Benchmarking Higher Education System Performance

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Higher Education

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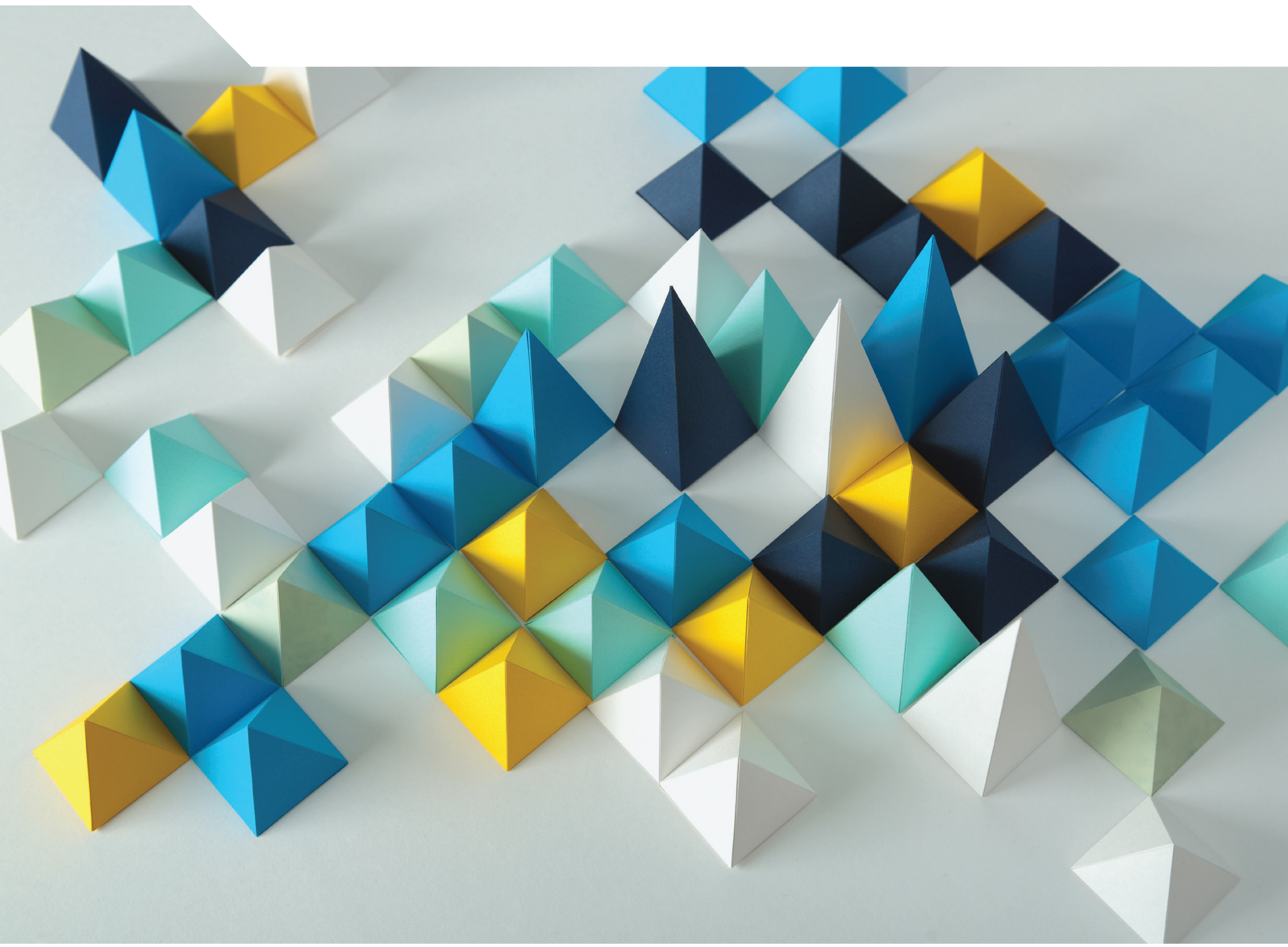

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Foreword

The scope of contemporary higher education is broad, and concerns about the performance of higher education systems are widespread. The number of young people with a higher education qualification is expected to surpass 300 million in OECD and G20 countries by 2030. Higher education systems are faced with many challenges, which include expanding access, containing costs, and ensuring the quality and relevance of provision.

