OECD Skills Studies

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THE PERSISTENCE OF GENDER GAPS IN EDUCATION AND SKILLS

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BETTER POLICIES FOR BETTER LIVES

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Foreword

Creating a more inclusive, just and equitable world – the essence of sustainable development – means ensuring that all men and women, all boys and girls, can lead empowered and dignified lives. One of the key ways to achieve this goal is an inclusive and gender-equitable education of good quality that enables men and women to develop the right skills and find opportunities to use them productively. Education is also at the heart of the Sustainable Development Goals (SDGs) that the international community sets itself to achieve by 2030. To that end, many countries have witnessed a remarkable evolution over the past two decades, in terms of closing the gender gap in education access and learning outcomes between girls and boys. But the reality remains more complex. As this report reveals, even when boys and girls are equally proficient in mathematics and science, their attitudes towards learning and aspirations for their future are markedly different – and that has a significant impact on their decisions to pursue further education and their choice of career.

The 2023 Gender, Education and Skills Report *on the persistence of gender gaps in education and skills* presents fresh insights on progress towards gender parity in education with respect to access, attainment and learning, using data from the latest rounds of the Survey of Adult Skills (PIAAC), the Programme for International Student Assessment (PISA), and Education at a Glance. The report tries to understand why teen boys are more likely than girls, on average, to fail to attain a baseline level of proficiency in reading, mathematics and science, and why high-performing girls do not continue investing in developing skills in areas such as mathematics and science, when compared to high-performing boys. The report also describes that despite overall gender gaps in mathematics and science being quite small, young women continue to be under-represented in STEM-related fields after leaving school. At university, men develop greater proficiency in numeracy than women, probably due to these very different career choices that men and women make. But it is also noticed that the advantage in literacy performance that girls had during compulsory education seems to narrow or completely disappear at university. These career choices are also reflected in gender disparities in the labour market: tertiary-educated women earn 76% of the earnings of their male peers. This could be possible because men are more likely than women to pursue studies in fields associated with higher earnings, such as engineering, manufacturing and construction, and information and communication technologies, while women still choose fields associated with lower earnings, including education, welfare and arts and humanities.

The evidence in the report makes clear that the gender disparities in school performance and the resultant career choices do not stem from innate differences in aptitude but rather from students' attitudes towards learning and their behaviour in school, from how they choose to spend their leisure time, and from the confidence they have – or do not have – in their abilities as students. Many of these differences in behaviour and confidence are a direct outcome of gender norms and cultural constructs in society negatively affecting student and teacher attitudes, career choices and women's opportunities later in life.

It is common knowledge that education is critical for sustainable development and achieving basic human rights. Now, more than ever, education has a responsibility to foster the right type of skills, attitudes and behaviour that will lead to sustainable and inclusive growth. Inclusive growth requires that education is inclusive of the development of both men and women. But gender equality in education cannot be achieved by the education sector alone. It requires concerted efforts by parents, teachers and employers to become more aware of their own conscious or unconscious biases so that they give girls and boys equal chances for success at school and beyond.

This report is a valuable contribution to the OECD's work on gender issues, which examines existing barriers to gender equality in education and the labour market with the aim of improving policies and promoting gender equality in both OECD and partner countries. It shows clearly that we cannot rest complacent. If countries tailor policies to act upon the evidence presented in this report, they would realise that education has the power like nothing else to nurture empowered, reflective, engaged and skilled citizens who can chart the way towards a more equitable and fairer planet for all.

Acknowledgements

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Editorial

Economies around the world are shuddering from the effects of Covid, climate change and war. When economies are struggling, they need the skills and creativity of the broadest range of workers just to keep up. But many societies are hobbling themselves by not encouraging their girls and women to fulfil their potential to participate fully in the economic and social life of their country.

In the best of times, limiting the opportunities available to half the population, whether intentionally or inadvertently, is a waste of valuable resources as well as a personal privation for the individual girls and women involved. Too often, women's contribution to the economy lags behind that of men – not because women are unwilling to offer their skills to the labour force, but because they have been prevented from developing their skills to the fullest.

This report, Gender, Education and Skills: The persistence of gender gaps in education and skills, examines the impressive progress made over the past couple of decades in access to education for girls in OECD and partner countries; but it also highlights the persistent disparities in educational and professional outcomes that stimy the realisation of gender equality in the workplace as those girls become women. Using data from the OECD Programme for International Student Assessment (PISA), Education at a Glance and the Survey of Adult Skills (PIAAC), the report provides an overview of how these disparities manifest themselves at several important points during the course of a person's life: towards the end of compulsory education, in tertiary education, and at entry into the labour market.

Girls make strides early in their education

There is no question that over the past 20 years, girls have made enormous progress in education. Evidence from OECD data show that in almost half of the countries considered, women are now more likely than men to hold an upper secondary degree. Even in countries where men have an advantage, that gap has shrunk considerably since 2020. In several countries, namely Belgium, France, Greece, Italy, Mexico, New Zealand, Poland and Spain, the gap observed in favour of men in 2000 reversed in favour of women by 2020. In Estonia, Latvia, Portugal and Spain, men are more than five percentage points behind women in secondary school attainment.

In secondary school, gender differences in performance – particularly in reading – are stark. PISA consistently shows that 15-year-old girls outperform boys in reading. In 2018, girls scored 30 points higher than boys, on average, in reading, and their advantage in that subject was observed in every participating country and economy.

How students spend their time outside of the classroom has an impact on how they perform in school. Students who enjoy reading, for example, are motivated to spend more time reading and thus improve their vocabulary and comprehension skills. In all PISA-participating countries and economies in 2018, girls reported much higher levels of enjoyment of reading than boys. On average across OECD countries, 44% of 15-year-old girls, but only 24% of boys the same age, agreed that "Reading is one of my favourite hobbies".

Something keeps girls from excelling in mathematics and science

While 15-year-old boys are more likely than girls of the same age to be low achievers in reading, mathematics and science, PISA also finds that among the highest performers of both genders, boys usually outperform girls in mathematics and science. On average, across OECD countries in 2018, around 12% of boys and 9% of girls attained the highest levels of mathematics performance in PISA, while just over 7% of boys and around 6% of girls were top performers in science.

There could be many reasons why girls are under-represented among the highest performers in mathematics. Girls generally have less self-confidence than boys in their ability to solve mathematics or science problems. Girls – even high-achieving girls – are also more likely to express strong feelings of anxiety towards mathematics. In 70 countries and economies that participated in PISA 2018, girls reported more often, and to a larger extent, a fear of failure than boys. Fear of failure and lack of confidence in their abilities are often linked to gender stereotypes that persist in families, school and communities. For example, in all PISA countries and economies that distributed the parent questionnaire in 2012, parents were more likely to expect their sons, rather than their daughters, to work in a field related to science, technology, engineering or mathematics (STEM).

These attitudes can influence students' career expectations, even among high-performing students. PISA 2018 results showed that, on average across OECD countries, only 14% of 15-year-old girls who were top performers in science or mathematics reported that they expect to work as professionals in science or engineering, while 26% of top-performing boys the same age so reported. Not surprisingly, these attitudes influence students' decisions about what to study in university which, in turn, affect young men's and women's prospects in the labour market and their earnings throughout their lives.

Women have made their mark in tertiary education, but not in certain fields of study

In recent decades, the share of women who have completed tertiary education has risen consistently, reversing the historical gender gap in favour of men. By 2020, in almost all countries women were more likely than men to have graduated from tertiary education. Even in Germany, Korea, Mexico and Switzerland, where men were more likely to complete tertiary education, the gender gap in their favour narrowed dramatically between 2000 and 2020.

Among many possible reasons for this remarkable turnaround are the economic benefits that accrue to all people, but particularly to women, who have a tertiary degree. Not only are tertiary-educated people more likely to be employed, compared with those who have only completed a secondary degree, but they also earn more over their lifetime. On average across OECD countries, 25-34 year-old tertiary-educated women earn 52% more than women of the same age with only an upper secondary education (among men the same age, the difference between the two groups is a sizeable, but smaller, 39%).

Yet once in tertiary education, women still predominantly choose fields of study that will land them in lower-paying professions. Between 2005 and 2020, the percentage of new tertiary graduates in engineering, manufacturing and construction who were women remained almost the same, around 25%, and the percentage of graduates in ICT-related fields who were women shrunk by about 3%. But the percentage of women among all graduates in fields related to education (80%), health (80%) and social sciences (70%) also barely changed since 2005.

There are many reasons, including gender stereotypes and social conventions, why young women continue to shy away from STEM studies. Given the paucity of female scientists, young women have little tangible evidence to disprove the notion that mathematics and science are somehow more “masculine” disciplines. PISA results show that few mothers of 15-year-olds around the world work in STEM occupations; indeed, in all PISA countries and economies there are far fewer women than men employed in these sectors.

Choices made during tertiary education are reflected in gender disparities in the labour market

Even though women are now as likely as men (in some countries, even more likely than men) to graduate from tertiary education, in every OECD country, women in the workforce earn less than men. On average, among all adults, tertiary-educated women earn 76% of the earnings of their male peers. Often, earnings are directly linked to the field of study people choose in tertiary education. Men are more likely than women to pursue studies in fields associated with higher earnings, such as engineering, manufacturing and construction, and information and communication technologies, while women still choose fields associated with lower earnings, including education, arts and humanities.

In addition, women, to a much greater extent than men, often have to balance the conflicting demands of a professional career with household and family responsibilities. To do so, women are more likely than men to seek less competitive paths and greater flexibility at work, leading to lower earnings than men with the same educational attainment enjoy.

The key to narrowing gender gaps in education and employment is awareness

Too often, parents, teachers and employers are not conscious of their gender biases. As a result, girls and boys are not given equal chances for success at school, and men and women are not given equal opportunities and rewards in the labour market.

More young people might choose scientific and technological careers if students, particularly girls, were given greater assistance in overcoming their anxiety towards mathematics and their lack of confidence in their STEM abilities. Removing gender biases in curricula could encourage more girls to improve their numeracy skills and more boys to improve their reading skills – and make it possible for all students to realise their potential.

Governments, schools and the private sector could work together to provide timely and accurate information to secondary and tertiary students about the studies required for specific careers and the earnings students can expect from those careers.

Persistent pay gaps related to gender could be narrowed by introducing targeted policies at the national level. One such policy focuses on pay transparency, which makes companies acknowledge the size of their gender pay gap. With this measure, companies are required to analyse wage gaps between their male and female employees and are requested or required to share this information with employees, government auditors or the public.

The concurrent crises rattling the world's economies demand a concerted response from all countries. Societies are most creative and capable when they encourage all members to invest in their own future and then participate fully in the life of the community. How much harder it is to weather, let alone overcome, these crises if girls and women remain – or are left – on the sidelines.

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Executive summary

Gender equality in education is a matter of social justice, opportunities and freedoms. It is crucial for sustainable development, for peaceful societies and for individual wellbeing. Gender-equitable education systems empower girls and boys and promote the development of life skills – like self-management, communication, negotiation and critical thinking – that young people need to succeed. They also help close skills gaps that perpetuate pay gaps, and contribute to the prosperity for entire countries. Over the past century, OECD countries and other partner countries have made significant progress in narrowing or closing long-standing gender gaps in many areas of education and employment, including educational attainment, pay and labour-market participation. However, new gendered patterns in education have come to light and this report seeks to highlight and examine these gender gaps using the most recent data from the Survey of Adult Skills (PIAAC), the Programme for International Student Assessment (PISA), and Education at a Glance.

The report starts with an introduction that presents the main highlights from the remainder of the report. Section 2 then goes on to show that gender gaps in upper secondary education attainment have almost closed with more than 80% of women on average across the OECD completing education at this level. But the section also reveals that in most countries, those who quit school early are predominantly men. Data from PIAAC shows that, on average across OECD countries, 58% of early school leavers among all 18-24-year-olds are men.

Looking beyond attainment at the upper secondary education level, Section 3 analyses the gender gaps in performance in upper secondary education. Gender gaps in cognitive skills of boys and girls around age 15 are similar across countries: girls outperform boys in reading in all countries and while boys do better than girls in mathematics, they do so by a much smaller margin than that of girls doing better than them in reading. It is also observed that even though the gender gaps in mathematics are not too large, among high-achieving students, boys tend to significantly outperform girls in mathematics. Section 4 tries to explain these interesting findings. It posits that student attitudes (motivation, interest) in studying a particular subject rather than their ability. Boys tend to fall behind girls in reading because they spend much less time reading outside of school, spend less time doing their homework and also use the Internet for leisure for longer hours than girls. Girls, especially high-achieving girls, tend to underperform in mathematics because they generally have lesser self-confidence than boys in their ability to solve mathematics or science problems. They are also more likely to express strong feelings of anxiety towards mathematics. This fear of failure and lack of confidence in their abilities is often exacerbated by the gender stereotypes that girls face at home, in school and within their communities.

Section 5 then tries to understand the transition from school to tertiary education and the gender gaps at higher levels of education. While the share of women with tertiary education has risen consistently in recent decades, young women are much less likely than young men to choose Science, Technology, Engineering, or Mathematics (STEM) as fields of study at graduate level. The share of women in these fields further declines at the post-graduate level. The existence of gender gaps in fields of tertiary study indicates that young women often do not translate their good school performance into fields of studies for higher education that offer better employment prospects, such as STEM studies. This is explained by the lack of self-confidence girls have in their mathematics and science abilities during school which may be one of the first fissures that widen into the gender gap in students' pathways towards STEM-related careers. Added to that is the lack of role models for girls in STEM fields, which means that young girls have little tangible evidence to disprove the notion that mathematics and science are somehow more "masculine" disciplines.

Sections 6 and 7 discuss the skill levels of university students and those of adults later in life. These sections highlight with data that since more men than women choose fields of study with higher mathematical content, such as STEM fields, this could explain why the use of advanced mathematics among university students is overwhelmingly greater among men. This disproportionately higher likelihood that men will specialise in fields of study that make more intensive use of numeracy skills could also explain the wide gender gap in numeracy skills among university students and later on in the general adult population.

Section 8 emphasises the inevitable consequences of these gender imbalances in fields of study and choices of careers. More women have indeed entered the workforce in recent years, but they often experience more difficulty than men in finding a first job, earn less than men, and are more likely to work part time. Furthermore, the fields of study that young women and men choose perpetuate gender segregation in the labour market, with women under-represented in the STEM sector and concentrated in health, welfare, education and administrative jobs.

These gendered patterns raise concern for policy makers for a number of reasons- they imply an under-utilisation and misallocation of talent, which limits economic growth. In addition, horizontal segregation in the field of study contributes to occupational segregation, which hinders employment opportunities and significantly contributes to gender gaps in earnings. Section 9 thus offers ways and key learnings from different countries that could be used to address these systemic and pervasive gender gaps in a systematic and planned manner. Countries must step up their efforts through sustained campaigns, monitoring policies aimed at gender equality, greater public investment, and the introduction and expansion of legal measures. The policy suggestions in this report could serve as a toolkit for policy makers and stakeholders willing to tackle gender inequality. The time is now to ensure that better policies lead to better lives – for girls and boys, and for women and men.

The persistence of gender gaps in education and skills

This report compiles and analyses data from all levels of education in OECD and partner countries. It begins by examining trends in the gender gaps related to upper secondary attainment and achievement among girls and boys. It identifies school subjects in which boys and girls appear to excel or underperform, and suggests reasons for these gendered differences in performance. It describes how school performance might affect men's and women's choices regarding fields of study, and highlights how choosing certain fields might influence the development of specific skills, both at university and in later life. The report also discusses men's and women's transition from education to the labour market and the existing gender gaps in employment and wages. Lastly, policies that might be useful in narrowing or closing these gender gaps are presented in the final section of the report.

1. Introduction

Over the past century, countries around the world have made significant progress in narrowing – and even closing – long-standing gender gaps in educational attainment. Indeed, in OECD countries more young women than ever before are now participating in and completing upper secondary and tertiary education. Moreover, over the past decade, gender gaps in educational attainment have reversed: girls are now more likely to graduate than boys.

Although girls and women have made impressive headway in educational attainment around the world, gender gaps in favour of boys persist in mathematics and numeracy. These differences seem to be largely due to persistent gender stereotypes and cultural constructs that feed into girls' lack of confidence in their abilities and fear of failure. Given these negative perceptions of their abilities in mathematics, even if they are not true, young women are also much less likely than their male peers to choose scientific and technological fields of study in upper secondary or tertiary education. Shying away from the more lucrative science, technology, engineering and mathematics (STEM) fields limits women's employment and income prospects; and since STEM fields involve more intensive use of mathematics, women may be less likely than men to develop and maintain numeracy proficiency as adults, as shown in the OECD Survey of Adult Skills (PIAAC).

While women's progress in education is undeniable, if limited, boys consistently underperform in school, on average, across OECD countries. In most countries, early school leavers are predominantly young men. These two observations might be inter-related. Students who perform poorly in all subjects are difficult to motivate and keep in school because there is little that teachers, school principals and parents can build on to promote improvement. These students may also feel disconnected from school and find it easier to build an identity based on rebellion against school and formal education, leading to them dropping out of the school system early.

