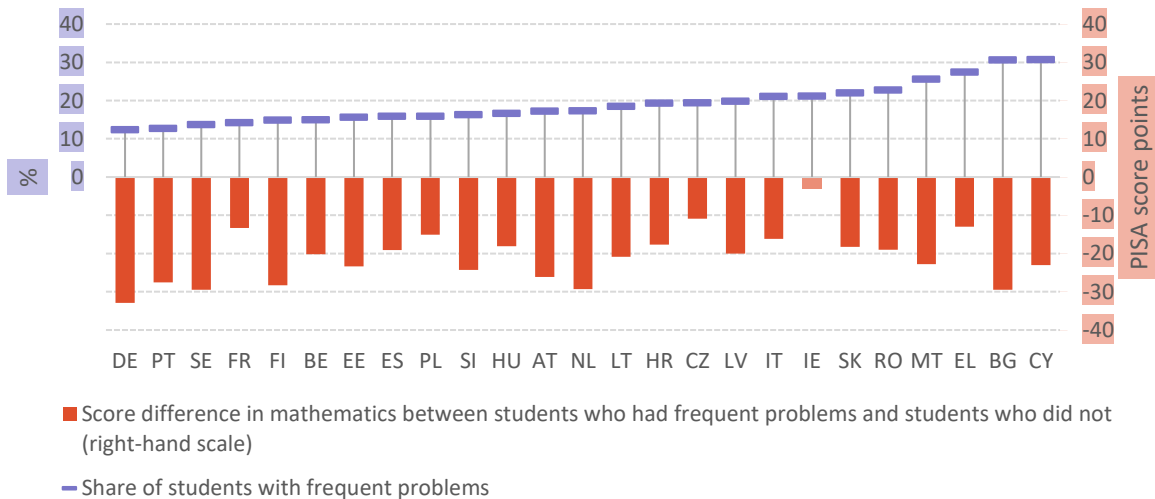
Figure 26. Frequent problems with access to a digital device when students needed it and association with mathematics performance



Notes: Caution is required when interpreting 2022 data for Ireland, Latvia and the Netherlands because one or more PISA sampling standards were not met (see OECD, 2023a, Annexes A2 and A4). The question refers to the time when the school building was closed because of Covid-19. The category 'frequent problems' is the sum of the share of students who reported having problems 'about once or twice a week' or 'every day or almost every day'. The figure reports the score differences after accounting for students' and schools' socio-economic profile. All differences are statistically significant. Data is not available for Denmark.

Source: OECD, 2023b (Tables II.B1.2.30 and II.B1.2.32).

Figure 27. Frequent problems with finding a quiet place to study and association with mathematics performance



Notes: Caution is required when interpreting 2022 data for Denmark, Ireland, Latvia and the Netherlands because one or more PISA sampling standards were not met (see OECD, 2023a, Annexes A2 and A4). The question refers to the time when the school building was closed because of Covid-19. The category 'frequent problems' is the sum of the share of students who reported having problems 'about once or twice a week' or 'every day or almost every day'. The figure reports the score differences after accounting for students' and schools' socio-economic profile. Lighter columns indicate differences that are non-statistically significant. Data is not available for Denmark.

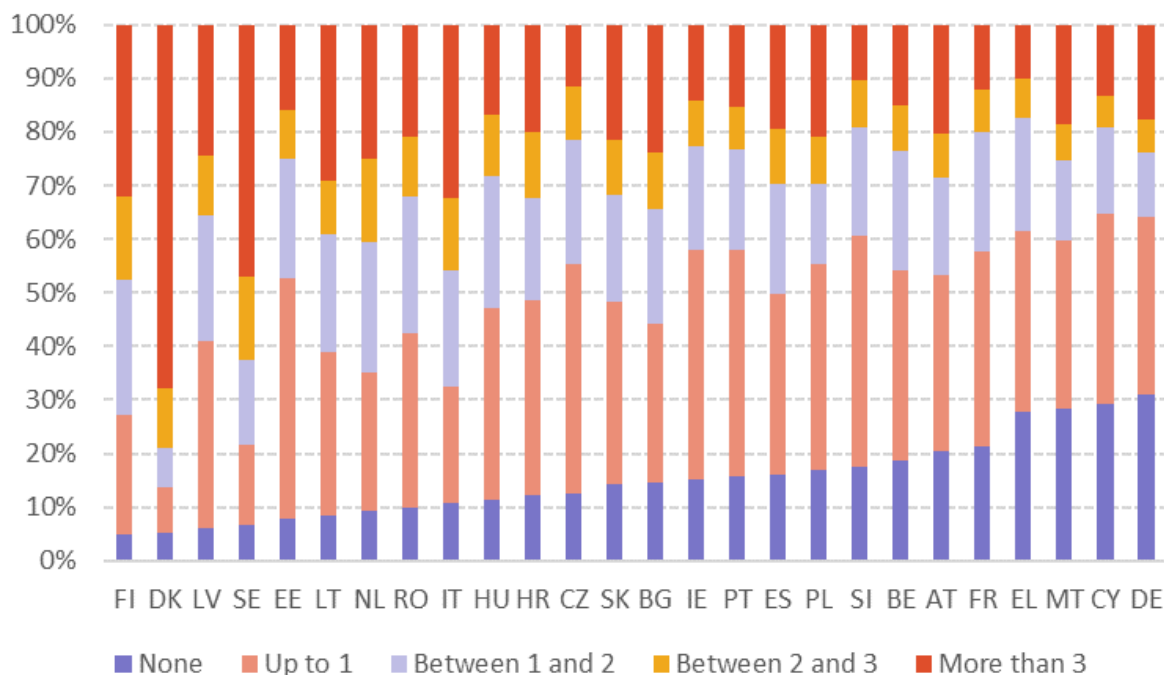
Source: OECD, 2023b (Tables II.B1.2.30 and II.B1.2.32).

2.2 How do students use digital devices for learning at school?

The PISA 2022 student questionnaire contains many questions about how students use digital devices for various purposes (such as learning or leisure) and in various environments (such as at school or at home). This subsection will focus on the use of digital devices for learning purposes at school, as this is closely linked to the key policy question about how to effectively use digital technology in education.

The intensity of using digital devices for learning activities at school varies considerably across EU countries. This degree of divergence may hint at different approaches to the use of digital devices in education.¹⁸ However, we can detect some patterns (Figure 28). In 22 out of 26 countries, the most frequent intensity is up to one hour per day. Only in Finland, Denmark, Italy and Sweden, the most frequent intensity is more than three hours per day. The share of students reporting no use of digital devices for learning at school ranges from 5% in Finland to 31% in Germany.

Figure 28. Distribution of students by hours spent per day on digital resources for learning activities at school



Notes: Caution is required when interpreting 2022 data for Denmark, Ireland, Latvia and the Netherlands because one or more PISA sampling standards were not met (see OECD, 2023a, Annexes A2 and A4). Countries are shown in ascending order according to the share of students reporting no use of digital devices for learning at school.

Source: OECD, 2023b (Table II.B1.5.62).

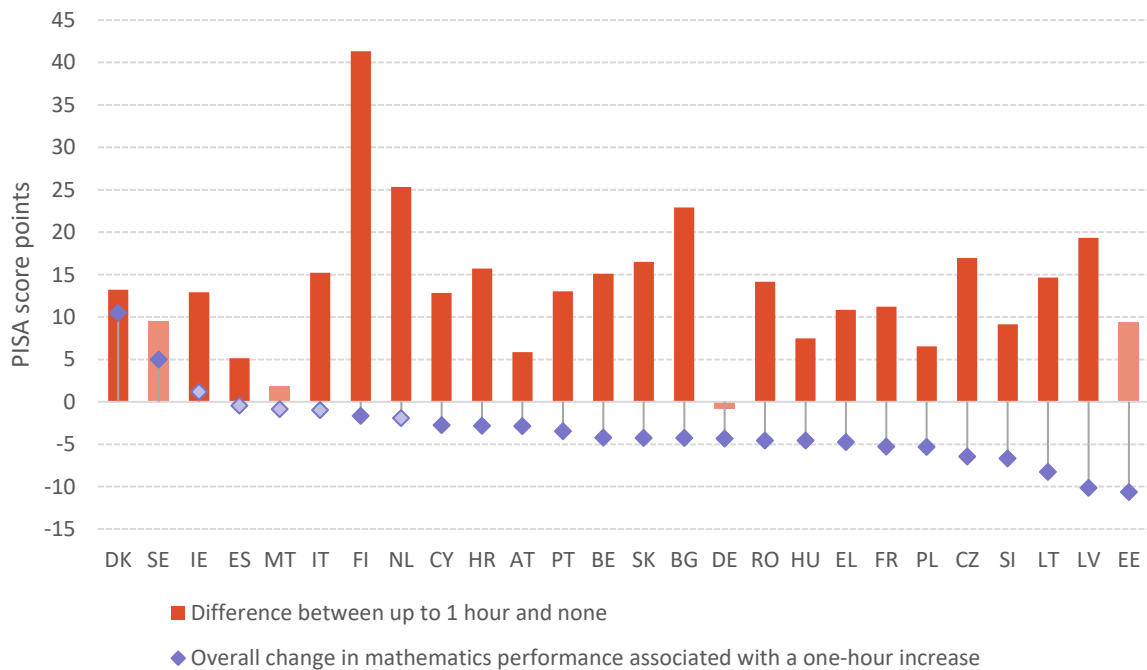
The association between the intensity of using digital resources for learning at school and mathematics performance is clearly non-linear (Figure 29). It is strongly positive in most countries when students move from no use to up to one hour per day. When the intensity further increases, the relationship tends to become negative (i.e. performance worsens when the number of hours per day

¹⁸ A caveat in analysing these findings concerns the difficulty that students may face in accurately estimating the daily amount of time they spend using digital resources for learning at school.

rise), so that the overall change in mathematics performance associated with a one-hour increase in using digital devices appears negative and statistically significant in most countries. Denmark and Sweden are two notable exceptions to this pattern: in these countries, the overall change is positive and statistically significant. They are also the countries with the highest share of students reporting a very intense use of digital resources (see Figure 28 above).

To sum up, a moderate use of digital resources for learning at school is usually associated with better performance, while the opposite holds true for more intense use, with a few exceptions. It is worth recalling that these are only correlations and further analysis of individual data with counterfactual econometric methods¹⁹ would be needed before being able to make any causal claim about the impact of digital resources for learning on educational outcomes. The causal evidence about the effects of digital resources on educational outcomes in EU countries is still rather limited and inconclusive (Agasisti et al., 2020). The sign and size of those effects (i.e. whether they are positive or negative, large or non-significant) likely depend on which technologies are selected for use, how they are implemented in the classroom and how they are integrated into the teaching process (Fack et al., 2022).

Figure 29. Change in mathematics performance associated with increasing time spent on digital resources for learning activities at school



Notes: Caution is required when interpreting 2022 data for Denmark, Ireland, Latvia and the Netherlands because one or more PISA sampling standards were not met (see OECD, 2023a, Annexes A2 and A4). The figure reports the score differences after accounting for students' and schools' socio-economic profile. Lighter columns indicate differences that are non-statistically significant.

Source: OECD, 2023b (Table II.B1.5.66).

¹⁹ Counterfactual methods allow researchers to identify possible causal effects of events or policies on specific outcomes.

2.3 How do students feel?

Research has long indicated that student well-being at school, as well as good mental and physical health are fundamental factors to improve academic performance, as they are directly linked to learners' motivation at school, their focus, their capacity to learn, retain and apply knowledge, and other behavioural and cognitive aspects (European Commission, 2021).

The concept of well-being can be analysed in multiple ways (see Box 3). While the literature shares a rather general starting point (Statham and Chase, 2010), i.e. that well-being is about quality of life and is multidimensional, the degree of consensus decreases as the definition attempts to become more precise and operational. The actual measurement of well-being is a challenge (Selwyn and Wood, 2015), given that indicators are usually self-reported and collected through surveys. The comparability of cross-country data requires not only international surveys asking the same question in several countries, but also selecting the most “unbiased” indicators, i.e. those that are more independent from country-specific cultural contexts (OECD, 2019; European Commission, 2021).

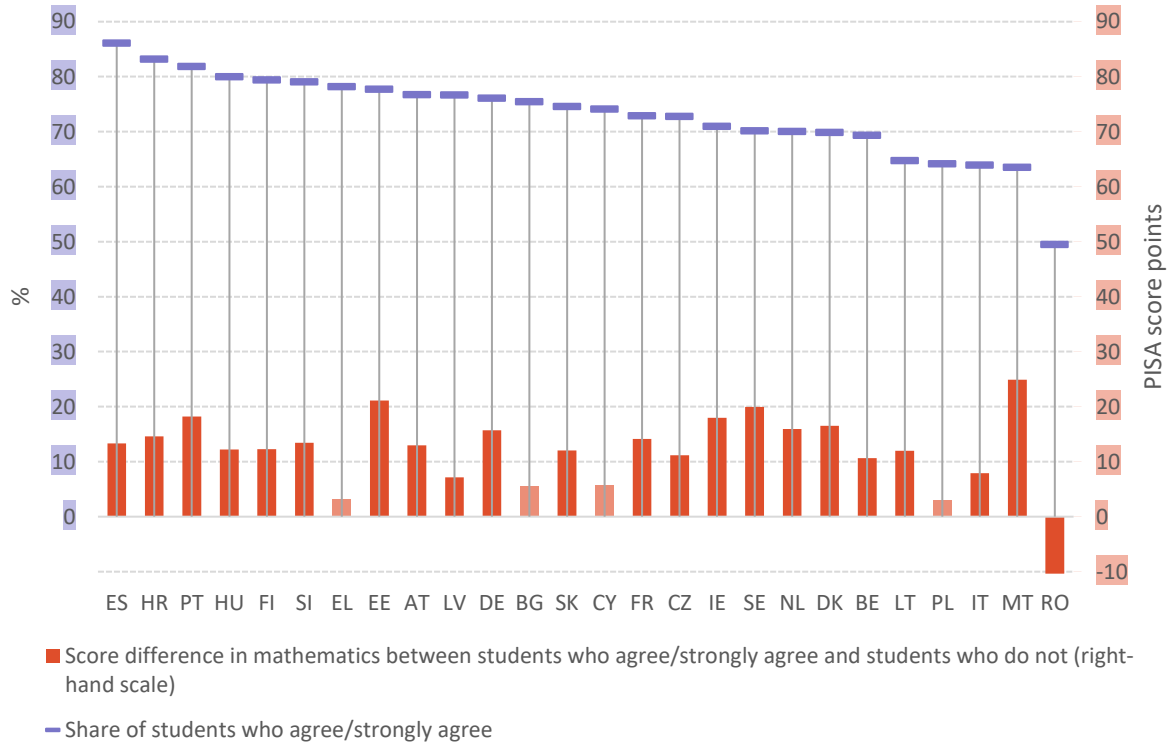
Box 3. Defining child well-being

According to the World Health Organisation (WHO), child well-being can be defined as a dynamic state, where children realise their own abilities, learn to cope with common stresses of life, to develop a positive sense of identity and the ability to manage thoughts and emotions, to build social relationships, and to acquire an education that fosters active citizenship. The term is used interchangeably with positive mental health. Definitions of well-being refer to two dimensions: subjective and objective well-being. The former refers to children's overall sense of well-being, psychological functioning and affective states, i.e. what they think about life satisfaction as a whole and in specific areas (home, school, friends, etc) and how they feel (happy, sad, bored, etc.). The latter includes health, education, family, socioeconomic status, social relationships, safety and security, and civic participation/rights (European Commission, 2022a).

A sense of belonging is a fundamental human need. It includes a desire for social approval and to be accepted, respected and liked by others. A sense of belonging helps people make sense of their lives and contributes to their overall well-being (Greenaway et al., 2015). This also applies in a school context (Osterman, 2000). Since students spend a considerable part of their lives in school, interactions with their peers and teachers affect their overall well-being as well as school motivation and performance at school.

In most EU countries, between 70% and 80% of students feel like they belong at school. This share exceeds 80% in Spain, Croatia and Portugal, while it ranges between 50% and 70% in Romania, Malta, Italy, Poland, Lithuania and Belgium (Figure 30). The difference in mathematics performance between students who feel like they belong to their school and those who do not, often ranges between 10 and 20 score points and is statistically significant in all countries, except for Bulgaria, Cyprus, Greece and Poland (where it is non-statistically significant) and Romania (where it is negative and statistically significant).

Figure 30. Students' agreement with the statement 'I feel like I belong at school' and association with reading performance



Notes: Caution is required when interpreting 2022 data for Denmark, Ireland, Latvia and the Netherlands because one or more PISA sampling standards were not met (see OECD, 2023a, Annexes A2 and A4). The figure reports the score differences after accounting for students' and schools' socio-economic profile. Lighter columns indicate differences that are non-statistically significant.

Source: OECD, 2023b (Tables II.B1.1.1 and II.B1.1.8).

Bullying refers to physical, verbal and relational behaviours, which involve one party having the intention to repeatedly hurt or harm another, within an uneven power relationship where the victim is unable to defend him/herself. It is a repeated, aggressive behaviour intended to hurt another individual, physically, mentally, or emotionally. It usually involves the victim/s, perpetrator and bystanders, and the perpetrator may be one individual or a group. However, children and young people often define bullying differently from adults, for example, by omitting “power imbalance” and claiming that the behaviour was not intended to harm but was “fun” or “a joke” (European Commission, 2022a). Bullying can take different forms (Box 4) and research shows that bullying has a direct negative impact on the well-being of students (Oliveira et al., 2018). Bullying can be a major barrier to learning, with bullied children more likely to miss lessons, be excluded from school and experience depression.

Box 4. How PISA 2022 measures bullying

In PISA 2022, students answered a question on how often during the 12 months prior to the test they had the following experiences in school (OECD, 2023b, pp. 269-70):²⁰

- 'Other students left me out of things on purpose' (relational bullying);
- 'Other students made fun of me' (verbal bullying);
- 'I was threatened by other students' (verbal bullying);
- 'Other students took away or destroyed things that belong to me' (extortion bullying);
- 'I got hit or pushed around by other students' (physical bullying);
- 'Other students spread nasty rumours about me' (relational bullying);
- 'I was in a physical fight on school property' (physical bullying);
- 'I stayed home from school because I felt unsafe' (any type of bullying);
- 'I gave money to someone at school because they threatened me' (extortion bullying).

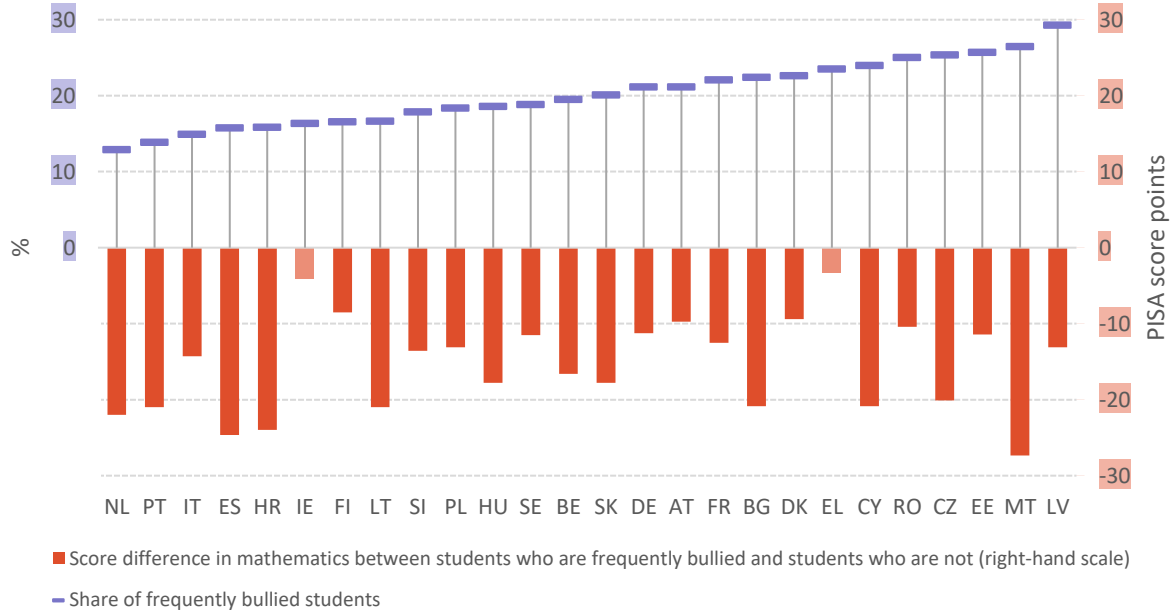
The share of students who report being frequently bullied (i.e. suffering from any bullying act at least a few times a month)²¹ ranges from 13% in the Netherlands to 29% in Latvia. The average mathematics score of frequently bullied students is significantly lower than the score of other students in all countries (except for Greece and Ireland). The difference is in most cases between -10 and -20 points (Figure 31). Although this data is net of students' and schools' socio-economic characteristics, it is not sufficient to infer any direct causal impact of bullying on mathematics performance. Other factors may affect both mathematics performance and the probability of being bullied. However, research applying a counterfactual approach to individual data from another recent international large-scale assessment – the Progress in International Reading Literacy Study (PIRLS) 2021²² – finds that exposure to bullying actually has a sizeable negative impact on educational performance (Karpiński, 2023).

²⁰ The question clarified that 'some experiences can also happen in social media'.

²¹ The OECD applies another definition of "frequently bullied students": students in the top 10% student sample of the calculated index of exposure to bullying across all PISA countries/economies in the world (OECD, 2023b). This definition can be useful when analysing bullying from a global perspective, but is not appropriate for focusing on a specific group of countries, like the EU Member States.

²² PIRLS measures the reading competence of students in the fourth year of primary school.

Figure 31. Frequency of being bullied and mathematics performance



Notes: Caution is required when interpreting 2022 data for Denmark, Ireland, Latvia and the Netherlands because one or more PISA sampling standards were not met (see OECD, 2023a, Annexes A2 and A4). The category 'frequently bullied' is the sum of the shares of students who report experiencing any type of bullying act 'once a week or more' or 'a few times a month'. The figure reports the score differences after accounting for students' and schools' socio-economic profile. Lighter columns indicate differences that are non-statistically significant.

Source: OECD, 2023b (Tables II.B1.3.30 and II.B1.3.34).



Part 3 - The EU policy response



Basic skills are the foundation for more complex tasks and are crucial for personal, academic, and professional success. They serve as the building blocks for enabling individuals to navigate the complexities of life, engage with their communities, and contribute meaningfully to society. They are also key to economic competitiveness. The European Commission has anticipated a possible decline in educational outcomes due to Covid-19 and has worked with Member States since the onset of the pandemic to tackle its negative effects on the EU education systems.

Substantial EU funds have been mobilised to support Member States in mitigating the negative impact of the pandemic and make education systems more resilient through structural reforms. The Recovery and Resilience Facility (RRF), which has been set up as a temporary instrument for crisis response under NextGeneration EU, has become a major source of funding of educational reforms and investments across the EU with a total allocation of EUR 73 billion (14% of the total RRF envelope) for education and skills (European Commission, 2023).

As a result, together with Cohesion Policy (EUR 32.6 billion) and Erasmus+ (EUR 26 billion), EU funding for education has tripled in the 2021-27 period. The largest part of these funds (43 billion from RRF and 15.7 billion from Cohesion Policy) will be channelled to the school sector, opening up new opportunities for Member States to engage in major reform efforts to boost basic skills.

Some Member States have launched comprehensive curricular reforms with the support of the RRF to enhance the acquisition of key competences. Developing digital competences has been a key priority for almost all Member States with about one-third of the total RRF education expenditure linked to digital objectives. To mitigate the negative impact of the pandemic some countries also launched compensatory learning programmes for disadvantaged learners or stepped up support to disadvantaged schools. The RRF also supports a broad range of other measures aimed to improve educational outcomes, such as: strengthening education in science, technology, engineering and mathematics (STEM); developing quality assurance mechanisms; or strengthening the teaching profession. Box 5 provides some examples of concrete measures in EU countries. All in all, while RRF implementation is still in its initial phases, a series of promising measures are being rolled out, which have the potential to contribute to the modernisation of education systems and reverse the deteriorating trends demonstrated by the PISA results.

Box 5. Examples of measures supported under the RRF to improve basic skills

- In **Belgium**, 30,000 students from the French Community are benefitting from individualised mental, emotional and learning support. The measure consists of hiring additional teaching staff and support personnel (psychologists, speech therapists, social and childcare workers, etc.) in more than 500 schools and psycho-medical-social centres to help students overcome learning difficulties aggravated by the Covid-19 pandemic. The remedial support targets children struggling with the acquisition of basic skills, while also fostering well-being. The measure is closely linked to the Community's plan to combat early school leaving and absenteeism.
- **Bulgaria** is funding the establishment of STEM laboratories across schools to support the acquisition of digital skills and learning in STEM subjects. In addition, a national STEM centre and three regional centres will be developed with RRF support in view of developing and delivering content, tools and methodologies to support students and provide the necessary teacher training.

- **Slovakia** is undertaking a curriculum reform to enhance competence-based teaching and learning with a focus on competences needed in 21st century, including sustainability and promoting safe use of digital technologies in schools, while also supporting an inclusive learning environment. The objective is to implement the integrated curriculum for primary schools within cycles. Each cycle defines basic learning objectives for areas rather than detailed content, thus creating flexibility to develop curricula at school level. Schools will implement their own curricula, adapting them to regional specificities and the needs of their students. They are also supported by teams of professional development teachers and the mentors of the Regional Teacher Support Centres. The implementation has started with 39 pilot schools, and a new curriculum will be transferred to all primary schools by September 2026.
- **Spain** is undertaking a comprehensive curricular reform to move towards competence-based teaching. After the approval of the new Education law in December 2020, the Ministry put forward several Royal Decrees in 2022, covering early childhood education and school education and establishing learning outcomes that students are expected to achieve by education level, linked to the acquisition of key competencies. The new curricula have been rolled out by the school year 2023/2024. In addition, to reduce the share of early leavers from education and training, the 2021-2023 Educational Guidance, Advancement and Enrichment in Centres of Special Educational Complexity programme (PROA+) has been implemented with the support of the National Recovery and Resilience plan (NRRP) and the European Social Fund. PROA+ aims at improving school success rates by providing support to students. In addition, the NRRP will also establish at least 1,000 units, which will provide support, guidance and psycho-educational services for vulnerable students and their families to overcome educational obstacles.

As indicated in Section 1 above, further research is needed to identify the full set of causes for the PISA results, and more generally, to improve the understanding of how education systems can best promote the acquisition of basic skills. This is part of the work that the Commission is carrying out with Member States through the [Learning Lab on Investing in Quality Education and Training](#), launched in November 2022 (European Commission 2022d).

The Learning Lab will support Member States to further develop an evidence-based approach to policy design and implementation, by strengthening the expertise on rigorous evaluation methods among policy makers and sharing knowledge about properly evaluated policies. This will also help understand which conditions are required to make additional funding more able to improve educational outcomes, and consequently the productivity and competitiveness of EU countries (Box 6).

Box 6. The Learning Lab on Investing in Quality Education and Training

The Learning Lab on Investing in Quality Education and Training aims to promote a culture of evaluation in education policy and provide knowledge and resources to identify how to make EU education systems more effective, efficient and equitable. Its activities cover three main areas:

- **Capacity building on evaluation methodologies:** the Learning Lab proposes training courses on education policy evaluation methodologies to policymakers at all levels (national, regional, and local) and education practitioners. In 2023, two general events took place, as well as three more specific trainings tailored to the education system's needs in the French Community of Belgium, Ireland and Portugal.
- **Collaborative work among Member States:** the Learning Lab has created a Community of Practice, where representatives of Member States and international organisations can discuss their experiences with impact evaluation in education and share good practices.
- **Analysis and evaluation of education policies:** the Learning Lab carries out analytical work on education policies, from impact evaluations to analyses of microdata from large-scale international student assessments (Karpiński, 2023) and in-depth analyses of existing research findings (Di Pietro, 2023). Specific calls under the [2023-2024 Horizon Europe work programme of cluster 2 \(Culture, Creativity and Inclusive society\)](#) support research projects on education policy evaluation. The topics are: 'Efficiency and effectiveness of investment in high-quality education and training', 'Mapping of longitudinal data and assessment of inequalities in education, training and learning achievements' and 'Effective education and labour market transitions of young people'.