During 2017-2018, the OECD Higher Education Policy team carried out a benchmarking review of higher education systems. The review involved the compilation and analysis of statistical data related to higher education (ISCED levels 5-8) for all OECD countries, as well as a review of indicators, policies and practices for four jurisdictions that elected to participate in a deeper benchmarking exercise: Estonia, the Flemish Community of Belgium, the Netherlands and Norway. The evidence compiled for the review spanned the inputs, activities, outputs and outcomes of higher education systems, with a view to assessing their relative performance.

The analysis in this synthesis report for the project provides a comprehensive and empirically rich review of the higher education landscape across OECD countries, taking stock of how well systems are performing in meeting their education, research and engagement responsibilities. This report represents the first extensive examination of higher education systems undertaken by the OECD in more than a decade, and is timely given the continuing shifts in the higher education landscape in recent years. It presents an analysis of the state of higher education across the OECD today; the wider context in which it operates; how it is resourced; outputs and outcomes of education and research activities; and the range of actions higher education institutions are increasingly taking to improve engagement with the wider world and their relevance to society.

This review also finds that the necessary evidence base to guide higher education policy is trailing behind the quickly moving developments in higher education systems. While higher education is by far the most internationalised level of education, with systems competing globally for students and researchers, there are almost no international comparisons available of how teaching, learning and research are organised within the "black box" of higher education institutions.

Furthermore, higher education grows more costly every year. Yet, despite continuously increasing public and private expenditure, the body of available evidence required to measure the value achieved for this investment is less developed compared to other levels of education. Tackling core data gaps on the quality of education services provided and the impact of higher education on students' development of skills and knowledge is essential to demonstrate the value provided by higher education systems and illuminate the areas in which performance needs to be improved.

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Reader's Guide

Statistical coverage

The statistics reported in this publication cover the entire respective national higher education system, including higher education research and development, within the national or jurisdictional territory and regardless of ownership, sponsorship and mode of delivery, except when differently specified. All higher education students, graduates, staff and programmes are included, following internationally agreed definitions (UNESCO Institute for Statistics, OECD and Eurostat, 2018[1]; OECD, 2018[2]; OECD, 2015[3]). Deviations from this general rule are reported in the text or notes within this publication.

Country and jurisdiction coverage

The indicators in this publication cover all OECD countries for which data is available, and in some cases subnational units when data are specifically available at that level (for example, England (United Kingdom) or the French Community of Belgium). The policy analysis carried out in this publication focuses primarily on the four jurisdictions that participated in the 2017-2018 Benchmarking Higher Education System Performance exercise. These four jurisdictions are Estonia, the Flemish Community of Belgium, the Netherlands and Norway, and are referred to as the "participating jurisdictions" throughout the report. Policies from other jurisdictions are discussed throughout the report when relevant.

As the Flemish Community of Belgium is a participating jurisdiction in the benchmarking exercise, data have been included for the jurisdiction wherever possible. Data sources for the Flemish Community of Belgium include OECD Regional Statistics, and a special data collection conducted for the benchmarking exercise in collaboration with the Flemish Ministry for Education and Training. The Flemish Community of Belgium is referred to throughout as "The Flemish Community". In some cases, data are reported for the region of Flanders; this is specified within the text.

Use of the term "higher education" in this report

The term "higher education" in this publication is equivalent to the term "tertiary education", as defined in the ISCED 2011 classification (UNESCO Institute for Statistics, 2012[4]): "Tertiary education builds on secondary education, providing learning activities in specialised fields of education. It aims at learning at a high level of complexity and specialisation. Tertiary education includes what is commonly understood as academic education but also includes advanced vocational or professional education". This comprises the short-cycle, bachelor's, master's or doctoral levels of education (Table 1). The term "higher education" is used throughout this report rather than "tertiary education" due to its wider use in academic and policy literature.