This report compiles and analyses data from all levels of education in OECD and partner countries. It presents trends in upper secondary and tertiary educational attainment among young men and women over the past two decades. The report discusses student performance in reading, mathematics and science, as analysed by the OECD Programme for International Student Assessment (PISA), and adult competence in literacy and numeracy, as analysed by the Survey of Adult Skills (PIAAC). In addition to describing how performance might affect men's and women's choices regarding fields of study, this report highlights how choosing certain fields might influence the development of specific skills, both at university and in later life. The report covers men's and women's transition from education to the labour market and discusses existing gender gaps in adult skills, employment and wages. Policies that might be useful in narrowing or closing these gender gaps are discussed in the last section of the report.

Highlights

- Girls tend to perform better than boys in reading across all OECD and partner countries.
- Boys outperform girls in mathematics by a much smaller margin than girls outperform boys in reading; the gender gap in science is far narrower than in the other two subjects.
- The average performance of boys and girls masks wide variations among students at the extreme ends of the performance distribution.
- PISA finds that at age 15, boys are more likely than girls to be low achievers in all the three domains assessed: reading, mathematics and science.
- Among the highest-achieving students, girls perform better than boys in reading, but not in mathematics.
- Young men are more likely than young women to lack an upper secondary and a tertiary qualification, on average across OECD countries. This gender gap in favour of women has only increased between 2000 and 2020.
- In most countries, early school leavers are predominantly boys/men.
- Women continue to dominate in fields of study related to caring, health and welfare, and education, but are under-represented in STEM-related fields.
- Since women in tertiary education choose fields of study with relatively less mathematical content, they are also much less likely than their male peers to practise advanced mathematics daily.
- PIAAC finds that at university, men have greater proficiency in numeracy than women, probably due to career choice. The advantage in literacy performance that girls had during compulsory education seems to narrow or completely disappear at university.
- Gender differences in numeracy proficiency are apparent when all adults, aged 16-65, are considered, even though the differences are smaller than those found among university students.
- In contrast to numeracy, men's and women's performance in literacy is markedly similar in all countries.
- In all OECD and partner countries, men are more likely to be employed and earn higher wages, than women.

Gender equality is a fundamental human right (UN, 1948[1]). It is also a keystone of a prosperous, modern economy that provides sustainable, inclusive growth. Gender equality ensures that men and women can contribute fully at home, at work and in public life, to improve societies and economies. International recognition of the importance of gender equality led to the adoption of the Sustainable Development Goal 5 (SDG5), which views gender equality as a universal basis of sustainable development and asserts the need to accelerate efforts to end gender inequality.

However, despite growing global consensus as well as the narrowing of gender gaps in educational attainment, such differences persist in many areas of social and economic life, at all ages, and in countries at all levels of development. Young women in OECD countries have begun to complete more schooling than young men, but they continue to be less likely to study in the lucrative science, technology, engineering and mathematics (STEM) fields. Women's labour-force participation rates have moved closer to men's over the past few decades, but in every country, women are still less likely than men to engage in paid work. When women do work, they are more likely to work part time, are less likely to become managers, less likely to be entrepreneurs and earn less than men. The median full-time female worker earns just under 15% less than her male counterpart, on average across OECD countries – a rate that has barely moved in recent years (OECD, 2017[2]). Women are also under-represented in private-sector management and in politics, holding, on average, fewer than one-third of lower-house seats in national legislatures in OECD countries. On the whole, however, gender gaps are more prominent in private-sector employment and entrepreneurship.

In some regions, the cost of these gender inequalities is high, with a total income loss of 27% in the Middle East and North Africa, a 23% loss in South Asia, and a loss of around 15% in the rest of the world (Cuberes and Teignier, 2014[3]). Similarly, if the gender gap in labour-force participation is halved by 2025, the average projected baseline GDP growth across OECD countries could increase by almost 2.5 percentage points (OECD, 2017[2]). There is also evidence which suggests that raising women's labour-force participation rate to that of men in specific countries would, for instance, raise GDP in the United States by 5%, in Japan by 9%, in the United Arab Emirates by 12% and in Egypt by 34% (Aguirre et al., 2012[4]). Other studies have shown that reducing gender-based discrimination in social institutions could – depending on the chosen scenario – lead to an annual increase in the global GDP growth rate of between 0.03 and 0.6 percentage points by 2030 (Ferrant and Kolev, 2016[5]).

In rapidly ageing economies, higher labour-force participation rates among women can boost growth by mitigating the impact of a shrinking workforce. For example, in Japan, the annual potential growth rate could rise by about 0.25 percentage point if the female labour-force participation rate were to reach the average among G7 countries, resulting in a permanent rise in per capita GDP of 4%. Women are more likely to invest their resources in education and the health of their children, building human capital to fuel future growth (Schultz, 2002[6]). Helping women fully participate in the economy is not only growth promoting, but it also diversifies economies, reduces income inequality, mitigates demographic shifts and contributes to financial sector stability (Gonzales et al., 2015[7]; Kochhar, Jain-Chandra and Newiak, 2017[8]). Furthermore, after tracking 17 years of data from the United States, Canada, Europe, Australia, New Zealand and Japan, Audette, Lam and O'Connor, (2019)[9] also find evidence that promoting gender equality is positively associated with greater subjective wellbeing, and that policies promoting gender equality tend to improve the quality of life for everyone, not just the direct beneficiaries of the policies, i.e. women.

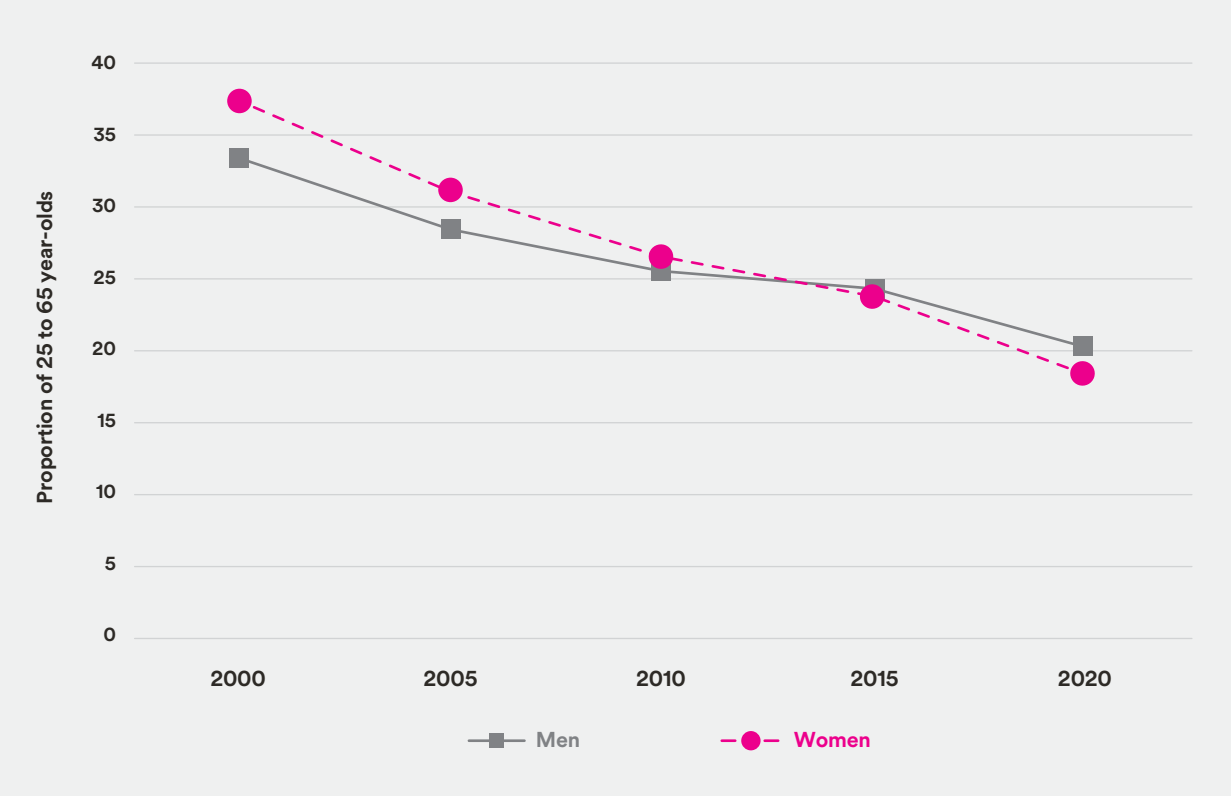
Given the above-cited benefits of gender equality, it is useful to take stock of the progress made and the gender gaps that remain in the educational outcomes of young men and women. Gender gaps in education lie at the heart of gender divides in the labour market and beyond, which adversely affect GDP growth and quality of life. Indeed, differences in labour-market outcomes among prime age and older workers are influenced by the decisions about education and careers these workers made when they were as young as 15 years. Girls' remarkable progress in educational attainment worldwide is perhaps the greatest success story in gender equality of the past half-century. Yet it will take more time before changes in young women's educational profiles translate into narrower gender gaps in labour markets. Many countries are on the right path in reaching this target, but policy efforts are still needed to make this a reality.

2. Attainment of secondary education and early school leaving

Over the past 50 years, many more girls have completed higher levels of education. Indeed, countries are slowly achieving greater gender equality in the number of years spent in education. But although most countries have won the battle to provide universal primary education, the picture is much more mixed in secondary and higher education.

Young men are more likely than young women to lack an upper secondary qualification, on average across OECD countries. Figure 1 shows that, on average across OECD countries, the proportion of adults (25-65 year-olds) without an upper secondary degree has fallen from around 35% (average of men and women) to around 20%. It also shows that women in the labour force are now less likely than men not to hold an upper secondary degree than they were in 2000. In other words, both men and women are now more likely to finish upper secondary education, but women are increasingly taking the lead.

Figure 1. Proportion of 25-65 year-olds without an upper secondary degree by gender, OECD average

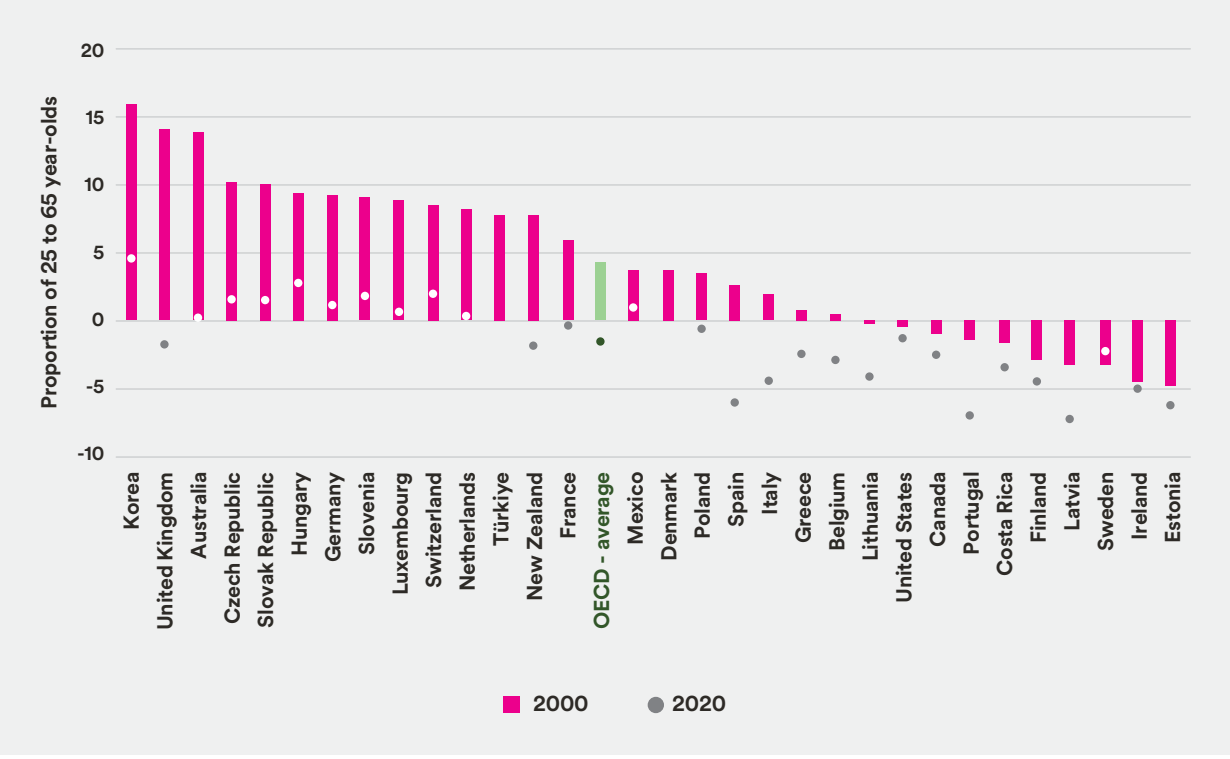


Source: OECD (2021), *Education at a Glance 2021: OECD Indicators*, https://doi.org/10.1787/b35a14e5-en.

This change was dramatic in many countries between 2000 and 2020. In 2000, on average across OECD countries, adult women (25-65 year-olds) in the labour force were more likely than men not to hold an upper secondary degree, with a gap of close to 4.1 percentage points. In 2000, the cross-country gender differences in completing an upper secondary degree were also stark, with countries like Korea, the United Kingdom and Australia showing gaps exceeding 10 percentage points and others, such as Finland, Latvia and Ireland, showing gaps wider than 3 percentage points in the opposite direction (Figure 2).

Twenty years later, in 2020, this gap had narrowed substantially in every country, so much so that, in almost half of the countries considered, men are now more likely than women not to hold an upper secondary degree. Even in countries where men have an advantage, the gap in their favour has shrunk considerably. Korea, the country with the largest gap in favour of men in 2020, is a good illustration. While in 2020 more men than women were upper secondary graduates, the gap shrunk from 15.9 percentage points in 2000 to 4.5 percentage points in 2020. In a few other countries, such as New Zealand, France, Mexico, Poland, Spain, Italy, Greece and Belgium, the gap in favour of men in 2000 reversed in favour of women by 2020. Men's disadvantage now exceeds 5 percentage points in Spain, Latvia, Portugal and Estonia.

Figure 2. Proportion of 25-65 year-olds without an upper secondary degree
Women minus men, by country and year



Source: OECD (2021), *Education at a Glance 2021: OECD Indicators*, https://doi.org/10.1787/b35a14e5-en.

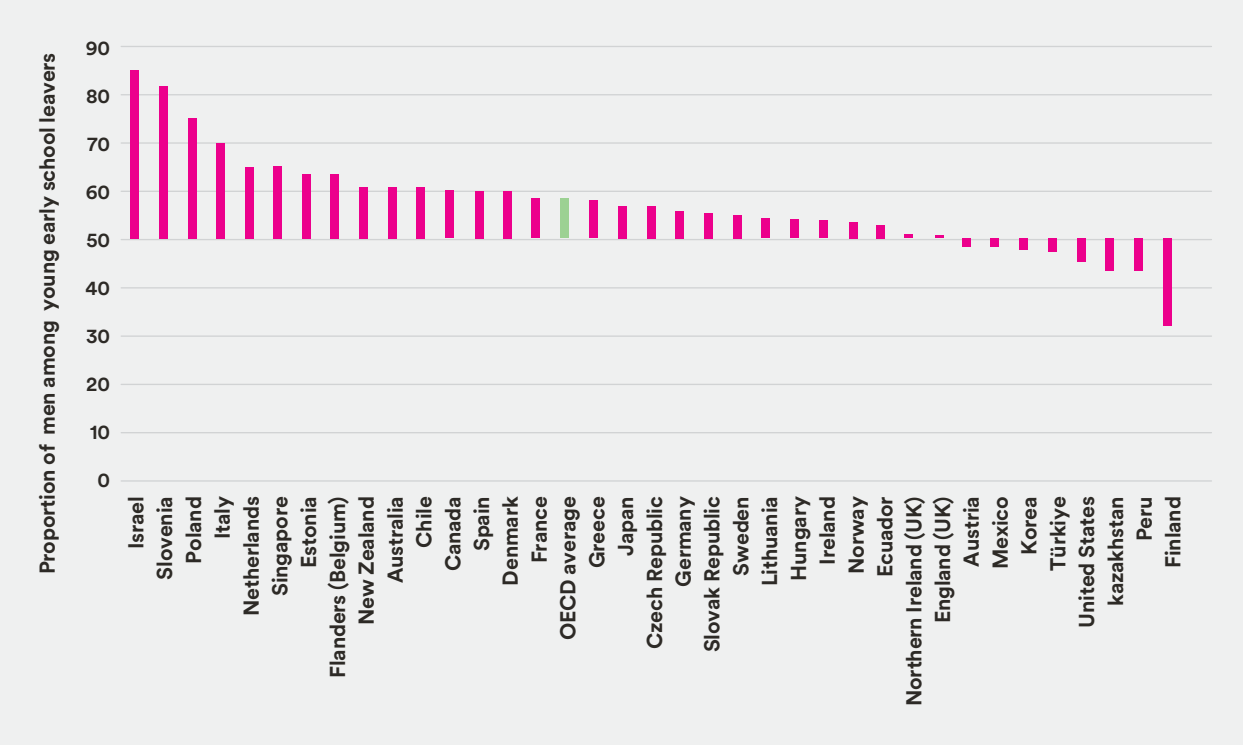
While it is good news that more women are attaining an upper secondary education, it is also worrying that, in most countries, those who quit school early are predominantly men. Data from PIAAC shows that, on average across OECD countries, 58% of early school leavers among all 18-24 year-olds are men. Early school leavers are here defined as young adults who are not in education and did not graduate from secondary school. In some countries, the proportion is extremely high: 70% or more in Italy, Poland, Israel and Slovenia. The reverse is true in only a few countries, namely Finland, Kazakhstan, Korea, Peru, and Türkiye. In Finland, close to 70% of the total population of early school leavers are women.