The Commission and Member States have also been working together in the context of the European Education Area to define and implement a comprehensive policy approach to improve educational outcomes for all learners, regardless of their personal situations and backgrounds.

On 28 November 2022, EU Education Ministers adopted a Council Recommendation on Pathways to School Success (Council of the European Union, 2022). This recommendation urges Member States to implement comprehensive and systemic approaches to improve educational outcomes. The Recommendation is based on extensive consultations with stakeholders and Member States, incorporating the latest insights from research and lessons learned from previous initiatives, particularly the 2011 Council Recommendation on policies to reduce early school leaving (Council of the European Union, 2011). In comparison to the previous Recommendation, Pathways to School Success has a broader scope as it concurrently addresses the two 2030 EU-level targets on underachievement in basic skills and early leaving from education and training.²³ This approach recognises the interconnected nature of these challenges and the need for complementary measures to address them; research confirms that underachievement and early leaving from education and training are multi-faceted and complex issues that cannot be solved separately. It also requires sustained and systematic efforts to promote student and teachers' well-being, prevent bullying and all forms of violence at school, favour a positive and welcoming school climate.

Concretely, the Recommendation invites Member States to develop strategies towards school success combining prevention, intervention and compensation measures (but with a stronger emphasis on preventative actions) and accompanied by solid data collection and monitoring systems. They should only include evidence-based measures which have proven successful to promote better educational outcomes, be based on structured cooperation between actors representing various policy areas,

²³ The share of early leavers from education and training should be less than 9%, by 2030 (Council of the European Union, 2021).

levels of governance and educational levels, benefit from adequate funding and be accompanied by a clear implementation and evaluation plan (see Box 7 for more details). At-risk children and young people should be given priority, including those from socioeconomically disadvantaged backgrounds, migrants, refugees, Roma communities, individuals with disabilities or special educational needs, and those facing mental health challenges, by combining general measures for all learners with targeted and individualised support for specific groups in inclusive settings.

The Commission is actively supporting the implementation of the Recommendation through funding opportunities, peer learning, and developing and sharing good practices and resources through the European School Education Platform and the European Toolkit for Schools.²⁴

In addition, the 2021-2022 work programme of Horizon Europe Cluster 2 included the topic ‘Addressing poor learning outcomes in basic skills and early school leaving’, linked to Pathways to School Success, where three research projects have been selected.

The Commission is working closely with the Member States through the dedicated EEA Working Group on Schools, Pathways to School Success sub-group. The Working Group has explored and produced policy guidance on how blended learning approaches can support effective and inclusive teaching and learning, and on new approaches to learners’ competence assessment to support learners’ progression. Ongoing and future work includes supporting vulnerable learners through multi-agency approaches, positive learning environments and well-being at school, students’ agency and voice, community involvement and teachers’ and leaders’ capacity-building.²⁵ To further advance in developing evidence-informed policy, the Commission launched in 2023 a dedicated Expert Group on supportive learning environments for groups at risk of underachievement and for supporting well-being at school. The Expert Group is exploring how to promote whole school approaches to well-being and mental health at school and is developing guidelines for policymakers and schools, expected to be published in March 2024.

Box 7. Pathways to School Success: measures to promote school success for all

Among the policy measures recommended to support **learners**, Pathways to School Success champions:

- learner-centred curricula, based on inclusive and relational pedagogies, diversification and more personalised forms of teaching and learning;
- pedagogical approaches that are interactive and experiential as well as culturally and linguistically responsive, and include opportunities for blended learning, transdisciplinary approaches and cooperative teaching and learning;
- assessment practices that reflect and support personal learning needs (in particular by making extensive use of formative and continuous assessment);
- social and emotional education as part of compulsory curricula;
- targeted support for learners facing learning difficulties through a multi-disciplinary and team-based approaches;
- individualised support for learners with complex needs, including social, emotional and mental health needs.

²⁴ <https://school-education.ec.europa.eu/en/insights/school-success-for-all>

²⁵ The Working Group’s main deliverables can be consulted at: <https://wikis.ec.europa.eu/display/EAC/Pathways+to+School+Success>.

To help **school leaders, teachers, trainers and other staff** in their key mission, Pathways to School Success recommends:

- embedding inclusion, equity and diversity, understanding underachievement and disengagement, and addressing well-being, mental health and bullying in all statutory initial teacher education programmes.
- enhancing opportunities for high-quality and research-based continuous professional development and for access to peer learning, professional communities and adequate resources. Special consideration should also be given to teachers' well-being, including by ensuring appropriate working conditions and access to support.

Pathways to School Success emphasises the importance of a **whole-school approach to school success and well-being**. It recommends:

- adequate autonomy is granted to schools and governance boards, coupled with strong accountability;
- quality assurance mechanisms focussing, among others, on addressing low achievement, with clear targets and indicators as a key element to ensuring school success;
- a participatory and democratic school environment that involves learners in school and classroom decision-making;
- effective communication and cooperation with parents, legal guardians and families and their participation in school-decision making;
- networking between schools, as well as multi-professional learning communities at local, regional, national and international level;
- additional support for schools in socio-economically disadvantaged areas or with high numbers of pupils from marginalised backgrounds.

Among **system level measures**, Pathways to School Success includes recommendation against different forms of segregation, such as:

- promoting active anti-segregation policies, in particular by adopting admission rules that allow for a heterogeneous school composition and policies focused on the quality of learning, and raise awareness of the benefits of diversity in the classroom for enhancing educational outcomes for all learners;
- considering alternatives to early tracking, in order to promote positive interactions between learners of different ability levels in heterogeneous groups and reduce the impact of socioeconomic background on learners' performance through academic segregation;
- concerning newly arrived migrants, supporting schools to embed effective practices at each stage of the 'language learning process', including reception and assessment, placement and admission,²⁶ and monitoring to prevent the geographical segregation of migrant learners through school entry and admissions criteria.

²⁶ e.g. by providing time-limited initial preparatory classes, where necessary and where applicable, and putting in place welfare and academic supports to facilitate a smooth transition into mainstream education.



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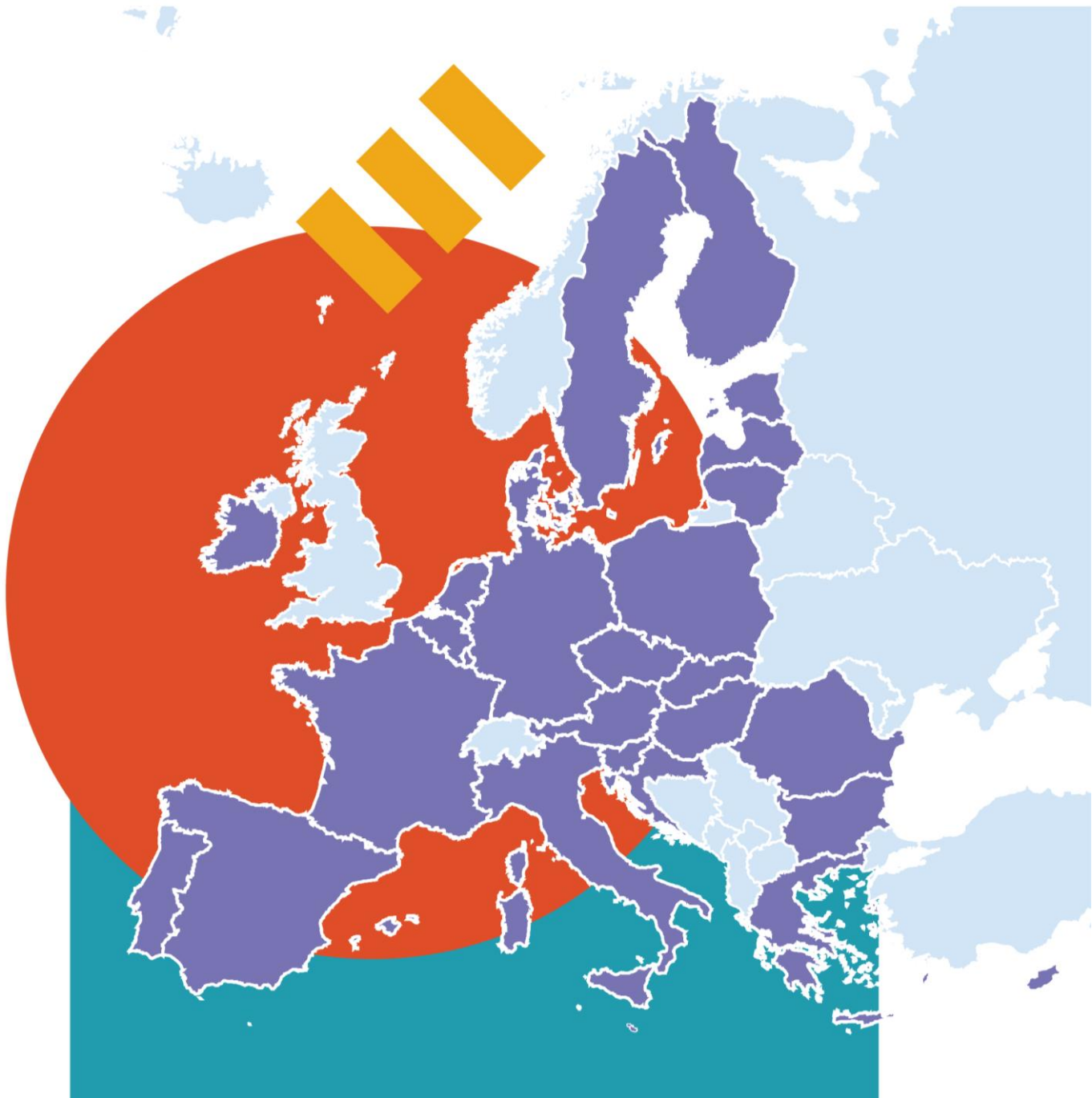
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Annex – Country profiles



Austria

Figure A1. Key indicators from PISA 2012, 2018 and 2022

			2012		2018		2022		
			AT	EU	AT	EU	AT	EU	
Share of 15-year-olds underachieving	Mathematics	Total	18.7	22.1	21.1	22.9	24.9	29.5	
		By gender	Boys	16.1	16.1	20.5	22.8	22.7	29.0
			Girls	21.2	22.8	21.7	22.9	27.1	30.0
	By socio-economic status	Top quarter	6.4	7.6	7.7	8.6	7.3	10.9	
		Bottom quarter	35.1	38.0	35.5	38.2	45.1	48.0	
	By migrant background	Native with native-born parents	14.7	:	15.8	:	17.7	:	
		Native with foreign-born parents	36.3	:	35.3	:	38.9	:	
		Foreign-born students	37.8	:	42.3	:	45.4	:	
	Reading	Total	19.5	18.0	23.6	22.5	25.3	26.2	
		By gender	Boys	26.2	24.3	28.8	27.3	28.5	30.7
Girls			12.8	11.7	18.3	17.4	21.9	21.7	
Science	Total	15.8	16.8	21.9	22.3	22.7	24.2		
	By gender	Boys	:	:	23.1	23.2	21.7	25.6	
		Girls	:	:	20.6	21.2	23.7	22.9	
Share of 15-year-olds top performers	Mathematics	Total	14.3	12.6	12.6	11.0	10.3	7.9	
		By gender	Boys	18.0	14.8	15.8	12.6	13.2	9.8
			Girls	10.6	10.3	9.2	9.3	7.3	5.9
	Reading	Total	5.5	8.3	7.4	8.1	7.7	6.5	
		By gender	Boys	3.7	5.8	6.4	7.0	6.4	5.6
			Girls	7.3	21.8	8.4	10.0	9.1	7.4
Science	Total	7.9	8.0	6.3	6.3	7.9	6.9		
	By gender	Boys	:	:	7.7	7.0	9.4	7.8	
		Girls	:	:	4.9	5.6	6.3	5.9	

Source: OECD (2023a).

Underachievement rates are below the EU average in all three fields, but have increased among disadvantaged students. The proportion of low-achieving students in mathematics has continuously increased since 2012 going from 18.7% to 24.9%, but remaining below the EU average. In science and reading, the share rose since 2012 and 2018, by 6.1 pps and 4.1 pps respectively, but has not changed since then. While the share of underachieving students among students from disadvantaged backgrounds in mathematics was largely stable between 2012–2018, at around 35%, it grew sharply in the past four years by 9.6 pps. In 2022, 45.1% of disadvantaged students did not reach a minimum proficiency level in mathematics. As underachievement has remained stable among advantaged students, the socio-economic gap has widened. A gender gap of 4.4 pps is observable in mathematics in favour of boys while girls are less likely to underachieve in reading (6.6 pps).

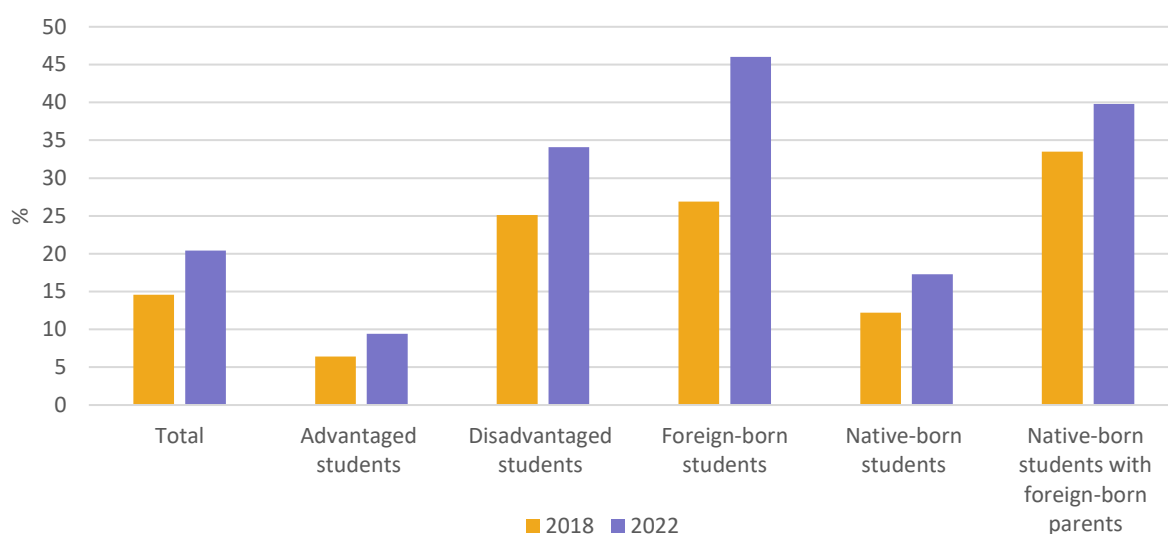
In Austria, underachievement in mathematics is more frequent among students with a migrant background. They represent 26.6% of the student population. The underachievement rate for foreign-born students is 27.6 pps higher than that of students without a migrant background, reaching 45.4% in 2022. A significant gap (21.2 pps) also exists with native-born students with foreign-born parents.

The rate of top performing students is above the EU average in all three domains in 2022. In science, the share has grown by 1.6 pps since 2018, one of the highest increases at EU level. By contrast, in reading, it did not change in the past decade. A worsening trend is recorded in mathematics: the share went from 14.3% to 10.3% between 2012 and 2022. Despite the drop, it has been above the EU average since 2012. In line with EU trends, boys are over-represented among top

achieving students in mathematics and science and under-represented in reading. The gender gaps are above the EU average in all three domains and in mathematics the gap is the biggest at EU level.

Student well-being impacts on mathematics performance. 76.7% of Austrian 15-year-olds feel that they belong at school. Sense of belonging is positively associated with an increase in mathematics score by 13 points²⁷. More than 1 out of 5 students (21.2%) reported that they were bullied at least a few times a month and bullying is more frequent in disadvantaged schools²⁸. Exposure to bullying is correlated with a drop in mathematics score by 10 points²⁹.

Figure A2. Underachievement rates in mathematics



Source: OECD (2023a).

Several measures are being implemented to strengthen student outcomes. Since 2019 all curricula of compulsory schools have been revised to become more competence oriented, focussed on cross subject learning. First graders entering school undergo more intensified screening to identify supplementary learning needs as early as possible. Regular individual competence testing at 3rd, 4th and 7th as well as at 8th grade (iKM^{PLUS}) aims to provide feedback to pupils and teachers with a comprehensive aggregated analysis every 3rd year. A first such report is expected in 2024. Pupils who do not speak sufficiently German follow separate classes with a strong focus on language acquisition for up to two years. Two-week summer schools in German, English and mathematics are also organised to provide support for pupils from a disadvantaged background. As of 2023/2024 reading gets additional attention with a broad range of activities including reinforced curricula at primary and lower secondary level combined with a competences grid and reaching out to municipalities, appointing Ambassadors for literacy and providing a centralised digital platform providing access to all initiatives and to material. The project “assuring basic competences” provided from 2017 to 2022 additional tailored support through multi-professional teams for participating schools. The pilot project “100 schools and 1000 chances” tests conditions for a social index to better adjust resources especially to schools in highly challenged environments was extended until end 2024.

²⁷ After taking into account schools' and students' socio-economic characteristics.

²⁸ Table II.B1.3.32.

²⁹ After taking into account schools' and students' socio-economic characteristics.

Belgium

Figure A3. Key indicators from PISA 2012, 2018 and 2022

			2012		2018		2022	
			BE	EU	BE	EU	BE	EU
Share of 15-year-olds underachieving	Mathematics	Total	19.0	22.1	19.7	22.9	25.0	29.5
		By gender						
		Boys	18.6	16.1	18.3	22.8	25.1	29.0
		Girls	19.3	22.8	21.0	22.9	24.8	30.0
		By socio-economic status						
		Top quarter	5.4	7.6	4.7	8.6	6.2	10.9
		Bottom quarter	34.7	38.0	36.6	38.2	45.8	48.0
		By migrant background						
		Native with native-born parents	14.3	:	15.5	:	19.4	:
		Native with foreign-born parents	35.8	:	32.3	:	36.9	:
	Foreign-born students	41.8	:	36.0	:	45.1	:	
Reading	Total	16.1	18.0	21.3	22.5	25.3	26.2	
	By gender							
	Boys	20.4	24.3	24.7	27.3	30.1	30.7	
	Girls	11.8	11.7	17.8	17.4	20.6	21.7	
Science	Total	17.7	16.8	20.0	22.3	22.4	24.2	
	By gender							
	Boys	:	:	19.8	23.2	23.4	25.6	
	Girls	:	:	20.2	21.2	21.5	22.9	
Share of 15-year-olds top performers	Mathematics	Total	19.5	12.6	15.7	11.0	11.5	7.9
		By gender						
		Boys	22.3	14.8	18.1	12.6	13.4	9.8
		Girls	16.8	10.3	13.3	9.3	9.6	5.9
	Reading	Total	11.8	8.3	9.5	8.1	7.3	6.5
		By gender						
		Boys	9.1	5.8	8.3	7.0	5.9	5.6
		Girls	14.4	21.8	10.8	10.0	8.7	7.4
	Science	Total	9.1	8.0	8.0	6.3	7.2	6.9
		By gender						
Boys		:	:	9.3	7.0	8.2	7.8	
	Girls	:	:	6.8	5.6	6.2	5.9	

Source: OECD (2023a).

Underachievement has increased since 2018 in all three areas but remains below the EU averages. Around one out of four 15-year-old students do not reach a minimum proficiency level in mathematics (25% vs EU: 29.55%), reading (25.3% vs EU: 26.2%) and science (22.4% vs EU: 24.2%). In mathematics, the share of low-achieving students increased since 2018 (+5.3 pps vs EU: 6.6 pps), while in reading and science, a more gradual deterioration can be observed since 2012. Underachievement is more frequent among boys in reading and science with a gender gap standing at 9.4 pps and at 1.9 pps, respectively. No gender differences exist in mathematics.

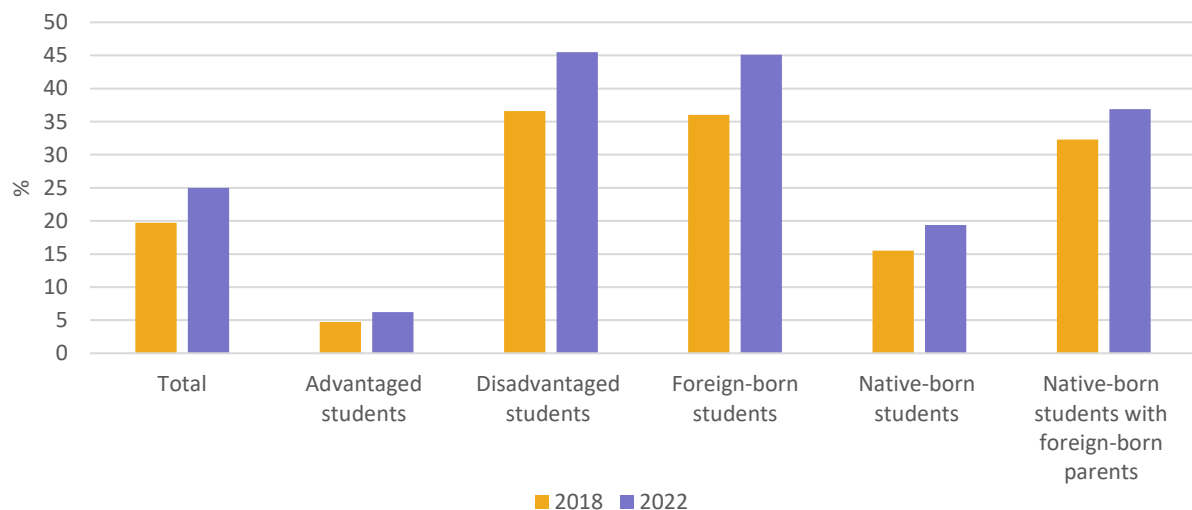
The socio-economic gap in underachievement in mathematics has widened. The underachievement rate of students from the bottom quarter of the socio-economic distribution rose by 9.2 pps since 2018 reaching 45.8% in mathematics (EU: 48%), while the rate for advantaged pupils remains the lowest in the EU 6.2%. Migrant background is also a key determinant of performance. Almost half of all foreign-born students (45.1%) underachieve in mathematics, in contrast to one in five students (19.4%) without a migrant background. This represents a gap of 25.7 pps, which shrinks to 17.5 pps for native born students with foreign-born parents.

The share of top performing students has been above the EU average since 2012 in all three areas, but recorded a stronger decline than in other EU countries. In 2012 Belgium ranked first in terms of top performing pupils in mathematics with 19.5% (vs EU: 12.6%), but the rate fell by 8.1 pps to 11.5% (vs EU: 7.9%) in 2022. This is the second largest drop in the EU. A more moderate decline can be observed in reading (4.4 ps) and science (1.9 pp). Nevertheless, advantaged students still have a much higher chance to be top performers (25.2%) compared to other EU

countries (18.4%). In line with EU trends, top performance is more prevalent among boys in mathematics and science, while girls outperform boys in reading.

Students' well-being influences their performance. 69.3% of 15-year-olds reported that they feel like they belong at school, a slightly lower share than in most EU countries. Students with a positive sense of belonging score 11 points higher in mathematics than their peers who did not have a positive sense of belonging³⁰. 19.5% of students reported that they were frequently bullied, but bullying is more frequent among disadvantaged students and in disadvantaged schools³¹. Being exposed to bullying at least a few times a month is correlated with a drop in mathematics score by 17 points³².

Figure A4. Underachievement rates in mathematics



Source: OECD (2023a).

The Communities are implementing structural reforms to improve the quality of school education. The Flemish Community will start rolling out the compulsory standardised “Flemish tests” in the academic year 2023-24 in Dutch and mathematics, which should strengthen schools’ accountability and help better monitor pupils’ performance. Flanders has also introduced new attainment targets for secondary schools, which will serve as the basis of the tests. The French Community is rolling out comprehensive reforms under the Pact for an Excellent Education, which aim to increase both the performance and equity of the school system. A major curricular revision should boost basic and digital skills, art and culture, entrepreneurship and provide earlier second language learning. In addition, with support from the Recovery and Resilience Facility, around 30,000 pupils from the French Community are benefitting from individualised support to help them overcome learning difficulties aggravated by the Covid-19 pandemic. The French Community is also developing a comprehensive plan to combat early school leaving and to reduce absenteeism and grade repetition. The Flemish community is implementing the ‘Digisprong’ programme under the national recovery and resilience plan, which aims to strengthen digital competences among all learners and teachers.

³⁰ After taking into account schools’ and students’ socio-economic characteristics.

³¹ Table II.B1.3.31 and Table II.B1.3.32

³² After taking into account schools’ and students’ socio-economic characteristics.

 **Bulgaria**
Figure A5. Key indicators from PISA 2012, 2018 and 2022

			2012		2018		2022		
			BG	EU	BG	EU	BG	EU	
Share of 15-year-olds underachieving	Mathematics	Total	43.8	22.1	44.4	22.9	53.6	29.5	
		By gender	<i>Boys</i>	45.1	16.1	45.2	22.8	55.0	29.0
			<i>Girls</i>	42.3	22.8	43.6	22.9	52.0	30.0
	By socio-economic status	<i>Top quarter</i>	18.4	7.6	23.5	8.6	29.2	10.9	
		<i>Bottom quarter</i>	68.8	38.0	66.2	38.2	77.2	48.0	
	By migrant background	<i>Native with native-born parents</i>	42.2	:	42.6	:	51.0	:	
		<i>Native with foreign-born parents</i>	:	:	:	:	:	:	
		<i>Foreign-born students</i>	:	:	:	:	56.1	:	
	Reading	Total	39.4	18.0	47.1	22.5	52.9	26.2	
		By gender	<i>Boys</i>	50.9	24.3	55.1	27.3	59.1	30.7
<i>Girls</i>			27.0	11.7	38.1	17.4	45.8	21.7	
Science	Total	36.9	16.8	46.5	22.3	48.0	24.2		
	By gender	<i>Boys</i>	:	:	50.2	23.2	52.4	25.6	
		<i>Girls</i>	:	:	42.4	21.2	43.0	22.9	
Share of 15-year-olds top performers	Mathematics	Total	4.1	12.6	4.2	11.0	3.1	7.9	
		By gender	<i>Boys</i>	4.5	14.8	4.8	12.6	3.7	9.8
			<i>Girls</i>	3.6	10.3	3.6	9.3	2.5	5.9
	Reading	Total	4.3	8.3	2.3	8.1	2.2	6.5	
		By gender	<i>Boys</i>	2.3	5.8	1.7	7.0	1.8	5.6
			<i>Girls</i>	6.5	21.8	3.1	10.0	2.6	7.4
	Science	Total	3.1	8.0	1.5	6.3	1.4	6.9	
		By gender	<i>Boys</i>	:	:	1.6	7.0	1.6	7.8
			<i>Girls</i>	:	:	1.5	5.6	1.3	5.9

Source: OECD (2023a). Note: Students with migrant background in Bulgaria represent 1.1% of student population. Therefore, this annex does not analyse data by migrant background (see also section 1.2).

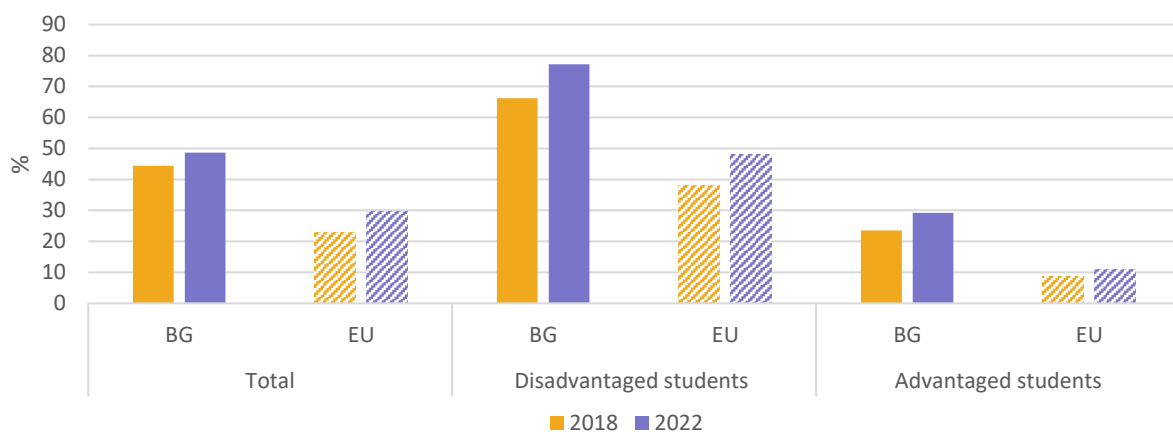
The proportion of underachieving students has been persistently among the highest in the EU since 2012 and results have deteriorated further since 2018 in line with EU trends. In 2022, around half of 15-year-olds underachieve in mathematics (53.6%), reading (52.9%) and science (48%), around double of the EU averages. This represents an increase of more than 10 pps since 2012 in all three tested areas. Since 2018, the share of low-achievers increased in particular in mathematics (9.2 pps) and reading (5.8 pps), while it remained largely stable (1.5 pps) in science. There is also a significant gender gap with more boys among underachieving students in reading (13.3 pps) and science (9.4 pps), both in line with EU trends but above the EU averages.