Table 1. Higher education levels in the ISCED 2011 classification

Label (as used in the publication)	Complete name and description
Short-cycle programmes	*Short-cycle tertiary education (ISCED level 5)*: Programmes at ISCED level 5 aim to provide professional knowledge, skills and competencies. Typically, they are practically based, occupationally specific and prepare students to enter the labour market, but may also provide a pathway to other higher education programmes. Academic higher education programmes below the bachelor's level are also classified as ISCED level 5. Programmes classified at ISCED level 5 may be referred to as (higher) technical education, community college education, technician or advanced/higher vocational training, an associate degree, or the *bac+2*.
Bachelor's programmes	*Bachelor's or equivalent level* (*ISCED level 6*): Programmes at ISCED level 6 aim to provide intermediate academic and/or professional knowledge, skills and competencies, leading to a first degree or equivalent qualification. Programmes are typically theoretically based, but may include practical components and are informed by research and/or best professional practice. Programmes at this level do not necessarily involve the completion of a research project or thesis, but if they do, it is less advanced, less independent or is undertaken with more guidance than those at ISCED level 7 or 8. Programmes classified at ISCED level 6 may be referred to as a bachelor's programme, a *licence*, or the first university cycle.
Master's programmes	*Master's or equivalent level (ISCED level 7)*: Programmes at ISCED level 7 are designed to provide advanced academic and/or professional knowledge, skills and competencies, leading to a second degree or equivalent qualification. Typically, programmes at this level are theoretically based, but may include practical components and are informed by state-of-the-art research and/or best professional practice. Programmes at this level may involve the completion of a research project or thesis that is more advanced than those expected at ISCED level 6 and less advanced than those expected at ISCED level 8. Master's programmes can be also entirely coursework-based in some countries, or there may be a differentiation between a coursework programme and a research programme. Programmes classified at ISCED level 7 may be referred to in many ways, for example: master's programmes, magister, or MPhil.
Doctoral programmes	*Doctoral or equivalent level (ISCED level 8)*: Programmes at ISCED level 8 lead to an advanced research qualification. Programmes at this ISCED level are devoted to advanced study and original research, and are typically offered only by research-oriented higher education institutions, such as universities. Doctoral programmes exist in both academic and professional fields, and usually conclude with the submission and defence of a thesis, dissertation or equivalent written work of publishable quality, representing a significant contribution to knowledge in the respective field of study. In some education systems, ISCED level 8 programmes contain very limited course work, or none at all, and individuals working towards a doctoral degree engage in research mostly independently or in small groups with varying degrees of supervision. Other countries require the completion of coursework before the doctoral candidates can progress to the thesis component of the programme (see Chapter 6). Programmes classified at ISCED level 8 may be referred to in many ways, for example: PhD, DPhil, D.Lit, D.Sc, LL.D, Doctorate or similar terms.

Note: Descriptions are taken from the UNESCO Institute for Statistics (2012[4]). Short-cycle programmes at the ISCED 5 level are not recognised as part of the higher education system in Norway and are offered through vocational colleges. Norway offers a two-year programme at ISCED 6 level (*høgskolekandidatgrad*) and students who successfully complete the two-year programme can enter into the third year of a bachelor's programme in the same field.

Calculation of the averages

Unless otherwise specified in the text, the averages presented in the charts and tables of this publication are the unweighted arithmetic averages across the OECD jurisdictions with available data, following the rules outlined in Table 2.