Many social scientists view education as an investment. For high school students, the decision to invest in education would involve weighing the expected rewards from earning a degree to the effort required to graduate. Those who drop out of school often find it difficult to adjust to a school environment, lack motivation, or anticipate little reward from graduating (Eckstein and Wolpin, 1999[10]). There are many reasons for higher dropout rates among young men compared to women, and many of them are connected with gender differences in behaviour in school as well as differences in attitudes towards learning. These differences are seen among students as young as 15, the age group surveyed in PISA.

Students are in the middle of adolescence at that age – a time when children start to claim their independence from their parents and when social acceptance by one's peers can have a powerful influence on behaviour (Baumeister and Leary, 1995[11]; Rubin, Bukowski and Parker, 1998[12]). Around this time, gender differences in attitudes towards school and learning become evident as well. For example, several research studies suggest that, for many boys, it is not acceptable to be seen to be interested in schoolwork. Boys adopt a concept of masculinity that includes a disregard for authority, academic work and formal achievement (Salisbury, Rees and Gorard, 1999[13]). Although an individual boy may understand how important it is to study and achieve at school, he will choose to do neither for fear of being excluded

from the society of his male classmates (Van Houtte, 2004[14]). Indeed, some have suggested that boys' motivation at school dissipates from the age of eight onwards, and that by the age of 10 or 11, 40% of boys belong to one of three groups: the "disaffected", the "disappointed" or the "disappeared". Members of the latter group either drop out of the education system or are thrown out (Salisbury, Rees and Gorard, 1999[13]). This is worrying because early school dropout is seen to be related to adverse social outcomes later in life (Balfanz et al., 2007[15]; OECD, 2010[16]; Oreopoulos, 2007[17]; Rumberger, 2011[18]), such as low skills and/or skills that are not well matched with labour-market requirements, leading to poor employment prospects and inadequate wages.

Figure 3. Proportion of men among early school leavers aged 18 to 24, by country (PIAAC)



Source: Survey of Adult Skills (PIAAC) (2012, 2015, 2018).

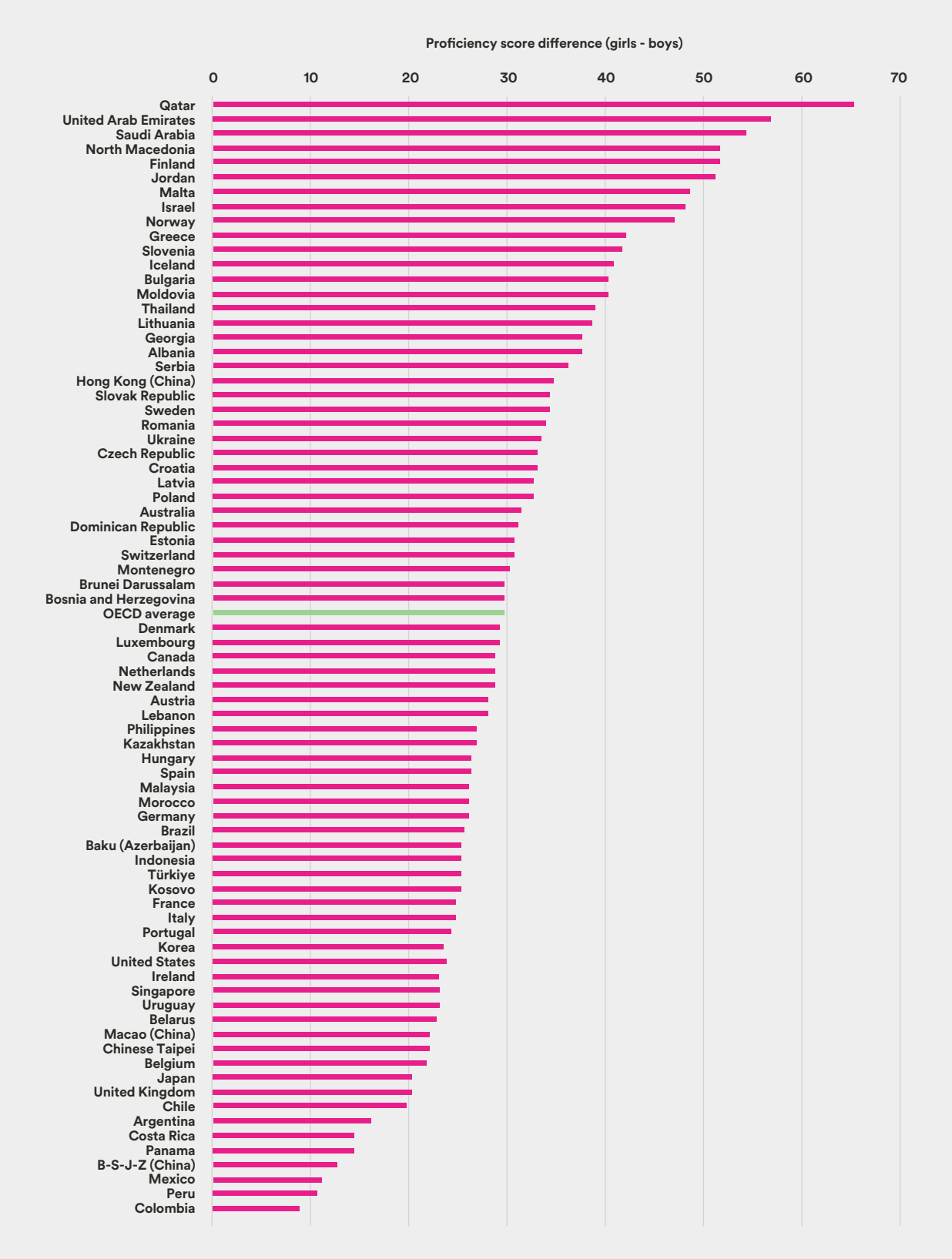
3. Gender differences in performance in upper secondary education

While girls are making great strides in completing upper secondary education, there are persistent gender gaps in performance at school, especially among low- and high-achieving students. PISA has consistently found that girls outperform boys in reading and, to a lesser extent, that boys outperform girls in mathematics, on average across all participating countries and economies, though not in all countries (OECD, 2019[19]). However, the average performance of boys and girls masks wide variations among students at the extreme ends of the performance distribution. PISA finds that 15-year-old boys are more likely than girls of the same age to be low achievers in the three domains assessed (reading, mathematics and science). In contrast, among the highest-performing students, boys often perform better than girls in mathematics.

Gender disparities in achievement are a matter of considerable concern, as they may have long-term consequences for girls' and boys' personal and professional future. Those boys who lag behind and lack basic proficiency in reading may face serious difficulties in their further education, in the labour market and in everyday life. Equally, the under-representation of girls among top performers in science and mathematics can at least partly explain the persistent gender gap in careers in STEM fields, which are often among the highest-paying occupations.

In PISA 2018, girls outperformed boys in reading by almost 30 score points, on average across OECD countries. While girls outperformed boys in reading in every participating country and economy, the gap was much wider in some countries than in others. This can be observed in Figure 4 where girls show better performance than boys in all countries, and where the gap is larger than 20 score points in all but 10 participating countries. The narrowest gender gaps (less than 20 score points) were observed in Argentina, Beijing, Shanghai, Jiangsu and Zhejiang (China) (hereafter "B-S-J-Z [China]"), Chile, Colombia, Costa Rica, Mexico, Panama and Peru. The widest gaps (more than 50 score points) were observed in Finland, Jordan, the Republic of North Macedonia (hereafter "North Macedonia"), Qatar, Saudi Arabia and the United Arab Emirates (OECD, 2019[19]).

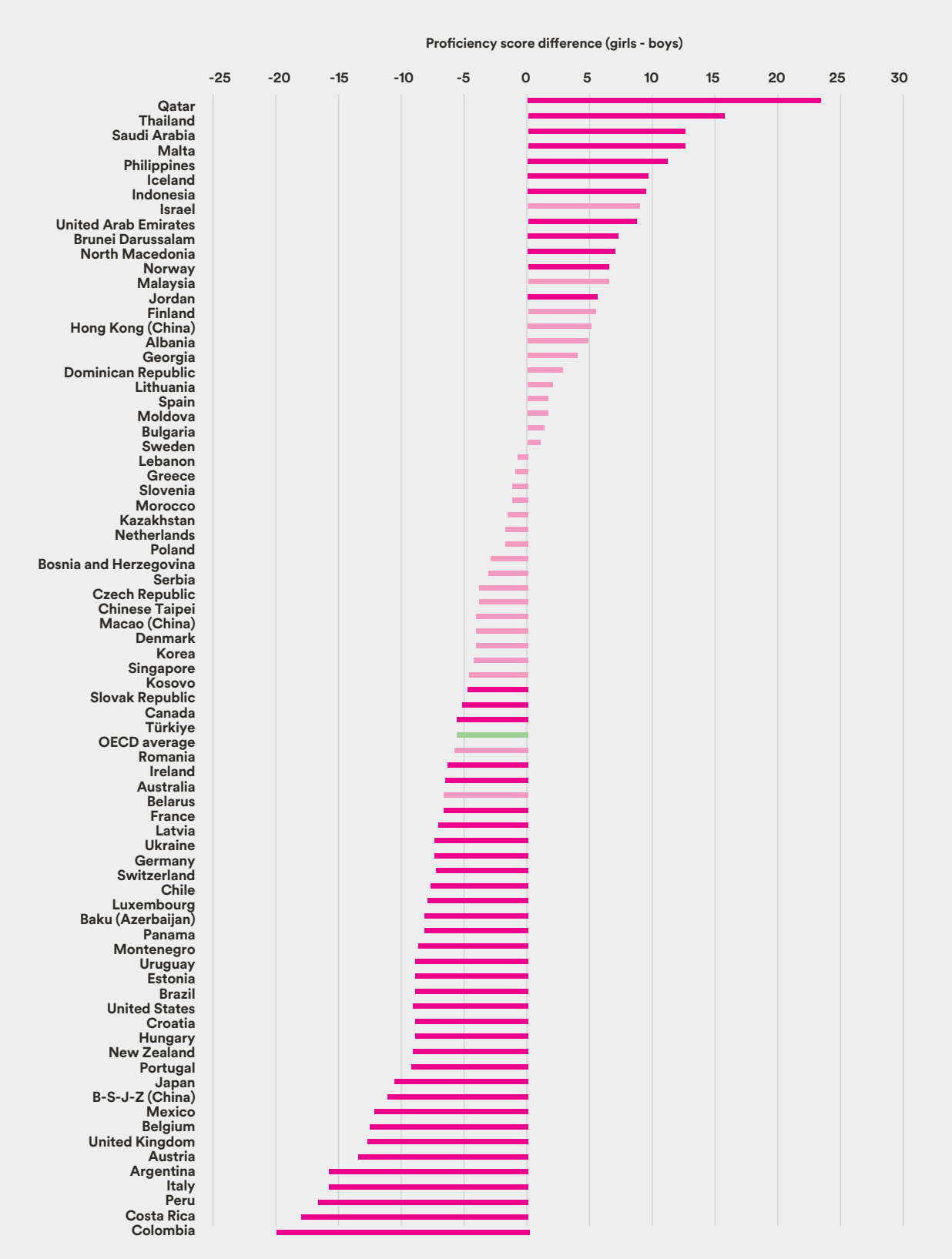
Figure 4. Gender gap in reading performance, PISA 2018



Note: All differences are statistically significant at 5%.
Source: OECD (2019), *PISA 2018 Results (Volume II): Where All Students Can Succeed*, https://doi.org/10.1787/b5fd1b8f-en.

Boys outperformed girls in mathematics by a much smaller margin than girls outperformed boys in reading. The average gender gap in mathematics amounted to only five score points in favour of boys (as opposed to almost 30 score points in reading in favour of girls), on average across OECD countries. Despite the stereotype that boys are better than girls at mathematics, boys significantly outperformed girls in mathematics in only 32 of the 79 countries and economies that participated in PISA 2018 (Figure 5). The largest difference in scores between boys and girls was seen in Colombia, where boys scored around 20 points higher than girls. In Argentina, Costa Rica, Italy and Peru, the difference amounted to between 15 and 18 points. However, in 14 countries and economies, including Brunei Darussalam, Finland, Iceland, Indonesia, Malaysia, Malta, North Macedonia, Norway, the Philippines, Qatar, Saudi Arabia, Thailand and the United Arab Emirates, girls significantly outperformed boys in mathematics (OECD, 2019[19]).

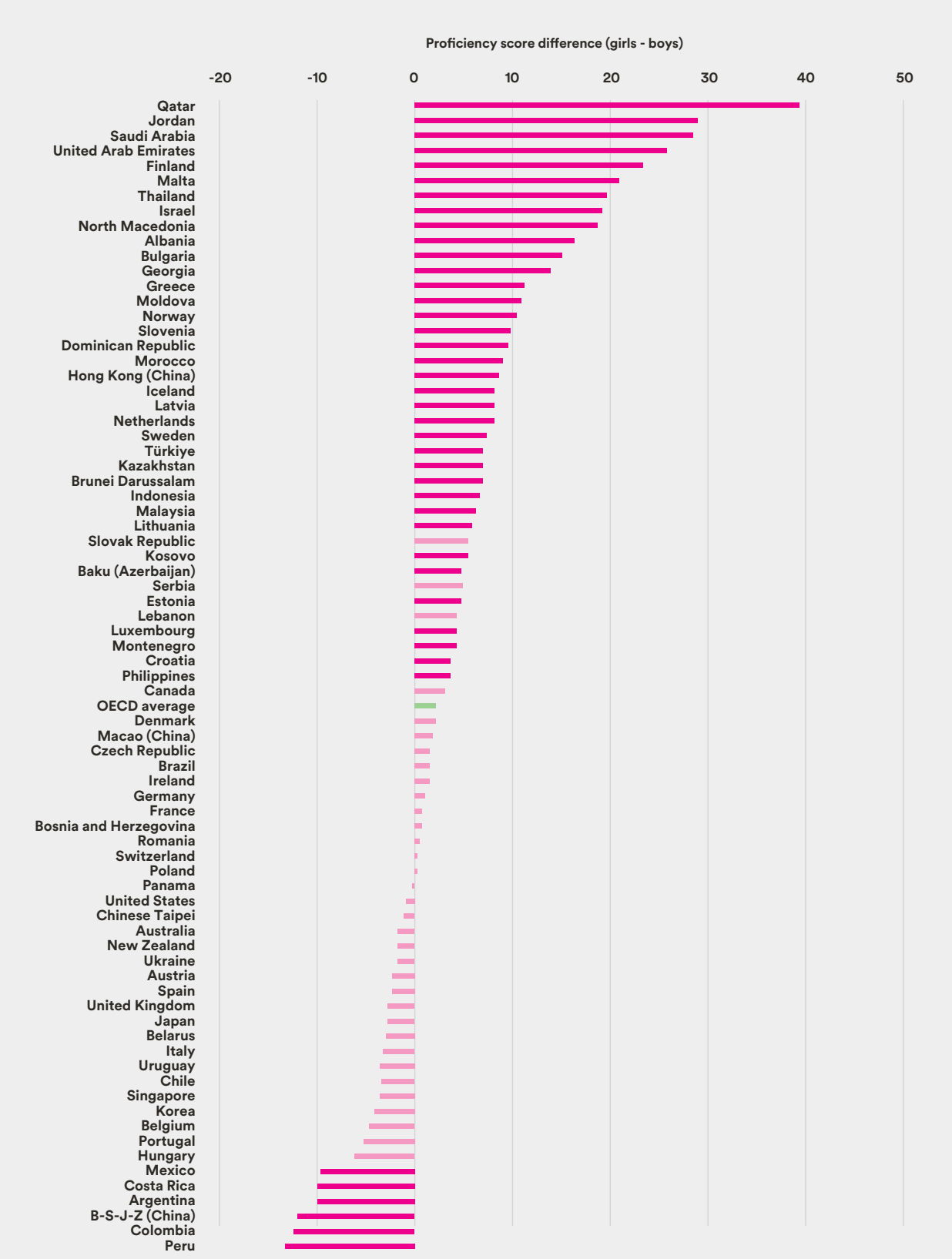
Figure 5. Gender gap in mathematics performance, PISA 2018



Note: Statistically significant differences at 5% are displayed in a darker tone.
Source: OECD (2019), *PISA 2018 Results (Volume II): Where All Students Can Succeed*, https://doi.org/10.1787/b5fd1b8f-en.