While basic skills levels are generally low, Bulgaria has one of the highest gaps in the underachievement rate between students from the top and the bottom end of the socio-economic distribution. With almost 8 out of 10 students from socio-economically disadvantaged backgrounds not meeting basic skills levels in mathematics, Bulgaria has the highest share of low-achievers among students from disadvantaged backgrounds. At the other end of the distribution, even the most advantaged students are almost three times more likely to underachieve than their peers in other Member States (29.2 pps vs EU: 10.9 pps).

The share of top performing students has been very low in all three fields during the past decade and decreased further in reading and science since 2012. The proportion of top performers in reading and science dropped by 2.1 pps and 1.6 pps between 2012 and 2022, while the share of top performing students in mathematics remained unchanged. The figures are well below the EU averages. The share of top performers remains low even among the most advantaged students compared to their peers from similar socio-economic backgrounds in other Member States (8.8% vs EU: 18.4% in mathematics). As in other EU Member States, there are more boys than girls among top performers in mathematics, but the difference remains small. Unlike in many EU countries, there is no significant gender gap in reading and science.

Being bullied at school has a negative impact on academic performance. More than one in five students (22.4%) reported being frequently bullied, a phenomenon that affects students and schools irrespective of their socio-economic profile. Being the victim of bullying at least a few times per month was associated with 21 points difference in mathematics performance³³. 75% of students in Bulgaria felt that they belonged at school, a factor which was found to have no significant impact on students' mathematics performance, contrary to nearly all other Member States.

Figure A6. Underachievement rates in mathematics



Source: OECD (2023a).

Measures to support improvements in student outcomes are underway. Such measures are guided by the Strategic framework for the development of education, training and learning in the period 2021-2030, which set ambitious goals for improving education outcomes. In the past decade, Bulgaria revised its school curricula and has taken measures to tackle early school leaving. To reduce the large impact of socio-economic status on students' performance and reduce school drop-out, between February 2019 and October 2023, Bulgaria implemented the 'Support for success' project, co-financed by the European Social Fund. The project facilitated remedial education classes in schools with large concentrations of students from disadvantaged backgrounds. These efforts are currently continued by the 'Success for You' project financed by the European Social Fund Plus. Furthermore, the Recovery and Resilience Facility is funding the establishment of STEM laboratories across Bulgarian schools in view of supporting the acquisition of digital skills and learning in STEM subjects.

³³ After taking into account schools' and students' socio-economic characteristics.

 Croatia

Figure A7. Key indicators from PISA 2012, 2018 and 2022

		2012		2018		2022		
		HR	EU	HR	EU	HR	EU	
Share of 15-year-olds underachieving	Mathematics	Total	29.9	22.1	31.2	22.9	32.9	29.5
		By gender						
		Boys	28.8	16.1	30.4	22.8	33.0	29.0
		Girls	31.0	22.8	31.9	22.9	32.8	30.0
		By socio-economic status						
		Top quarter	14.1	7.6	15.6	8.6	15.8	10.9
		Bottom quarter	43.7	38.0	42.5	38.2	47.8	48.0
		By migrant background						
		Native with native-born parents	28.8	:	30.4	:	32.0	:
		Native with foreign-born parents	34.6	:	34.2	:	36.5	:
	Foreign-born students	37.5	:	31.4	:	31.4	:	
Reading	Total	18.7	18.0	21.6	22.5	22.7	26.2	
	By gender							
	Boys	27.6	24.3	28.2	27.3	28.5	30.7	
	Girls	9.5	11.7	15.0	17.4	16.4	21.7	
Science	Total	17.3	16.8	25.4	22.3	22.4	24.2	
	By gender							
	Boys	:	:	26.8	23.2	25.0	25.6	
	Girls	:	:	24.0	21.2	19.7	22.9	
Share of 15-year-olds top performers	Mathematics	Total	7.0	12.6	5.1	11.0	5.9	7.9
		By gender						
		Boys	8.7	14.8	6.4	12.6	7.2	9.8
		Girls	5.2	10.3	3.9	9.3	4.4	5.9
	Reading	Total	4.4	8.3	4.7	8.1	4.2	6.5
		By gender						
		Boys	2.7	5.8	3.5	7.0	3.0	5.6
		Girls	6.2	21.8	5.9	10.0	5.4	7.4
	Science	Total	4.6	8.0	3.6	6.3	5.4	6.9
		By gender						
Boys		:	:	4.1	7.0	5.4	7.8	
	Girls	:	:	3.2	5.6	5.5	5.9	

Source: OECD (2023a).

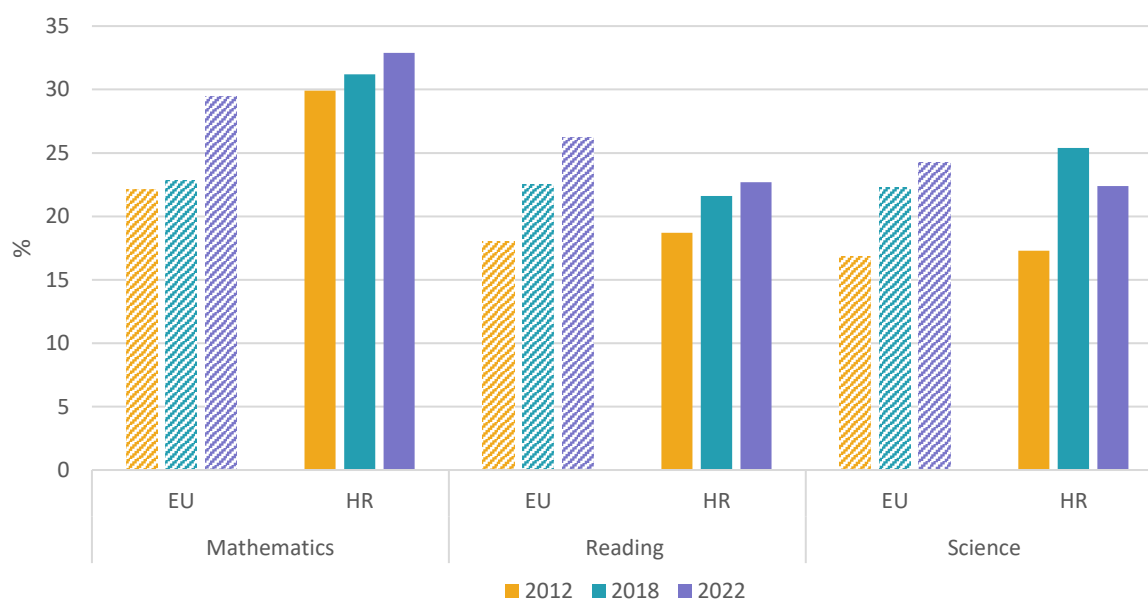
Underachievement in Croatia remained largely stable in all three competences tested by PISA between 2018 and 2022. The proportion of low achieving students in mathematics was higher than the EU average (32.9% vs 29.5%) in 2022. By contrast, the rate is 3.6 pps below the EU average in reading and 1.8 pps in science. Underachievement is more frequent among boys in reading and science with a gender gap which stands at 12.1 pps and at 5.3 pps, respectively. No difference exists in mathematics. Concerning students with a migrant background who represent 8.8% of student population, there are not significant differences in underachievement between them and native-born students, contrary to the majority of EU Member States.

About half of disadvantaged students underachieve in mathematics. The share (47.8%) of underachieving students from the bottom quarter has not changed since 2012, unlike in the majority of EU Member States. Similarly, no change is observable for the rate of students at the top quarter in the past decade, which remains higher than the EU average (15.8% vs 10.9%). The socio-economic gap is equal to 32 pps, below the EU average (37.2 pps).

The share of top performing students is below the EU average in all three domains. The rate has not improved since 2012 in mathematics and reading standing at 5.9% (EU:7.9%) and 4.2% (EU: 6.5%), respectively in 2022. On the contrary, a moderate positive trend is recorded in science whose rate (5.4%) has risen by 1.8 pps since 2018, the highest increase within the EU. When it comes to gender differences, boys are more likely to be top performers in mathematics and less likely in reading, in line with the EU trends. There is no gender gap in science.

Croatian students have a relatively high sense of belonging at school. 83.2% of students feel like they belong at school, one of the highest shares in the EU. Sense of belonging is positively associated with an increase in mathematics score by 15 points³⁴. 15.9% of students reported that they were frequently bullied, but bullying is more frequent among disadvantaged students and in disadvantaged schools³⁵. Being exposed to bullying at least a few times a month is correlated with a drop in mathematics score by 24 points³⁶.

Figure A8. Proportion of underachieving students in mathematics, reading and science in PISA 2012, 2018 and 2022



Source: OECD (2023a).

Comprehensive education reform for improving pupils' basic skills is advancing. Originally envisioned in the 2014 Strategy of Education, Science and Technology, it started with the curricular reform introducing competence-based teaching (pilot phase in 2018, implementation in all schools 2019 – 2022) in all grades. Simultaneously, the e-Schools project provided digital equipment and resources to raise the digital maturity of schools (completed in September 2023). In March 2023, national exams were introduced in the 8th grade in all primary schools, for the first time providing evaluation at national level before the end of secondary school, and giving feedback to pupils and schools. The introduction of single-shift schools and the transition to the whole-day schooling aims to increase the low number of instruction hours and improve basic skills. It is supported by big investments in the Croatian Recovery and Resilience Plan. A pilot project testing the proposed whole-day school model started in September 2023. It will be monitored and evaluated externally by the National Centre for External Evaluation of Education. The model is planned to be extended to all schools from 2027/2028.

³⁴ After taking into account schools' and students' socio-economic characteristics.

³⁵ Table II.B1.3.31 and Table II.B1.3.32.

³⁶ After taking into account schools' and students' socio-economic characteristics.

 **Cyprus**
Figure A9. Key indicators from PISA 2012, 2018 and 2022

			2012		2018		2022	
			CY	EU	CY	EU	CY	EU
Share of 15-year-olds underachieving	Mathematics	Total	42.0	22.1	36.9	22.9	53.2	29.5
		By gender						
		Boys	42.8	16.1	39.8	22.8	57.1	29.0
		Girls	41.2	22.8	33.8	22.9	49.0	30.0
		By socio-economic status						
		Top quarter	20.1	7.6	22.1	8.6	32.7	10.9
		Bottom quarter	59.2	38.0	52.2	38.2	69.8	48.0
		By migrant background						
		Native with native-born parents	39.9	:	36.0	:	50.4	:
		Native with foreign-born parents	43.6	:	41.9	:	53.8	:
	Foreign-born students	54.4	:	35.0	:	47.8	:	
Reading	Total	32.8	18.0	43.7	22.5	60.6	26.2	
	By gender							
	Boys	44.6	24.3	54.3	27.3	70.5	30.7	
	Girls	20.5	11.7	32.7	17.4	50.3	21.7	
	Science	Total	38.0	16.8	39.0	22.3	51.8	24.2
		By gender						
Boys		:	:	44.2	23.2	58.2	25.6	
	Girls	:	:	33.5	21.2	45.0	22.9	
Share of 15-year-olds top performers	Mathematics	Total	3.7	12.6	4.4	11.0	3.9	7.9
		By gender						
		Boys	5.2	14.8	5.1	12.6	4.7	9.8
		Girls	2.2	10.3	3.6	9.3	3.0	5.9
	Reading	Total	4.0	8.3	1.8	8.1	1.4	6.5
		By gender						
Boys		2.6	5.8	1.4	7.0	1.0	5.6	
	Girls	5.4	21.8	2.2	10.0	1.9	7.4	
Science	Total	2.0	8.0	1.6	6.3	2.0	6.9	
	By gender							
	Boys	:	:	1.7	7.0	1.8	7.8	
	Girls	:	:	1.5	5.6	2.3	5.9	

Source: OECD (2023a).

More than half of Cypriot 15-year-old students underachieve in all three areas tested.

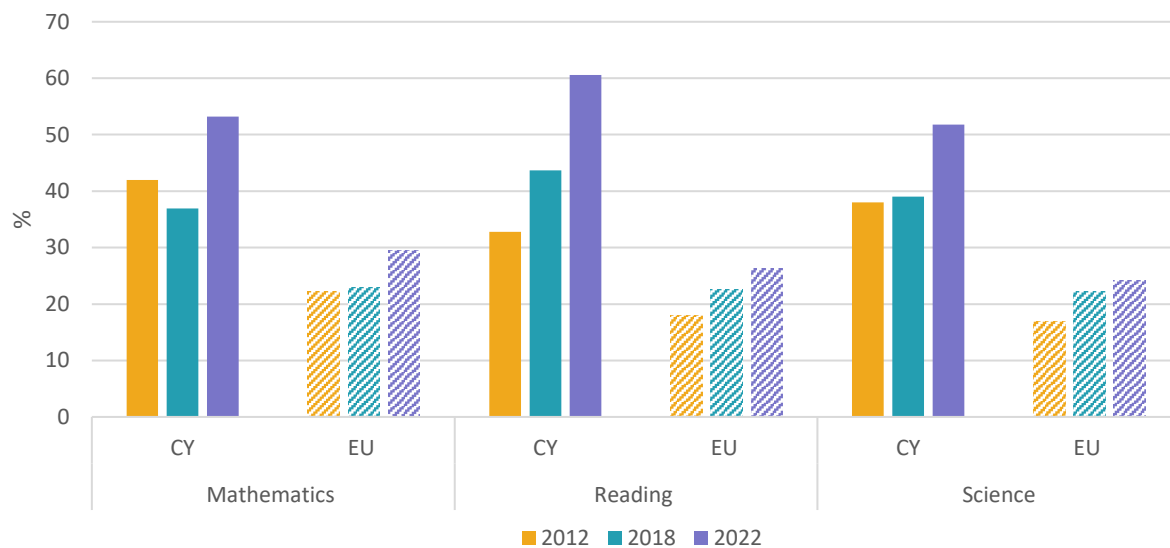
Their underachievement rate continues to increase notably and remains as one of the highest at EU level. The most dramatic increase since 2012 occurred in reading (+27.9 pps vs EU: 8.2 pps), resulting in remarkably high proportion of underachievement: 60.6% (EU: 26.2%). Likewise, the shares are also among the highest in the EU in mathematics (53.2% vs EU: 29.5%) and in science (51.8% vs EU: 24.2%). In these fields, the strongest increase took place between 2018 and 2022, +16.3 pps vs 6.6 pps at EU level and +12.8 pps vs 2.0 pps, respectively. Boys are over-represented among the underachieving students in all three domains. The rate is especially high in reading, 70% (EU: 30.7%), which is the highest value in the EU. The gender gap is also the EU's widest in all three fields, particularly in reading where it stands at 20.1 pps (EU: 8.9 pps).

Underachievement in mathematics has grown over the entire socio-economic distribution since 2018. The rate has increased notably in the top quartile (10.6 pps vs 2.2 pps at EU level), where the share (32.7%) is three times higher than the EU average (10.9%). For comparison, the rate for the bottom quartile is also high (69.8% vs EU: 48.0%) and grew by 17.6 pps between 2018 and 2012. Both increases have been the most pronounced among all the EU Member States during this period.

In Cyprus, the share of top performing students is well below the EU average in all three fields. Since 2012, it has remained unchanged in mathematics and science. When it comes to reading, the rate first decreased between 2012 and 2018 and then remained stable, resulting in a total decrease of -2.6 pps since 2012. As in all EU Member States, girls are under-represented among top performers in mathematics. On the contrary, when it comes to reading, the share is 0.9 pps higher among girls. There is no difference in science.

Cypriot students have a high sense of belonging at school. 74.1% of them feel they belong at school. However, it has no impact on students' mathematics performance. At the same time, exposure to frequent bullying is associated with a drop of 21 score points³⁷ in mathematics performance, which is one of the highest values in the EU. More than 1 out of 4 students (24.0%) reported being bullied at least few times a month.

Figure A10. Underachievement rates in mathematics, reading and science



Source: OECD (2023a).

Several measures are being implemented to strengthen student outcomes. During the last decade, Cyprus is implementing a comprehensive education and training reform package. Curricula have been revised and the subsequent integration of skills related to pupils' future professional prospects is underway. The student assessment reform, implemented since 2019, provides for a unified assessment system from pre-primary to upper-secondary education and will be further enhanced with policy measures as of 2023/2024 to reflect real educational outcomes of students. The country committed to extending compulsory pre-primary education from the age of 4 under its recovery and resilience plan, following a gradual implementation in different phases. To address the problem of students' disengagement and early school leaving, and according to recommendations of a Commission's Technical Support Instrument project, Cyprus develops a related governance framework and prepares legislation. Furthermore, a reform was adopted for all-day schooling in lower secondary education to enhance the quality of education and improve educational outcomes, promote social cohesion, reduce the share of early school leavers, and improve pupils' well-being at school. In addition, the digital transformation of school units with the aim of enhancing digital skills and skills related to STEM education is an essential investment that Cyprus is implementing with funding by the EU Recovery and Resilience Facility.

³⁷ After taking into account students' and schools' socio-economic characteristics.

 **Czechia**
Figure A11. Key indicators from PISA 2012, 2018 and 2022

		2012		2018		2022		
		CZ	EU	CZ	EU	CZ	EU	
Share of 15-year-olds underachieving	Mathematics	Total	21.0	22.1	20.4	22.9	25.5	29.5
		By gender						
		Boys	19.3	16.1	20.8	22.8	25.8	29.0
		Girls	22.7	22.8	20.0	22.9	25.2	30.0
	By socio-economic status							
	Top quarter	7.7	7.6	6.7	8.6	8.9	10.9	
	Bottom quarter	38.5	38.0	38.5	38.2	48.5	48.0	
	By migrant background							
	Native with native-born parents	20.5	:	19.4	:	24.9	:	
	Native with foreign-born parents	40.7	:	31.9	:	27.9	:	
Foreign-born students	22.4	:	48.3	:	44.3	:		
Reading	Total	16.9	18.0	20.7	22.5	21.3	26.2	
	By gender							
	Boys	22.8	24.3	26.3	27.3	26.3	30.7	
	Girls	10.6	11.7	15.0	17.4	16.3	21.7	
Science	Total	13.8	16.8	18.8	22.3	19.9	24.2	
	By gender							
	Boys	:	:	19.4	23.2	21.1	25.6	
	Girls	:	:	18.1	21.2	18.6	22.9	
Share of 15-year-olds top performers	Mathematics	Total	12.9	12.6	12.7	11.0	10.6	7.9
		By gender						
		Boys	14.4	14.8	13.5	12.6	12.4	9.8
		Girls	11.3	10.3	11.8	9.3	8.8	5.9
	Reading	Total	6.1	8.3	8.2	8.1	8.1	6.5
		By gender						
		Boys	3.7	5.8	6.2	7.0	6.5	5.6
		Girls	8.5	21.8	10.3	10.0	9.6	7.4
	Science	Total	7.6	8.0	7.5	6.3	9.0	6.9
		By gender						
Boys		:	:	8.0	7.0	9.7	7.8	
	Girls	:	:	7.0	5.6	8.3	5.9	

Source: OECD (2023a). Note: Students with migrant background in Czechia represent 4.1% of student population. Therefore, this annex does not analyse data by migrant background (see also section 1.2).

The proportion of underachieving students is below the EU average in all three domains tested since 2012. Compared to 2018, there was only a significant increase in mathematics (+5.1 pps), while underachievement did not increase significantly in the other two domains between 2018 and 2022. The rate in reading has remained unchanged among the Czech 15-year-olds since 2012 and it is now among the lowest in the EU with 21.3%. In the area of science, the share grew by 6.1 pps between 2012 and 2022, but it also remains well below the EU average (19.9% vs EU: 24.2%). In mathematics, it stands at 23%, below the EU average (29.5%). Regarding gender differences, there are considerably more boys among underachieving students in reading (+10 pps), while there are no gender gaps in the other two domains.

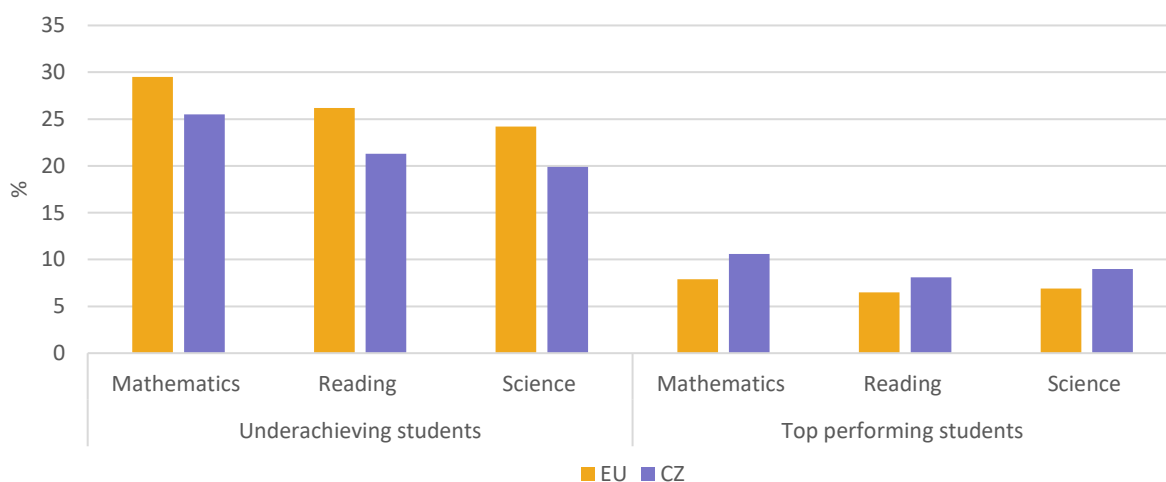
The socioeconomic gap among underachieving students remains significant. Almost half of all students from disadvantaged backgrounds underachieve in mathematics (48.5% vs EU: 48%), while the underachievement rate remains below the EU average among students at the top quartile of the socioeconomic distribution (8.9% vs EU: 10.9%). The share of students from a disadvantaged background who do not meet basic proficiency levels in mathematics grew by 10 pps between 2018 and 2022, while among advantaged students, it remained stable. This has widened the socioeconomic gap to 39.5 pps, which is above the EU average (37.2 pps).

The share of top performing 15-year-olds is above the EU average in all three domains. In mathematics, the rate decreased significantly since 2018 (-2.1 pps), however, it is amongst the highest in the EU (10.6% vs EU: 7.9%). In reading and science, the shares of top performers did not change significantly since 2012 and are now above the EU average in both domains. The share of

top performers from the top quartile of the socioeconomic distribution is one of the highest in the EU in mathematics (24.4% vs EU: 18.4%), while the share of disadvantaged students among top performers is around the EU average (1.9% vs EU: 1.8%). Regarding gender gaps, in mathematics, there are 3.5 pps more boys among the top-performers, while in reading, there are 3.1 pps more girls; there is no significant gender difference in science.

Students' wellbeing influences their performance. 72.8% of Czech 15-year-olds reported that they feel like they belong at school. Students with a positive sense of belonging were scoring 11 points higher in mathematics than their peers who did not have a positive sense of belonging³⁸. 1 in 4 (18.4%) students reported that they were exposed to bullying at least a few times a month, one of the highest rates in the EU. Students from a disadvantaged background or in a disadvantaged school are more likely to be affected by this form of harmful behaviour.³⁹ Exposure to bullying is associated with a 20 score point drop in students' mathematics performance⁴⁰.

Figure A12. Proportion of underachieving and top performing students, PISA 2022



Source: OECD (2023a).

Czechia recognises the need to address persistent regional inequalities in its education system and has launched a series of reforms. Czechia's recovery and resilience plan foresees measures to support vulnerable schools and to reform the school financing system. A nation-wide tutoring programme financed under RRF seeks to help students at risk of school failure and to compensate for learning losses experienced during the pandemic, focusing on core subjects (Czech language, mathematics, English). Furthermore, the Jan Amos Comenius Operational Programme (ESF+) supports schools and teachers in developing innovative pedagogies for key competences – including reading, mathematics, language, social literacy and STEM subjects – with the aim of acquiring the ability to work critically and effectively with information. It also provides funding for the employment of specialist staff (school psychologists, special needs educators, etc.) to strengthen inclusive education in schools. Czechia has also initiated a reform of teacher training to reinforce the practical component of initial teacher education and better prepare teachers to work with heterogenous classrooms.

³⁸ After taking into account schools' and students' socio-economic characteristics.

³⁹ Table II.B1.3.31 and Table II.B1.3.32.

⁴⁰ After taking into account schools' and students' socio-economic characteristics.

 Denmark⁴¹

Figure A13. Key indicators from PISA 2012, 2018 and 2022

		2012		2018		2022		
		DK	EU	DK	EU	DK	EU	
Share of 15-year-olds underachieving	Mathematics	Total	16.8	22.1	14.6	22.9	20.4	29.5
		By gender						
		Boys	15.1	16.1	14.9	22.8	19.8	29.0
		Girls	18.6	22.8	14.3	22.9	21.1	30.0
	By socio-economic status							
	Top quarter	5.4	7.6	6.4	8.6	9.4	10.9	
	Bottom quarter	31.4	38.0	25.1	38.2	34.1	48.0	
	By migrant background							
	Native with native-born parents	13.4	:	12.2	:	17.3	:	
	Native with foreign-born parents	38.4	:	33.5	:	39.8	:	
Foreign-born students	48.3	:	26.9	:	46.0	:		
Reading	Total	14.6	18.0	16.0	22.5	19.0	26.2	
	By gender							
	Boys	19.2	24.3	20.9	27.3	22.5	30.7	
	Girls	10.1	11.7	11.1	17.4	15.3	21.7	
Science	Total	16.7	16.8	18.7	22.3	19.5	24.2	
	By gender							
	Boys	:	:	20.2	23.2	19.7	25.6	
	Girls	:	:	17.1	21.2	19.2	22.9	
Share of 15-year-olds top performers	Mathematics	Total	10.0	12.6	11.6	11.0	7.7	7.9
		By gender						
		Boys	11.5	14.8	13.0	12.6	9.9	9.8
		Girls	8.4	10.3	10.2	9.3	5.4	5.9
	Reading	Total	5.4	8.3	8.4	8.1	6.3	6.5
		By gender						
		Boys	3.7	5.8	6.5	7.0	5.6	5.6
		Girls	7.2	21.8	10.3	10.0	7.0	7.4
	Science	Total	6.8	8.0	5.5	6.3	7.0	6.9
		By gender						
Boys		:	:	5.9	7.0	8.5	7.8	
	Girls	:	:	5.1	5.6	5.4	5.9	

Source: OECD (2023a).

Danish underachievement rates are among the lowest in the EU. While being above the EU level target set for 2030, the 2022 rates are below the EU average in all three domains. The proportion of underachieving students in mathematics grew by 5.9 pps between 2018 and 2022, compared with 6.6 pps rise at EU level. The increase was smaller in reading (+3.0 pps vs 3.7 pps at EU level) in the same period. By contrast, the rate in science has remained unchanged since 2012. A gender gap (7.2 pps vs 8.9 pps at EU level) is only observable in reading: boys are more likely to underachieve. This figure is one of the smallest among EU Member States.

Underachievement in mathematics has risen among disadvantaged students since 2018.

Although the rate has also increased among students from the top quarter of the socio-economic distribution by 3.0 pps (EU: 2.2 pps), the rise among students from the bottom quarter was three times higher (9.0 pps vs 9.9 pps at EU level). However, the rate for the latter remains one of the lowest at EU level and so does the socio-economic gap in underachievement (24.7 pps vs 37.2 pps at EU level).

