2.1 Underachievement in basic skills

In a nutshell

Underachievement at age 15 focuses on students who perform below the minimum level in reading, maths or science[108] necessary to participate successfully in society. Failing to meet this very basic proficiency level lowers a pupil's future chances both on a personal and professional level. The corresponding EU-level target for 2030 is to ensure that the total average underachievement in these three domains across the EU is below 15%. On average across the EU, the EU-level target – an underachievement rate of less than 15% – has not been reached in any of the three domains tested by PISA 2018. In 2018, the underachievement rate stood at 22.5% in reading, 22.9% in mathematics and 22.3% in science[109]. Despite progress in 2009-2018 in some countries, performance in science and reading deteriorated at EU level and remained stable in mathematics. PISA results suggest that countries tend to obtain similar results across the three domains. Countries such as Estonia, Finland, Ireland and Poland have low underachievement rates in all three domains. By contrast, in Bulgaria, Romania Cyprus and Malta, more than one in five students underachieve at the same time across all three domains.

2.1.1 Progress towards the EU-level target: reading

In 2018, reading performance showed large variation across the Member States (Figure 45). Four countries met the 15% EU-level target for low achievement: Estonia (11.1%), Ireland (11.8%), Finland (13.5%) and Poland (14.7%) and Denmark was just above the target (16.0%). By contrast, the underachievement rate exceeded 30% in Malta (35.9%), Slovakia (31.4%) and Greece (30.5%), and even 40% in Bulgaria (47.1%), Cyprus (43.7%) and Romania (40.8%).

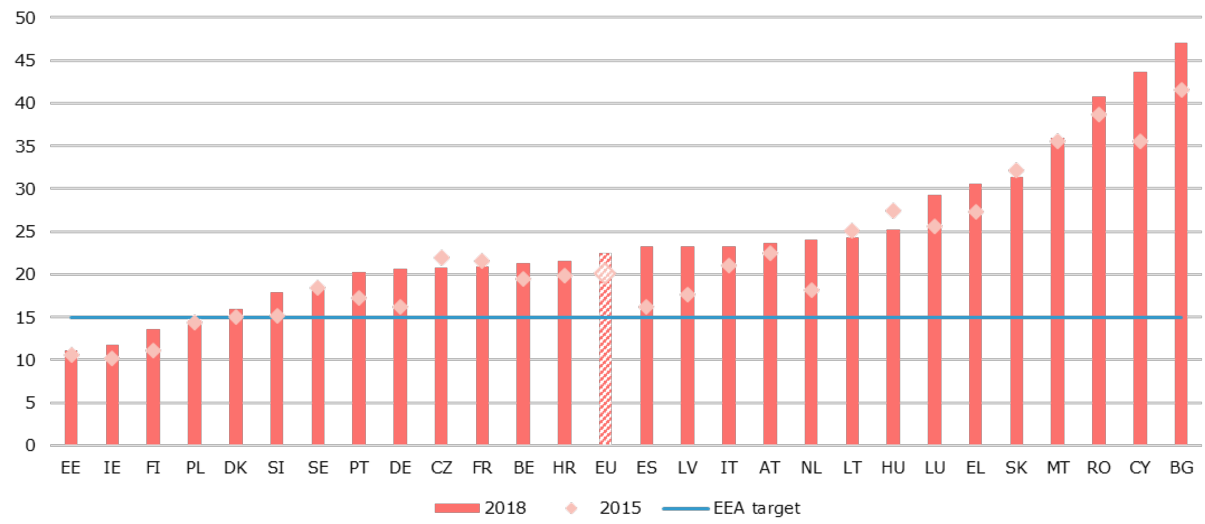
Performance worsened in most countries compared to the previous 2015 PISA round. This is reflected in the slightly increased EU average, from 20.0% in 2015 to 22.5% in 2018. The deterioration was statistically significant in Cyprus (+8.1 pps), the Netherlands (+6.0 pps), Latvia (+4.8 pps), Germany (+4.5 pps), Luxembourg (+3.6 pps), Slovenia (+2.7 pps) and Finland (+2.5 pps).

Looking at reading performance over a longer time span, performance did not change substantially in most countries between 2009 and 2018. In eight countries (the Netherlands, Slovakia, Greece, Hungary, Finland, Latvia, Belgium and Luxembourg) the underachievement rate increased at a statistically significant rate. Only Ireland and Slovenia experienced a statistically significant decline. Overall, EU reading performance deteriorated, with the 2009 EU average underachievement rate at 19.2%.