The gender gap in science performance was narrower than in mathematics and reading (Figure 6). In science, girls outperformed boys by two score points in PISA 2018; and in around half of the countries and economies assessed, the gender gap in science performance was not statistically significant. In only six countries and economies was boys' performance in science significantly higher than that of girls; the opposite was observed in 35 countries and economies. The widest gender gaps in science performance, in favour of girls, were observed in Qatar (a gap of 39 points), Jordan (29 points), Saudi Arabia (29 points) and the United Arab Emirates (26 points) (OECD, 2019[19]).

Figure 6. Gender gap in science performance, PISA 2018

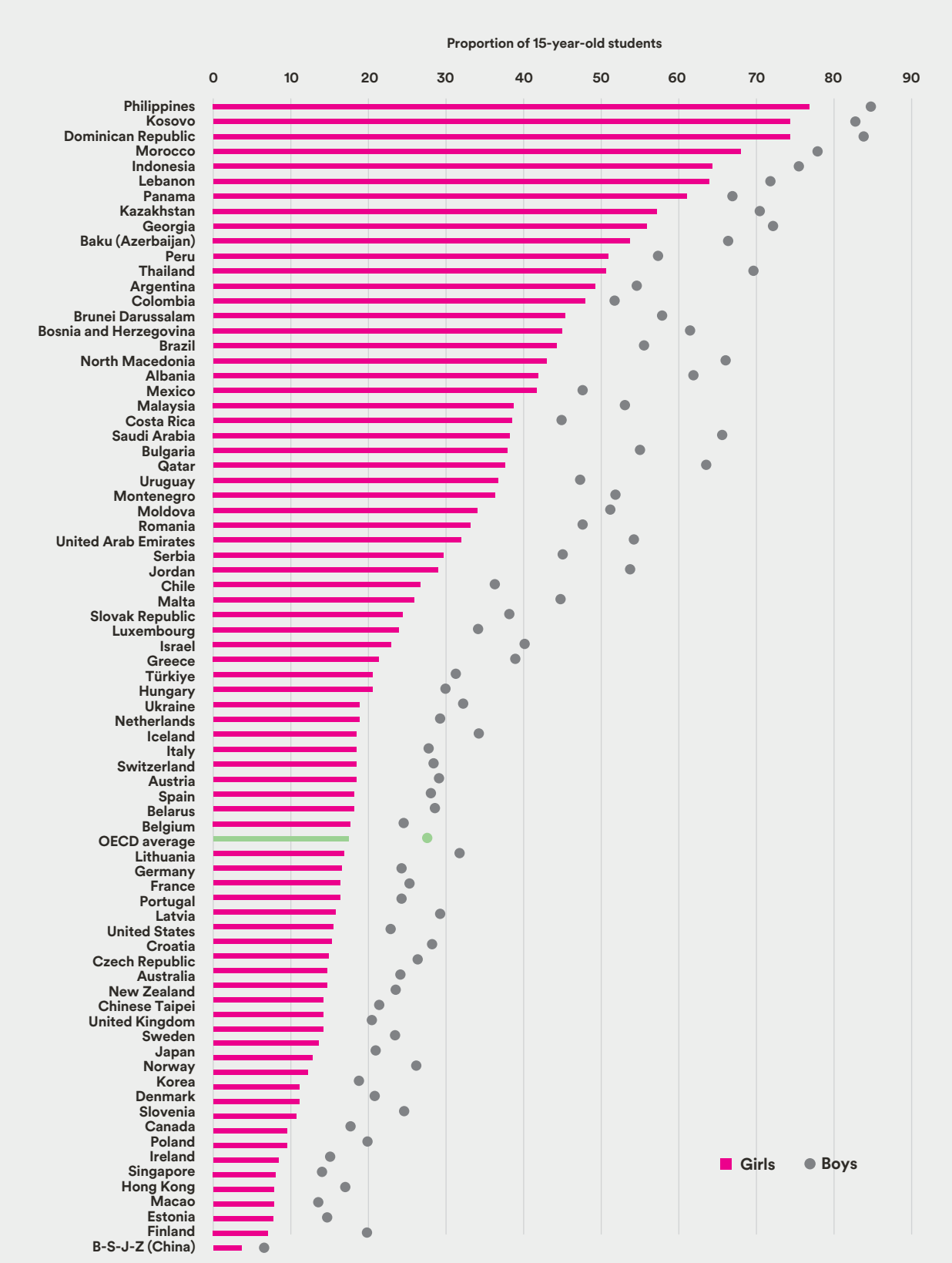


Note: Statistically significant differences at 5% are displayed in a darker tone.
Source: OECD (2019), *PISA 2018 Results (Volume II): Where All Students Can Succeed*, https://doi.org/10.1787/b5fd1b8f-en.

While the above results are important for cross-country comparisons, the average performance of boys and girls in the PISA assessment masks wide variations among students at different proficiency levels. Using data from several large-scale international surveys, including previous cycles of PISA (from 2000 to 2012), Baye and Monseur, (2016)[20], show that gender differences vary largely according to the proficiency level considered, and that the gender gaps at the extreme ends of the performance distribution are often more substantial than gender differences at the mean (OECD, 2019[19]).

PISA finds that 15-year-old boys are more likely than girls of the same age to be low achievers, especially in reading (Figure 7 shows that boys are lower achievers than girls in all participating countries). On average across OECD countries, 28% of boys and only 18% of girls did not reach Level 2 proficiency in reading, considered a "minimum" proficiency level. In 26 PISA-participating countries and economies, more than one in two boys did not reach Level 2 proficiency in reading. Only in B-S-J-Z (China), Canada, Estonia, Finland, Hong Kong (China), Ireland, Korea, Macao (China), Poland and Singapore did more than four in five boys attain Level 2 proficiency in reading. By contrast, in 36 countries and economies, more than four in five girls attained at least this level of proficiency in reading.

Figure 7. Proportion of low achievers in reading, by gender, PISA 2018

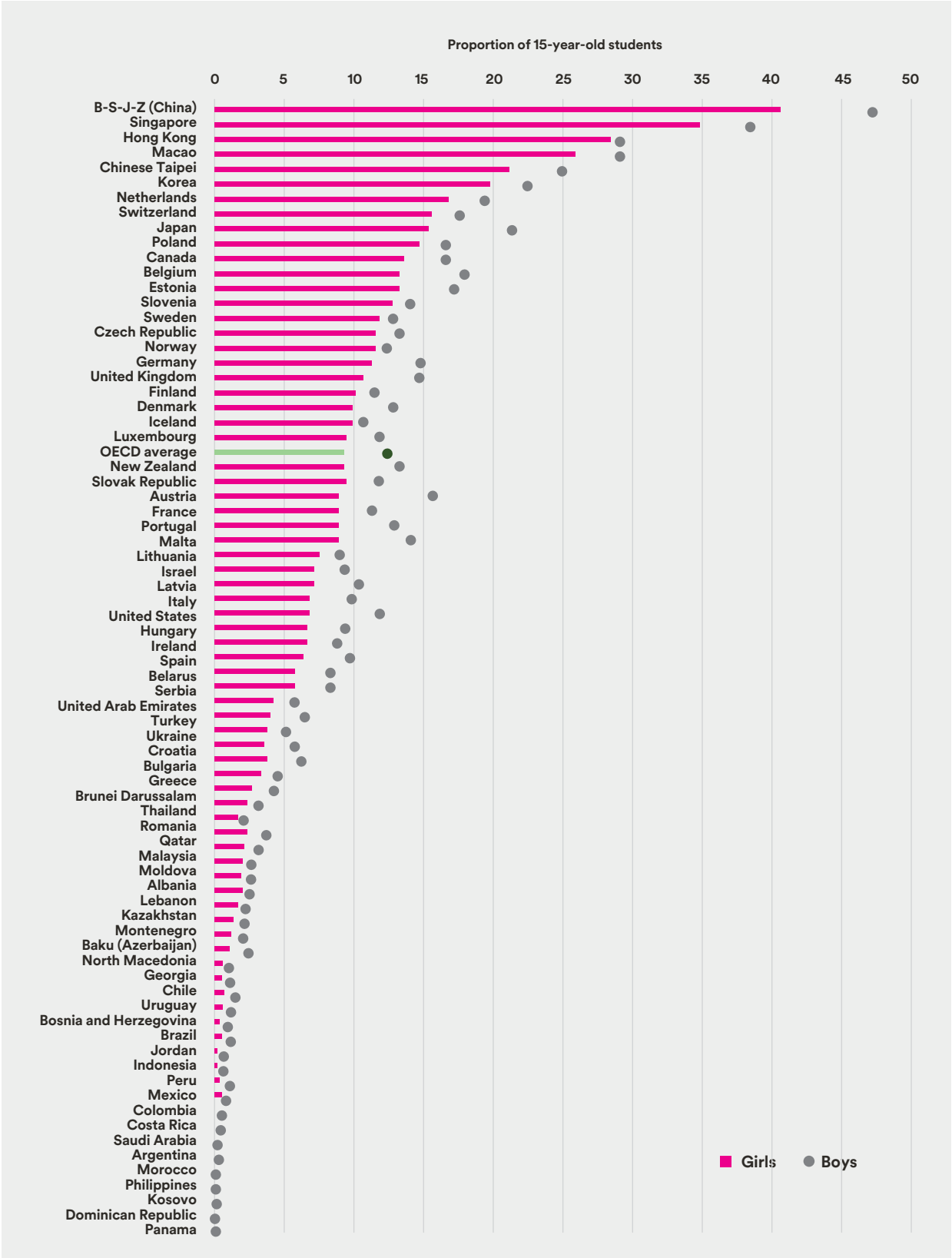


Source: OECD (2019), *PISA 2018 Results (Volume II): Where All Students Can Succeed*, https://doi.org/10.1787/b5fd1b8f-en.

While boys were over-represented at the bottom of the performance distribution, girls were over-represented at the top. In 45 of 77 participating countries and economies with available data, significantly more girls than boys attained the highest levels in reading performance (Level 5 or 6). On average across OECD countries, only 7% of boys were top performers in reading, as compared to 10% of girls. The largest gender gap among top performers in reading was observed in Finland, where almost 20% of girls, but only 9% of boys attained proficiency Level 5 or 6.

The picture was more complex in mathematics and science performance. Boys were generally over-represented at both the bottom and the top of the performance distributions in these two subjects. As with reading, boys performed worse than girls at the lower levels of the performance distribution in mathematics and science. But the largest differences were observed at the top of the distribution of mathematics performance, meaning that among the highest performers of both genders, boys usually outperformed girls. PISA results show that boys perform better than girls in mathematics, particularly among the highest-achieving students (Figure 8). On average, across OECD countries, 12.3% of boys and 9.5% of girls attained the highest levels of mathematics performance (Level 5 or 6), while 7.3% of boys and 6.2% of girls were top performers in science (OECD, 2019[19]).

Figure 8. Proportion of high achievers in mathematics, by gender, PISA 2018



Source: OECD (2019), *PISA 2018 Results (Volume II): Where All Students Can Succeed*, https://doi.org/10.1787/b5fd1b8f-en.

4. Examining differences in school performance between boys and girls

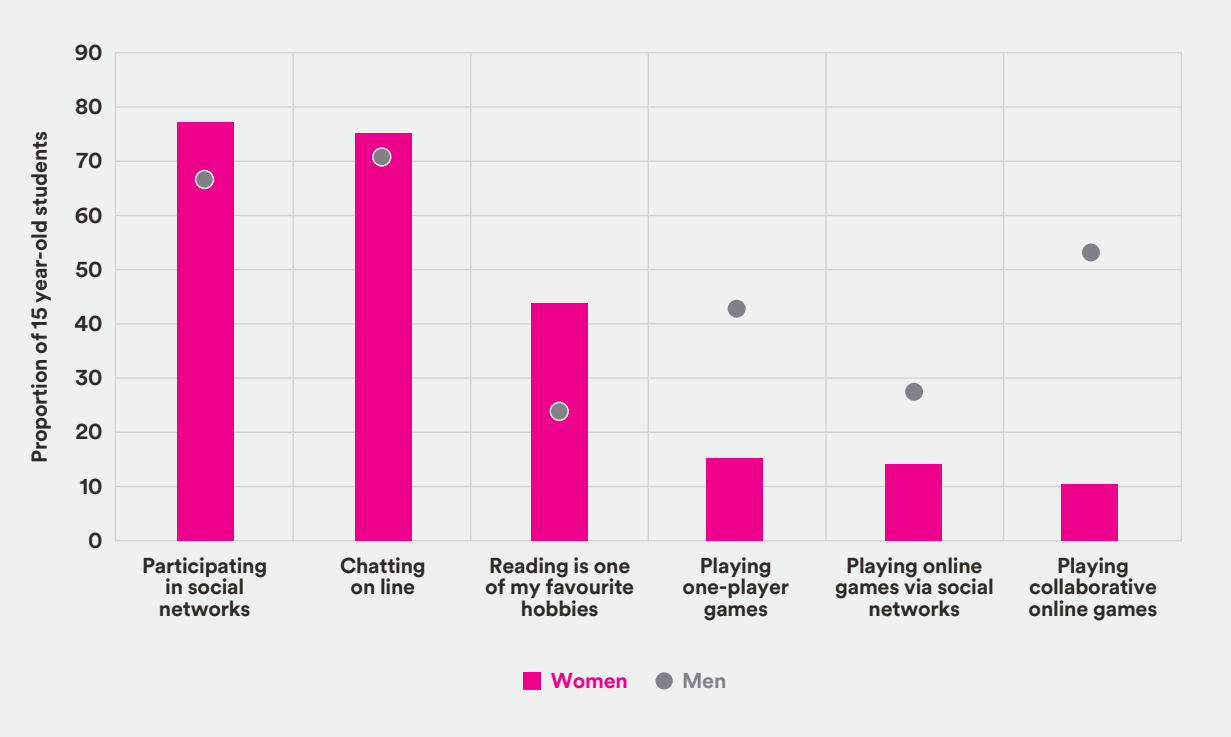
There are many possible reasons for boys' poor performance in school, and many of them are connected with differences in behaviour between boys and girls, and with differences in their attitudes towards learning. Previous analyses of PISA data suggest that boys tend to spend less time than girls doing homework. In several countries and economies that participated in PISA 2012, time spent doing homework was positively correlated with student performance (OECD, 2014[21]). While the results were not causal, doing homework regularly may help students consolidate their learning, or it may simply be a sign of engagement, defined as behavioural displays of effort, time and persistence in attaining desired outcomes (Klauda and Guthrie, 2014[22]). In a subset of 32 countries and economies that participated in PISA 2018, students were asked how long they studied before and after school on the most recent day prior to the PISA test. On average across OECD countries where this optional questionnaire was distributed, 64% of boys and 73% of girls reported that they had studied at home for more than one hour on the day immediately prior to the PISA test (OECD, 2019[19]).

What students do outside of school during their leisure time might also be correlated with academic performance in school, as well as with their later career choice and skills development.

Previous evidence suggests that the association between academic performance and enjoyment of reading is strong (Guthrie, Schafer and Huang, 2001[23]; Mol and Jolles, 2014[24]; OECD, 2015[25]), and that the influence runs in both directions (Mol and Bus, 2011[26]). Students who enjoy reading, and make it a regular part of their lives, are able to improve their reading skills through practice. Better readers tend to read more because they are more motivated to read, which, in turn, leads to improved vocabulary and comprehension skills (Sullivan and Brown, 2015[27]). In all PISA-participating countries and economies in 2018, girls reported much higher levels of enjoyment of reading than boys. On average across OECD countries, 24% of 15-year-old boys and 44% of girls the same age agreed that "Reading is one of my favourite hobbies", while 60% of boys but 39% of girls agreed that "I read only to get information that I need" (OECD, 2019[19]).

Boys also tend to report greater frequency of ICT use outside of school for leisure than girls. With children having greater access, and at ever-younger ages, to digital devices, teenagers' online activities are increasingly unsupervised. This has raised concern among parents and teachers. For instance, previous results from PISA suggest that students who use the Internet intensively (more than six hours a day) perform worse academically, particularly when they use the Internet intensively on school days (Echazarra, 2018[28]). Girls and boys also differ in what they use digital devices for (Figure 9). On average across OECD countries, the proportion of girls who reported using digital devices every day or almost every day for participating in social media was larger – by 10 percentage points – than that of boys; and girls were slightly more likely than boys (a difference of 4 percentage points) to report using these devices frequently for chatting on line. But the largest gender gap regarding ICT activities concerned video games. On average across OECD countries, 53% of 15-year-old boys, but only 10% of girls that age reported that they play collaborative online games every day or almost every day; and 28% of boys, but 14% of girls reported that they play online games via social networks (OECD, 2019[19]).

Figure 9. Gender gaps in leisure activities



Source: OECD (2019), *PISA 2018 Results (Volume II): Where All Students Can Succeed*, https://doi.org/10.1787/b5fd1b8f-en.