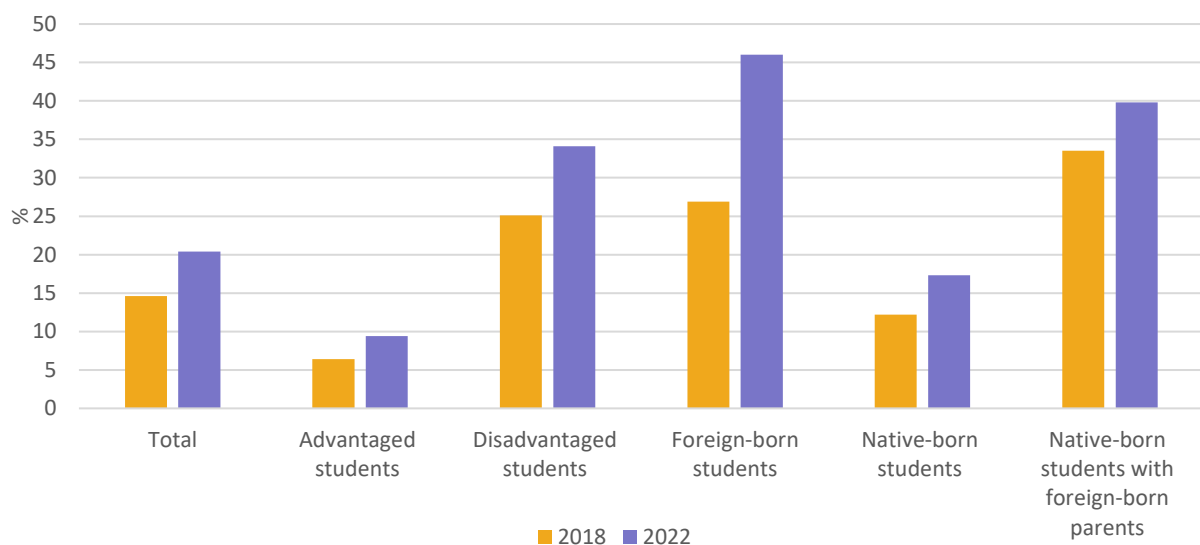
In Denmark, students with a migrant background are more likely to underachieve. The rate in mathematics for foreign-born students stands at 46.0% while for native-born students without migrant background, it is 17.3%, one of the lowest values within the EU. However, the rate is also twice as high for native-born students with parents born abroad. The difference with non-migrant students reaches 22.5 pps, the largest gap among EU Member States.

⁴¹ Caution is required when interpreting 2022 data for Denmark because one or more PISA sampling standards were not met (see OECD, 2023a, Annexes A2 and A4).

The proportion of top performing students is around the EU average in all three fields. In mathematics, the rate stood at 7.7% in 2022, slightly below the EU average (7.9%) and has declined by 3.9 pps since 2018. Likewise, in reading, the rate has decreased by 2.1 pps. Both drops are higher than the EU average (-3.1 pps in mathematics and -2.1 pps in reading). By contrast, the share has remained unchanged in science. While there are not significant gender differences in reading, boys are over-represented among top performing students in science and mathematics. The gap in both domains are among the highest within the EU.

Student well-being impacts on mathematics performance. 69.9% of 15-year-olds in Denmark feel like they belong at school, and this is associated with an increase by 17 score point in mathematics. More than 1 out of 5 students (22.7%) report to be bullied at least a few times a month. Exposure to bullying is linked with a drop in mathematics score by 9 points after taking into account schools' and students' socio-economic characteristics, the smallest figure within the EU.

Figure A14. Underachievement rates in mathematics in Denmark



Source: OECD (2023a).

Several measures are being implemented to strengthen student outcomes. The government aims to improve basic competences through reinforcing the practical elements in primary and lower secondary education. Working on real problems and observing its impact motivates many students. Schools can opt to participate in an experiment of the Ministry of Children and Education with a more practically oriented oral test in Danish and mathematics for 9th and 10th grade. A pilot action develops more practical teaching approaches for primary and lower secondary schools jointly with teachers in three municipalities. In addition, the maximum number of pupils in primary schools will be reduced from 28 to 26, and there are plans to simplify the readiness assessment for school before entering first class of primary school. Efforts aim to improve individual support for each student towards the end of lower secondary school to allow students to make a better fitting choice for the different upper secondary school orientations.

 **Estonia**
Figure A15. Key indicators from PISA 2012, 2018 and 2022

		2012		2018		2022		
		EE	EU	EE	EU	EE	EU	
Share of 15-year-olds underachieving	Mathematics	Total	10.5	22.1	10.2	22.9	15.0	29.5
		By gender						
		Boys	10.6	16.1	10.1	22.8	15.2	29.0
		Girls	10.4	22.8	10.3	22.9	14.7	30.0
		By socio-economic status						
		Top quarter	3.6	7.6	4.6	8.6	6.2	10.9
		Bottom quarter	14.9	38.0	16.1	38.2	24.6	48.0
		By migrant background						
		Native with native-born parents	9.3	:	9.2	:	14.0	:
		Native with foreign-born parents	17.8	:	16.0	:	16.3	:
	Foreign-born students	:	:	20.8	:	27.2	:	
Reading	Total	9.1	18.0	11.1	22.5	13.8	26.2	
	By gender							
	Boys	14.2	24.3	14.5	27.3	17.5	30.7	
	Girls	4.2	11.7	7.6	17.4	9.9	21.7	
Science	Total	5.0	16.8	8.8	22.3	10.1	24.2	
	By gender							
	Boys	:	:	9.5	23.2	11.3	25.6	
	Girls	:	:	8.0	21.2	8.8	22.9	
Share of 15-year-olds top performers	Mathematics	Total	14.6	12.6	15.5	11.0	13.1	7.9
		By gender						
		Boys	16.3	14.8	17.7	12.6	14.4	9.8
		Girls	13.0	10.3	13.3	9.3	11.7	5.9
	Reading	Total	8.3	8.3	13.9	8.1	10.6	6.5
		By gender						
		Boys	4.8	5.8	10.6	7.0	8.5	5.6
		Girls	11.8	21.8	17.1	10.0	12.9	7.4
	Science	Total	12.8	8.0	12.2	6.3	11.6	6.9
		By gender						
Boys		:	:	11.9	7.0	11.9	7.8	
	Girls	:	:	12.5	5.6	11.2	5.9	

Source: OECD (2023a).

The underachievement rate is below the EU target in reading and science and the lowest in the EU in mathematics, putting Estonia among the top performers in PISA. The proportion of low-achieving students has remained well below the EU average in all three fields over the past decade. While it increased by 5.1 pps between 2012 and 2018, the rate in science remains the lowest among the EU Member States since 2012. In mathematics, it has grown by 4.7 pps since 2018, less than at EU level (6.6 pps), reaching 15% in 2022, the level of the EU target. A moderate worsening is also observable in reading where the share moved from 9.1% to 13.8% in the past decade. Concerning gender differences, boys are more likely to underachieve in reading and science. The difference in science (2.5 pps) is the lowest in the EU and below the average in reading (7.6 pps vs 8.9 pps at EU level). Like in most of EU countries, underachievement in mathematics is more frequent among foreign-born students who only represent 1.3% of Estonia student population. Their rate differs from that of students without a migrant background by 13.2 pps, one of the smallest gaps within the EU. A very small difference (2.3pps) is observable between students without a migrant background and native-born students with foreign-born parents who represents 8.7% of student population.

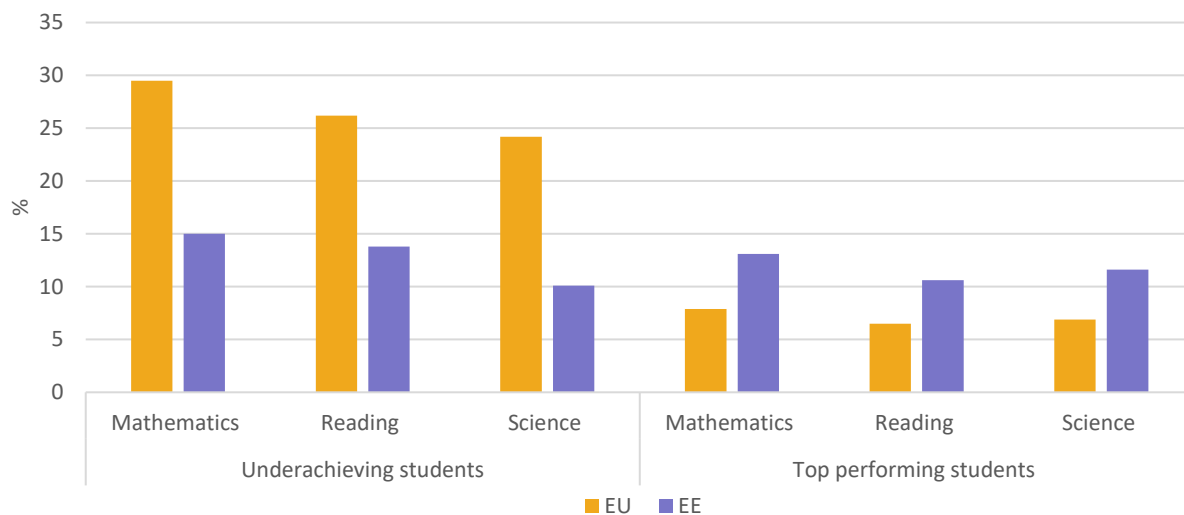
Estonia is the country with the smallest socioeconomic gap in underachievement in mathematics (18.4 pps vs EU: 37.2 pps). However, the gap rose between 2018 and 2022 due to the increase of underperformance among students in the bottom quarter of the socio-economic distribution (+8.5 pps). Underachievement rates did not change in the top quarter.

Estonia has one of the highest shares of top performers in all three domains in the EU. Although the rate remains well above the EU average, a negative trend is observable in mathematics and science since 2018. The rate has decreased by 3.3 pps in science and 2.4 pps in mathematics

since 2018 in line with the EU trends. In reading, the rate is the highest in the EU (11.6% vs 6.9% at EU level). When it comes to gender differences, boys are over-represented among top achieving students in mathematics like in all other EU MS. On the contrary, in reading, girls outperform boys. No gender gap exists in science. The share of top performers in mathematics among disadvantaged students is also relatively high (4.1% vs 1.8% at EU level).

Student well-being impacts on mathematics performance. 77.7% of Estonian 15-year-olds feel like they belong at school. Sense of belonging is associated with an increase of 21 score points in mathematics⁴². 1 out of 4 students (25.7%) reported that they were bullied at least a few times a month, one of the highest shares within the EU. This causes a drop by 11 score points in mathematics⁴³.

Figure A16. Underachieving and top performing students, PISA 2022



Source: OECD (2023a).

Several measures are being implemented to strengthen learning outcomes and reduce early school leaving. In 2023 and as part of its Education strategy 2021-2035, the Estonian government updated the national curricula for primary and secondary education, focusing on transversal competences and the autonomy of teachers and learners to achieve the defined learning outcomes. The new curricula will be implemented as of the school year 2024/25, which also marks the start of an accelerated gradual implementation of the transition to Estonian-language education by 2030, a major reform supported by the ESF+ aiming at using Estonian as the sole language of instruction for subject teaching. Another priority of the 2035 Estonian education strategy is to increase the motivation of all learners and to reduce early school leaving, which remains a stumbling block to solving skills and graduates' shortages. The strategy also envisages supporting students with special educational needs and improving the school climate, including preventing bullying in all schools. Moreover, the integration of formal and non-formal education is considered as key to create an enabling environment for the success of all learners and is supported by the EU Technical Support Instrument to design and implement this reform.

⁴² After taking into account schools' and students' socio-economic characteristics.

⁴³ Ibid.



Figure A17. Key indicators from PISA 2012, 2018 and 2022

			2012		2018		2022		
			FI	EU	FI	EU	FI	EU	
Share of 15-year-olds underachieving	Mathematics	Total	12.3	22.1	15.0	22.9	24.9	29.5	
		By gender	Boys	14.1	16.1	16.8	22.8	27.4	29.0
			Girls	10.4	22.8	13.1	22.9	22.2	30.0
	By socio-economic status	Top quarter	4.5	7.6	6.0	8.6	10.7	10.9	
		Bottom quarter	19.9	38.0	24.5	38.2	38.7	48.0	
	By migrant background	Native with native-born parents	10.5	:	13.0	:	22.0	:	
		Native with foreign-born parents	36.6	:	34.3	:	43.2	:	
		Foreign-born students	51.5	:	40.4	:	57.2	:	
	Reading	Total	11.3	18.0	13.5	22.5	21.4	26.2	
		By gender	Boys	17.7	24.3	19.6	27.3	28.2	30.7
Girls			4.6	11.7	7.3	17.4	14.3	21.7	
Science	Total	7.7	16.8	12.9	22.3	18.0	24.2		
	By gender	Boys	:	:	16.7	23.2	21.9	25.6	
		Girls	:	:	8.9	21.2	13.8	22.9	
Share of 15-year-olds top performers	Mathematics	Total	15.3	12.6	11.1	11.0	8.6	7.9	
		By gender	Boys	16.3	14.8	11.9	12.6	9.5	9.8
			Girls	14.1	10.3	10.3	9.3	7.6	5.9
	Reading	Total	13.5	8.3	14.2	8.1	8.8	6.5	
		By gender	Boys	7.1	5.8	9.1	7.0	6.0	5.6
			Girls	20.3	21.8	19.6	10.0	11.6	7.4
	Science	Total	17.1	8.0	12.3	6.3	12.7	6.9	
		By gender	Boys	:	:	11.1	7.0	11.6	7.8
			Girls	:	:	13.5	5.6	13.8	5.9

Source: OECD (2023a).

In Finland, underachievement continues to increase in all three fields. Since 2012 it has increased by 12.6 pps in mathematics (EU: +7.3 pps), 10.1 pps in reading (EU: +8.2 pps), and 10.6 pps in science (EU: +7.4 pps), which represent one of the most notable changes at EU level. Compared to 2018 when the shares of 15-years-olds underachieving in PISA were still below the EU target of 15% in all three fields, now all of them have exceeded it. Nevertheless, the rates remain below the EU average. Gender differences exist in all three fields: girls are less likely to underachieve than boys in all three fields; the gender gaps are larger than the EU average.

Underachievement has been growing across the entire socio-economic distribution since 2012 but the increase has been more pronounced at the bottom quartile. In 2022, the proportion of underachieving students in mathematics among socio-economically disadvantaged students was 38.7% (EU: 48.7%). This represents an increase of 18.9 pps compared to PISA 2012 and of 14.3 pps compared to 2018 (EU: 9.9 pps), being one of the highest increases among EU Member States. In contrast, only 10.7% (EU: 10.9%) of the students belonging to the top quartile underachieved in mathematics in 2022, which represents nevertheless an increase of 6.1 pps compared to PISA 2012 and of 4.7 pps compared to PISA 2018 (EU: 2.2 pps). While increasing, the Finnish socio-economic gap remains one of the smallest in the EU (28.1 pps vs 37.2 pps at EU level).

A significant gap in the underachievement rate between migrant students and students without migrant background exists. As in nearly all EU Member States, in Finland students born abroad - who represent about 4% of 15-year-old student population - are more likely to underachieve. In 2022, 57.2% of them underachieved in mathematics, meanwhile for students without migrant background, the figure was considerably lower (22.0%). This gap (35.2 pps) is one of the largest within the EU. The rate (43.2%) is also relatively high for native-born students with parents born abroad.

While remaining higher than the EU average, the proportion of top performers has decreased in all three domains since 2012. In mathematics the decline has been -6.7 pps since 2012, (EU: -4.7 pps), in reading -4.7 pps (EU: -1.8 pps), and in science -4.4 pps (EU: -1.2 pps). Within the EU, this represents one of the most dramatic drops. This negative trend is also observable looking at the 2018-2022 change in reading and mathematics, but not in science where the share of top performers has remained stable since 2018.

Finnish students enjoy a higher level of well-being compared to their peers in most other EU Member States. The share of students who report being bullied at least a few times a month stood at 10.3% in 2022, one of the lowest shares at EU level. Exposure to bullying is associated with a drop of 9⁴⁴ score points in mathematics performance, which is the lowest value in the EU. Likewise, a relatively high share of students (79.4%) in Finland feels like they belong at school, and this is positively associated with an increase of 12⁴⁵ points in mathematics score.

Figure A18. Underachievement rates in mathematics, reading and science



Source: OECD (2023a).

A comprehensive curricular reform is underway. Finland is implementing a new core curriculum for primary and lower secondary education since 2016/2017, and for upper secondary education from 2021/2022. Since 2021, compulsory schooling was extended from age 16 to 18. The reform aims to enhance competences, reduce learning gaps, boost equality and non-discrimination in education, improve the well-being of young people and raise the employment rate. Measures are also being taken to strengthen the quality and inclusiveness of ECEC and compulsory education. The Right to Learn 2020–2022 Programme has three goals: 1) to create equal conditions for learning paths; 2) to provide better support for children’s learning, develop special needs support and effectively use nationwide measures to promote inclusion; and 3) to strengthen the quality of teaching. The programme provides for an equality fund aimed at reducing socio-economic, regional and gender gaps in learning. With the support of the EU’s Technical Support Instrument multi-country project (together with Ireland), Finland will implement strategies to develop an inclusive school culture and address regional differences to ensure quality inclusive education for all children.

⁴⁴ After taking into account schools’ and students’ socio-economic characteristics.

⁴⁵ Ibid.

France

Figure A19. Key indicators from PISA 2012, 2018 and 2022

		2012		2018		2022		
		FR	EU	FR	EU	FR	EU	
Share of 15-year-olds underachieving	Mathematics	Total	22.4	22.1	21.3	22.9	28.8	29.5
		By gender						
		Boys	22.3	16.1	21.2	22.8	28.7	29.0
		Girls	22.4	22.8	21.3	22.9	28.9	30.0
		By socio-economic status						
		Top quarter	4.9	7.6	6.4	8.6	8.7	10.9
		Bottom quarter	41.0	38.0	39.1	38.2	49.4	48.0
		By migrant background						
		Native with native-born parents	17.7	:	18.1	:	24.3	:
		Native with foreign-born parents	38.5	:	33.0	:	42.2	:
	Foreign-born students	52.9	:	44.7	:	50.0	:	
Reading	Total	18.9	18.0	20.9	22.5	26.9	26.2	
	By gender							
	Boys	25.5	24.3	25.4	27.3	30.8	30.7	
	Girls	12.7	11.7	16.3	17.4	23.1	21.7	
Science	Total	18.7	16.8	20.5	22.3	23.8	24.2	
	By gender							
	Boys	:	:	21.6	23.2	25.7	25.6	
	Girls	:	:	19.4	21.2	21.9	22.9	
Share of 15-year-olds top performers	Mathematics	Total	12.9	12.6	11.0	11.0	7.4	7.9
		By gender						
		Boys	15.3	14.8	12.9	12.6	9.6	9.8
		Girls	10.6	10.3	9.1	9.3	5.3	5.9
	Reading	Total	12.9	8.3	9.2	8.1	7.1	6.5
		By gender						
		Boys	9.2	5.8	8.2	7.0	6.4	5.6
		Girls	16.4	21.8	10.2	10.0	7.8	7.4
	Science	Total	7.9	8.0	6.6	6.3	7.7	6.9
		By gender						
Boys		:	:	7.5	7.0	8.9	7.8	
	Girls	:	:	5.6	5.6	6.6	5.9	

Source: OECD (2023a).

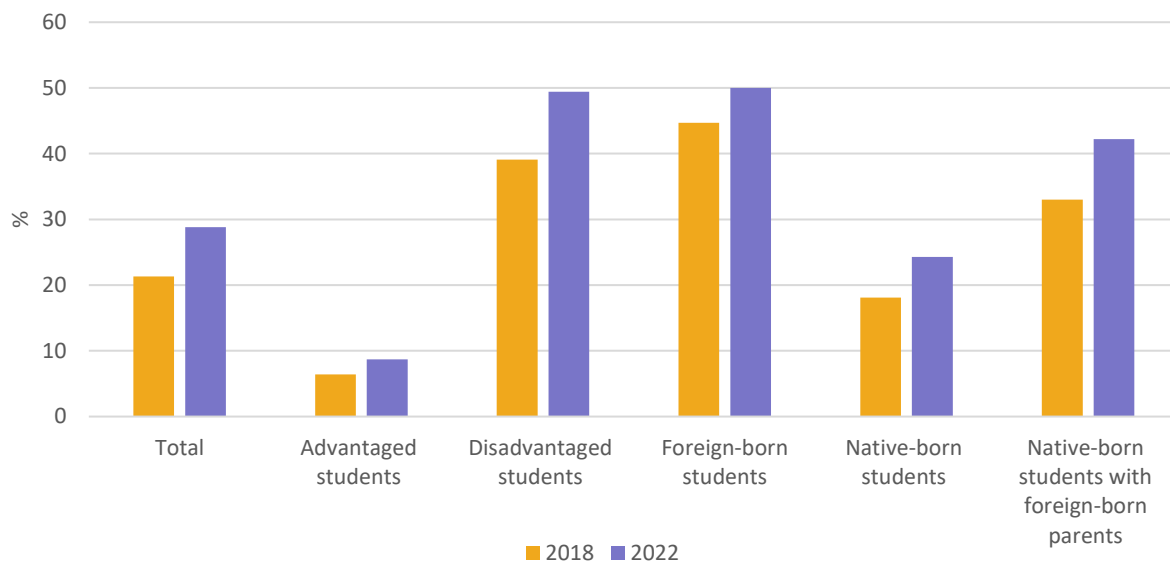
Underachievement rates have significantly increased since 2018 in all three fields and stand around the EU averages. The share of underachieving students is slightly above the EU average in reading (26.9% vs 26.2%) and below the EU average in mathematics (28.8% vs EU: 29.5%) and science (23.8% vs 24.2%). While in reading and science, a gradual downward trend in performance can be observed since 2012, the underachievement rate sharply increased since 2018 in mathematics (7.6 pps vs EU: 6.6 pps) and in reading (5.9 pps vs EU: 3.7 pps). A gender gap in favour of girls is notable in reading (7.8 pps) and science (3.8 pps), while no difference exists in mathematics.

While underachievement has grown across all quarters of socio-economic distribution, the negative trend is most pronounced among disadvantaged students. About half of all students from disadvantaged backgrounds do not reach a minimum proficiency level in mathematics. Their underachievement rate rose from 39.1% in 2018 to 49.4% in 2022, pointing to a widening socio-economic gap. A similarly large gap can be observed for students with a migrant background. Foreign-born students are twice more likely (50%) to underachieve than their native-born peers without a migrant background (24.3%). The underachievement rate for native born students with parents born abroad is only slightly better at 43%.

The rate of top performing students is around the EU average in all three domains. While in science, the share of top performers remained largely stable since 2012 and even slightly increased since 2018 (1.1 pp), a clear negative trend can be observed in mathematics and reading, both dropping by more than 5 pps between 2012-2022 to 7.4% and 7.1% respectively. In line with EU trends, boys are over-represented among top achieving students in mathematics and science and under-represented in reading.

Student well-being impacts on mathematics performance. 72.9% of French 15-year-olds feel like they belong at school. Sense of belonging is positively associated with an increase in mathematics score by 14 points⁴⁶. More than 1 out of 5 students (22.1%) reported that they were bullied at least a few times a month and bullying is more frequent in disadvantaged schools⁴⁷. Exposure to bullying is correlated with a drop in mathematics score by 13 points⁴⁸.

Figure A20. Underachievement rates in mathematics



Source: OECD (2023a).

Strengthening basic skills and addressing socio-economic inequalities remain a political priority in France. As from the school year 2023/24, one hour a week of differentiated teaching in French and mathematics is introduced for all students; the “Homework done” scheme is expanded to all schools as well as providing teaching guidance. The “early years plan” also aims to strengthen mathematical skills and language learning in early childhood education. In addition, to assess students’ learning outcomes, the comprehensive national standardised tests are also extended to the fourth grade of primary school and the third grade of lower secondary school. To reduce inequalities in education, schools are encouraged to increase their social mix. In 2023, the Ministry of Education set a non-binding target to reduce social segregation in public schools by 20% by 2027 and signed a memorandum of understanding with private schools. Other policies continue, such as the full completion in 2023/2024 of the landmark reform of reducing class sizes in priority education zones. To help students and teachers attain green and digital skills, France adopted in 2023 action plans including competency frameworks with the digital transformation of schools being supported by the French Resilience and Recovery Plan to develop hybrid education.

⁴⁶ After taking into account schools’ and students’ socio-economic characteristics.

⁴⁷ Table II.B1.3.32.

⁴⁸ After taking into account schools’ and students’ socio-economic characteristics.

 **Germany**
Figure A21. Key indicators from PISA 2012, 2018 and 2022

		2012		2018		2022		
		DE	EU	DE	EU	DE	EU	
Share of 15-year-olds underachieving	Mathematics	Total	17.7	22.1	21.1	22.9	29.5	29.5
		By gender						
		Boys	16.8	16.1	21.2	22.8	28.3	29.0
		Girls	18.7	22.8	21.0	22.9	30.7	30.0
		By socio-economic status						
		Top quarter	4.7	7.6	6.2	8.6	8.4	10.9
		Bottom quarter	32.6	38.0	35.6	38.2	46.6	48.0
		By migrant background						
		Native with native-born parents	13.7	:	15.2	:	21.9	:
		Native with foreign-born parents	29.0	:	30.2	:	34.5	:
	Foreign-born students	39.0	:	48.2	:	64.0	:	
Reading	Total	14.5	18.0	20.7	22.5	25.5	26.2	
	By gender							
	Boys	20.1	24.3	24.4	27.3	28.7	30.7	
	Girls	8.7	11.7	16.4	17.4	22.2	21.7	
Science	Total	12.2	16.8	19.6	22.3	22.9	24.2	
	By gender							
	Boys	:	:	20.8	23.2	23.7	25.6	
	Girls	:	:	18.2	21.2	22.0	22.9	
Share of 15-year-olds top performers	Mathematics	Total	17.5	12.6	13.3	11.0	8.6	7.9
		By gender						
		Boys	19.9	14.8	14.9	12.6	10.3	9.8
		Girls	14.9	10.3	11.5	9.3	6.8	5.9
	Reading	Total	8.9	8.3	11.3	8.1	8.2	6.5
		By gender						
		Boys	5.2	5.8	9.4	7.0	7.1	5.6
		Girls	12.8	21.8	13.5	10.0	9.3	7.4
	Science	Total	12.2	8.0	10.0	6.3	9.7	6.9
		By gender						
Boys		:	:	11.1	7.0	10.5	7.8	
	Girls	:	:	8.7	5.6	8.8	5.9	

Source: OECD (2023a).

The share of underachieving students in all three domains has increased dramatically since 2012. The increase has been one of the highest among EU Member States, reaching +11.8 pps in mathematics, and above 10 pps in the other two fields. While the increase in mathematics took place between 2018 and 2022 (+8.4 pps), underachievement in science and reading increased mainly between 2012 and 2018. The 2022 rate in mathematics is at EU level, while it is slightly below the EU average in science and reading. When it comes to gender gaps in underachievement, the rate in reading is 6.6 pps (8.9 pps at EU level) higher for boys. There are no significant differences in the other two areas tested.

In Germany, underachievement is particularly high among foreign born students. About 2 out of 3 (64.0%) foreign born students are among the low achieving students (against 21.9% among native born), which is the highest rate in the EU. Foreign-born students represent about 9% of student population. The large gap (at 42.1 pps) however shrinks to one third 12.6 pps for native-born students whose parents were born abroad.