108 Data stem from the OECD PISA, which targets 15 year-olds, takes place every three years and is the largest international competence test for school students. All EU Member States participated in PISA 2018, involving 7 854 schools and 207 851 students across the EU. The three PISA domains of reading, mathematics and science are all tested in each wave of the survey, with one domain being chosen as "core" each time. In PISA 2018, reading was the core domain. This section features a summary of the PISA 2018 data with regard to the EEA 2030 target. A new PISA study is scheduled only for 2022 with the data likely to become available at the end of 2023.

109 EU27 (without the UK).

Figure 45: Underachievement rate in reading, 2015 and 2018 [%]



Source: PISA 2018, OECD.

Note: In 2018, some regions in ES conducted their high-stakes exams for tenth-grade students earlier in the year than in the past, which resulted in the testing period for these exams coinciding with the end of the PISA testing window. Because of this overlap, a number of students were negatively disposed towards the PISA test and did not try their best to demonstrate their proficiency. Although the data of only a minority of students show clear signs of lack of engagement (see PISA 2018 Results Volume I, Annex A9), the comparability of PISA 2018 data for ES with those from earlier PISA assessments cannot be fully ensured.

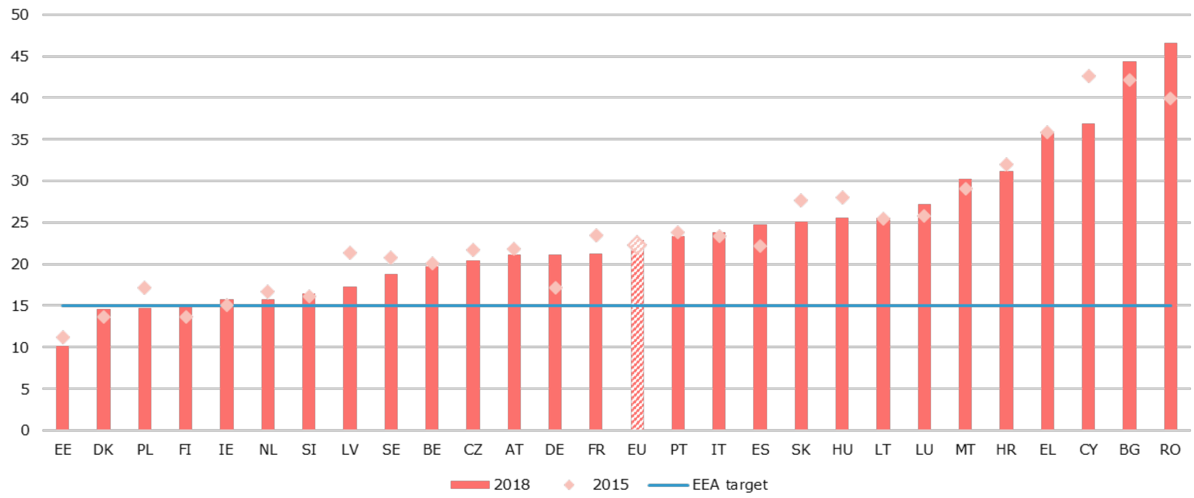
2.1.2 Progress towards the EU-level target: maths

The 2018 pattern of underachievement in mathematics is similar to that for reading (Figure 46). Four countries met the 15% target: Estonia (10.2%), Denmark (14.6%), Poland (14.7%) and Finland (15.0%). Ireland (15.7%), the Netherlands (15.8%) and Slovenia (16.4%) were just above the EU-level target. The underachievement rate exceeded 30% in Romania (46.6%), Bulgaria (44.4%), Cyprus (36.9%), Greece (35.8%), Croatia (31.2%) and Malta (30.2%).

Performance remained rather stable in many Member States between 2015 and 2018. A slight majority of countries experienced a decline in the underachievement rate, but it was statistically significant only in Cyprus (−5.7 pps) and Latvia (−4.1 pps). The only statistically significant increases took place in Romania (+6.6 pps) and Germany (+3.9 pps). Consequently, the EU average, at 22.9%, remained stable compared to 2015, when it stood at 22.2%.

The EU average performance in mathematics remained stable also over the longer window of 2009-18, although trends differ across Member States. Three countries experienced a statistically significant increase of their share, namely Finland (+7.1 pps), Slovakia (+4.1 pps) and Luxembourg (+3.3 pps). At the same time, four Member States registered a statistically significant decrease: Poland (−5.8 pps), Latvia (-5.2 pps), Ireland (-5.1 pps) and Slovenia (-3.9 pps).

Figure 46: Low achievers rate in mathematics, 2015 and 2018 [%]



Source: PISA 2018, OECD.

Note: Data in ascending order according to 2018 values.