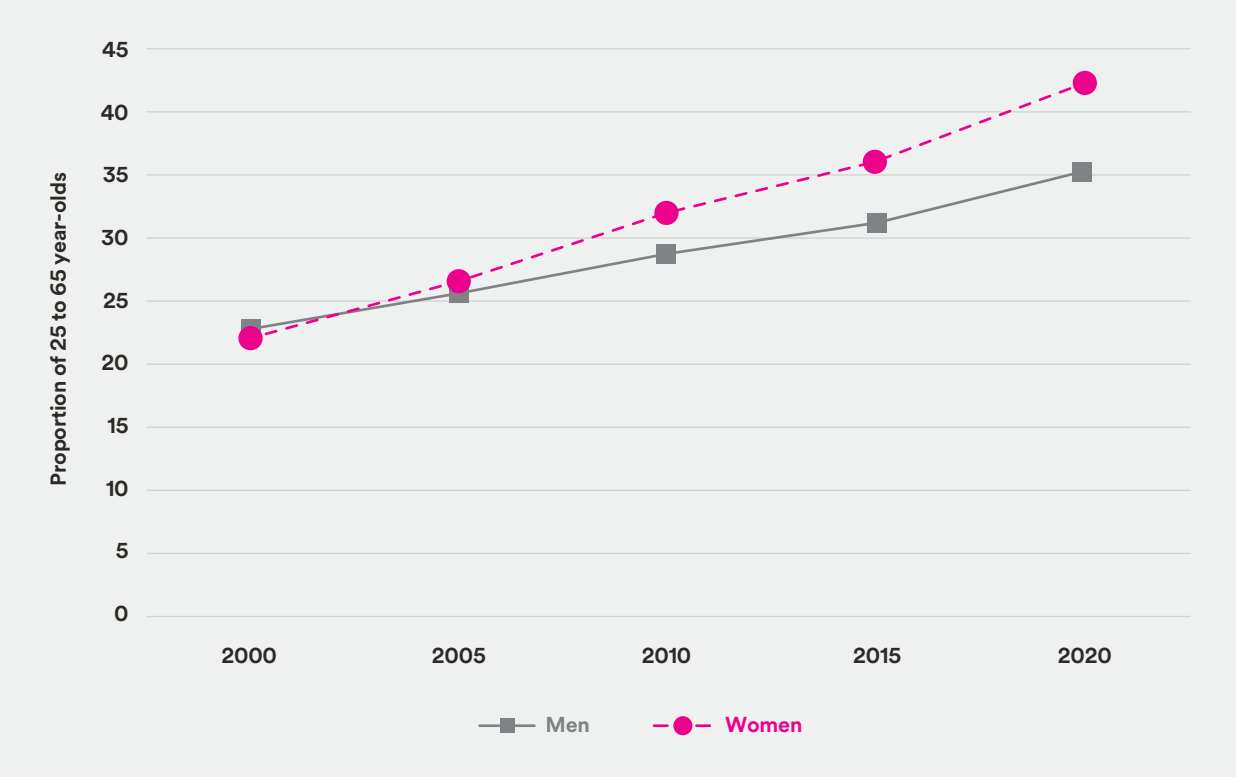
As in the case of low-performing boys, there could be many possible reasons for the under-representation of girls among high-performing students in mathematics. Girls generally have less self-confidence than boys in their ability to solve mathematics or science problems. Girls – even high-achieving girls – are also more likely to express strong feelings of anxiety towards mathematics. In 70 countries and economies that participated in PISA 2018, girls reported more often, and to a larger extent, than boys, fear of failure (OECD, 2019[19]). PISA reveals that self-efficacy (the extent to which students believe in their own ability to solve specific mathematics tasks) and self-concept (students' beliefs in their own mathematics abilities) are much more strongly associated with performance among high-achieving than low-achieving students. Still, at every level of performance, girls tend to have much lower levels of self-efficacy and self-concept in mathematics and science. And while girls have less self-efficacy and lower self-concept, they tend to be highly motivated to do well in school and to believe that doing well at school is important. They also tend to fear negative evaluations by others more than boys and are eager to meet others' expectations for them. Given girls' keen desire to succeed in school and to please others, their fear of negative evaluations, and their lower self-confidence in mathematics and science, it is hardly surprising that high-achieving girls choke under (often self-imposed) pressure.

This fear of failure and lack of confidence in their abilities is often coupled with gender stereotypes that girls face at home, in school and within their communities. Parents still harbour stereotypical notions of what girls and boys excel at and the careers they can pursue when they enter the labour market. In all PISA countries and economies that distributed the parent questionnaire in 2012, parents were more likely to expect their sons, rather than their daughters, to work in a STEM field. The gender gap in the percentage of 15-year-old boys and girls whose parents expected them to work in STEM occupations was larger than 30 percentage points in Chile, Hungary and Portugal. These gender stereotypes are often reinforced in the classroom and are related to teachers' conscious or unconscious biases about girls' and boys' strengths and weaknesses in various subjects, which are invariably reflected in student performance (OECD, 2015[25]). Student performance, in turn, is also related to students' career expectations and field-of-study choices later on. PISA 2018 showed that, on average across OECD countries, only 14% of girls who were top performers in science or mathematics reported that they expect to work as professionals in science or engineering while 26% of top-performing boys so reported. Such decisions can have negative consequences for women's labour-market prospects (OECD, 2019[19]).

5. Transitioning from school to tertiary education

Since 2000, access to tertiary education has been growing for both men and women, but particularly for women. In recent decades, the share of women with tertiary education has risen consistently, reversing the historical gender gap in favour of men. While the percentage of men with a tertiary degree increased by 13 percentage points (from 22% to 35%) between 2000 to 2020, the percentage of women with a tertiary degree increased by an additional 7 percentage points in the same period.

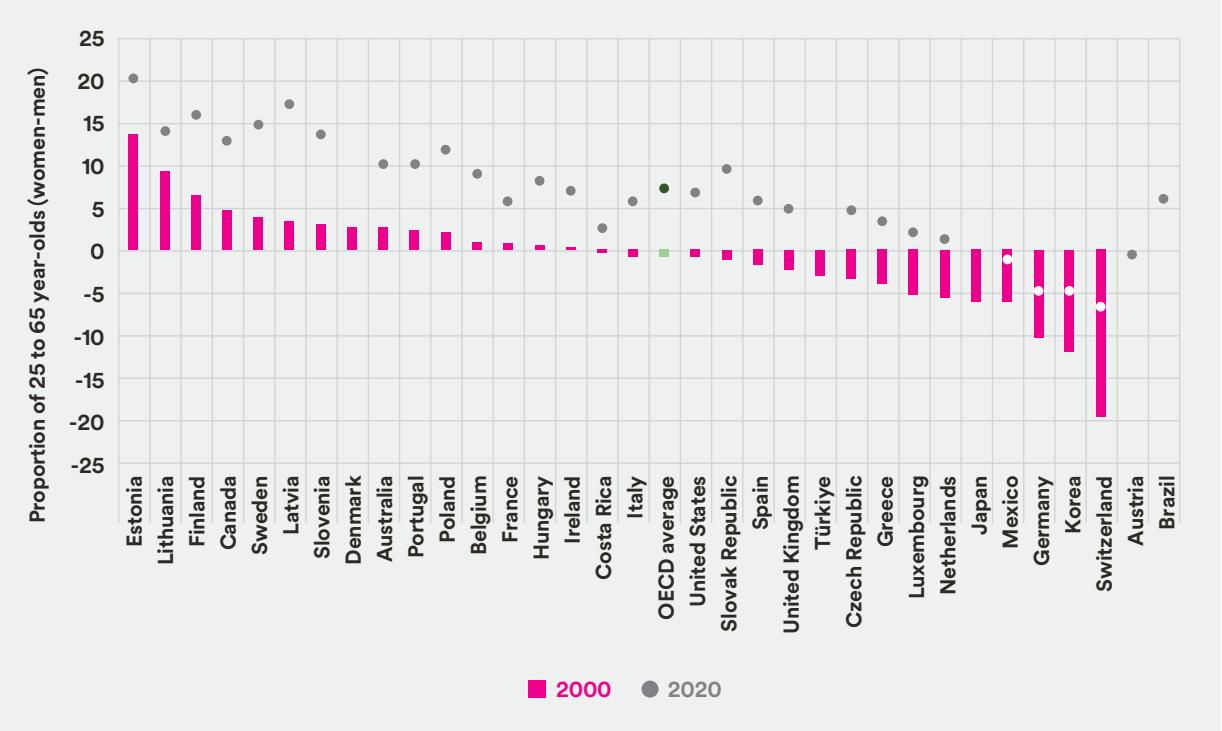
Figure 10. Proportion of tertiary graduates among 25-65 year-olds, by gender
OECD average



Source: OECD (2021), *Education at a Glance 2021: OECD Indicators*, https://doi.org/10.1787/b35a14e5-en.

In 2020, this gender gap in favour of women became even wider. The proportion of tertiary graduates among men and women in 2000 was similar on average across OECD countries, but in some countries (Estonia and Lithuania) women were more likely than men to be tertiary graduates; the opposite was true in Korea and Switzerland. By 2020, in almost all countries, women were more likely than men to have graduated from tertiary education. Even in Mexico, Germany, Korea and Switzerland, where men were more likely to complete tertiary education, the gender gap in their favour narrowed dramatically between 2000 and 2020. In several other countries, such as Estonia, Finland and Sweden, the difference in the percentage of female tertiary graduates compared to male graduates widened, with the gap in favour of women amounting to close to or more than 15 percentage points.

Figure 11. Proportion of tertiary graduates among 25-65 year-olds
Women minus men, by country and year



Source: OECD (2021), *Education at a Glance 2021: OECD Indicators*, https://doi.org/10.1787/b35a14e5-en.

The dynamics behind these trends are complex and multi-faceted. Among other factors, the trend hinges on the pivotal years of upper secondary education, and on expected career prospects following a tertiary education. As seen in the previous section, OECD countries have achieved near gender parity among those graduating from upper secondary education and this might motivate more women to enter tertiary education.

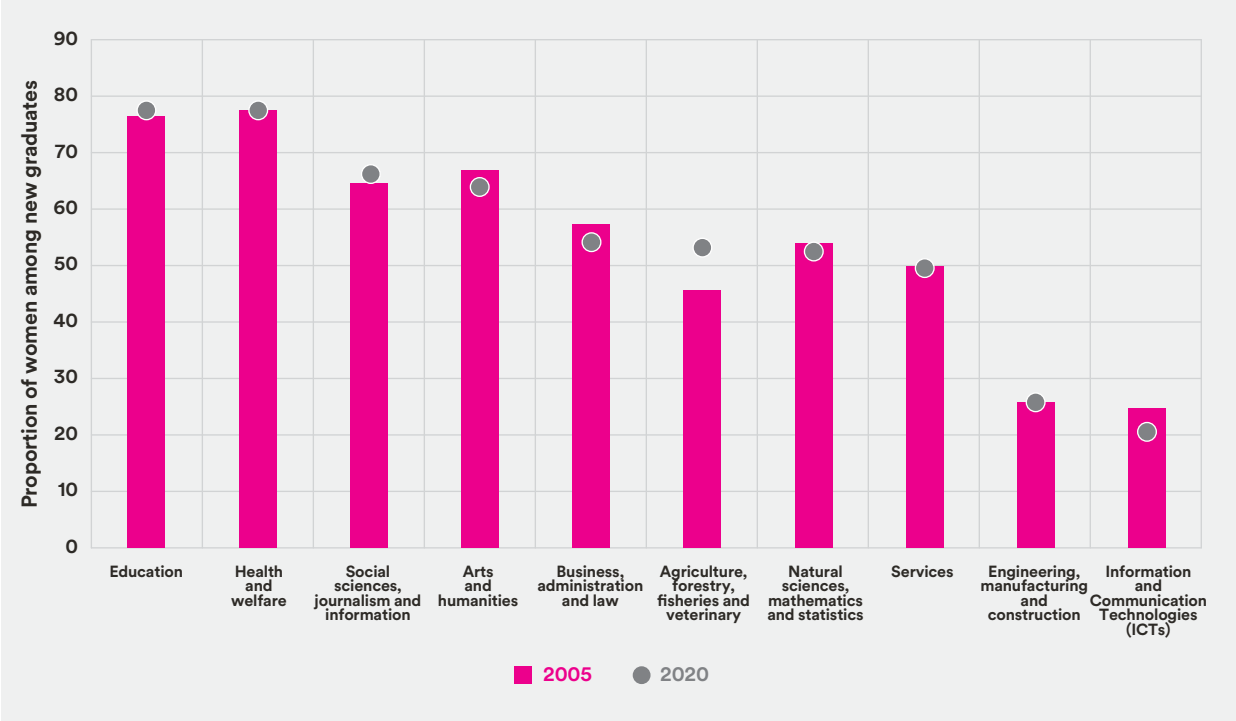
The growing number of university courses offered and changes in the degree requirements of jobs may also partially explain the increase in women's participation in tertiary education. In addition, social attitudes related to women in tertiary education and the changing status of tertiary-educated women in society and the workplace have influenced women's participation in higher education. Countries where citizens highly value a university education for girls are also more likely to have a greater enrolment of women among tertiary students.

Indeed, young women have more to gain in the labour market from a tertiary degree than men. Across OECD and partner countries, the Survey of Adult Skills (PIAAC) shows that a tertiary degree significantly reduces the risk of unemployment compared to an upper secondary education for most 25-34 year-olds, but women benefit more than men. Young women's unemployment rates fall from 9% among those with upper secondary education to 6% among those with tertiary education. In contrast, the rates for young men fall from 6% to 5%. Similarly, the earnings advantage from a tertiary degree is larger for young women than for men. On average across OECD countries, 25-34 year-old tertiary-educated women earn 52% more than women of the same age with only an upper secondary education do. In contrast, the earnings premium related to a tertiary degree among young men is 39% (OECD, 2021[29]).

However, while more young women are enrolling in and completing tertiary education, women still dominate the health and welfare, and education-related fields, but are under-represented in the broad field of science, technology, engineering and mathematics. On average across OECD countries in 2017, women made up only 20% of new entrants to short-cycle tertiary programmes and 30% of new entrants to bachelor's programmes in STEM fields. In contrast, women made up 79% of new entrants to health and welfare short-cycle tertiary programmes (often labelled "care professions") (OECD, 2019[30]). This indicates that the career expectations of 15-year-old students are mirrored in the field-of-study choices made by men and women at the tertiary education level.

Analysing data from both 2005 and 2020, it is striking that women's field-of-study choices have not changed over time (Figure 12). The percentage of new female tertiary graduates in engineering, manufacturing and construction remained almost the same at around 25% in the 14 years between 2005 and 2020, and it shrunk by about 4% for female graduates in ICT-related fields. In contrast, the percentage of female graduates in fields related to education (80%), health (80%) and social sciences (70%) has hardly changed since 2005.

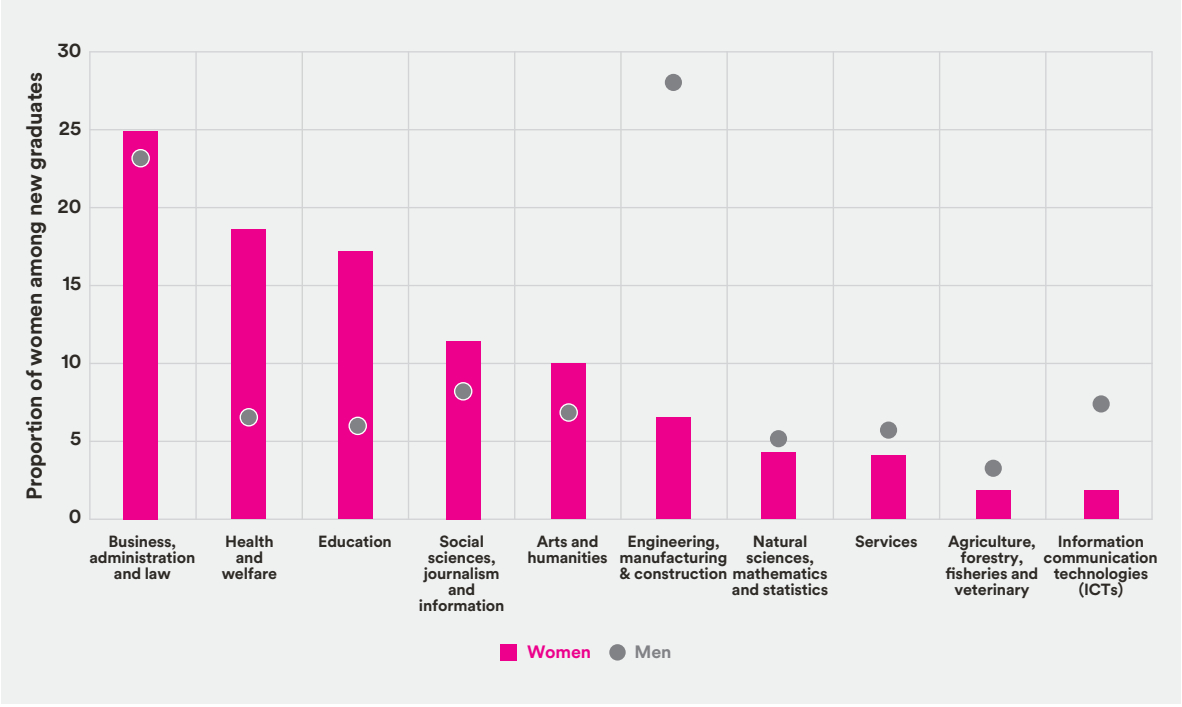
Figure 12. Percentage of women among new graduates by field of tertiary education, average of participating countries



Source: OECD (2021), Education at a Glance Database.