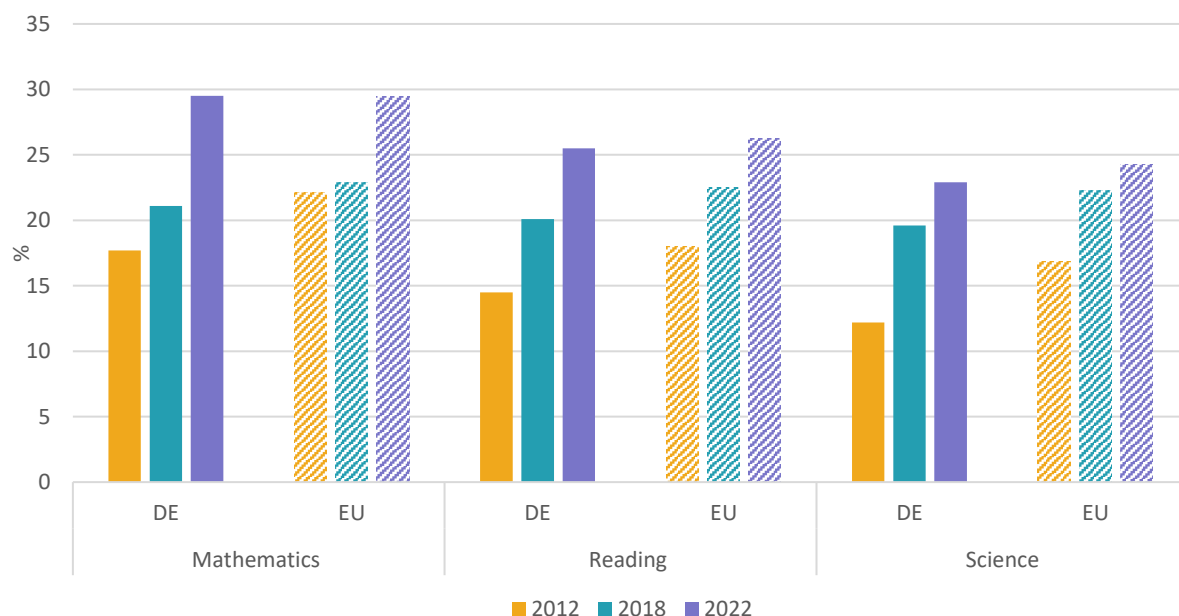
The socio-economic gap in underachievement in mathematics has widened since 2018. This has been driven by a sharp increase of 11 pps of the underachievement rate of students from the bottom quarter of the socio-economic distribution. The rate stands at 46.6% now, slightly below the EU average (48%). By contrast, the rate remained stable between 2018 and 2022 for students from the top quarter of the socio-economic distribution.

The share of top performers in all three domains is above the EU average. While no significant change is observable in reading since 2012, a negative trend is recorded in mathematics,

where the rate has decreased by 8.9 pps since 2012, and in science with a drop of 3.1 pps between 2018 and 2022. Small gender gaps are visible in all three domains: the share of top performers is larger among boys than girls in mathematics and in science and smaller in reading, in line with the other EU countries.

Student's well-being has an impact on student performance. 76.1% of 15-year-olds feel that they belong at school, and this is associated with an increase in mathematics performance by 16 pps. 1 out of 5 students (21.2%) reported they were bullied at least a few times a month. Frequent exposure to bullying is associated with an 11 score point drop in mathematics performance⁴⁹.

Figure A22. Underachievement rates in mathematics, reading and science



Source: OECD (2023a).

Several measures are being implemented to strengthen student outcomes. As the German Laender are responsible for their school education systems, the scope for federal funding is limited. Therefore, the well-established programme '*Lesestart*' (Start reading), which provides funding for a nationwide early language and reading scheme for families with young children will be fully transferred to the Laender. A new federal programme '*Startchancen*' (opportunities from the start), targeting mainly disadvantaged pupils, is under way and will be implemented at the level of the Laender. The Federal Ministry of Education and the Laender have agreed on the key points of the new programme to provide targeted educational support to all children and young people regardless of their parents' social situation. The programme with an annual federal contribution of EUR 1 billion is expected to start in the school year 2024-25 and will run for ten years. Laender are expected to match federal funds. This allows to target up to 4 000 schools (about 10% of all German schools). The programme aims to better equip schools, enhance needs-based school and teaching development, and strengthen multi-professional teams working in schools. The programme will complement own initiatives of the Laender.

⁴⁹ After taking into account schools' and students' socio-economic characteristics.

 **Greece**
Figure A23. Key indicators from PISA 2012, 2018 and 2022

		2012		2018		2022		
		EL	EU	EL	EU	EL	EU	
Share of 15-year-olds underachieving	Mathematics	Total	35.7	22.1	35.8	22.9	47.2	29.5
		By gender						
		Boys	34.5	16.1	37.0	22.8	46.2	29.0
		Girls	36.9	22.8	34.6	22.9	48.2	30.0
		By socio-economic status						
		Top quarter	16.2	7.6	18.4	8.6	26.7	10.9
		Bottom quarter	54.3	38.0	52.8	38.2	64.0	48.0
		By migrant background						
		Native with native-born parents	32.6	:	32.7	:	43.3	:
		Native with foreign-born parents	55.3	:	52.6	:	61.9	:
	Foreign-born students	59.3	:	58.0	:	78.6	:	
Reading	Total	22.6	18.0	30.5	22.5	37.6	26.2	
	By gender							
	Boys	32.2	24.3	39.2	27.3	43.6	30.7	
	Girls	13.3	11.7	21.6	17.4	31.5	21.7	
Science	Total	25.5	16.8	31.7	22.3	37.3	24.2	
	By gender							
	Boys	:	:	34.9	23.2	40.2	25.6	
	Girls	:	:	28.5	21.2	34.3	22.9	
Share of 15-year-olds top performers	Mathematics	Total	3.9	12.6	3.7	11.0	2.0	7.9
		By gender						
		Boys	5.1	14.8	4.6	12.6	2.7	9.8
		Girls	2.7	10.3	2.8	9.3	1.3	5.9
	Reading	Total	5.1	8.3	3.7	8.1	2.0	6.5
		By gender						
		Boys	3.6	5.8	2.7	7.0	1.7	5.6
		Girls	6.7	21.8	4.6	10.0	2.3	7.4
	Science	Total	2.5	8.0	1.3	6.3	1.5	6.9
		By gender						
Boys		:	:	1.5	7.0	1.8	7.8	
	Girls	:	:	1.2	5.6	1.1	5.9	

Source: OECD (2023a).

Greek students' underachievement rate is one of the highest in the EU in all three fields tested. It had increased steadily in reading and science since 2012, while in mathematics most of the increase in underperformance occurred after 2018 (11.4 pps vs EU: 6.6 pps). The increase in underperformance since 2012 is among the highest in the EU in all areas. Gender disparities exist in reading and science where boys are over-represented among underachieving students. The gap stands at 12.0 pps and 5.9 pps, respectively, higher than at EU level (8.9 pps; 2.7 pps). In mathematics there is no difference between boys and girls.

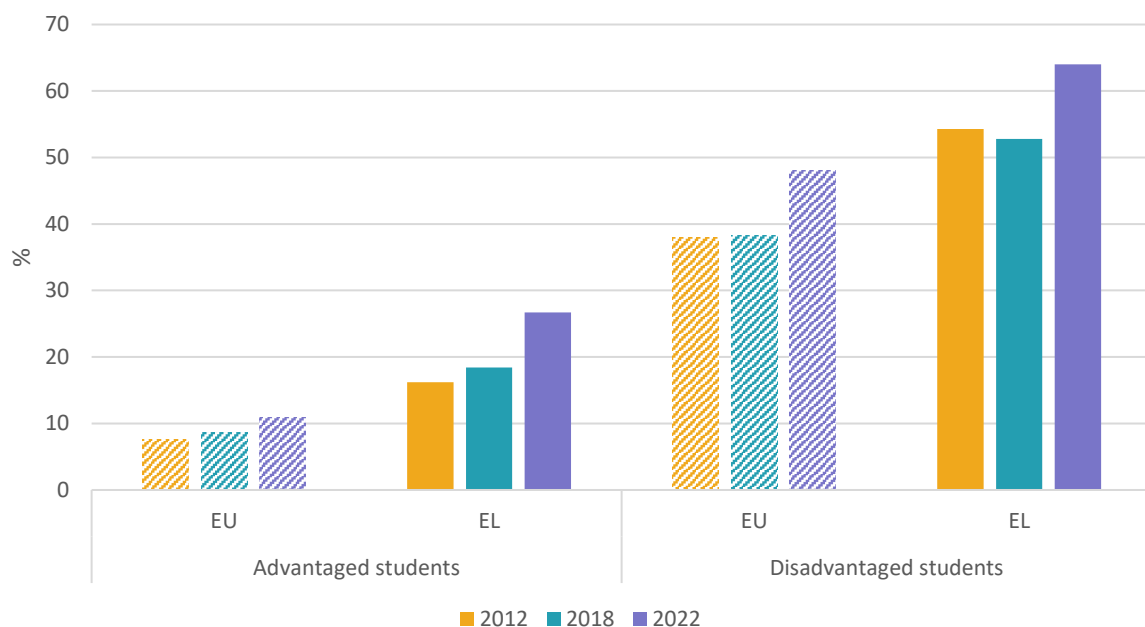
Greece has the highest share of underachieving students with migrant background in the EU. 8 out of 10 foreign-born students (78.6%) and 6 out of 10 native-born students with parents born abroad (61.9%) underachieve in mathematics. These are the highest rates in the EU. While the underachievement rate of students without migration background is also high at 43.3%, the gap with foreign born students is at 35.3 pps, although drops to half (18.6 pps) for native-born students with foreign-born parents.

Underachievement in mathematics has grown over the entire socio-economic distribution since 2018. In 2022, 6 out of 10 students from disadvantaged backgrounds (64%) did not reach a minimum proficiency level in mathematics (vs 52.8% in 2018). The rate has also significantly increased for the top quartile of the socio-economic distribution, more than the EU average (8.2 pps vs EU: 2.2 pps), reaching 26.7%. This is nearly three times higher than the average rate in other EU countries (10.9%).

The share of top performing students is well below the EU average in all three fields. Since 2012, it has decreased in mathematics and reading, while remaining unchanged in science. As in all EU Member States, girls are under-represented among top performers in mathematics, where their share is 1.5 pps lower than boys'. This gender gap is slightly narrower than the EU average, 3.8 pps. In reading and science there are no gender differences.

Greek students have a high sense of belonging at school. 78.2% of them feel they belong there, which is one of the highest figures in the EU. However, it seems not to impact on students' mathematics performance. In contrast, 23.5% of students reported being bullied at least a few times a month, which is one of the highest shares among EU Member States. Exposure to bullying seems not to impact students' performance in mathematics, which is scarce at EU level.

Figure A24. Underachievement in mathematics by student socio-economic status



Source: OECD (2023a).

Several measures are being implemented to strengthen learning outcomes. Early childhood education and care has been undergoing significant reforms, including the lowering of the starting age for compulsory education to age 4. In 2021, curricula and textbooks have been developed for pre-primary to upper secondary education with emphasis on key competences. To assess the implementation of the new curricula and the learning outcomes of students, a programme of system-level-evaluation in Greek and mathematics is being implemented in schools. In addition, an innovative action called 'Skills Labs' was introduced in 2020 from pre-primary to lower secondary education. A framework for inclusive education has been designed with the help of the EU Technical Support Instrument aiming to meet the diverse needs of learners. In 2021/2022, 50 new model and experimental schools were established enhancing accessible education for all. Policies also aim to create flexible education and training pathways and help early school leavers re-enter the education system through second-chance education and career guidance. Also, with the support of the EU Recovery and Resilience Facility, Greece is investing in the digital transformation and digitalisation of education.

 Hungary

Figure A25. Key indicators from PISA 2012, 2018 and 2022

		2012		2018		2022		
		HU	EU	HU	EU	HU	EU	
Share of 15-year-olds underachieving	Mathematics	Total	28.1	22.1	25.6	22.9	29.5	29.5
		By gender						
		Boys	27.6	16.1	24.8	22.8	28.2	29.0
		Girls	28.5	22.8	26.5	22.9	30.8	30.0
		By socio-economic status						
		Top quarter	8.8	7.6	6.8	8.6	7.6	10.9
		Bottom quarter	50.8	38.0	48.1	38.2	54.9	48.0
		By migrant background						
		Native with native-born parents	27.7	:	25.3	:	28.9	:
		Native with foreign-born parents	10.3	:	16.1	:	19.2	:
	Foreign-born students	:	:	28.8	:	33.6	:	
Reading	Total	19.7	18.0	25.3	22.5	25.9	26.2	
	By gender							
	Boys	26.9	24.3	30.1	27.3	29.5	30.7	
	Girls	13.0	11.7	20.5	17.4	22.3	21.7	
Science	Total	18.0	16.8	24.1	22.3	22.9	24.2	
	By gender							
	Boys	:	:	23.6	23.2	23.4	25.6	
	Girls	:	:	24.6	21.2	22.4	22.9	
Share of 15-year-olds top performers	Mathematics	Total	9.3	12.6	8.0	11.0	7.8	7.9
		By gender						
		Boys	11.2	14.8	9.2	12.6	10.1	9.8
		Girls	7.4	10.3	6.8	9.3	5.5	5.9
	Reading	Total	5.6	8.3	5.7	8.1	5.5	6.5
		By gender						
		Boys	3.8	5.8	4.2	7.0	4.9	5.6
		Girls	7.4	21.8	7.2	10.0	6.0	7.4
	Science	Total	5.9	8.0	4.7	6.3	6.2	6.9
		By gender						
Boys		:	:	5.4	7.0	7.1	7.8	
	Girls	:	:	4.0	5.6	5.2	5.9	

Source: OECD (2023a). Note: Students with migrant background in Hungary represent 2.2% of student population. Therefore, this annex does not analyse data by migrant background (see also section 1.2).

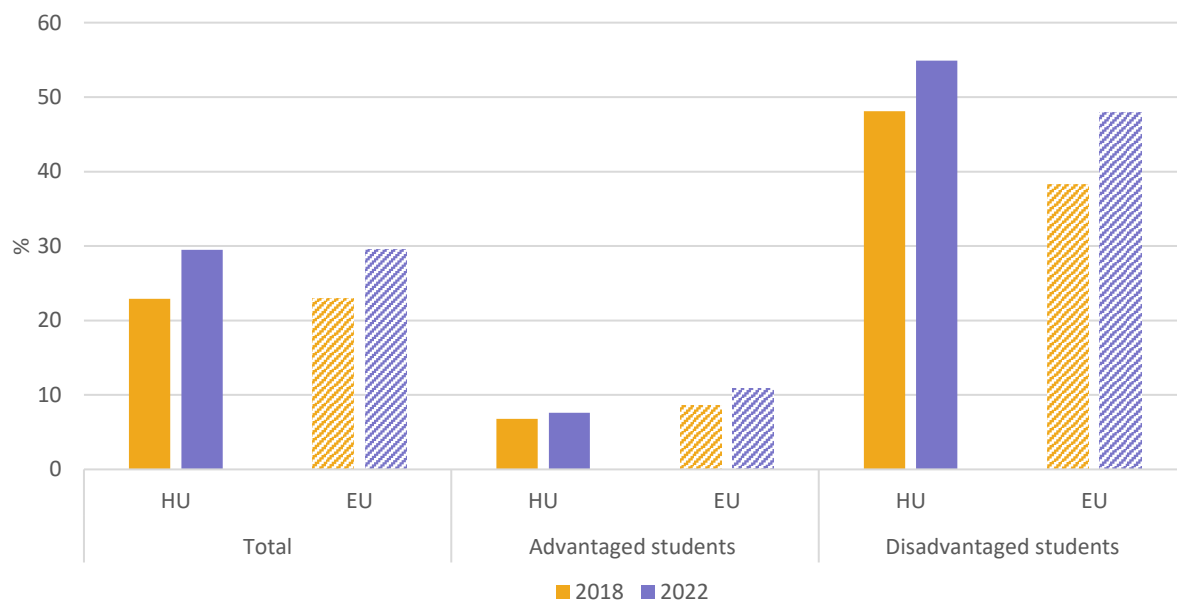
Underachievement among 15-year-old Hungarians is around the EU average in all three domains. 3 out of 10 students in mathematics, and 1 in 4 students in reading and science do not meet the basic proficiency levels in these areas. Compared with the 2012 PISA results, the share of underachieving students rose in reading (+6.2 pps) and science (+4.9 pps), while in mathematics, it did not increase significantly. However, compared with results from 2018, the rate grew in mathematics by 3.9 pps, while it did not change significantly in reading and science. Gender differences are only significant in reading, with 7.3 pps more underachieving boys than girls, one of the lowest gender gaps in the EU in this domain.

Hungary has one of the highest performance gaps by socio-economic status. More than half of students (54.9%) from the bottom quarter of the socio-economic distribution underachieve in mathematics, a share which has increased by 6.7 pps between 2018 and 2022. The gap stood at 47.3 pps in 2022, 10.1 pps higher than at the EU level. At the same time, the proportion of low-achievers among the most advantaged students remains below the EU average (7.6% vs EU: 10.9%).

The share of top performing students did not change significantly in any of the three domains since 2012. While the proportion of top achieving students was below the EU average in the previous PISA rounds, as the EU average decreased gradually in all three domains while Hungary's remained stable, the share of top performing 15-year-olds is now at the EU average in mathematics, and close to the EU average is science and reading. Like in most EU countries, girls are under-represented among top achievers in mathematics and there is a small but significant gender gap in science, with 1.9 pps more boys among top achievers. There is no significant gap in reading.

Student well-being has an impact on student performance. 80% of students in Hungary felt that they belong at school. Students with a positive sense of belonging scored 12 points higher in mathematics than those who did not feel they belong at school⁵⁰. Almost 1 in 5 students reported that they were bullied at least a few times a month. Students from a disadvantaged background and in disadvantaged schools are more likely to be bullied⁵¹. Frequent exposure to bullying is associated with an 18 score point drop in mathematics performance⁵².

Figure A26: Underachievement rates in mathematics, PISA 2018 and 2022



Source: OECD (2023a).

Hungary has adopted legislation to combat educational segregation and announced some other measures to improve access to quality education. In December 2023, Hungary adopted a law according to which primary schools having a considerably lower share of disadvantaged students than the average of their respective settlements will see their state financing reduced by 10% as of January 2024. Hungary's Recovery and Resilience Plan (RRP) includes a pilot whereby low-performing lower secondary classes of small schools will be integrated into larger schools of the neighbouring settlements. This is to ensure that students in smaller settlements, facing more challenges related to teacher shortages, can also access quality education. Furthermore, the RRP contains a measure to improve the provision of services for students with special educational needs by purchasing specialized equipment and support for the continuing professional development of special education teachers. Finally, digital devices are made available from the RRP for the use of students in grades five and nine, for the use of teachers and for schools to develop their IT classrooms.

⁵⁰ After taking into account schools' and students' socio-economic characteristics.

⁵¹ Table II.B1.3.31 and Table II.B1.3.32.

⁵² After taking into account schools' and students' socio-economic characteristics.

 Ireland

Figure A27. Key indicators from PISA 2012, 2018 and 2022

			2012		2018		2022	
			IE	EU	IE	EU	IE	EU
Share of 15-year-olds underachieving	Mathematics	Total	16.9	22.1	15.7	22.9	19.0	29.5
		By gender						
		Boys	15.2	16.1	15.7	22.8	18.5	29.0
		Girls	18.7	22.8	15.7	22.9	19.6	30.0
		By socio-economic status						
		Top quarter	4.8	7.6	6.7	8.6	8.3	10.9
		Bottom quarter	31.0	38.0	27.4	38.2	32.2	48.0
		By migrant background						
		Native with native-born parents	16.5	:	14.9	:	17.9	:
		Native with foreign-born parents	15.4	:	19.8	:	18.6	:
	Foreign-born students	18.1	:	14.6	:	22.3	:	
Reading	Total	9.6	18.0	11.8	22.5	11.4	26.2	
	By gender							
	Boys	13.0	24.3	15.1	27.3	14.5	30.7	
	Girls	6.1	11.7	8.5	17.4	8.2	21.7	
Science	Total	11.1	16.8	17.0	22.3	15.6	24.2	
	By gender							
	Boys	:	:	18.1	23.2	16.1	25.6	
	Girls	:	:	16.0	21.2	15.0	22.9	
Share of 15-year-olds top performers	Mathematics	Total	10.7	12.6	8.2	11.0	7.2	7.9
		By gender						
		Boys	12.7	14.8	9.9	12.6	9.6	9.8
		Girls	8.5	10.3	6.6	9.3	4.7	5.9
	Reading	Total	11.4	8.3	12.1	8.1	10.3	6.5
		By gender						
Boys		8.5	5.8	10.3	7.0	9.4	5.6	
	Girls	14.4	21.8	13.8	10.0	11.2	7.4	
Science	Total	10.7	8.0	5.8	6.3	7.5	6.9	
	By gender							
	Boys	:	:	6.8	7.0	9.5	7.8	
	Girls	:	:	4.9	5.6	5.5	5.9	

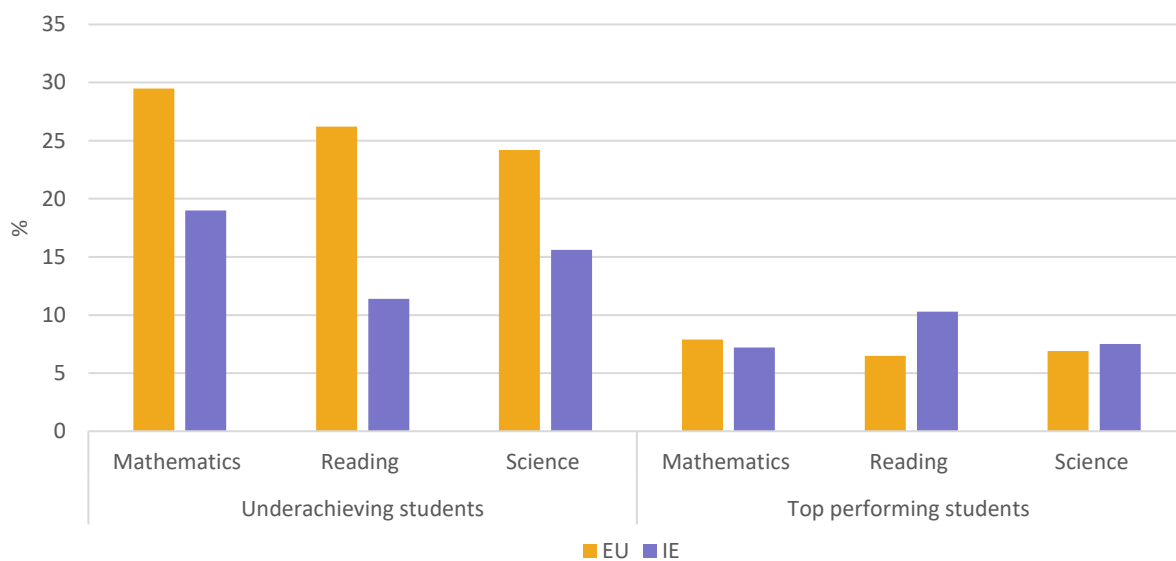
Source: OECD (2023a).

Underachievement is relatively close to the EU 2030 target in all three domains measured by PISA, putting Ireland among the top performing countries. The proportion of low-achieving students has remained well below the EU average in all three fields over the past decade. The rate in reading has been the lowest among the EU countries since 2012. However, there is a slight increase in underachievement in mathematics since 2018, smaller than in other EU countries. Ireland is among the countries with one of the smallest socioeconomic gaps in underachievement rate in mathematics (23.9 pps vs EU: 37.2 pps), a gap which did not increase significantly between 2018 and 2022. However, students in the bottom quarter of the socio-economic distribution are four times more likely to underachieve in mathematics than students in the top quarter, 32.2% and 8.3%, respectively. Gender differences among the share of low-achieving students only exist in reading. Yet, even in this domain, Ireland has the smallest gender gap with 6.2 pps (EU: 8.9 pps). In contrast to EU trends, migrant background has hardly any effect on underachievement: the difference in the underachievement rates of student with and without migrant background is not statistically significant.

Ireland has one of the highest shares of top performers in reading in the EU for a decade. The rate stood at 10.3% in 2022, well above the EU average of 6.5%. In science, the share of top performers decreased by 3.2 pps between 2012 and 2022, with an increase of 1.7 pps between 2018 and 2022, currently standing at 7.5%, which is still above the EU average of 6.5%. In mathematics, the share of top performers remains below the EU average since 2012. When it comes to gender differences, Ireland has one of the highest gender gaps among top performers both in science and mathematics. In science, the rate of top performers is 4 pps higher among boys (9.5%) than girls (5.5%), whereas in mathematics, there are twice as many top performing boys as girls, 9.6% and 4.7% respectively. In the area of reading, there is no significant difference.

Exposure to bullying does not impact on student performance in Ireland. 16.4% of students reported that they were bullied at least a few times a month, but after taking into account schools' and students' socio-economic characteristics, it does not affect mathematics score, contrary to nearly all EU Member States. In Ireland, 71% of students feel they belong at school, which is lower than the median rate in the Member States. Those students who do not feel that they belong at school are more likely to have a lower performance in mathematics (-18 score points)⁵³ than those students who feel a sense of belonging.

Figure A28. Underachieving and top performing students, PISA 2022



Source: OECD (2023a).

Ireland is modernising its core curricula with a focus on key competences, and it is fostering equity in education. Bringing in a new 'Framework for Junior Cycle' in 2015 was the most significant development in school education implemented in Ireland over the last decade. This multi-layered curriculum reform introduced targeted changes to the curriculum and assessment, with an emphasis on skills, learning outcomes-based curricula, classroom-based assessment, and encouraging more learner-centred teaching and learning approaches. Working with digital technology forms part of each skill. Literacy and numeracy, which were first boosted by the 2011 literacy and numeracy strategy, are seen as foundation skills, developed horizontally across the curriculum. The newly published primary curriculum framework places greater emphasis on science, technology, engineering, mathematics (STEM), wellbeing, a broader arts education, and foreign languages. The digital strategies for schools (2015-2020, 2021-2027) promote meaningful embedding digital technologies in teaching, learning and assessment, as well as digital inclusion. The Delivering Equality of Opportunity in Schools (DEIS) programme provides additional resources and staff to schools to support students with disadvantaged socio-economic backgrounds. From September 2022, the programme was extended to additional 310 schools. From September 2023, the free primary schoolbooks scheme was introduced in all recognised primary and special schools, and free hot school meals are provided in every disadvantaged primary school.

⁵³ After taking into account schools' and students' socio-economic characteristics.

 Italy

Figure A29. Key indicators from PISA 2012, 2018 and 2022

			2012		2018		2022	
			IT	EU	IT	EU	IT	EU
Share of 15-year-olds underachieving	Mathematics	Total	24.7	22.1	23.8	22.9	29.6	29.5
		By gender						
		Boys	22.8	16.1	22.6	22.8	27.5	29.0
		Girls	26.7	22.8	25.1	22.9	31.7	30.0
		By socio-economic status						
		Top quarter	12.1	7.6	11.8	8.6	14.3	10.9
		Bottom quarter	39.1	38.0	39.2	38.2	47.6	48.0
		By migrant background						
		Native with native-born parents	22.6	:	22.0	:	27.5	:
		Native with foreign-born parents	33.5	:	32.0	:	35.7	:
	Foreign-born students	45.6	:	37.4	:	48.1	:	
Reading	Total	19.5	18.0	23.3	22.5	21.4	26.2	
	By gender							
	Boys	25.9	24.3	27.7	27.3	25.8	30.7	
	Girls	12.6	11.7	18.6	17.4	17.2	21.7	
Science	Total	18.7	16.8	25.9	22.3	23.9	24.2	
	By gender							
	Boys	:	:	25.8	23.2	24.9	25.6	
	Girls	:	:	25.9	21.2	23.0	22.9	
Share of 15-year-olds top performers	Mathematics	Total	9.9	12.6	9.5	11.0	7.0	7.9
		By gender						
		Boys	13.0	14.8	12.0	12.6	9.7	9.8
		Girls	6.7	10.3	6.9	9.3	4.3	5.9
	Reading	Total	6.7	8.3	5.3	8.1	5.0	6.5
		By gender						
		Boys	5.0	5.8	4.5	7.0	4.6	5.6
		Girls	8.5	21.8	6.3	10.0	5.4	7.4
	Science	Total	6.1	8.0	2.7	6.3	4.2	6.9
		By gender						
Boys		:	:	3.2	7.0	5.3	7.8	
	Girls	:	:	2.2	5.6	3.2	5.9	

Source: OECD (2023a).