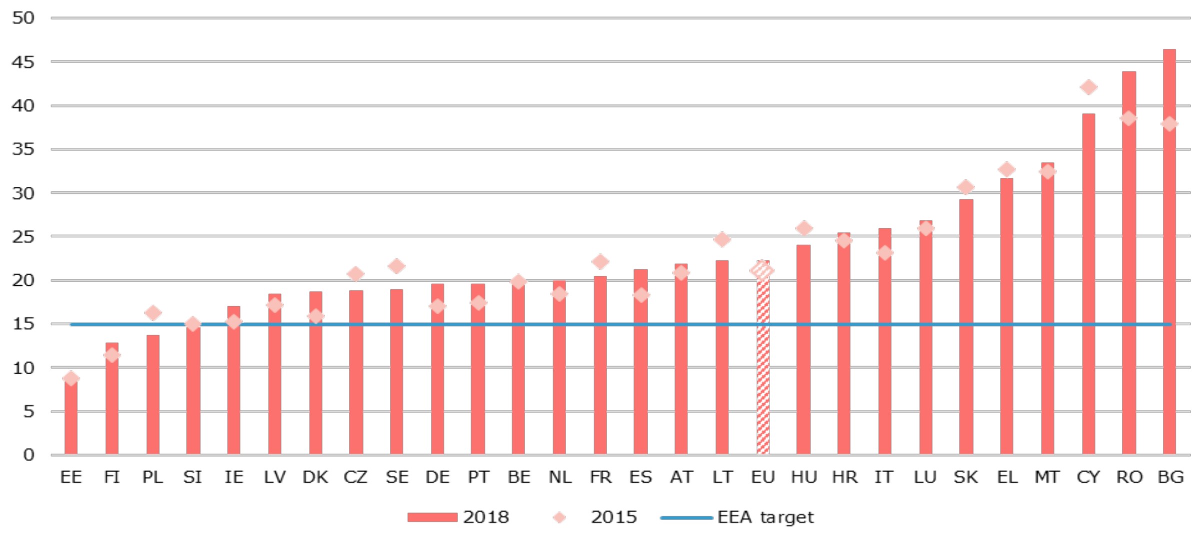
2.1.3 Progress towards the EU-level target: science

The rate of low achievers in science also shows a mixed picture across EU Member States (Figure 47). Four countries met the 15% target in 2018: Estonia (8.8%), Finland (12.9%), Poland (13.8%) and Slovenia (14.6%). By contrast, the rate of low achievers was higher than 30% in Bulgaria (46.5%), Romania (43.9%), Cyprus (39.0%) and Greece (31.7%).

In a few Member States the rate of low achievers increased with statistical significance between 2015 and 2018 (+8.6 pps in Bulgaria, +3.0 pps in Spain, +2.8 pps in Denmark), while Cyprus and Poland experienced a statistically significant decline (—3.2 pps and —2.4 pp, respectively). The EU average slightly increased, from 21.1% to 22.3%.

Long-term trends (2009-18) for science are more negative than for reading or mathematics. The EU average rate of low achievers increased by 4.2 pps over the past decade. No EU country was able to reduce significantly its share of low achievers over the decade. The share increased significantly in Hungary (+10.0 pps), Slovakia (+10.0 pps), Bulgaria (+7.7 pps), Croatia (+6.9 pps), Finland (+6.9 pps), Greece (+6.5 pps), Italy (+5.2 pps), Lithuania (+5.2 pps), Germany (+4.8 pps) and Latvia (+3.8 pps). In many cases, the largest increase took place between 2012 and 2015.

Figure 47: Rate of low achievers in science in 2015 and 2018 [%]



Source: PISA 2018, OECD.

Box 10: Girls in science, technology, engineering and mathematics (STEM)

Performance on the OECD's PISA scale for science has proved to be a strong predictor of STEM and ICT career aspirations. Girls aspiring to STEM careers are better performers in science than girls with non-STEM career aspirations or boys with STEM career aspirations. On average across OECD countries, boys and girls are almost equally likely to expect to work in a science-related field – although this does not apply for all fields in the sciences. Some 25% of boys and 24% of girls expect to be working in a science-related occupation when they are 30, a small (yet statistically significant) difference. In most countries, similar shares of top-performing boys and girls expect a career in a science-related field; and in Denmark and Poland, top-performing girls are significantly more likely than top-performing boys to expect a career in one of these fields.