Tertiary degree completion rates in different fields of study, among adults aged 25-65, also paint a similar picture compared to entry rates in tertiary education. Figure 13 shows how the gender composition in fields related to mathematics and technology are markedly unbalanced. As compared to female tertiary graduates in the same field, men are almost 20% more likely to graduate with a degree in engineering, manufacturing and construction, and about 7% more likely to graduate with a degree in ICT. On the other hand, more than 11% of women graduate with a degree in education, or health and welfare, as compared to men.

Figure 13. Distribution of fields of study among tertiary graduates aged 25-65 by gender, OECD average



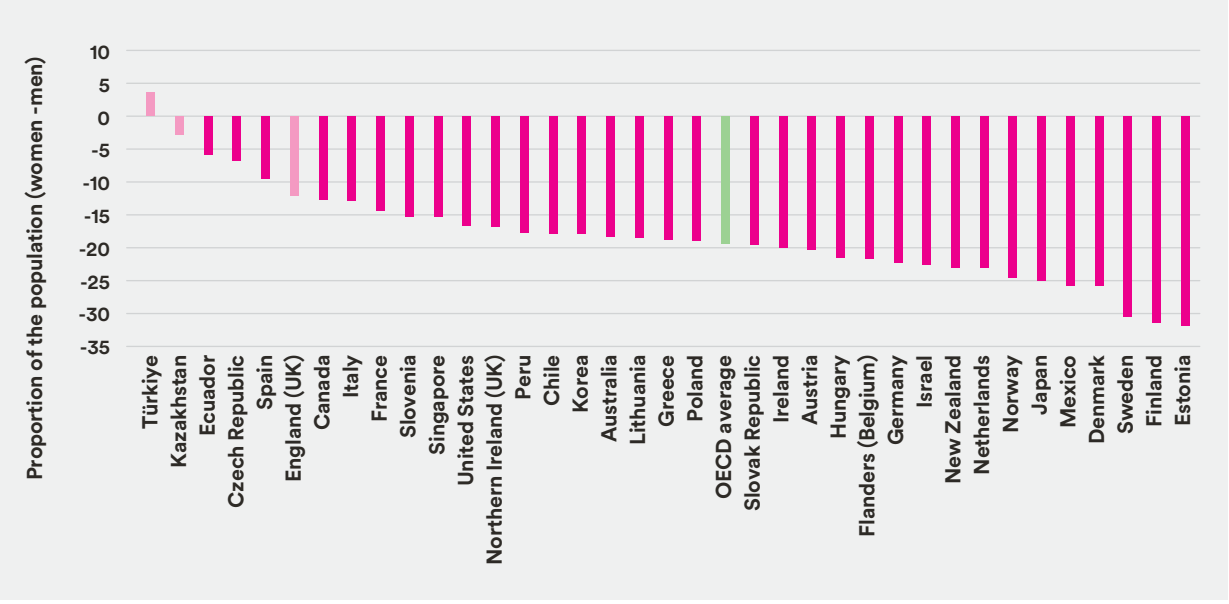
Source: OECD (2020), *Education at a Glance 2020: OECD Indicators*, https://doi.org/10.1787/f8d7880d-en.

As discussed above, one of the main reasons for these differences in field-of-study choices are the various gender stereotypes that boys and girls face at home, in school and within their communities. These stereotypes contribute significantly to the overall development of their academic, professional and personal lives. According to results from PISA 2018, stereotypical notions about girls not being good at mathematics persist: 15-year-old girls are less likely than boys the same age to believe in their abilities, especially in mathematics. This lack of self-confidence may be one of the first fissures that widen into the gender gap in students' pathways towards science-related careers. There is also a paucity of female scientists, which means that young girls have little tangible evidence to disprove the notion that mathematics and science are somehow more "masculine" disciplines. PISA results show that few mothers of 15-year-olds around the world work in STEM occupations; indeed, in all PISA countries and economies there are far fewer women than men employed in these sectors (OECD, 2015[25]).

6. How field-of-study choices affect skills development at university

Evidence that men are more likely to take up jobs in the more lucrative STEM fields is also reflected in how gender gaps in information-processing skills evolve over time. Results from PIAAC (OECD, 2016[31]) highlighted that men and women differ significantly in how frequently they use numeracy skills in everyday life. Figure 14 confirms that among tertiary students in all countries, women are much less likely to practise advanced mathematics daily. On average across OECD countries, 20% more tertiary-educated men than women engage in numeracy practices frequently. This difference in favour of men is large in most countries; it is close to zero only in Kazakhstan and Türkiye.

Figure 14. Proportion of tertiary students who use advanced mathematics in daily life at least sometimes
Women minus men, by country

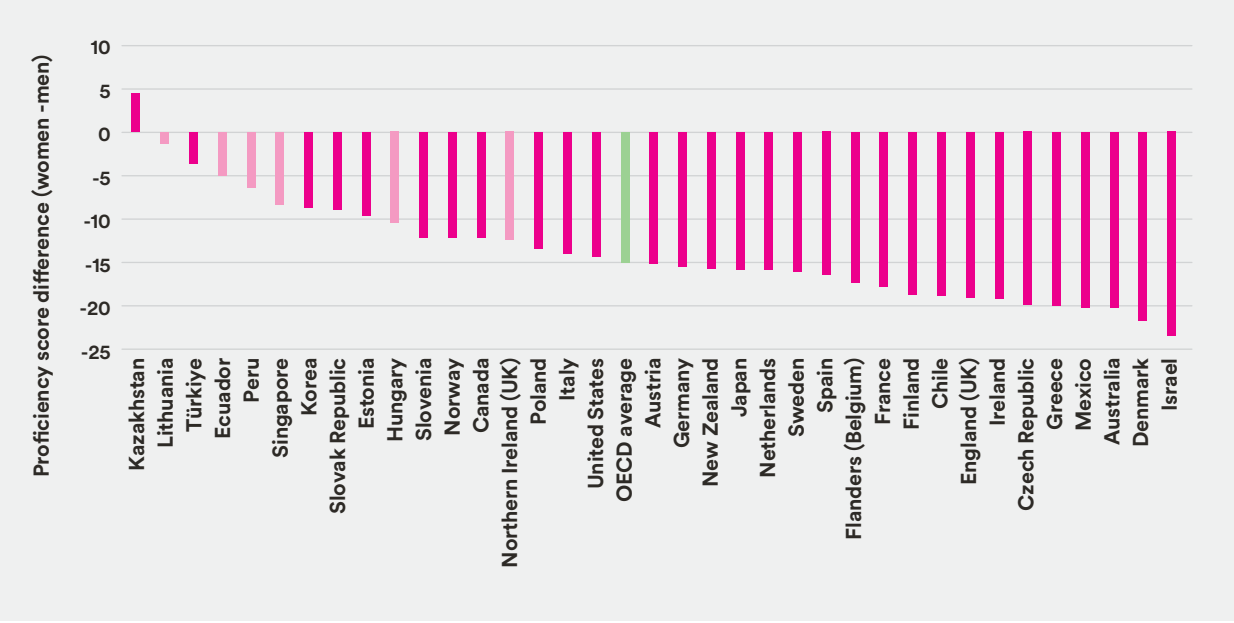


Note: Statistically significant differences at 5% are displayed in a darker tone.
Source: Survey of Adult Skills (PIAAC) (2012, 2015, 2018).

Since more men than women choose fields of study with higher mathematical content, such as STEM fields, this could explain why the use of advance mathematics among university students is overwhelmingly greater among men.

This disproportionately higher likelihood that men will specialise in fields of study that make more intensive use of numeracy skills could also explain the wide gender gap in numeracy skills among university students (OECD, 2020[32]), and later on in the general adult population. Figure 15 uses PIAAC data to show that male tertiary students score around 15 points higher in numeracy than female students, on average across OECD countries. This difference is as large as 20 points in Australia, Mexico and Greece, and even larger in Israel and Denmark.

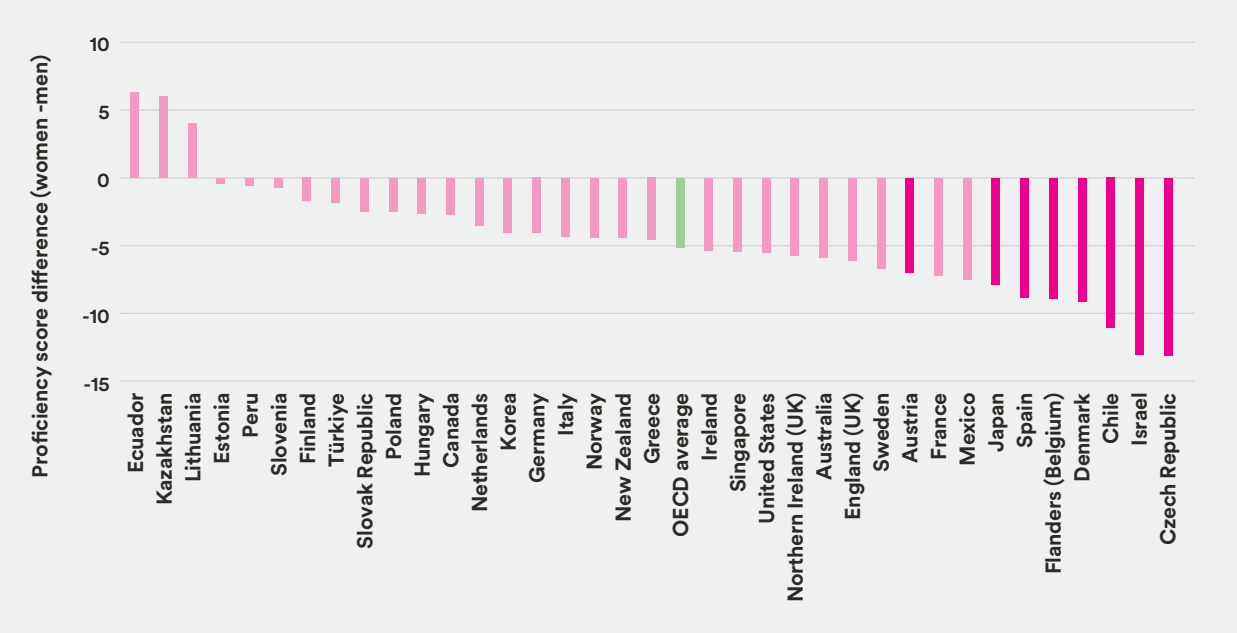
Figure 15. Gender gap in numeracy among tertiary students
Women minus men, by country, PIAAC Cycle I



Note: Statistically significant differences at 5% are displayed in a darker tone.
Source: Survey of Adult Skills (PIAAC) (2012, 2015, 2018).

In literacy (reading), however, girls initially perform much better than boys, as is evident from PISA results. But this gap completely disappears in adulthood, with young men and women having almost identical levels of literacy proficiency, on average. Figure 16 shows how the performance advantage in reading that girls had during their compulsory education seems to narrow or completely disappear at university. According to PIAAC results, on average across OECD countries, tertiary-educated men score higher than women in literacy by only around 5 points. While this difference is close to or higher than 10 points in Spain, Belgium, Denmark, Chile, Israel and the Czech Republic, it is still much smaller than the difference in numeracy scores in the same countries. The narrowing of the gender gap in literacy over time is slightly puzzling, but it may happen because literacy is a more transversal skill that everybody needs to master in order to succeed in education and in the labour market, irrespective of the chosen occupation or field of study (OECD, 2020[32]).

Figure 16. Gender gap in literacy among tertiary students
Women minus men, by country

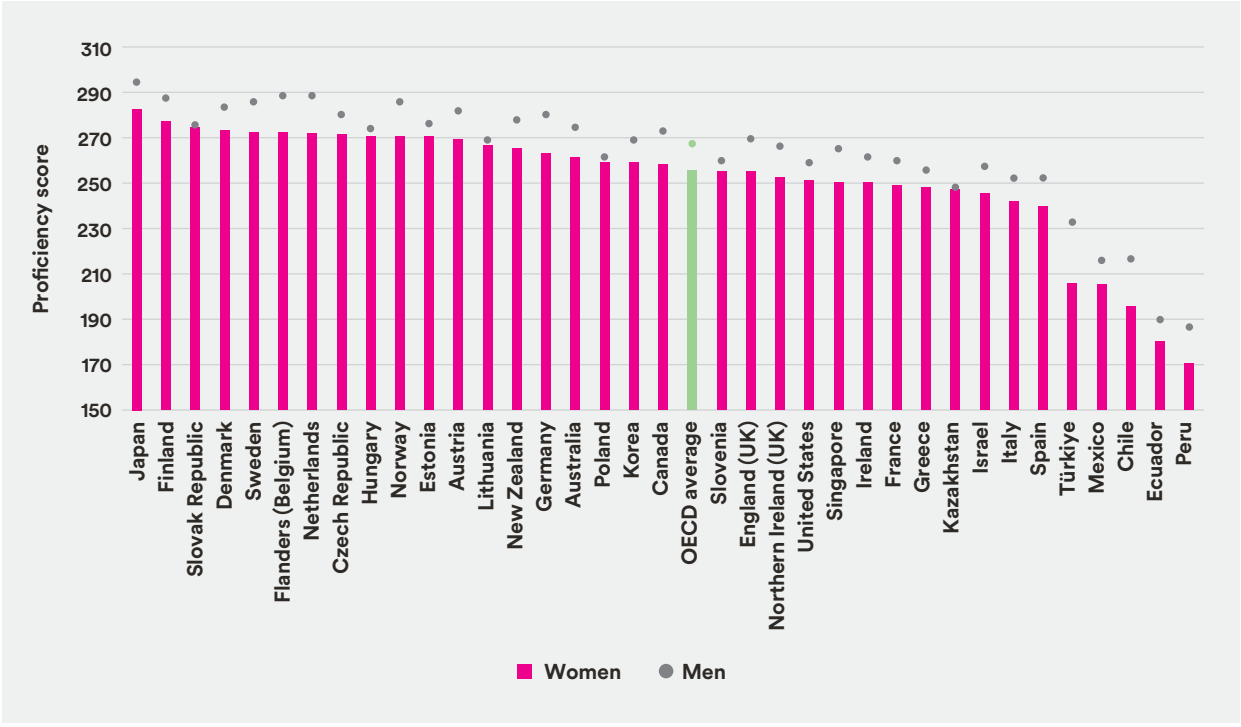


Note: Statistically significant differences at 5% are displayed in a darker tone.
Source: Survey of Adult Skills (PIAAC) (2012, 2015, 2018).

7. Skills development in adult life

When looking at the population of adults aged 16-65 years, men continue to have an advantage over women in numeracy skills. In all but a few countries, including Hungary, Poland, Kazakhstan and Lithuania, women score lower than men in numeracy, with a difference averaging 11 points (less than the 15 score-point difference among university students) across OECD countries.

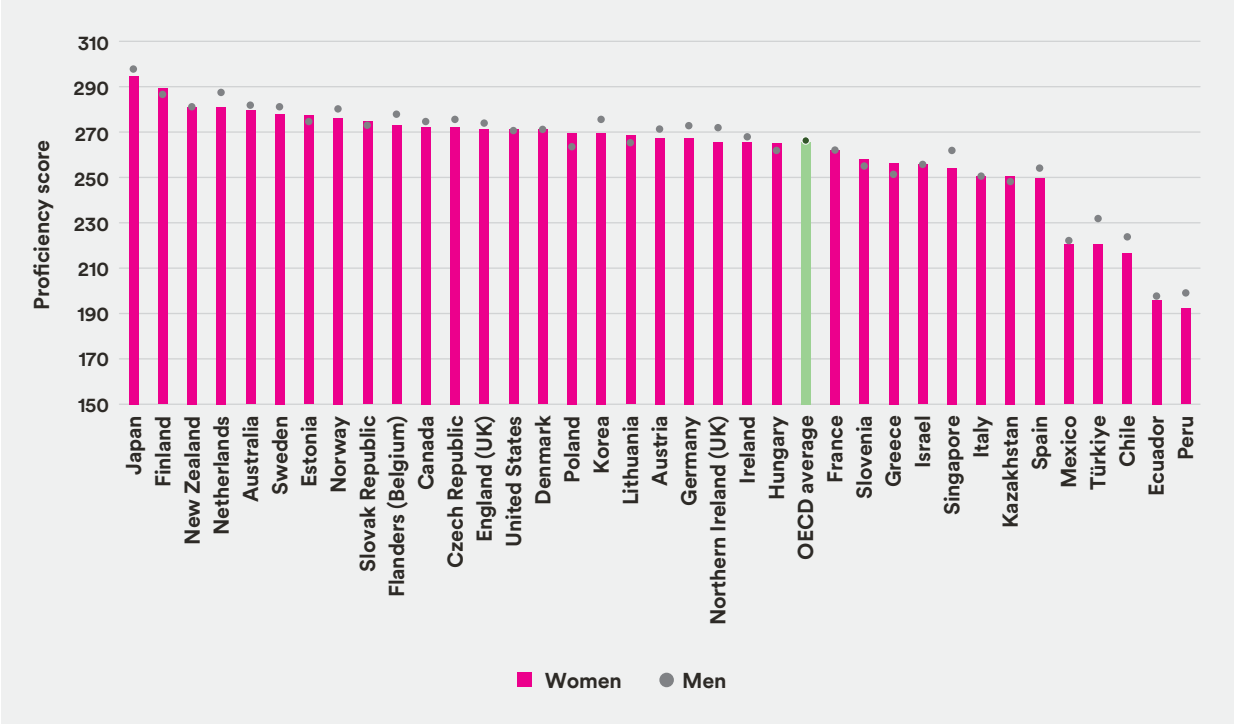
Figure 17. Numeracy average for the adult population, by gender and country



Source: Survey of Adult Skills (PIAAC) (2012, 2015, 2018).