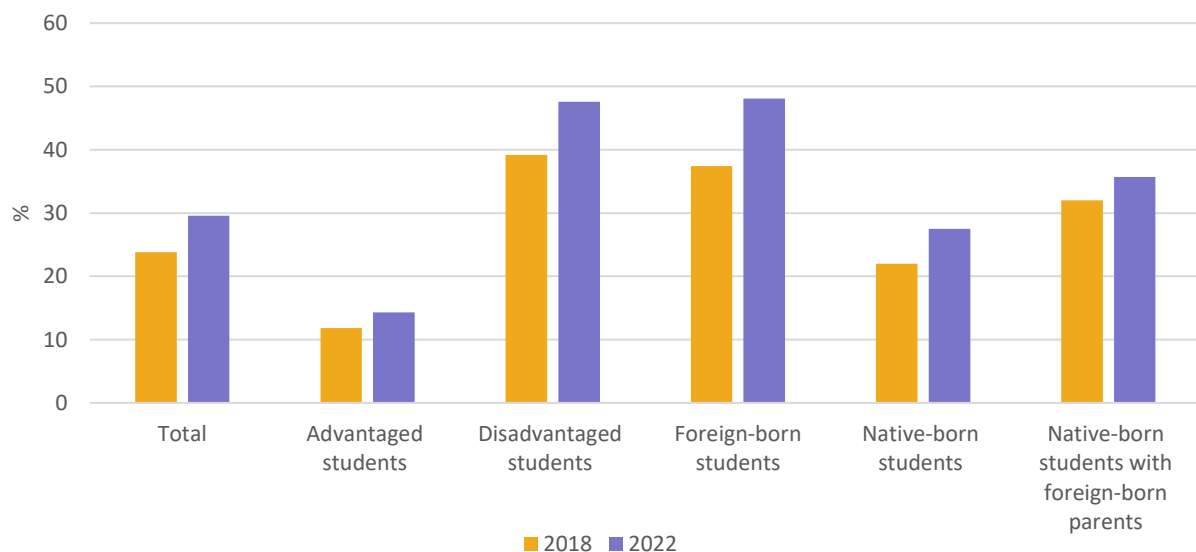
The share of underachieving students in science and reading has remained stable since 2018, but increased in mathematics. The rate in both domains is slightly below the EU average, but above the EU level target set for 2030. In mathematics, however, the share increased by 5.8 pps between 2018 and 2022, less than at EU level (6.6 pps), and reached 29.6% in 2022 (EU: 29.5%). With a rate that exceeds that of boys by 4.2 pps, girls are more likely to underachieve in mathematics. On the contrary, they are under-represented among underachieving students in reading with a rate that is 8.6 pps lower (EU: 8.9 pps). About half of foreign-born students (48.1%) do not reach level 2 in mathematics and the gap with native born students stands at 20.6 pps. However, the difference shrinks by more than half in case of native-born students with foreign-born parents (8.2 pps).

The socio-economic gap in underachievement in mathematics has widened since 2018. This increase (+6 pps) has been driven by a rise by 8.5 pps of the underachievement rate of students from the bottom quarter of the socio-economic distribution. The rate stands at 47.6% now, at the EU average (48.0%). By contrast, the rate has remained stable for students from the top quarter since 2012. The share of top performers among disadvantaged students decreased by 1.7 pps, in line with the EU average.

The share of top performing students is below the EU average in all three domains. While it has remained stable in reading since 2012, a positive trend is observable in science, where the rate grew by 1.5 pps between 2018 and 2022 but remains below the 2012 value. In mathematics, in line with most EU countries, the rate has decreased by 2.6 pps since 2018 (EU: -3.1 pps). Gender gaps are recorded in mathematics (5.5 pps) and science (2.1 pps) in favour of boys. In mathematics, the difference is one of the highest at EU level (EU average: 3.8 pps).

In Italy, less than 2 out of 3 students feel like they belong at school. The rate (63.9%) is one of the lowest within the EU. Sense of belonging is positively associated with an increase⁵⁴ of mathematics score but this impact (+8 points) is among the smallest among MS. 14.9% students reported that they were bullied at least a few times a month and this affects their mathematics performance that drops by 14 score points⁵⁵. Exposure to bullying is more frequent among disadvantaged students and schools.

Figure A30. Underachievement rates in mathematics



Source: OECD (2023a).

Several measures are being implemented to strengthen learning outcomes and reduce territorial disparities, in the framework of Italy's national recovery and resilience plan. In 2023 the Ministry of education and merit launched the "*Agenda SUD*" project, which is aimed at overcoming the gaps in learning outcomes between Northern and Southern Italy through targeted interventions in primary and secondary state schools in southern and island regions, with support from EU Cohesion Policy funds and the Recovery and Resilience Facility. A new system of orientation and guidance was launched in secondary schools in September 2023, with the aim of reducing early school leaving and raising tertiary attainment. The system is based on an individual approach, helping each student to identify their strengths and weaknesses, skills and interests through a series of orientation modules. The results are recorded in a digital portfolio (*E-portfolio*) detailing each student's educational background and the skills and competences acquired over the years. In addition, the Ministry of education and merit has issued guidelines for strengthening mathematical, scientific, technological and digital skills through innovative teaching methodologies at all education levels, with the aim of raising achievement and encouraging enrolments in tertiary STEM curricula, in particular for women.

⁵⁴ After taking into account students and schools' socio-economic characteristics.

⁵⁵ Ibid.



Figure A31. Key indicators from PISA 2012, 2018 and 2022

		2012		2018		2022		
		LV	EU	LV	EU	LV	EU	
Share of 15-year-olds underachieving	Mathematics	Total	19.9	22.1	17.3	22.9	22.2	29.5
		By gender						
		Boys	21.5	16.1	17.3	22.8	22.0	29.0
		Girls	18.3	22.8	17.4	22.9	22.3	30.0
		By socio-economic status						
		Top quarter	7.9	7.6	7.5	8.6	8.9	10.9
		Bottom quarter	33.5	38.0	27.4	38.2	36.9	48.0
		By migrant background						
		Native with native-born parents	19.5	:	16.6	:	21.6	:
		Native with foreign-born parents	21.7	:	27.0	:	22.2	:
	Foreign-born students	:	:	18.0	:	24.0	:	
Reading	Total	17.0	18.0	22.4	22.5	22.8	26.2	
	By gender							
	Boys	25.7	24.3	29.4	27.3	28.2	30.7	
	Girls	8.2	11.7	15.7	17.4	17.6	21.7	
Science	Total	12.4	16.8	18.5	22.3	16.5	24.2	
	By gender							
	Boys	:	:	21.1	23.2	17.5	25.6	
	Girls	:	:	16.0	21.2	15.4	22.9	
Share of 15-year-olds top performers	Mathematics	Total	8.0	12.6	8.5	11.0	6.4	7.9
		By gender						
		Boys	8.7	14.8	10.1	12.6	8.0	9.8
		Girls	7.3	10.3	6.9	9.3	4.9	5.9
	Reading	Total	4.2	8.3	4.8	8.1	4.2	6.5
		By gender						
		Boys	2.0	5.8	3.5	7.0	3.1	5.6
		Girls	6.4	21.8	6.1	10.0	5.3	7.4
	Science	Total	4.4	8.0	3.7	6.3	5.2	6.9
		By gender						
Boys		:	:	4.0	7.0	6.0	7.8	
	Girls	:	:	3.5	5.6	4.4	5.9	

Source: OECD (2023a). Note: Students with migrant background in Latvia represent 3.3% of student population. Therefore, this annex does not analyse data by migrant background (see also section 1.2).

Underachievement in all three domains has been below the EU average since 2012 and Latvia is among the top performing countries in science. The underachievement rate in this domain stood at 16.5% in the EU, 1.5 pps above the EU level target. The proportion of underachieving students in mathematics (22.2%) is 7.3 pps lower than the EU average but has increased by 4.8 pps since 2018, less than at EU level (6.6 pps). In reading it went from 17.0% to 22.8% between 2012 and 2022, but the increase occurred mainly between 2012 and 2018 (5.4 pps). Gender differences are observable only in reading where boys are over-represented among low-achieving students with a gap of 10.6 pps.

Latvia has one the smallest socio-economic gaps in underachievement in mathematics. It was equal to 28.0 pps in 2022, 9.1 pps lower than the EU average. Although the rate of students from the bottom quarter of the distribution has risen by 9.6 pps since 2018 to 36.9%, it remained well below the EU average (36.9% vs 48.0% at EU level) in 2022. No change has taken place at the top quarter of the socio-economic distribution.

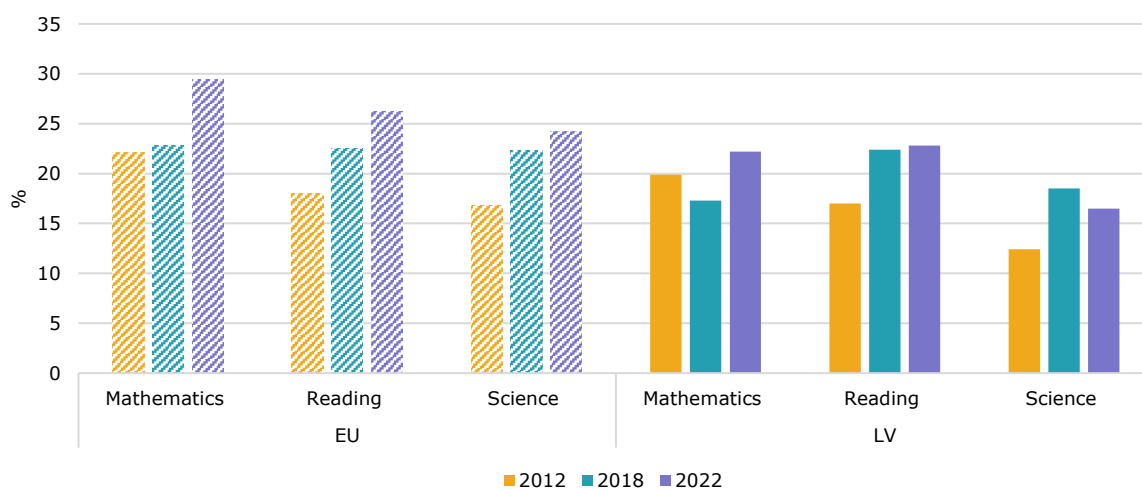
The share of top performing students in all three domains has been below the EU average for a decade. While the rate in reading has remained stable since 2012 standing at 4.2% (EU: 6.5%), in mathematics it went down by 2 pps between 2018 and 2022 to 6.4%, below the EU average (7.9%). By contrast, in science, the rate increased by 1.5 pps in the same period, and now stands at

⁵⁶ Caution is required when interpreting 2022 data for Latvia because one or more PISA sampling standards were not met (see OECD, 2023a, Annexes A2 and A4).

5.2% (EU: 6.9%). When it comes to gender gaps, Latvian boys are more likely to be top performers in mathematics (3.1 pps) and science (1.6 pps) and less likely in reading (-2.3 pps), in line with the EU trends.

3 of out 10 Latvian students are exposed to frequent bullying. 29.3% of students reported that they were bullied at least a few times a month, the highest share in the EU. Exposure to bullying is correlated with a drop in mathematics score by 13 points⁵⁷. 76.7% of Latvian 15-year-olds feel like they belong at school. Sense of belonging is associated with a moderate increase in mathematics score (+7 points)⁵⁸.

Figure A32. Underachievement rates in mathematics, reading and science



Source: OECD (2023a).

Latvia is implementing a range of measures designed to strengthen learning outcomes.

The implementation of the new competence-based curriculum was completed, as envisaged by the Skola2030 reform programme. The new curriculum was introduced gradually, starting in 2019 with preschools. The revised curriculum is accompanied by changes in the assessment system. In 2023 new centralized exams were introduced at the end of basic school (year 9) while year 12 exams were reformed to reflect the new competence-based approach. To promote the take-up of STEM subjects, in 2023 the government adopted an amendment to the education law, requiring students to take one of their year 12 exams in physics, chemistry, or biology as of the school year 2023/2024. The new curriculum also envisages the integration of digital literacy throughout general education, with a focus on coding and algorithmic thinking skills, as well as the use of digital tools in schools at all levels. In 2022, the government adopted legislation introducing remote learning from the third grade onwards, with the aim to provide learners with differentiated, personalised and interdisciplinary learning. RRF support is being used to equip schools with digital devices so that all students are able to participate.

⁵⁷ After taking into account schools' and students' socio-economic characteristics.
⁵⁸ Ibid.

 Lithuania

Figure A33. Key indicators from PISA 2012, 2018 and 2022

			2012		2018		2022	
			LT	EU	LT	EU	LT	EU
Share of 15-year-olds underachieving	Mathematics	Total	26.0	22.1	25.6	22.9	27.8	29.5
		By gender						
		Boys	27.7	16.1	27.4	22.8	28.1	29.0
		Girls	24.3	22.8	23.8	22.9	27.6	30.0
		By socio-economic status						
		Top quarter	11.9	7.6	11.7	8.6	11.0	10.9
		Bottom quarter	44.2	38.0	43.4	38.2	46.5	48.0
		By migrant background						
		Native with native-born parents	25.5	:	25.2	:	26.7	:
		Native with foreign-born parents	27.0	:	27.4	:	33.6	:
	Foreign-born students	:	:	27.7	:	31.7	:	
Reading	Total	21.2	18.0	24.4	22.5	24.9	26.2	
	By gender							
	Boys	31.9	24.3	31.8	27.3	31.1	30.7	
	Girls	10.4	11.7	16.6	17.4	18.8	21.7	
Science	Total	16.1	16.8	22.2	22.3	21.8	24.2	
	By gender							
	Boys	:	:	24.6	23.2	24.0	25.6	
	Girls	:	:	19.7	21.2	19.5	22.9	
Share of 15-year-olds top performers	Mathematics	Total	8.1	12.6	8.4	11.0	7.2	7.9
		By gender						
		Boys	9.5	14.8	9.5	12.6	8.8	9.8
		Girls	6.6	10.3	7.3	9.3	5.6	5.9
	Reading	Total	3.3	8.3	5.0	8.1	4.7	6.5
		By gender						
		Boys	1.6	5.8	3.5	7.0	3.7	5.6
		Girls	5.0	21.8	6.5	10.0	5.7	7.4
	Science	Total	5.1	8.0	4.4	6.3	5.5	6.9
		By gender						
Boys		:	:	5.2	7.0	6.2	7.8	
	Girls	:	:	3.7	5.6	4.8	5.9	

Source: OECD (2023a). Note: Students with migrant background in Lithuania represent 1.8% of student population. Therefore, this annex does not analyse data by migrant background (see also section 1.2).

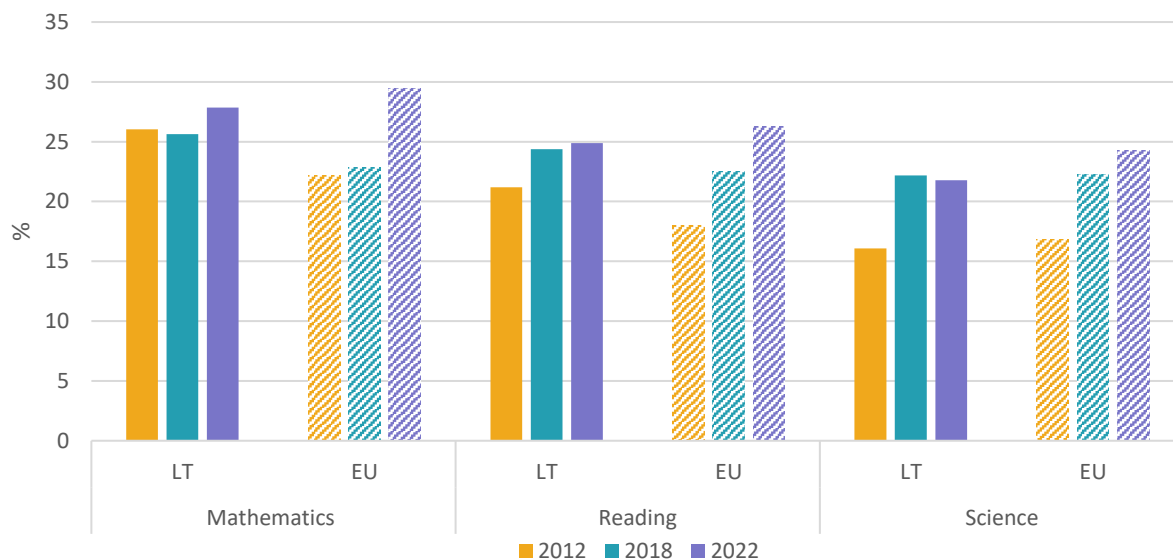
Underachievement was in 2022 below the EU average in all three fields. However, it remains well above the EU target set for 2030. The proportion of underachieving students has remained stable in mathematics and reading since 2012. On the contrary, when it comes to science, it has increased by 5.7 pps (EU: 7.5 pps). Gender disparities exist in reading and science where boys are over-represented among underachieving students. The gap stands at 12.3 pps and 4.5 pps, respectively, higher than at EU level (8.9 pps; 2.4 pps).

Socio-economic background remains a strong predictor of student competences. In 2022, underachievement in mathematics was higher among socio-economically disadvantaged students than among their socio-economically advantaged peers. The gap stands at 35.5 pps below the EU average (37.2 pps) and has not changed since 2012. Only 1.9% (EU: 1.8%) of students from the bottom socio-economic quartile are top performers in mathematics.

The percentage of top performers has remained unchanged since 2012. This share is below the EU average in all three domains. As in almost all EU MS, girls are under-represented among top performing students in mathematics and science. On the contrary, the share is 2 pps higher among girls in reading. The gender gap among top performers is close to the EU average in all three fields.

Exposure to bullying and sense of belonging at school are associated with mathematics performance. In Lithuania, 16.7% of students report being bullied at least a few times a month and this causes a decrease in mathematics performance by 21⁵⁹ score points, one of highest value in the EU. Bullying is more frequent among disadvantaged students⁶⁰. A lower share of students (64.8%) than in most EU countries feel they belong at school. The difference in mathematics performance between students who feel that they belong to their school and those who do not is 12 score points⁶¹.

Figure A34. Underachievement rates in mathematics, reading and science



Source: OECD (2023a).

Several measures are being implemented to strengthen learning outcomes. In 2018, Lithuania started to work on a new competence-based curriculum whose implementation started in September 2023. This reform is accompanied by changes in the assessment system. Intermediate tests on students' achievements in the last two grades have been introduced and the results will be included in the final school leaving exam. The objective is to provide stronger incentives for students to invest earlier and more comprehensively in the secondary curriculum instead of focusing disproportionately on the two subjects of the final exam. The Ministry has prepared a 2023-2030 plan to improve mathematics outcomes. It includes measures aimed at: (i) improving teaching and learning on the basis of scientific research and the development of new IT tools that better respond to students' learning needs; (ii) providing additional teaching assistance to students with poor results; (iii) helping more teachers to update their mathematical and assessment competences. These actions will be accompanied by measures designed at municipal and school level. In addition, a plan to increase students' interests in STEAM (science, technology, engineering, arts and mathematics) competences and careers was adopted in 2023. With the help of EU funds, since 2022, seven regional STEAM centres are operating in Lithuania and another three are being developed in the three biggest cities.

⁵⁹ After taking into account schools' and students' socio-economic characteristics.

⁶⁰ Table II.B1.3.18.

⁶¹ After taking into account schools' and students' socio-economic characteristics.

 **Malta**

Figure A35. Key indicators from PISA 2015⁶², 2018 and 2022

			2015		2018		2022			
			MT	EU	MT	EU	MT	EU		
Share of 15-year-olds underachieving	Mathematics	Total	29.1	22.2	30.2	22.9	32.6	29.5		
		By gender	<i>Boys</i>	30.7	21.3	34.2	22.8	34.6	29.0	
			<i>Girls</i>	27.5	23.2	26.0	22.9	30.5	30.0	
		By socio-economic status	<i>Top quarter</i>	14.1	8.1	15.1	8.6	17.2	10.9	
			<i>Bottom quarter</i>	46.9	37.3	47.1	38.2	47.7	48.0	
		By migrant background	<i>Native with native-born parents</i>	27.8	:	28.4	:	31.2	:	
			<i>Native with foreign-born parents</i>	28.0	:	34.6	:	37.6	:	
			<i>Foreign-born students</i>	22.1	:	27.5	:	25.7	:	
		Reading	Total	35.6	20.0	35.9	22.5	36.3	26.2	
			By gender	<i>Boys</i>	43.0	23.9	44.9	27.3	43.2	30.7
		<i>Girls</i>	27.9	16.1	26.0	17.4	29.0	21.7		
	Science	Total	32.5	20.6	33.5	22.3	30.3	24.2		
		By gender	<i>Boys</i>	:	21.3	38.4	23.2	33.6	25.6	
		<i>Girls</i>	:	21.0	28.2	21.2	26.8	22.9		
Share of 15-year-olds top performers	Mathematics	Total	11.8	10.7	8.5	11.0	7.2	7.9		
		By gender	<i>Boys</i>	12.7	12.7	9.2	12.6	9.0	9.8	
			<i>Girls</i>	11.0	8.6	7.7	9.3	5.3	5.9	
		Reading	Total	5.6	8.9	5.3	8.1	4.5	6.5	
			By gender	<i>Boys</i>	4.0	7.1	4.4	7.0	3.4	5.6
			<i>Girls</i>	7.3	10.0	6.3	10.0	5.6	7.4	
		Science	Total	6.0	7.1	4.4	6.3	4.6	6.9	
			By gender	<i>Boys</i>	:	8.4	4.7	7.0	4.7	7.8
			<i>Girls</i>	:	5.7	4.1	5.6	4.4	5.9	

Source: OECD (2023a).

Underachievement remains relatively high in all three fields tested. The proportion of low achieving students in mathematics, reading and science is above the EU average and has not changed in mathematics and reading since 2015. A decreasing trend is observable in science: the share has decreased by 2.2 points since then, but it is 13.4 pps higher than the EU average. The percentage of Maltese 15-year-olds failing to achieve minimum proficiency levels is high across the entire socio-economic distribution and this has not changed since 2015. Around 47.7% of students from the bottom socio-economic quartile lack basic skills in mathematics (EU 47.5%). Yet, the rate for the top quartile is also high (17.2% v 11% at EU level). Underachievement is higher among boys, especially in reading where the gender gap stands at 14.3 pps, one of the highest values in the EU (8.9 pps).

Foreign-born students are less likely to underachieve. Contrary to all other Member States the proportion of low achieving students is higher among native-born students without migrant background (31.2%) than among foreign-born students (25.7%). Results are worse among native-born students with foreign-born parents (37.6%). Malta is among the few EU countries where the share of disadvantaged students is higher among native-born students without migrant background (25.0%) than for foreign-born students (17.9%).

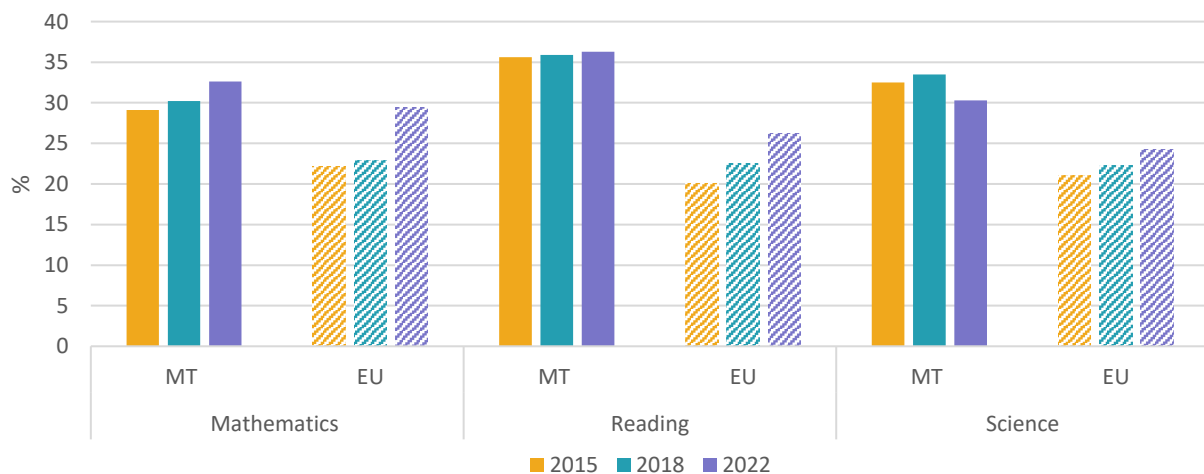
The percentage of top performers is below the EU average in all three fields. The share has decreased in mathematics and science since 2015 and has remained unchanged since 2018. In reading, it has not changed since 2015. As in almost all EU MS, girls are under-represented among

⁶² Malta did not participate in PISA 2012.

high-achievers in mathematics. On the contrary, when it comes to reading, the share is slightly higher among girls. 3.1% of disadvantaged students are top performers, one of the highest shares in the EU (EU: 1.8%).

Students' well-being influences their performance. In Malta, a lower share of students (63.6%) than in most EU countries feel like they belong at school. The mathematics performance of these students exceeds by 25 score points⁶³ - the highest value in the EU – that of those students who do not feel like they belong to their school. Bullying is a major issue that affect students regardless of their and schools' socio-economic characteristics⁶⁴. More than one out of four students (26.5%) report being bullied at least a few times a month. Exposure to bullying is associated with a drop in mathematics performance by 27 score points⁶⁵.

Figure A36. Underachievement rates in mathematics, reading and science



Source: OECD (2023a).

Malta aims to improve quality in school education. The National Curriculum Framework is currently under revision to create better synergies with the Learning Outcomes Framework. A new quality assurance framework (0-16) was published in 2023 together with new national quality standards for 3-16 years that aim to guide internal and external quality process. The latter complement the quality standard for childcare that has been in place since in 2021. As of 2025 the Secondary Education Certificate (SEC) qualification will include school-based assessments in all subjects reflecting performance in the final three years of secondary school. The objective is to provide stronger incentives for students to invest earlier and more consistently in learning instead of focusing disproportionately on the exam. At the same time, the use of formative assessment may help teachers better identify difficulties that students are encountering while learning. A new strategy on early leaving from education and training focused on prevention and intervention mechanisms was published in 2023.

⁶³ After taking into account schools' and students' socio-economic characteristics.

⁶⁴ Table II.B1.31 and Table II.B1.32.

⁶⁵ After taking into account schools' and students' socio-economic characteristics.

 Netherlands⁶⁶

Figure A37. Key indicators from PISA 2012, 2018 and 2022

			2012		2018		2022	
			NL	EU	NL	EU	NL	EU
Share of 15-year-olds underachieving	Mathematics	Total	14.8	22.1	15.8	22.9	27.4	29.5
		By gender						
		Boys	13.9	16.1	16.4	22.8	26.8	29.0
		Girls	15.8	22.8	15.1	22.9	27.9	30.0
	By socio-economic status	Top quarter	6.2	7.6	5.3	8.6	9.9	10.9
		Bottom quarter	24.4	38.0	26.1	38.2	42.0	48.0
		Native with native-born parents	12.3	:	12.3	:	21.4	:
	By migrant background	Native with foreign-born parents	29.5	:	29.9	:	37.9	:
		Foreign-born students	26.8	:	45.0	:	48.5	:
	Reading	Total	14.0	18.0	24.1	22.5	34.6	26.2
		By gender						
Boys		17.2	24.3	29.4	27.3	39.3	30.7	
	Girls	10.6	11.7	18.8	17.4	29.6	21.7	
Science	Total	13.1	16.8	20.0	22.3	27.3	24.2	
	By gender							
	Boys	:	:	21.6	23.2	27.8	25.6	
	Girls	:	:	18.4	21.2	26.8	22.9	
Share of 15-year-olds top performers	Mathematics	Total	19.3	12.6	18.4	11.0	15.4	7.9
		By gender						
		Boys	21.5	14.8	19.7	12.6	17.5	9.8
		Girls	16.9	10.3	17.1	9.3	13.1	5.9
	Reading	Total	9.8	8.3	9.1	8.1	7.0	6.5
		By gender						
		Boys	7.4	5.8	7.8	7.0	5.8	5.6
		Girls	12.2	21.8	10.4	10.0	8.1	7.4
	Science	Total	11.8	8.0	10.6	6.3	10.5	6.9
		By gender						
		Boys	:	:	10.6	7.0	11.6	7.8
		Girls	:	:	10.6	5.6	9.5	5.9

Source: OECD (2023a).