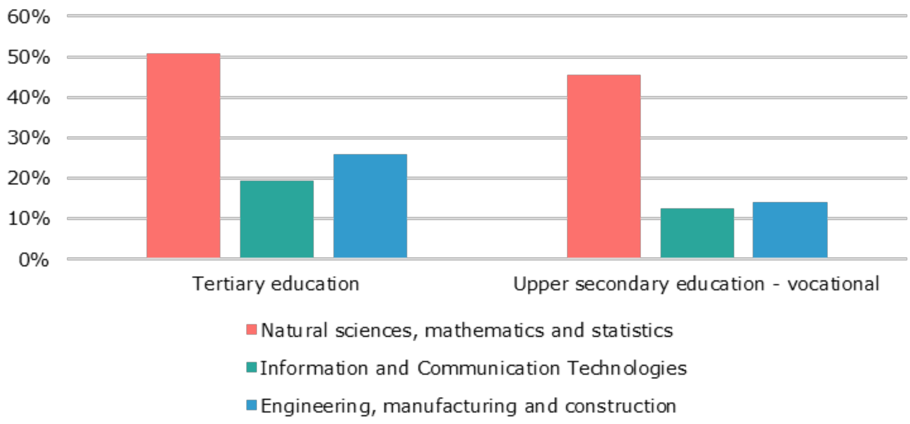
As shown in the figure below, the percentage of new entrant girls in 2019 was low both in tertiary and upper-secondary vocational education. Equally, on the labour market, women are underrepresented in high value sectors. In 2019, 41% of scientists and engineers working in the EU were women, and just 21% in high-technology sectors. Similarly, a mere 18% of ICT specialists in the EU were women.

Attracting more women into STEM education and subsequent employment could help to address labour supply and skills shortages in these occupations, as well as avoid talent loss to drive innovation and growth. Additionally, closing the gender gap in STEM is predicted to contribute to an increase in EU GDP per capita by 0.7–0.9% by 2030 and between 2.2% and 3.0% (€610-820 bn) by 2050. Some possible policy initiatives include introducing career counselling in schools, offering gender-sensitive training to staff, as well as providing advice and guidance during the early years. According to the 2021 OECD report Future at Five: Gendered Aspirations of Five-year-olds, children aspire to roles that are known to them. Exposure to STEM jobs and female role models is therefore essential. Several initiatives exist under the 2021-2027 digital education action plan, actions 12 and 13, respectively:

- a series of workshops, training and placement activities for female students at primary, secondary and tertiary education by the European Institute of Innovation and Technology and its Knowledge and Innovation Communities. This will boost digital skills applied to social challenges.

- developing new higher education programmes for STEM, by reinforcing the arts aspect and basing them on the concept of STEAM (STEM plus arts subjects). This will be done by building on the EU STEM Coalition's expertise to incorporate sustainability and creativity and include guidance and mentorship, to be more attractive for women.

Figure 48: Share of female students in STEM fields by education level in the EU, 2019 [%]



Source: Eurostat, New entrants by education level, programme orientation, sex and field of education. Online data code: [educ_uoe_ent02].

2.1.4 Policy takeaways

The PISA 2018 results show that one in five students cannot complete very basic tasks in reading, mathematics and science. This is not only a worrying social issue, but also a drag on EU future economic competitiveness and resilience. Yet some EU countries have been able to improve their PISA performance over time by putting in place structural education reforms. This section highlights some key takeaways from a few top-performing countries.

Among Member States, Estonia, Poland and Ireland show consistently outstanding results in PISA. Estonia gives particular attention to equity and inclusiveness: every school has coordinators who provide services to students with special needs, and a mandate to give additional personalised support to prevent students from dropping out of education, so that no one is left behind. Factors contributing to Estonia's strong performance may include compulsory attendance at school until completion (or until the student is 17 years old), the high degree of autonomy enjoyed by schools and the obligation to conduct self-evaluations every three years.

Poland's good results are likely due to factors such as increased school autonomy and a rapid expansion of early childhood education and care. Evidence shows that past reforms[110] have contributed to a significant reduction in education inequalities, in particular among children from rural areas. Supported by EU funding, Poland has also invested extensively in supporting teachers through continuous professional development programmes, as well as online teaching tools and resources.

A stronger focus on equity and the early years is also one of the main features of the Irish education system. Past initiatives[111] have helped reduce the impact of students' socio-economic background on their performance, and this extends to students from an immigrant background. Moreover, teachers are recruited from among high academic performers, and they benefit from extensive professional development.

110 For instance, in 1999, PL introduced an educational reform setting up lower secondary schools (*gimnasia*), which delayed channelling learners into different educational tracks until the age of 16. These changes were followed by a new competence-based core curriculum, new examination and assessment systems as well as increased school autonomy.

111 For instance, student performance has benefited from the "Strategy to Improve Literacy and Numeracy", the "Delivering equality of opportunity in schools" programme and from extensive support for special educational needs.