In contrast to numeracy, men's and women's performance in literacy is markedly similar in all countries. This is true irrespective of the level of performance. On average across OECD countries, women perform better than men in literacy by only around 1 percentage point (Figure 18). There is a literacy gender gap in Japan, the highest-performing country, and one in Peru, the lowest-performing country, and these gaps are comparable in size. In both countries, the literacy gap is very small, around 1-2 score points.

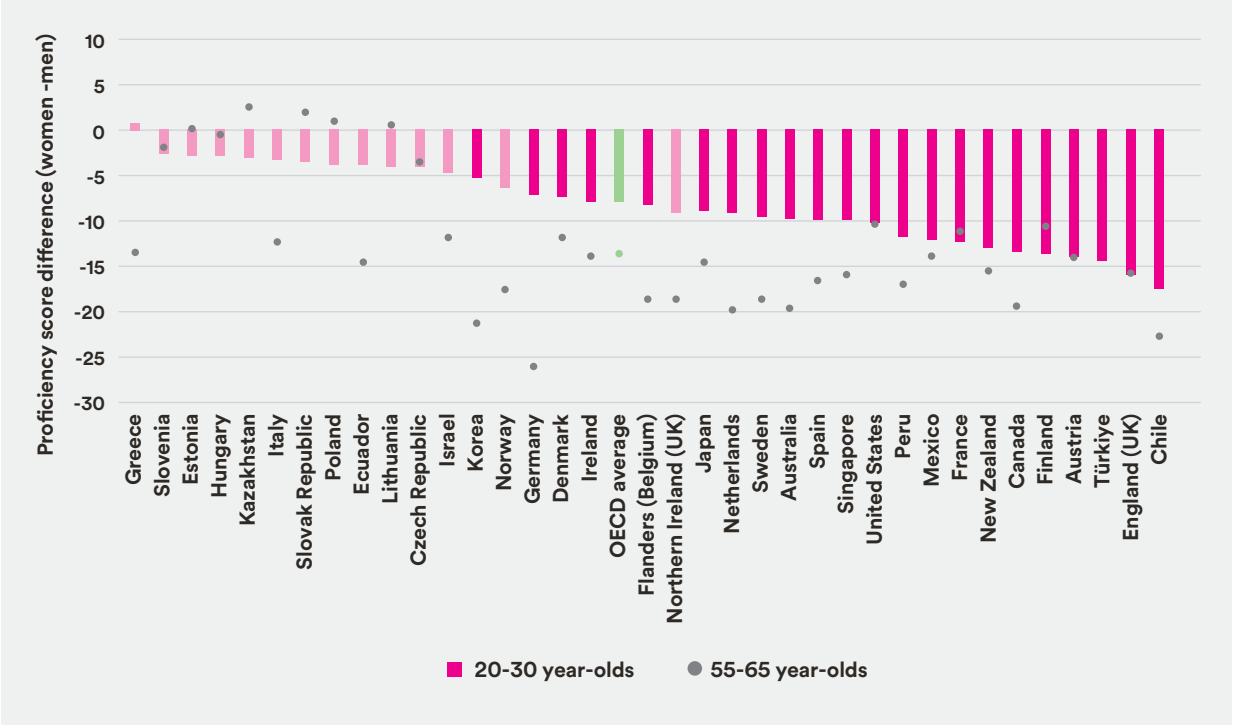
Figure 18. Literacy average for the adult population, by gender and country



Source: Survey of Adult Skills (PIAAC) (2012, 2015, 2018).

Across most countries, these gender gaps are typically more pronounced among older adults (Figure 19). In other words, women in the 55-65 years age bracket tend to perform much worse in numeracy and literacy than similarly aged men, as compared to women in the 20-30 years age group. For instance, on average across OECD countries, the difference in numeracy scores between men and women aged 55-65 is close to 13 score points, as opposed to only 7.8 score points among men and women in the younger age cohort. In some countries, the gender gap in performance between these two age groups is small or even negligible, as is the case in England, Austria and France. But in most countries, this gender gap by age group is quite large, especially in the case of numeracy. This is particularly true in Korea and Germany where the gender gap among the older population is more pronounced than that among the younger population by almost to 12-19 score points. This is mainly due to two factors. The first is that women's educational attainment has progressively caught up with that of men. In other words, gender gaps in educational attainment are wider among older adults. The second is that women's numeracy skills depreciate more over time, possibly because women participate less in the labour market. This is related to the fact that women and men still tend to make different occupational choices, or have different labour-market outcomes for a given level of education, which might affect the extent to which they have the opportunity to practise and maintain their level of proficiency (OECD, 2019[33]).

Figure 19. Numeracy gender gap (women minus men), by country and age



Note: Statistically significant differences at 5% are displayed in a darker tone.
Source: Survey of Adult Skills (PIAAC) (2012, 2015, 2018).

8. Gender gaps in labour market outcomes: Employment rates and wages

The transition from education to paid work is a crucial point in the lives of most young men and women. In fact, the structure of education and training systems often emerges as a key institutional factor for facilitating smooth transitions into the labour market. Higher levels of education usually translate into better employment opportunities and higher earnings. However, gender gaps in employment rates and earnings persist in all countries. More women have entered the workforce in recent years, but they often experience more difficulty than men in finding a first job, earn less than men, and are more likely to work part time. Furthermore, the fields of study that young women and men choose perpetuate gender segregation in the labour market, with women under-represented in the STEM sector and concentrated in health, welfare, education and administrative jobs.

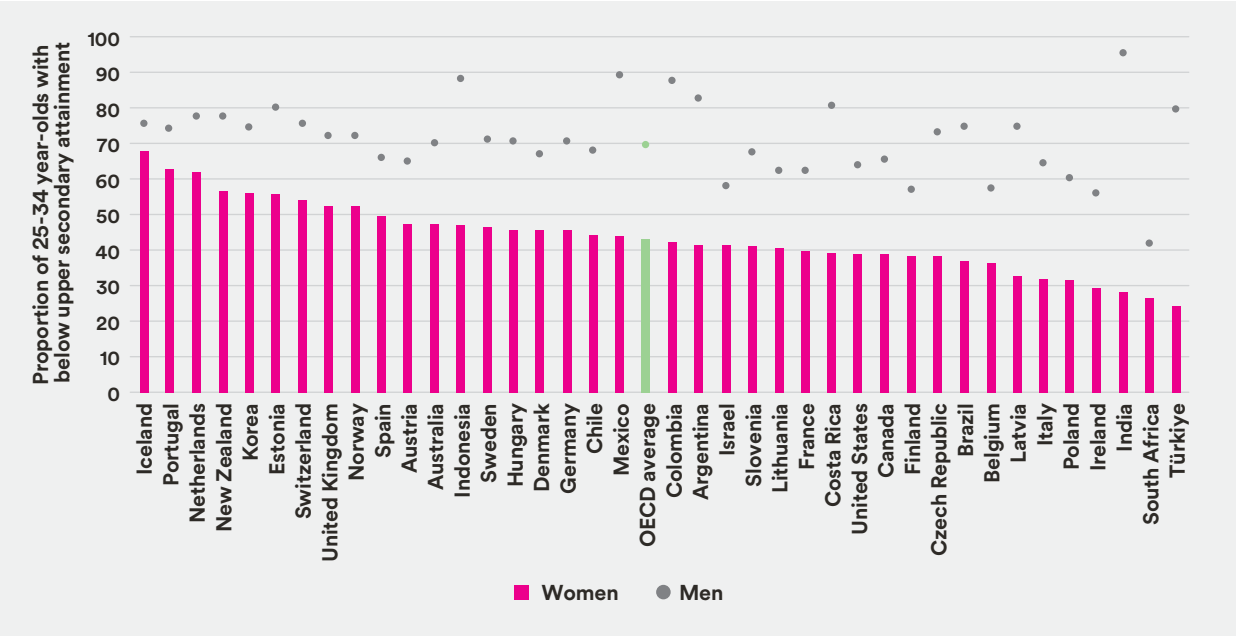
How does educational attainment affect employment outcomes?

It is widely documented that those with higher qualifications are more likely to find employment (Card, 2001[34]; Harvey, 2000[35]; Pages and Stampini, 2007[36]). In contrast, while there are employment opportunities for those with lower qualifications, these workers' labour-market prospects are relatively challenging. People with the lowest educational qualifications have lower earnings and are often working in routine jobs that are at greater risk of being automated, therefore increasing their likelihood of being unemployed (Arntz, Gregory and Zierahn, 2016[37]).

On average across OECD countries, the employment rate is 58% for adults (25-64 year-olds) without upper secondary education and 75% for those with upper secondary or post-secondary non-tertiary education as their highest attainment, i.e. 17 percentage points higher. On average across OECD countries, the employment rate for tertiary-educated adults increases by a further 10 percentage points (84%), compared to the employment rate for those with just an upper secondary or post-secondary non-tertiary education as their highest attainment. The employment premium of upper secondary or post-secondary non-tertiary attainment compared to lower educational attainment levels is the highest – exceeding 20 percentage points – in Austria, Belgium, the Czech Republic, Denmark, Finland, Hungary, Israel, Poland, the Slovak Republic, Slovenia and Sweden. In contrast, the employment premium is less than 5 percentage points in Colombia, Indonesia and Saudi Arabia (OECD, 2021[38]).

Employment rates are particularly low among younger women without upper secondary attainment (Figure 20). On average across OECD countries, the employment rate among 25-34 year-old women without upper secondary attainment is 43%, compared to 69% for their male peers, a gender gap of 26 percentage points (OECD, 2021[39]). In most OECD and partner countries, less than half of younger women without upper secondary attainment are employed. In contrast, in about half of OECD and partner countries, the employment rates of younger men without upper secondary attainment exceed 70% and reach almost full employment (around 90%) in Indonesia and Mexico. In Iceland, younger men without upper secondary attainment have relatively high employment rates (79%), with concurrent high employment rates for women (73%) (OECD, 2021[38]).

Figure 20. Employment rates of 25-34 year-olds with below upper secondary attainment, by gender (2021)



Note: Year of reference differs from 2021: 2020 for Chile, India and South Africa.
Source: OECD (2021), Education at a Glance Database.

Disparities in employment rates by gender narrow as educational attainment increases; they are the lowest among tertiary-educated adults. On average across OECD countries, the gender difference in employment rates among 25-34 year-olds with a tertiary degree is 7 percentage points (87% for men and 80% for women). The smallest difference in employment rates (no more than 2 percentage points) is found in Belgium, Iceland, Lithuania, the Netherlands, Norway and Slovenia. However, in some countries, the gender difference among young adults with tertiary attainment is still very large, exceeding 20 percentage points in the Czech Republic, Hungary, the Slovak Republic and Türkiye (OECD, 2021[39]).

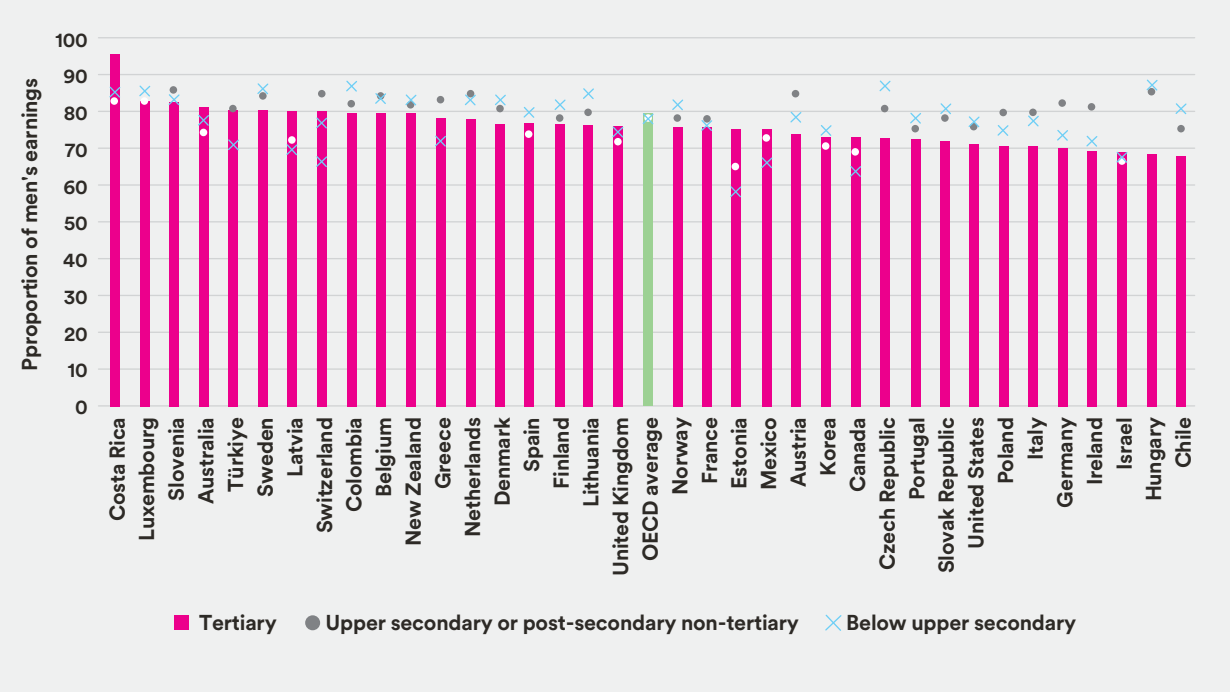
The high employment rate of women hides a greater likelihood for women to be in part-time or part-year employment compared to men. On average across OECD countries, women are about twice as likely as men to work part time or part year, regardless of their educational attainment (OECD, 2021[40]).

How does educational attainment affect earnings?

Besides better employment prospects, there is also an earnings advantage associated with higher educational attainment. On average across OECD countries, 25-64 year-olds with below upper secondary attainment earn 22% less than those with upper secondary attainment, while those with tertiary attainment have an earnings advantage of about 57%. Having a tertiary degree carries a considerable earnings advantage in most OECD countries. These relative earnings are the highest in Chile, Colombia and Costa Rica, where adults with tertiary education earn more than twice as much as those with upper secondary education only. However, in Australia, Denmark, Estonia, Norway and Sweden this earnings advantage is considerably smaller, at less than 30% for tertiary-educated adults compared to those with upper secondary attainment (OECD, 2021[38]).

Even with an earnings advantage associated with higher levels of education, women earn less than men in every OECD country (Figure 21). On average among adults, tertiary-educated women earn 76% of the earnings of their male peers. Women with below upper secondary attainment or upper secondary or post-secondary non-tertiary attainment earn 78% of the earnings of similarly educated men. There is a significant variation in the earnings of full-time working women compared to those of men. In nearly half of OECD countries, the smallest gender gap in earnings is observed among adults with below upper secondary attainment. This is the case in Chile, the Czech Republic and Hungary, where the gap is more than 10 percentage points smaller than the difference among tertiary-educated workers. In more than half of OECD countries, the gender gap is widest among tertiary-educated adults. Australia, Canada, Costa Rica, Estonia, Israel, Latvia, Mexico and the United Kingdom are the only countries where the earnings of tertiary-educated women are closer to those of men when compared to women with lower attainment levels (OECD, 2021[40]).