The share of underachieving students rose dramatically in all three domains both compared to 2012 and 2018. While in 2012, the share was below the EU 2030 target (15%) and well below the EU average in all three domains, by 2022, it almost doubled in mathematics and in science and it is 2.5 times higher in reading than in 2012. In mathematics, most of the increases occurred between 2018 and 2022 (+11.6 pps); in reading and science there was a considerable increase both between 2012 and 2018 (+10.1 pps in reading, +6.9 pps in science) and then between 2018 and 2022 (+10.5 pps, +7.3 pps, respectively). The underachievement rate only remains below the EU average in mathematics. Concerning gender differences, the only significant gap is in reading, with 9.7 pps more boys among low-achieving students. Almost 1 in 2 of foreign-born students underachieve in mathematics (48.5%), while for the rate for native born students with parents born abroad, the underachievement rate is considerably lower (37.9%). The underachievement gap stands at 27.1 pps between students without a migrant background and foreign-born students, and at 16.5 pps with native-born students with parents born abroad.

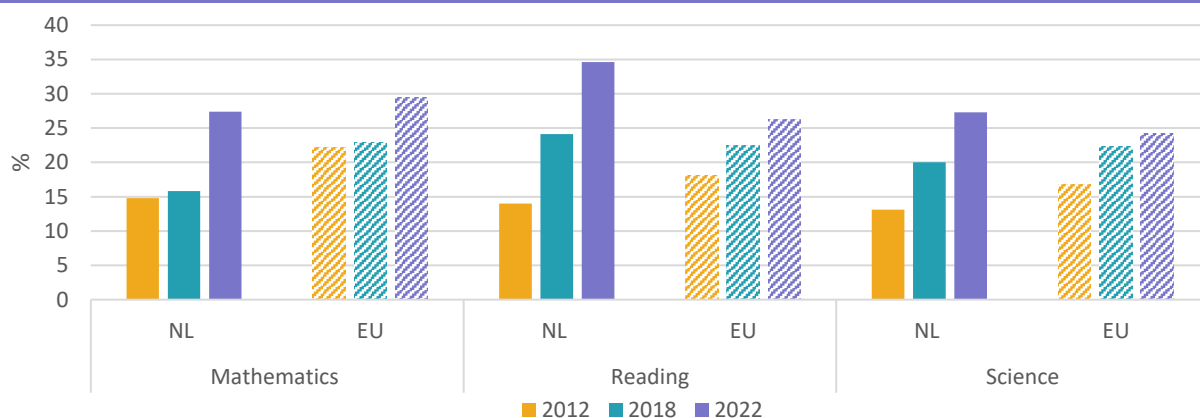
Underachievement increased in all quarters of the socioeconomic distribution since 2018, but especially among disadvantaged students. While in 2018, only 26.1% of students from the bottom quarter lacked basic competences in mathematics against 5.3% of advantaged students, the rates increased by 16 pps and 4.6 pps, standing at 42% and 9.9%, respectively. The socioeconomic gap grew by 11.3 pps, reaching 32.1 pps, still below the EU average (37.2 pps).

⁶⁶ Caution is required when interpreting 2022 data for the Netherlands because one or more PISA sampling standards were not met (see OECD, 2023a, Annexes A2 and A4).

The shares of top performers in mathematics and science are among the highest of the EU countries. Even though their share decreased significantly in mathematics (-3 pps) since 2018, the rate is almost twice as high as the EU average in 2022 (15.4% vs EU: 7.9%). In science, the share remained stable, and it is now one of the highest rates in the EU with 10.5% (EU: 6.9%). In reading the rate decreased by 2.1 pps since 2018, but it remains above the EU average (7.0% vs EU: 6.5%). When it comes to gender differences among top achievers, the Netherlands follows the EU trends: the share of boys is higher in mathematics and science, with 4.4 pps and 2.1 pps, respectively, while in reading, there are 2.3 pps more girls among top achievers. 5.7% of disadvantaged students are top performers, the highest share in the EU (EU:1.8%).

Student well-being has a large impact on student performance. 7 in 10 students feel like they belong at school. Sense of belonging is associated with a 16 score points⁶⁷ increase in students' mathematics performance. 12.9% of students reported that they were bullied at least a few times a month, which is the lowest rate among Member States. Frequent bullying is associated with a 22 score point⁶⁸ drop in students' mathematics performance.

Figure A38. Underachievement rates in mathematics, reading and science



Source: OECD (2023a).

The Netherlands has taken several measures to improve learning outcomes and to promote equal opportunities. The government launched a basic skills master plan for early childhood education and school education in May 2022. The plan promotes Dutch reading and writing skills, mathematics, citizenship education and digital literacy. A subsidy was created in October 2022 to fund school breakfasts and/or lunch for primary and secondary schools where over 30% of students come from low-income families. The scheme should prevent about 300 000 students from being hungry in class, which undermines their school performance. As of 2023/2024, students' orientation advice issued in their final year by their primary school in January will be adjusted upwards if the pupil performs better in the progression exam in February. The aim is to give students who receive a low assessment from their primary school another chance to progress to a higher secondary track if they pass the exam. Finally, in 2020 a legal right to progress was brought in to allow lower secondary VET students who have passed their final exams with an extra subject to progress automatically to general upper-secondary education (havo) and to graduates from general upper-secondary education (havo) to pre-university education (vwo).

⁶⁷ After taking into account schools' and students' socio-economic characteristics.

⁶⁸ Ibid.

 **Poland**
Figure A39. Key indicators from PISA 2012, 2018 and 2022

			2012		2018		2022	
			PL	EU	PL	EU	PL	EU
Share of 15-year-olds underachieving	Mathematics	Total	14.4	22.1	14.7	22.9	23.0	29.5
		By gender						
		Boys	15.0	16.1	15.4	22.8	23.8	29.0
		Girls	13.8	22.8	14.1	22.9	22.2	30.0
		By socio-economic status						
		Top quarter	3.8	7.6	5.0	8.6	7.8	10.9
		Bottom quarter	26.5	38.0	25.7	38.2	39.1	48.0
		By migrant background						
		Native with native-born parents	14.1	:	14.4	:	21.8	:
		Native with foreign-born parents	:	:	:	:	:	:
	Foreign-born students	:	:	:	:	48.9	:	
Share of 15-year-olds top performers	Reading	Total	10.6	18.0	14.7	22.5	22.2	26.2
		By gender						
		Boys	16.2	24.3	19.7	27.3	27.5	30.7
		Girls	5.2	11.7	9.6	17.4	16.8	21.7
	Science	Total	9.0	16.8	13.8	22.3	18.6	24.2
		By gender						
		Boys	:	:	15.0	23.2	20.6	25.6
		Girls	:	:	12.7	21.2	16.6	22.9
	Mathematics	Total	16.7	12.6	15.8	11.0	9.4	7.9
		By gender						
Boys		18.1	14.8	16.9	12.6	11.4	9.8	
Girls		15.4	10.3	14.7	9.3	7.4	5.9	
Reading	Total	10.0	8.3	12.2	8.1	8.8	6.5	
	By gender							
	Boys	7.2	5.8	9.6	7.0	7.7	5.6	
	Girls	12.7	21.8	14.8	10.0	9.8	7.4	
Science	Total	10.8	8.0	9.3	6.3	8.0	6.9	
	By gender							
	Boys	:	:	10.3	7.0	9.2	7.8	
	Girls	:	:	8.3	5.6	6.7	5.9	

Source: OECD (2023a).

Underachievement increased considerably in all three domains measured by PISA, but remains well below the EU average. While in 2018 underachievement rates were below the EU level target of 15% in all three domains, by 2022, the share of Polish 15-year-olds not meeting basic proficiency levels moved away from it. Especially in mathematics and reading, where the rate grew by 8.3 pps and 7.5 pps, currently standing at 23% and 22.2%, respectively. In science, the increase in the share of underachieving students since 2018 remained statistically non-significant, however, compared with 2012, there is a clear rise in the share (+9.6 pps), standing at 18.6% in 2022. There are more boys among underachieving students in reading (+10.6 pps) and in science (+4 pps), and there is no gender gap in mathematics.

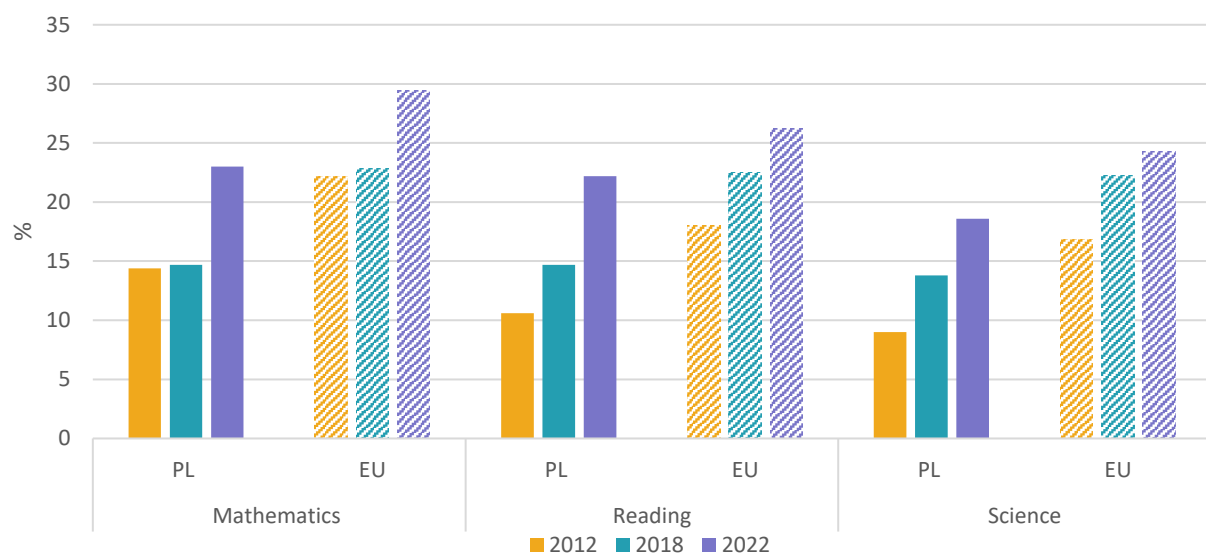
The socio-economic gap in underachievement in mathematics has widened since 2018.

Compared with 2018, there is an increasing share of underachieving students both at the bottom and at the top of the Polish socioeconomic distribution. As the increase was much more pronounced among disadvantaged students (+13.5 pps) than among advantaged students (+2.8 pps), the socioeconomic gap widened by 10.6 pps, while remaining below the EU average (31.3 pps vs EU: 37.2 pps).

The share of top performers dropped below 10% in all three domains. Compared with 2018, top performance decreased in mathematics (-6.4 pps) and reading (-3.4 pps), but both rates remain above the EU average. In science, the significant drop occurred between 2012 and 2022 (-2.8 pps). When looking at top performers by socioeconomic background, Polish students' rates remain above the EU average both among advantaged (21.1% vs EU: 18.4%) and disadvantaged (2.3% vs EU: 1.8%) students. In terms of gender gaps, girls are underrepresented among top performers in mathematics (-4 pps) and science (-2.1 pps), while boys are underrepresented in reading (-2.1 pps).

Being bullied at school seems to have a negative impact on student performance. Almost 1 in 5 students (18.4%) reported that they were bullied frequently, a harmful behaviour that affects students irrespective of their socioeconomic background, but which is more likely to affect students in schools with a disadvantaged profile⁶⁹. Being exposed to bullying at least a few times a month was associated with an 11 score point drop in students' mathematics performance⁷⁰. Only 64.2% of Polish students reported that they feel like they belong at school, one of the lowest rates in the EU. However, contrary to nearly all Member States, this factor was found to have no significant impact on students' mathematics performance.

Figure A40: Underachievement rates in mathematics, reading and science



Source: OECD (2023a).

Measures are underway to strengthen inclusiveness and digital education, but the reorganisation of the schooling system has been a major challenge. The previous three-level schooling system (primary, lower and upper-secondary schools) was reorganised between 2017 and 2022/2023 into two-levels, consisting of eight-year basic school and upper-secondary schools. Consequently, the compulsory general education was shortened from 9 to 8 years. The core curricula were changed. As part of the inclusive education reform in 2022, the number of specialists in mainstream schools was increased and a special educational needs teaching post introduced. A network of 23 inclusive education support centres has been established with the support of EU funds. Over the years, Poland has also invested in digital education, including the modernisation of the computer science curriculum for primary schools in 2017 and further measures are foreseen under the Polish Recovery and Resilience Plan. Since 2021/2022, Poland has invested in school laboratories to improve STEM teaching.

⁶⁹ Table II.B1.3.31 and Table II.B1.3.32.

⁷⁰ After taking into account schools' and students' socio-economic characteristics.

 Portugal

Figure A41. Key indicators from PISA 2012, 2018 and 2022

			2012		2018		2022	
			PT	EU	PT	EU	PT	EU
Share of 15-year-olds underachieving	Mathematics	Total	24.9	22.1	23.3	22.9	29.7	29.5
		By gender						
		Boys	24.0	16.1	23.3	22.8	28.9	29.0
		Girls	25.9	22.8	23.2	22.9	30.6	30.0
		By socio-economic status						
		Top quarter	7.2	7.6	7.1	8.6	9.6	10.9
		Bottom quarter	42.9	38.0	39.4	38.2	46.9	48.0
		By migrant background						
		Native with native-born parents	22.5	:	21.8	:	27.4	:
		Native with foreign-born parents	41.8	:	29.6	:	34.5	:
	Foreign-born students	43.1	:	53.8	:	46.5	:	
Reading	Total	18.8	18.0	20.2	22.5	23.1	26.2	
	By gender							
	Boys	25.0	24.3	24.4	27.3	27.3	30.7	
	Girls	12.5	11.7	15.9	17.4	18.9	21.7	
Science	Total	19.0	16.8	19.6	22.3	21.8	24.2	
	By gender							
	Boys	:	:	20.1	23.2	23.2	25.6	
	Girls	:	:	19.0	21.2	20.4	22.9	
Share of 15-year-olds top performers	Mathematics	Total	10.6	12.6	11.6	11.0	6.7	7.9
		By gender						
		Boys	12.6	14.8	14.2	12.6	8.2	9.8
		Girls	8.6	10.3	9.0	9.3	5.1	5.9
	Reading	Total	5.8	8.3	7.3	8.1	4.7	6.5
		By gender						
Boys		3.8	5.8	6.2	7.0	4.2	5.6	
	Girls	7.8	21.8	8.4	10.0	5.3	7.4	
Science	Total	4.5	8.0	5.6	6.3	4.9	6.9	
	By gender							
	Boys	:	:	6.7	7.0	5.5	7.8	
	Girls	:	:	4.5	5.6	4.3	5.9	

Source: OECD (2023a).

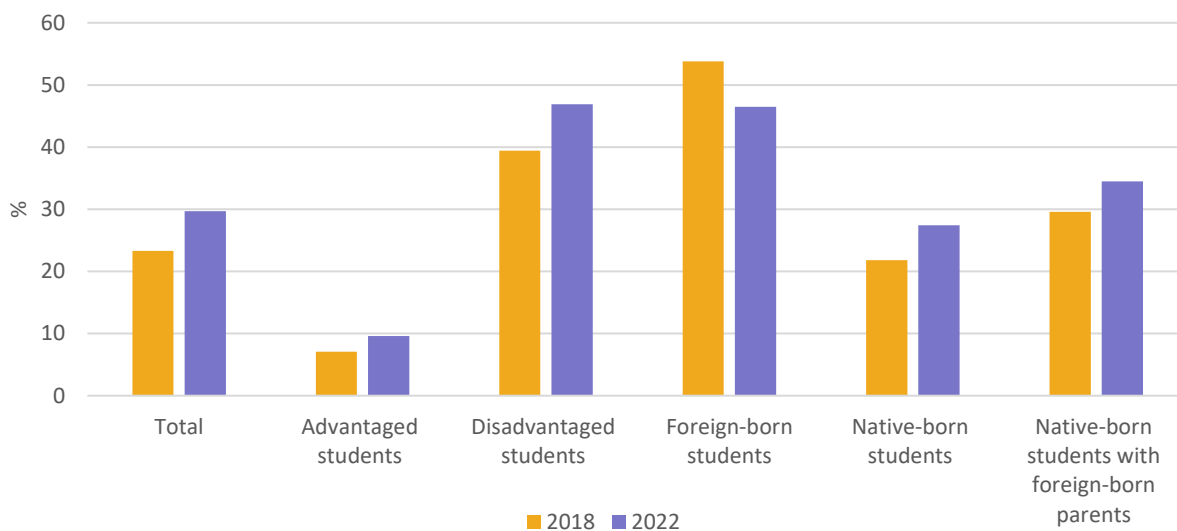
Underachievement has increased in mathematics and reading since 2018. In mathematics, the share stands at 29.7% (0.2 pps higher than the EU average) up from 23.3% in 2018. In reading, it has risen by 2.9 pps reaching 23.1%, below the EU average. While it has not changed, the proportion of underachieving students in science remains below the EU average. When it comes to foreign-born students, they are more likely to underachieve in mathematics than native-born students, in line with EU trends. About half of them (46.5%) do not reach level 2 in mathematics. Their underachievement rate is 19 pps higher than for students without a migrant background (27.4%). The gap is much smaller (7.1 pps) for native-born students with foreign-born parents (34.5%). Gender gaps in underachievement exist: in reading, the rate for girls is 8.4 pps lower than that of boys, 0.5 pps lower than the EU average; in science, it is 2.8 pps lower (EU: 2.7 pps).

Underachievement has risen among disadvantaged students. It has grown by 7.5 pps for students from the bottom quarter of the socio-economic distribution, reaching 46.9% in 2022, slightly below the EU average (48.0%). This has widened the socio-economic gap by 4.9 pps since 2018, in line with EU trends.

The share of top performing students is below the EU average in all three domains. In science, the rate has remained unchanged in the past decade, and it is now 2 pps lower than the EU average (4.9% vs 6.9% at EU level). By contrast, it declined in the other two domains between 2018 and 2022. In mathematics, the rate went from 11.6% to 6.7%, shrinking by 4.9 pps in the period, more than at EU level (-3.1 pps). In reading, the negative change was smaller (-2.6 pps) but still higher than the EU average (-1.6 pps). A gender gap is only recorded in mathematics: like in all EU MS, boys are over-represented among top performers (+3.0 pps).

Students' well-being is relatively high in Portugal. More than 8 out of 10 students (81.9%) feel like they belong at school, one of the highest shares in the EU. Sense of belonging is associated with an increase by 18 score points in mathematics after taking into account students' and schools' socio-economic characteristics. 13.9% of 15-year-olds reported to be bullied at least a few times a month, one of the lowest rates within the EU. However, bullying is more frequent among disadvantaged students and schools⁷¹. Students exposed to frequent bullying perform 21 points⁷² lower in mathematics.

Figure A42. Underachievement rates in mathematics



Source: OECD (2023a).

Several measures are being implemented to strengthen student outcomes. In 2017, Portugal published a new framework for teaching, learning and assessment delineating what young people are expected to achieve by age 18. The Students' Profile at the End of Compulsory Schooling establishes essential learnings and embraces the idea of transversality. The 2018 Law for Inclusive Education has emphasised the responsibility of schools to identify barriers to individual students' learning and develop diverse strategies to overcome them. Implementation of other policies such as the priority intervention educational territories programme (TEIP from 2012) and the national programme for school success promotion (PNPSE from 2016) is linked to the great success in reducing early school leaving rates in the last decade. In 2021, Portugal launched a comprehensive plan to compensate for the loss of learning. During the pandemic, the plan 21|23 Escola+, with a duration of two academic years and with an allocation of over EUR 900 million, supported cohesion funds. The plan aims to remedy students' learning losses in primary and secondary education, make curricular development more flexible and provide schools with resources to develop special measures, such as specific learning activities in priority subjects or domains.

⁷¹ Table II.B1.3.31 and Table II.B1.3.32.

⁷² After taking into account schools' and students' socio-economic characteristics.

 **Romania**

Figure A43. Key indicators from PISA 2012, 2018 and 2022

			2012		2018		2022	
			RO	EU	RO	EU	RO	EU
Share of 15-year-olds underachieving	Mathematics	Total	40.8	22.1	46.6	22.9	48.6	29.5
		By gender						
		Boys	40.4	16.1	46.0	22.8	48.5	29.0
		Girls	41.2	22.8	47.1	22.9	48.6	30.0
		By socio-economic status						
		Top quarter	16.5	7.6	23.0	8.6	18.7	10.9
		Bottom quarter	60.3	38.0	69.0	38.2	75.4	48.0
		By migrant background						
		Native with native-born parents	40.7	:	45.0	:	47.2	:
		Native with foreign-born parents	:	:	:	:	:	:
	Foreign-born students	:	:	:	:	:	:	
Share of 15-year-olds top performers	Reading	Total	37.3	18.0	40.8	22.5	41.7	26.2
		By gender						
		Boys	46.8	24.3	47.8	27.3	47.4	30.7
		Girls	28.1	11.7	33.4	17.4	36.0	21.7
	Science	Total	37.3	16.8	43.9	22.3	44.0	24.2
		By gender						
	Boys	:	:	44.8	23.2	45.6	25.6	
	Girls	:	:	43.1	21.2	42.4	22.9	
Share of 15-year-olds top performers	Mathematics	Total	3.2	12.6	3.2	11.0	4.0	7.9
		By gender						
		Boys	3.7	14.8	3.9	12.6	5.3	9.8
		Girls	2.7	10.3	2.4	9.3	2.6	5.9
	Reading	Total	1.6	8.3	1.4	8.1	2.0	6.5
		By gender						
	Boys	1.2	5.8	1.0	7.0	1.7	5.6	
	Girls	2.0	21.8	1.9	10.0	2.3	7.4	
Share of 15-year-olds top performers	Science	Total	0.9	8.0	1.0	6.3	1.4	6.9
		By gender						
		Boys	:	:	1.3	7.0	1.9	7.8
	Girls	:	:	0.6	5.6	0.9	5.9	

Source: OECD (2023a). Note: Students with migrant background in Romania comprise 0.6% of student population. Therefore, this note does not analyse data by migrant background (see also section 1.2).

With more than 40%, Romania has recorded among the highest underachievement rates in all three domains in the EU since 2012. A significant negative trend is observable in mathematics and science where the underachievement rate further increased between 2012 and 2022, with 7.7 pps and 6.7 pps, respectively. However, no significant changes are observable between 2018 and 2022. The rate in reading did not rise significantly since 2012, while remaining well above the EU average (+15.5 pps). Romania is in line with the EU trends when it comes to gender gaps in underachievement. There is a significant gap in reading and science, in favour of girls, while there is no gap in mathematics.

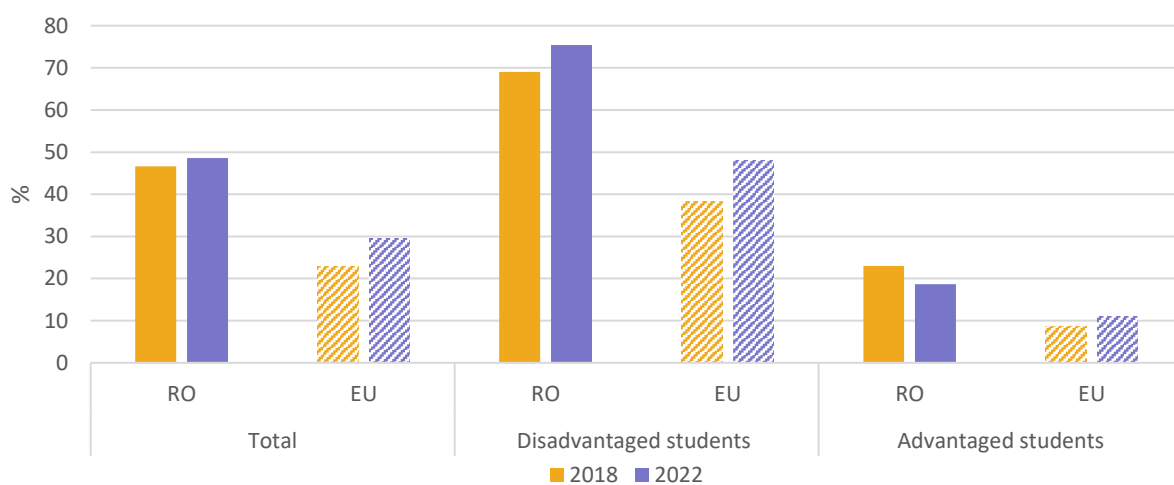
The underachievement gap among students from advantaged and disadvantaged backgrounds is the highest among all EU countries. 3 out of 4 students from disadvantaged backgrounds are low performers in mathematics, a rate that increased by 15.1 pps since 2012, reaching an over 1.5 times higher underachievement rate among disadvantaged students in Romania than in the EU on average (75.4% vs EU: 48%). At the same time, even on the advantaged end of the socio-economic distribution there is a high share of students who do not meet basic skills standards in mathematics when compared with the EU average (18.7% vs EU: 10.9%).

The proportion of top-performing students has remained very low in all three domains and did not change significantly since 2012. It is well below the EU average in mathematics (4% vs EU: 7.9%), reading (2% vs EU: 6.5%) and science (1.4% vs EU: 6.9%). The share of top performers coming from a disadvantaged socio-economic background remained below 0.5% since 2012, among the lowest rates in the EU. There is a gender gap in mathematics and science with more boys than girls among top achievers, while there is no significant gap in reading.

Only 49.5% of students felt they belong at school, the lowest rate in all EU Member States.

However, contrary to all other EU MS, a positive sense of belonging is associated with a negative impact on reading performance (-10 points). 1 in 4 students reported that they were frequently bullied, a phenomenon that affects more students from a disadvantaged background and in disadvantaged schools⁷³. This is one of the highest rates registered in the EU. Being exposed to bullying at least a few times a month is associated with a 10 score points drop in mathematics performance⁷⁴.

Figure A44. Underachievement rates in mathematics



Source: OECD (2023a).

Romania aims to improve the quality of education and improve student outcomes. Romania has recently adopted a new pre-university education law aiming to address some of its longstanding challenges in education. The new law introduced important changes to the teaching profession and strengthened measures to improve equity and reduce early school leaving. Romania has recently finalised the implementation of a major teacher training programme financed by the European Social Fund, aiming to support and finalise the implementation of the competence-based curricular reform introduced in 2011. To compensate for learning losses due to school closures, remedial education classes and after-school activities for disadvantaged students, including Roma and from schools in rural areas were organised with the support of EU funds. In addition, Romania is implementing ambitious investments financed by the Recovery and Resilience Facility (RRF) at all levels of education. These may also support and facilitate the development of student outcomes. For example, the RRF is supporting the National Programme to Reduce School Drop-out, which awards grants to schools with a high risk of drop-out in view of organising remedial education classes, extracurricular activities, and providing social support.

⁷³ Table II.B1.3.31 and Table II.B1.3.32.

⁷⁴ After taking into account schools' and students' socio-economic characteristics.

 **Slovakia**

Figure A45. Key indicators from PISA 2012, 2018 and 2022

		2012		2018		2022		
		SK	EU	SK	EU	SK	EU	
Share of 15-year-olds underachieving	Mathematics	Total	27.5	22.1	25.1	22.9	33.2	29.5
		By gender						
		Boys	27.6	16.1	25.4	22.8	34.2	29.0
		Girls	27.3	22.8	24.8	22.9	32.1	30.0
	By socio-economic status							
	Top quarter	9.5	7.6	7.6	8.6	12.1	10.9	
	Bottom quarter	52.1	38.0	48.0	38.2	62.6	48.0	
	By migrant background							
	Native with native-born parents	26.7	:	24.4	:	31.8	:	
	Native with foreign-born parents	:	:	41.1	:	40.1	:	
Foreign-born students	:	:	57.7	:	42.8	:		
Reading	Total	28.2	18.0	31.4	22.5	35.4	26.2	
	By gender							
	Boys	35.4	24.3	38.4	27.3	41.1	30.7	
	Girls	20.4	11.7	24.5	17.4	29.1	21.7	
Science	Total	26.9	16.8	29.3	22.3	30.6	24.2	
	By gender							
	Boys	:	:	31.1	23.2	32.5	25.6	
	Girls	:	:	27.5	21.2	28.5	22.9	
Share of 15-year-olds top performers	Mathematics	Total	11.0	12.6	10.7	11.0	7.3	7.9
		By gender						
		Boys	13.6	14.8	12.1	12.6	8.4	9.8
		Girls	8.1	10.3	9.5	9.3	6.1	5.9
	Reading	Total	4.4	8.3	4.6	8.1	3.4	6.5
		By gender						
		Boys	3.2	5.8	3.6	7.0	2.8	5.6
		Girls	5.7	21.8	5.6	10.0	4.1	7.4
	Science	Total	4.9	8.0	3.7	6.3	4.3	6.9
		By gender						
Boys		:	:	4.0	7.0	4.6	7.8	
	Girls	:	:	3.4	5.6	4.0	5.9	

Source: OECD (2023a). Note: Students with migrant background in Slovakia represent 1.8% of student population. Therefore, this annex does not analyse data by migrant background (see also section 1.2).

The proportion of underachieving students is relatively high and remains above the EU average in all three domains since 2012. Underachievement in reading has been on a negative trend since 2012, with a further increase of 4 pps since 2018. In mathematics, there was a rise in the share of underachieving 15-year-olds between 2018 and 2022 (+8.1 pps), while there was no significant increase in science since 2012. When it comes to gender gaps, Slovakia is in line with the EU trends. Underachievement is higher among boys in reading (11.9 pps vs EU: 8.9 pps) and science (4 pps vs EU: 2.7 pps), while there is no significant difference in the rate of underachieving boys and girls in mathematics.

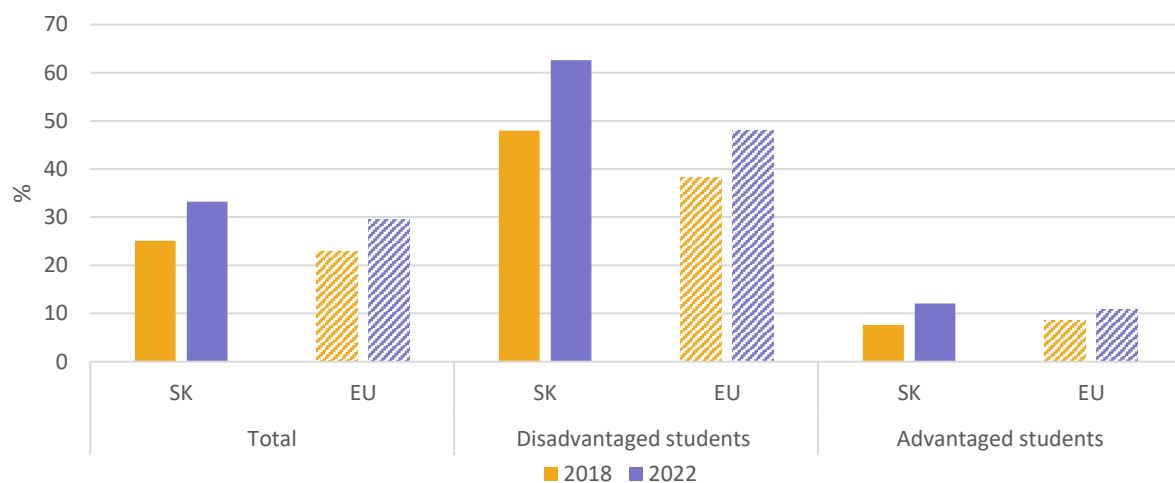
Slovakia has the second highest socioeconomic gap among low-achieving students in the EU in mathematics. The gap rose by 10 pps since 2018, reaching 50.6 pps by 2022, well above the EU average (EU: 37.2 pps). More than 6 out of 10 students from the bottom quarter of the socioeconomic distribution are underachieving (62.6% vs EU: 48%), a rate which has increased 1.5 times more than in other EU countries since 2018 (14.6 pps vs EU: 9.9 pps). Underachievement among the most advantaged students followed a similar trend during the same period, the rate increased by 4.5 pps, above the EU average of 2.2 pps.

The share of top achievers is below the average in all three fields. It is around the EU average in mathematics, below the EU average in science and almost half the EU average in reading. In the area of mathematics and reading, there were 3.4 pps and 1.2 pps less high-achieving students in 2022 compared with 2018, while the share of top achievers in science remained stable since 2012, in line with EU trends. Like in other EU countries, there are more boys among top performers in

mathematics (2.3 pps vs EU: 3.8 pps), while there are more top performing girls in reading (1.3 pps vs EU: 1.8 pps). In the area of science, there are no visible gender differences.

Students' well-being has an influence on their academic performance. 74.6% of students in Slovakia felt that they belong at school, which is the median rate of EU countries. A positive sense of belonging was associated with a 12 points higher score in mathematics performance. 1 in 5 students (20.1%) reported that they were frequently experiencing bullying, a harm that is more likely to affect students from a disadvantaged background or in a disadvantaged school⁷⁵. Exposure to bullying at least a few times a month is associated with an 18 score points drop in mathematics performance⁷⁶.

Figure A46. Underachievement rates in mathematics



Source: OECD (2023a).

Slovakia implements ambitious reforms to increase quality and inclusiveness in education.

A comprehensive reform of school education is being rolled out with the support of the RRF funds. It focuses on boosting skills needed for the 21st century, strengthening critical thinking and creativity of learners and providing better methodological support to schools. In 2023, the testing phase of the implementation of the new curricula for primary and lower secondary education began in 39 pilot schools and will be implemented in all schools in 2026/2027. To improve the inclusiveness of education, the Action plan on implementing a Strategy for inclusive approach to education (2022-2024) is being implemented. The School Act amendment (2023) introduced new initiatives which might also have positive impact on reducing influence of the pupils' socio-economic background on their performance at schools and their competences. From 2026 onwards it introduced the right for every child with special needs to get support such as tutoring or psychological help. Also, a network of counselling and prevention facilities was set up to cooperate closely with the school inclusion teams. The RRP will provide EUR 210 million to support these actions under its 'High-quality, inclusive, and accessible education and training for all' component.

⁷⁵ Table II.B1.3.31 and Table II.B1.3.32.

⁷⁶ After taking into account schools' and students' socio-economic characteristics.

 **Slovenia**
Figure A47. Key indicators from PISA 2012, 2018 and 2022

		2012		2018		2022		
		SI	EU	SI	EU	SI	EU	
Share of 15-year-olds underachieving	Mathematics	Total	20.1	22.1	16.4	22.9	24.6	29.5
		By gender						
		Boys	20.4	16.1	17.0	22.8	26.4	29.0
		Girls	19.8	22.8	15.8	22.9	22.7	30.0
	By socio-economic status							
	Top quarter	6.9	7.6	5.8	8.6	9.9	10.9	
	Bottom quarter	33.8	38.0	27.5	38.2	41.1	48.0	
	By migrant background							
	Native with native-born parents	18.2	:	13.8	:	21.3	:	
	Native with foreign-born parents	32.7	:	28.3	:	38.4	:	
Foreign-born students	49.9	:	48.4	:	51.2	:		
Reading	Total	21.1	18.0	17.9	22.5	26.1	26.2	
	By gender							
	Boys	30.5	24.3	24.6	27.3	34.6	30.7	
	Girls	11.1	11.7	10.8	17.4	17.0	21.7	
Science	Total	12.9	16.8	14.6	22.3	17.8	24.2	
	By gender							
	Boys	:	:	16.7	23.2	21.1	25.6	
	Girls	:	:	12.3	21.2	14.2	22.9	
Share of 15-year-olds top performers	Mathematics	Total	13.7	12.6	13.6	11.0	9.4	7.9
		By gender						
		Boys	14.8	14.8	14.3	12.6	10.5	9.8
		Girls	12.5	10.3	12.9	9.3	8.2	5.9
	Reading	Total	5.0	8.3	7.8	8.1	4.4	6.5
		By gender						
		Boys	2.3	5.8	5.3	7.0	3.4	5.6
		Girls	8.0	21.8	10.3	10.0	5.4	7.4
	Science	Total	9.6	8.0	7.3	6.3	8.0	6.9
		By gender						
Boys		:	:	7.3	7.0	8.0	7.8	
	Girls	:	:	7.4	5.6	8.0	5.9	

Source: OECD (2023a).

Underachievement increased in all three domains since 2018 but remains below the EU average. The positive trend in the share of low achieving students in mathematics and reading between 2012 and 2018 was reversed by 2022, as the underachievement rate rose again by 8.2 pps in both domains. While the share has been growing in science since 2012 (+4.9 pps in 2022), it remains among the lowest rates in the EU countries. The rise in underachievement was significant in all quartiles of the socioeconomic distribution between 2018 and 2022, but it was outstandingly high in the bottom quartile where it increased by 13.7 pps, compared with a 4.1 pps rise in the top quartile. With these negative developments, Slovenia's socioeconomic gap increased by 9.6 pps since 2018, but it still remains smaller than the EU average (31.3 pps vs EU: 37.2 pps).

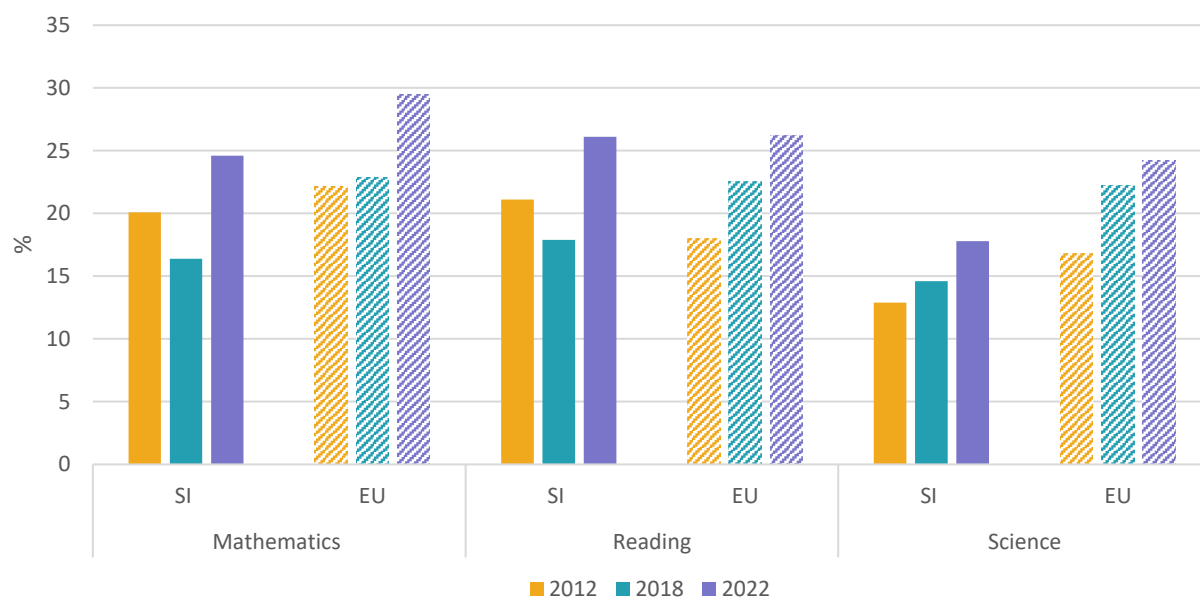
Underachievement is significantly more frequent among boys in all three domains. The gender gap stands at 17.6 pps in reading, the second highest in any domain, twice as high as the EU average, whereas there is a 6.9 pps gap in science, also well above the EU average. Contrary to most EU Member States, there is also a significant gender gap in mathematics with 3.7 pps more boys than girls among not reaching basic levels.

The share of top achievers decreased in mathematics and reading, while in science the rate did not change significantly since 2018. The rate of top achieving 15-year-olds remained above the EU average in mathematics even after a drop of 4.2 pps (9.4% vs EU: 7.9%), while in reading, after a 3.3 pps decrease, the proportion of high-performing students is now below the EU average (4.4% vs EU: 6.5%). In the area of science, the proportion of high-achieving students remains above the EU average since 2012, standing at 8% (EU: 6.9%) in 2022. The gender gap follows the EU

trend in mathematics and reading, with 2.4 pps more top achieving boys in mathematics and 2 pps more high performing girls in reading. Unlike in many EU countries, there is no gender gap in science.

Student well-being affects academic performance. 79.1% of students reported that they feel they belong at school, a rate above the EU average. A positive sense of belonging was associated with 13 points⁷⁷ higher achievement in mathematics. 17.9% of students reported that they experienced bullying more than a few times a month, a form of harmful behaviour that affects students irrespective of their socio-economic background, but which is more prevalent in schools with a disadvantaged profile⁷⁸. Exposure to bullying is associated with a 14 score points drop in students' mathematics performance⁷⁹.

Figure A48: Underachievement rates in mathematics, reading and science



Source: OECD (2023a).

In 2024, Slovenia plans to adopt the National Programme for Education until 2033 and continue the implementation of the curricular reforms. The Recovery and Resilience Plan has supported these reforms drawing on the work of the expert's working groups set up to update the curriculum (since 2022) and prepare the national programme (since 2023). The response to the Slovenian students' performance in the 2022 PISA will be incorporated in these national strategic policies and measures. The updated curricula also aim to strengthen green and digital skills, language learning and improve entrepreneurial, financial and sustainable development competences. The Slovenian multi-fund EU cohesion policy programme for 2021-2027, and the European Social Fund Plus (ESF+), are expected to substantially support relevant actions at all education, training and skill levels, with a total of EUR 207.6 million over 2021-20

⁷⁷ After taking into account schools' and students' socio-economic characteristics.

⁷⁸ Table II.B1.31 and Table II.B1.32.

⁷⁹ After taking into account schools' and students' socio-economic characteristics.

 **Spain**
Figure A49. Key indicators from PISA 2012, 2018 and 2022

			2012		2018		2022	
			ES	EU	ES	EU	ES	EU
Share of 15-year-olds underachieving	Mathematics	Total	23.6	22.1	24.7	22.9	27.3	29.5
		By gender						
		Boys	22.1	16.1	24.6	22.8	26.5	29.0
		Girls	25.1	22.8	24.8	22.9	28.1	30.0
		By socio-economic status						
		Top quarter	8.1	7.6	:	8.6	10.6	10.9
		Bottom quarter	40.0	38.0	:	38.2	44.0	48.0
		By migrant background						
		Native with native-born parents	20.6	:	:	:	24.1	:
		Native with foreign-born parents	34.9	:	:	:	31.9	:
	Foreign-born students	44.1	:	:	:	45.8	:	
Reading	Total	18.3	18.0	23.2	22.5	24.4	26.2	
	By gender							
	Boys	23.4	24.3	:	27.3	29.0	30.7	
	Girls	13.1	11.7	:	17.4	19.8	21.7	
Science	Total	15.7	16.8	21.3	22.3	21.3	24.2	
	By gender							
	Boys	:	:	21.8	23.2	21.6	25.6	
	Girls	:	:	20.8	21.2	21.0	22.9	
Share of 15-year-olds top performers	Mathematics	Total	8.0	12.6	7.3	11.0	5.9	7.9
		By gender						
		Boys	10.6	14.8	8.6	12.6	7.4	9.8
		Girls	5.3	10.3	5.9	9.3	4.4	5.9
	Reading	Total	5.5	8.3	4.8	8.1	5.3	6.5
		By gender						
	Boys	4.5	5.8	:	7.0	4.2	5.6	
	Girls	6.5	21.8	:	10.0	6.4	7.4	
Science	Total	4.8	8.0	4.2	6.3	4.9	6.9	
	By gender							
	Boys	:	:	4.8	7.0	5.9	7.8	
	Girls	:	:	3.5	5.6	3.9	5.9	

Source: OECD (2023a).

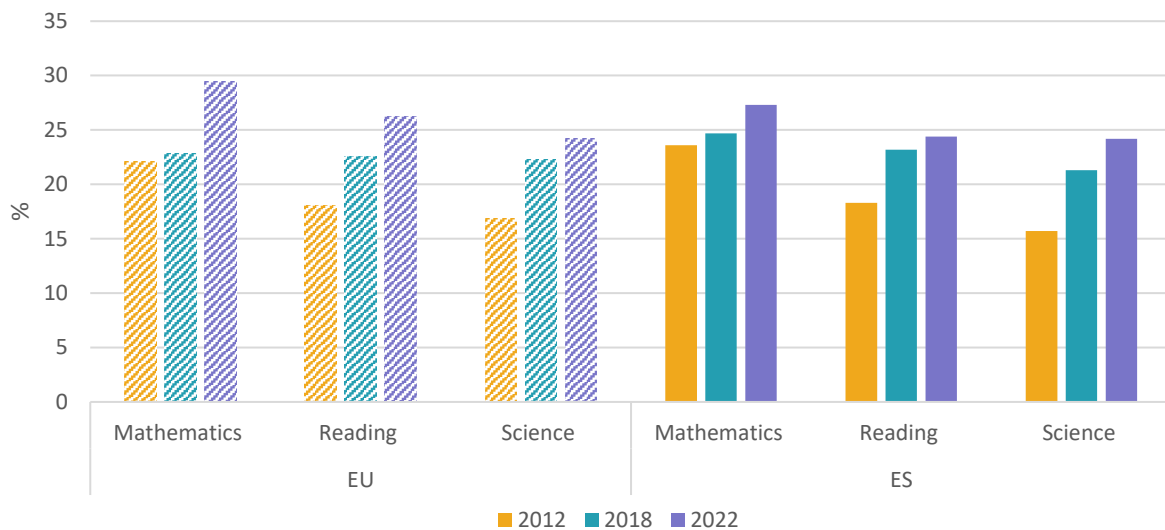
In Spain, the proportion of low-achieving students is below the EU average in all three fields but shows a moderate increase since 2018. Underachievement has gradually increased since 2012, albeit less than at EU level. In mathematics, the increase has been 3.7 pps (EU: 7.3 pps), and in reading and science slightly more, 6.1 pps (EU: 8.2 pps), and 5.6 pps (EU: 7.4 pps), respectively. The increase since 2018 was more moderate than the EU average (2.6 pps vs EU: 6.6 pps in mathematics). Similarly to other EU Member States, boys are more likely to underachieve than girls in reading while there is no gender gap in mathematics and science. When it comes to students born abroad, their underachievement rate exceeds that of students without migrant background by 21.7 pps. On the contrary, the gap between native-born students with foreign-born parents and those without migrant background stands at 7.9 pps in favour of the latter. This is among the lowest values within the EU.

The socio-economic gap in underachievement in mathematics has remained unchanged since 2012. In 2022, disadvantaged students performed better in Spain than in other EU countries (44.0% vs. EU: 48.0%), while the share of underachieving students among socio-economically advantaged students is around the EU average (10.6%, vs. EU: 10.9%). This represents a significant socio-economic gap, albeit smaller than the EU average (33.4 pps vs EU: 37.2 pps).

The share of top performing students is below the EU average in all three fields. While it has remained unchanged in reading and science since 2012, it has further dropped by 2.1 pps in mathematics (EU: -4.7pps). The gender gap among top performers is close to the EU average in all three domains with higher rates for boys in science and mathematics. On the contrary, girls are over-represented among top performers in reading.

Spanish 15-year-olds' well-being is high. 86.1% of them reported they felt they belong at school, which was the highest share among EU Member States. The mathematics performance of these students exceeds by 13 score points⁸⁰ that of those students who do not feel a sense of belonging. The share of students who report being bullied at least a few times a month stood at 7.7% in 2022, the second lowest share within the EU. However, exposure to bullying is associated with a drop of 25 score points⁸¹ in mathematics performance, which in turn is the highest value in the EU.

Figure A50. Underachievement rates in mathematics, reading and science



Source: OECD (2023a).

Since mid-2022 a curriculum reform for primary and secondary education is being rolled out. The new curricula aim to adapt the Recommendation on Key Competences for Lifelong Learning to the Spanish education system at the different education levels. The primary education curriculum is based on eight key competences. The curriculum for secondary education pays special attention to academic orientation and educational inclusion. This is to prevent early school-leaving and to facilitate the achievement of good learning outcomes for all students. A Royal Decree establishes curricular diversification programmes where subjects are organised in a flexible and alternative way for those students with learning difficulties. The Royal Decree on upper secondary education sets up four independent tracks to be chosen by students: sciences and technology; humanities and social sciences; arts; and general. This last track is a new route designed for those students who are looking for a more global and flexible training and allows a practically individualised organisation of this educational stage. Spain's Recovery and Resilience Plan supports the education guidance, advance and enrichment (#PROA+) programme in schools of particular educational complexity; and set up education support for vulnerable students.

⁸⁰ After taking into account students and schools' socio-economic characteristics.

⁸¹ Ibid.

 **Sweden**
Figure A51. Key indicators from PISA 2012, 2018 and 2022

			2012		2018		2022		
			SE	EU	SE	EU	SE	EU	
Share of 15-year-olds underachieving	Mathematics	Total	27.1	22.1	18.8	22.9	27.2	29.5	
		By gender	<i>Boys</i>	28.2	16.1	19.5	22.8	28.3	29.0
		<i>Girls</i>	26.0	22.8	18.1	22.9	26.1	30.0	
		By socio-economic status	<i>Top quarter</i>	12.9	7.6	8.4	8.6	10.9	10.9
		<i>Bottom quarter</i>	41.0	38.0	32.8	38.2	44.4	48.0	
		By migrant background	<i>Native with native-born parents</i>	22.1	:	12.8	:	20.1	:
		<i>Native with foreign-born parents</i>	39.0	:	30.7	:	40.3	:	
		<i>Foreign-born students</i>	58.8	:	47.7	:	52.3	:	
		Reading	Total	22.7	18.0	18.4	22.5	24.3	26.2
		By gender	<i>Boys</i>	31.3	24.3	23.2	27.3	30.2	30.7
	<i>Girls</i>	14.0	11.7	13.6	17.4	18.1	21.7		
	Science	Total	22.2	16.8	19.0	22.3	23.7	24.2	
	By gender	<i>Boys</i>	:	:	20.7	23.2	26.7	25.6	
	<i>Girls</i>	:	:	17.3	21.2	20.7	22.9		
Share of 15-year-olds top performers	Mathematics	Total	8.0	12.6	12.6	11.0	10.0	7.9	
		By gender	<i>Boys</i>	8.8	14.8	13.0	12.6	11.5	9.8
		<i>Girls</i>	7.2	10.3	12.2	9.3	8.4	5.9	
		Reading	Total	7.9	8.3	13.3	8.1	10.2	6.5
		By gender	<i>Boys</i>	5.3	5.8	10.6	7.0	8.0	5.6
		<i>Girls</i>	10.5	21.8	16.0	10.0	12.5	7.4	
		Science	Total	6.3	8.0	8.3	6.3	10.0	6.9
		By gender	<i>Boys</i>	:	:	8.6	7.0	10.9	7.8
		<i>Girls</i>	:	:	8.0	5.6	9.0	5.9	

Source: OECD (2023a).

Swedish students' underachievement rates increased significantly since 2018 but remain lower than the EU average in all three fields. The positive trends recorded between 2012-2018 have been reversed in the past 4 years, leading to underachievement rates comparable to 2012 levels. The largest increase has been recorded in mathematics with 8.4 pps (EU: 6.6 pps), leading to a rate of 27.2% (vs EU 29.5%). The deterioration was also significant in reading (5.9 pps vs EU: 3.7 pps) and science (4.7 pps vs EU: 2 pps). Gender disparities exist in reading and science where boys are over-represented among underachieving students. The gap stands at 12.1 pps and 5.9 pps, respectively, higher than at EU level (8.9 pps; 2.7 pps).

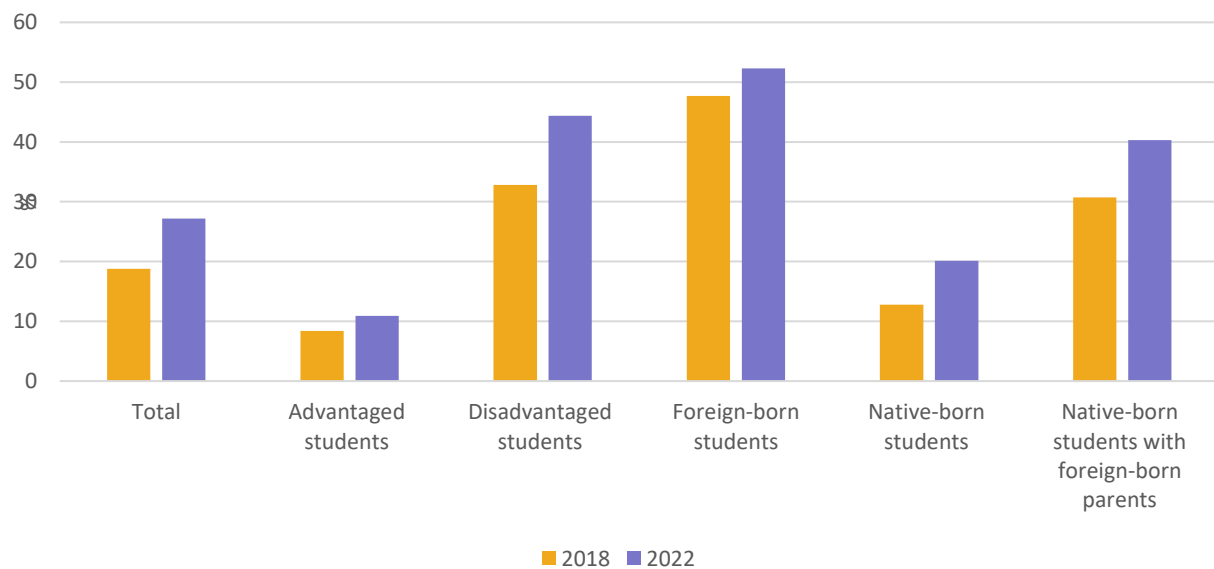
Migrant students are more likely to underachieve in mathematics. Half of foreign-born students (52.3%) and 4 out of 10 native-born students with parents born abroad (40.3%) do not reach a minimum proficiency level in mathematics. Their underachievement rates are among the highest rates in the EU, while those of students without a migration background is significantly lower at 20.1%. The gap between students without migrant background and foreign-born students stands at 32.2 pps, which shrinks to 20.6 pps when it comes to native-born students with foreign-born parents.

Underachievement in mathematics is linked to socio-economic status. In 2022, 4 out of 10 students from disadvantaged backgrounds (44.4%) did not reach a minimum proficiency level in mathematics. While this is below the EU average of 48.0%, it represents a major increase by 11.7 pps since 2018, when it stood at 32.8%. At the same time, the rate has remained stable for the top quartile of socio-economic distribution at 10.9% (corresponding to the EU average), pointing to a widening socio-economic gap.

Despite a downward trend since 2018, Sweden remains among the countries with the most top performers in all three fields. Following a positive trend between 2012-2018, the share of top performing students dropped in mathematics (-2.6 pps) and reading (-3.1 pps), but slightly increased further in science (1.7 pps) in the past four years. Nevertheless, the share of top-performers (around 10%) in all three fields is well above the EU averages. Girls are under-represented among top performers in mathematics and science in line with EU trends. At the same time, in reading the difference in favour of girls at 4.5 pps is significant (EU: 1.8 pps).

Student wellbeing impacts on mathematics performance. 18.9% of students report being bullied at least few times a month and this is associated with a decrease in mathematics performance by 12 score points. In contrast, students reporting a sense of belonging perform 20 score points better, which is one of the highest correlations in the EU. In Sweden, 70.2% of students feel they belong at school.

Figure A52. Underachievement rates in mathematics



Source: OECD (2023a).

Sweden is working on improving educational outcomes and equity. The Swedish School Inspectorate has published a report on the challenges faced by school providers and the action taken to reduce segregation in schools. The government has made available several investment schemes for more special education teachers, and psychosocial and medical support, and for teaching materials, primarily printed books. Financial incentives for teachers have been introduced to reward excellence in teaching and working in disadvantaged schools. Compulsory school pupils are offered additional study support and vacation schooling. During lessons, students are only allowed to use mobile devices following the teacher's instruction. From August 2022, school staff are allowed to take justified temporary measures to ensure discipline, students' security, and peaceful studying.

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