Figure 21. Women's earnings as a percentage of men's earnings for full-time, full-year workers, by educational attainment (2019)



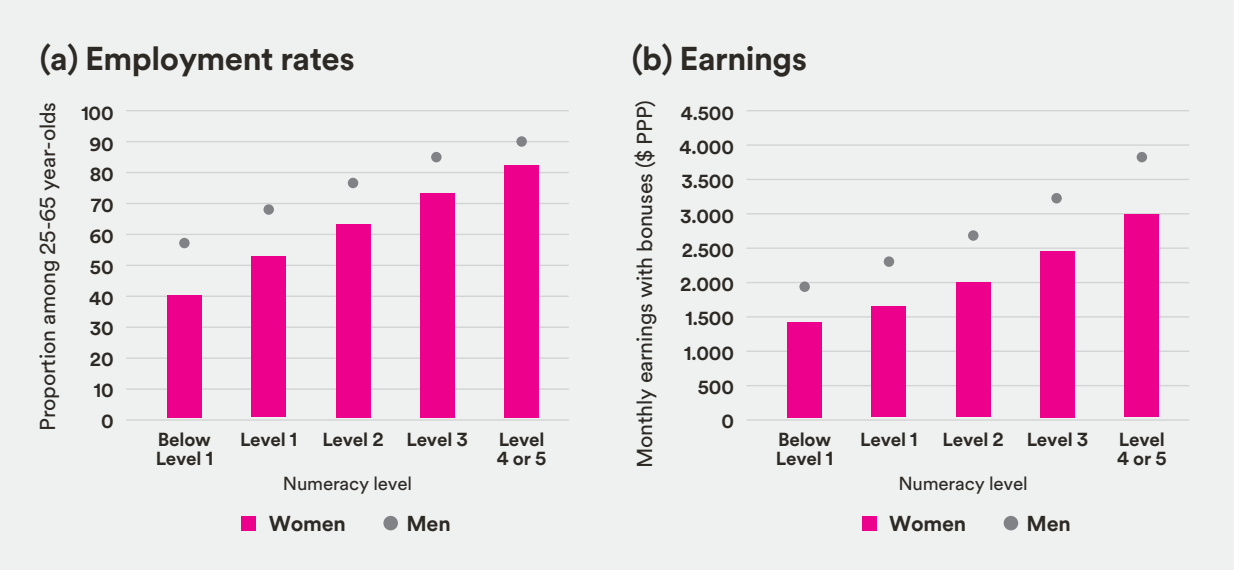
Notes:
Statistics are computed with earnings net of income tax in the following countries: Luxembourg, Türkiye, Latvia, Mexico and Ireland.
Year of reference differs from 2019 for the following countries: Belgium, Greece, Spain, Finland, Lithuania, France, Mexico, Canada, Czech Republic, Portugal, Poland, Italy, Israel and Chile. Refer to the source table for more details.
Source: OECD (2021), Education at a Glance Database.

Do skills use and skills proficiency affect employment and wages?

Educational qualifications and proficiency in information-processing skills reflect different aspects of an individual's human capital and are separately identified and valued in the labour market. But until the release of the Survey of Adult Skills (PIAAC), only a few studies examined the return on actual skills (Leuven, Oosterbeek and Ophem, 2004[41]; Tyler, 2004[42]). PIAAC shows that skills proficiency has an independent and positive impact on individuals' employment and earnings that complements the effect of formal education. Data from PIAAC suggest that, even when comparing individuals with the same level of education, an increase of one standard deviation in an individual's numeracy proficiency (56 score points) is associated with a 1.6 percentage-point increase in the probability of being employed as opposed to being unemployed. The same improvement in numeracy proficiency is also associated with a 7% increase in hourly wages, on average across the OECD countries and economies participating in PIAAC (OECD, 2019[33]). The PIAAC results show that employers reward highly proficient workers with a premium, even when they are compared with other employees with the same age, experience or level of education. This suggests that workers' skills proficiency influences their productivity and, in competitive economies, constitutes an important determinant of their employment and wage prospects (OECD, 2016[31]).

However, the gender gaps observed when considering the association between educational attainment and labour market outcomes are also evident in the association between skills proficiency and labour market outcomes. As previously shown, on average across OECD countries, numeracy skills are positively associated with being employed. Even though this holds true for both men and women, women tend to benefit less compared to men. Figure 22 confirms that numeracy skills are strongly associated with higher earnings, for both men and women. But with the same level of numeracy proficiency, women tend to earn less than men.

Figure 22. Employment rates and earnings among 25-65 year-olds
by level of numeracy proficiency and gender



Source: Survey of Adult Skills (PIAAC) (2012, 2015, 2018).

Reasons for the gender gap in employment rates (or the likelihood of being employed) and earnings include gender stereotyping, social conventions and discrimination against women, but also differences between men and women in their field-of-study choices. As discussed in previous sections, gender stereotypes and social conventions may also contribute to the observed differences in fields of study between men and women. Men are more likely than women to pursue studies in fields associated with higher earnings, such as engineering, manufacturing and construction, and information and communication technologies, while women's educational choices are still directed at fields associated with lower earnings, including education, and arts and humanities. Other reasons may relate to difficulties in combining a professional career with household and family responsibilities. To manage these different commitments, women are more likely to seek less competitive paths and greater flexibility at work, leading to lower earnings than men with the same educational attainment (OECD, 2016[43]).

9. Key policy messages to address gender gaps in education and skills, and in the workplace, particularly in numeracy

Narrowing gender gaps does not require expensive reforms. Rather, it requires concerted efforts by parents, teachers and employers to become more aware of their own conscious or unconscious biases so that they give girls and boys equal chances for success at school and beyond (Schleicher, 2019[44]).

More young people could choose scientific and technological careers if there were greater focus on helping students, particularly girls, overcome their anxiety towards mathematics and their lack of confidence in their STEM abilities. Teachers and parents can build girls' confidence in their abilities in mathematics and science by evaluating their actual abilities, giving them positive feedback on the work they do well, and helping in areas where they are weaker without giving them low marks. Training teachers to recognise and address any bias they may harbour about boys and girls will help them to teach more effectively so that students are able to make the most of their potential.

It is also crucial to improve the participation of girls in more mathematical and technological activities in which there is now a predominance of boys. Videogaming and web browsing are typical activities enjoyed by boys that can promote some skills and be used as learning aids. However, when young people spend excessive amounts of time on line, their academic results could also be affected, they can become socially isolated and show less engagement in school. Using technology to develop skills, and not hinder learning, can be better promoted.

Another way to get girls more interested in mathematics and science, and develop numeracy skills, and to encourage boys to read more would be to remove the gender bias and stereotypes in curricula, and raise awareness about the likely consequences on careers and earnings of students' decisions about what field of study to pursue. Governments, schools and the private sector need to explore co-operation strategies, such as job-information days or career fairs in schools for both parents and students, in order to increase girls' interest in science-related subjects and boys' interest in the humanities and arts-related subjects.

Besides school-related interventions, promoting early work experience through education programmes and apprenticeships could encourage women, particularly those who successfully completed STEM-related studies, to work in scientific fields (OECD, 2012[45]). Careful career guidance and counselling at schools and universities can help young men and women better match their acquired skills with their chosen career paths. PIAAC can also help build a data system that enables the assessment of available skills at the national level, informs skills policies, and minimises skills mismatches in the economy.

In order to help bridge the gender gap in numeracy proficiency at university and in adult life, university students can be encouraged to improve their numeracy skills by raising awareness about the importance of these skills in the labour market. Mathematics camps can be organised targeting women. At the workplace, employers can ensure sufficient opportunities and time for the professional development of their employees, focusing particularly on improving numeracy proficiency.

Reflecting on the stubborn persistence of gender pay gaps, national measures should be introduced to reduce wage disparities between men and women. One effective policy measure involves pay transparency, which makes companies acknowledge the size of their gender pay gap. Companies are increasingly required to carry out analyses of gender wage gaps, and are requested or required to share this information with employees, government auditors or the public. Other new strategies include introducing pay-gap calculators, which are often publicly available on line, as well as certifications for companies showing best practice in gender pay equality. These types of measures have been proposed or introduced in several countries since 2013, including Australia, Japan, Germany, Lithuania, Sweden, Switzerland and the United Kingdom (OECD, 2017[2]).

Countries must step up their efforts through sustained campaigns, monitoring policies aimed at gender equality, greater public investment, and by introducing and expanding legal measures. The policy suggestions in this report should serve as an initial toolkit for policy makers and stakeholders willing to tackle gender inequality in education and the workplace. The time is now to ensure that better policies lead to better lives – for girls and boys, and for women and men.

Note

Upper secondary education (ISCED 3) corresponds to the final stage of secondary education in most OECD countries. Instruction is often more organised along subject-matter lines than at ISCED Level 2 and teachers typically need to have a higher level, or more subject-specific, qualifications than at ISCED 2. The entrance age to this level is typically 15 or 16 years.

References

Aguirre, L. et al. (2012), *Empowering the Third Billion. Women and the World of Work in 2012,* Booz and Company. [4]

Arntz, M., T. Gregory and U. Zierahn (2016), "The risk of automation for jobs in OECD countries: A comparative analysis", *OECD Social, Employment and Migration Working Papers,* No. 189, OECD Publishing, Paris, https://doi.org/10.1787/5jlz9h56dvq7-en. [37]

Audette, A., S. Lam and H. O'Connor (2019), "(E)Quality of life: A cross-national analysis of the effect of gender equality on life satisfaction", *Journal of Happiness Studies 20,* pp. 2173–2188. [9]

Balfanz, R. et al. (2007), "Preventing student disengagement and keeping students on the graduation path in urban middle-grades schools: Early identification and effective interventions", *Educational Psychologist,* Vol. 42/4, pp. 223-235. [15]

Baumeister, R. and M. Leary (1995), "The need to belong: Desire for interpersonal attachments as a fundamental human motivation", *Psychological Bulletin,* Vol. 117, pp. 497-529. [11]

Baye, A. and C. Monseur (2016), "Gender differences in variability and extreme scores in an international context", *Large-scale Assessments in Education,* Vol. 4/1, https://doi.org/10.1186/s40536-015-0015-x. [20]

Card, D. (2001), "Estimating the return to schooling: Progress on some persistent econometric problems", *Econometrica,* pp. 1127-1160. [34]

Cuberes, D. and M. Teignier (2014), *Gender Gaps in the Labor Market and Aggregate Productivity*. [3]

Echazarra, A. (2018), "How has Internet use changed between 2012 and 2015?", *PISA in Focus,* No. 83, OECD Publishing, Paris, https://doi.org/10.1787/1e912a10-en. [28]

Eckstein, Z. and K. Wolpin (1999), "Why youths drop out of high school: The impact of preferences, opportunities, and abilities", *Econometrica 67,* No. 6, pp. 1295–1339. [10]

Ferrant, G. and A. Kolev (2016), "Does gender discrimination in social institutions matter for long-term growth?: Cross-country evidence", *OECD Development Centre Working Papers,* No. 330, OECD Publishing, Paris, https://doi.org/10.1787/5jm2hz8dgls6-en. [5]

Gonzales, C. et al. (2015), *Catalyst for Change: Empowering Women and Tackling Income Inequality,* https://doi.org/10.5089/9781513533384.006. [7]

Guthrie, J., W. Schafer and C. Huang (2001), "Benefits of opportunity to read and balanced instruction on the NAEP", *The Journal of Educational Research,* Vol. 94/3, pp. 145-162, https://doi.org/10.1080/00220670109599912. [23]

Harvey, L. (2000), "New realities: The relationship between higher education and employment", *Tertiary Education and Management,* pp. 3-17. [35]

Klauda, S. and J. Guthrie (2014), "Comparing relations of motivation, engagement, and achievement among struggling and advanced adolescent readers", *Reading and Writing,* Vol. 28/2, pp. 239-269, https://doi.org/10.1007/s11145-014-9523-2. [22]

Kochhar, K., S. Jain-Chandra and M. Newiak (2017), *Women, Work, and Economic Growth: Leveling the Playing Field,* International Monetary Fund. [8]

Leuven, E., H. Oosterbeek and H. Ophem (2004), "Explaining international differences in male skill wage differentials by differences in demand and supply of skill", *Economic Journal,* pp. 466-486. [41]

Mol, S. and A. Bus (2011), "To read or not to read: A meta-analysis of print exposure from infancy to early adulthood", *Psychological Bulletin, Vol. 137/2,* pp. 267-296, https://doi.org/10.1037/a0021890. [26]

Mol, S. and J. Jolles (2014), "Reading enjoyment amongst non-leisure readers can affect achievement in secondary school", *Frontiers in Psychology, Vol. 5.* [24]

OECD (2021), *Education and earnings,* Education at a Glance Database. [40]

OECD (2021), *Education at a Glance 2021: OECD Indicators,* OECD Publishing, Paris, https://doi.org/10.1787/b35a14e5-en. [38]

OECD (2021), *Educational attainment and labour-force status,* Education at a Glance Database. [39]

OECD (2021), "Why do more young women than men go on to tertiary education?", *Education Indicators in Focus,* No. 79, OECD Publishing, Paris, https://doi.org/10.1787/6f7209d1-en. [29]

OECD (2020), "Do gender gaps in reading and mathematics evolve between childhood and adulthood?", *Adult Skills in Focus,* No. 13, OECD Publishing, Paris, https://doi.org/10.1787/6db40c8d-en. [32]

OECD (2019), *Education at a Glance 2019: OECD Indicators,* OECD Publishing, Paris, https://doi.org/10.1787/f8d7880d-en. [30]

OECD (2019), *PISA 2018 Results (Volume II): Where All Students Can Succeed,* PISA, OECD Publishing, Paris, https://doi.org/10.1787/b5fd1b8f-en. [19]

OECD (2019), *Skills Matter: Additional Results from the Survey of Adult Skills,* OECD Skills Studies, OECD Publishing, Paris, https://doi.org/10.1787/1f029d8f-en. [33]

OECD (2017), *The Pursuit of Gender Equality: An Uphill Battle,* OECD Publishing, Paris https://doi.org/10.1787/9789264281318-en. [2]

OECD (2016), *OECD Employment Outlook 2016,* OECD Publishing, Paris https://doi.org/10.1787/empl_outlook-2016-en. [43]

OECD (2016), *Skills Matter: Further Results from the Survey of Adult Skills,* OECD Publishing, Paris https://doi.org/10.1787/9789264258051-en. [31]

OECD (2015), *The ABC of Gender Equality in Education: Aptitude, Behaviour, Confidence,* PISA, OECD Publishing, Paris, https://doi.org/10.1787/9789264229945-en. [25]

OECD (2014), *"Does Homework Perpetuate Inequities in Education?", PISA in Focus, No. 46,* OECD Publishing, Paris https://doi.org/10.1787/5jxrhqhtx2xt-en. [21]

OECD (2012), *Closing the Gender Gap: Act Now,* OECD Publishing, Paris https://doi.org/10.1787/9789264179370-en. [45]

OECD (2010), *The High Cost of Low Educational Performance: The Long-Run Economic Impact of Improving PISA Outcomes,* OECD Publishing, Paris, https://doi.org/10.1787/9789264077485-en. [16]

Oreopoulos, P. (2007), "Do dropouts drop out too soon? Wealth, health and happiness from compulsory schooling,", *Journal of Public Economics,* Vol. 91/11-12, pp. 2213-2229. [17]

Pages, C. and M. Stampini (2007), *No education, no good jobs? Evidence on the relationship between education and labour market segmentation.* [36]

Rubin, K., W. Bukowski and J. Parker (1998), *Peer interactions, relationships, and groups,* Wiley. [12]

Rumberger, R. (2011), *Why Students Drop Out of High School and What Can Be Done About It,* Harvard University Press. [18]

Salisbury, J., G. Rees and S. Gorard (1999), "Accounting for the differential attainment of boys and girls: A state of the art review", *School Leadership and Management,* Vol. 19/4. [13]

Schleicher, A. (2019), *PISA 2018: Insights and Interpretations,* OECD Publishing, Paris. [44]

Schultz, T. (2002), "Why governments should invest more to educate girls", *World Development,* 30(2), pp. 207-25. [6]

Sullivan, A. and M. Brown (2015), "Reading for pleasure and progress in vocabulary and mathematics", *British Educational Research Journal,* Vol. 41/6, pp. 971-991, https://doi.org/10.1002/berj.3180. [27]

Tyler, J. (2004), "Basic skills and the earnings of dropouts", *Economics of Education Review,* pp. 221-235. [42]

UN (1948), *The Universal Declaration of Human Rights (UDHR),* United Nations. [1]

Van Houtte, M. (2004), "Why boys achieve less at school than girls: The difference between boys' and girls' academic culture", *Educational Studies,* Vol. 30/2, pp. 159-173. [14]

OECD Skills Studies

Gender, Education and Skills

THE PERSISTENCE OF GENDER GAPS IN EDUCATION AND SKILLS

The 2023 Gender, Education and Skills Report on the persistence of gender gaps in education and skills presents fresh insights on progress towards gender equality in education. The report tries to understand why teen boys are more likely than girls, on average, to fail to attain a baseline level of proficiency in reading, mathematics and science, and why high-performing girls do not continue investing in developing skills in areas such as mathematics and science, when compared to high-performing boys. The report also describes that, despite overall gender gaps in mathematics and science being quite small, young women continue to be under-represented in STEM-related fields after leaving school. These career choices are also reflected in gender disparities in the labour market: tertiary-educated women earn 76% of the earnings of their male peers. This could be possible because men are more likely than women to pursue studies in fields associated with higher earnings, such as engineering, manufacturing and construction, and ICTs, while women still choose fields associated with lower earnings, including education, welfare, and arts and humanities.

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