Table 2. Rules used for the calculation of averages

Jurisdictions used for the calculation	All jurisdictions with available data on all of the series presented in a chart are used to calculate the average. There are some exceptions to this general rule, reported within this table.
Calculation of averages of indicators by level of higher education	When indicators are broken down by higher education level, the average for the bachelor's, master's and doctoral levels includes all jurisdictions with available data for all of the series presented in the chart, except for the series related to the short-cycle level. The average for the short-cycle level is calculated separately, for all jurisdictions with available data for this level of education. This choice has been made because short-cycle programmes do not exist in a number of OECD jurisdictions.
Exclusion of Flemish data	Whenever data are available for both Belgium and the Flemish Community (or the Region of Flanders), the latter is excluded from the calculation of the average.
Non-applicable data	In some instances, data are "not applicable" for a jurisdiction. For example: if short-cycle programmes do not exist in a jurisdiction, enrolment at the short-cycle level is not applicable; if a public student loan scheme does not exist in a jurisdiction, then the amount of money spent on loans is not applicable. In the calculation of indicators, non-applicable data is treated as zero (e.g. zero students enrolled in short-cycle programmes and zero dollars spent on loans). When data are not applicable both at the numerator and the denominator of an indicator (e.g. proportion of international students at the short-cycle level over total enrolment at the short-cycle level), then the data are treated as missing in the calculation of the average.

Data sources

The majority of the indicators in this publication come from OECD data collections, for example the joint UNESCO-OECD-Eurostat (UOE) data collection, the OECD Indicators of Education Systems (INES) data collection, the Survey of Adult Skills, or the OECD Career of Doctorate Holders Survey. When possible, OECD data have been extracted from the OECD Education Statistics (OECD, 2018[5]) or from the OECD Science, Technology and R&D Statistics (OECD, 2018[6]) databases. In the other cases, the data collection is indicated as the data source.

Other data sources, from outside the OECD, have been used for selected indicators within the publication. For example, some indicators on financial and human resources are based on the European Register for Tertiary Education (ETER) dataset; and data from the World Economic Forum and the European Community Innovation Survey have been used to present indicators on higher education engagement.

In addition, a survey was issued to the four participating jurisdictions to collect data on a variety of topics, including a number of statistics broken down by subsector (universities and professional higher education institutions). The survey results are published in a number of tables within the publication. In these cases the source is stated as "adapted from data/information provided by the participating jurisdictions".

Data updates

This publication makes use of the most recent available data at the time of its preparation. Data released after 31 December 2018 have not been included in the analysis, except for the data on human resources in Chapter 6, which were released in early 2019, in order to standardise as much as possible the reference years used in Chapter 6.

A note on the statistical collaboration with LinkedIn

Box 5.10 was produced in collaboration with LinkedIn, a platform for professional networking. These data cover self-reported information on professional and educational experiences; and information on individual skills, either self-reported or reported by other individuals on the professional platform.

LinkedIn staff extracted the data on request of the OECD. The data provided by LinkedIn cover around 2 710 000 members who indicated that they earned their first master's degree between 2010 and 2013 in eight jurisdictions (Australia, Canada, Estonia, the Flemish Community, France, the Netherlands, Norway and the United States). By comparison, the OECD estimated the number of first-time master's graduates covering the same period and jurisdictions to be around 5 000 000 (based on data returned by jurisdictions in UNESCO-OECD-Eurostat (UOE) data collection). Graduates who reported over seven educational and professional experiences in the five years after graduating (1.5% of the total) were excluded from the analysis.

To check the robustness of the results, the same data extraction and calculations have been performed for both first-time bachelor's and master's graduates. In addition, the extraction of data on interpersonal skills has been performed based on two different skill lists: LinkedIn's own list; and a list of skills closely matching (as agreed by the OECD and LinkedIn) the list of keywords on intrapersonal, interpersonal and problem-solving skills provided by (Binkley et al., 2005[7]). The conclusions discussed in Box 5.10 hold for all variations of the analysis carried out.

Sources of qualitative information

A substantial amount of qualitative information has been collected to prepare this publication. The main sources of this information are:

- documents sent by the participating jurisdictions (one per jurisdiction) describing their higher education systems and policies
- discussions between the OECD and the participating jurisdictions' project coordinators held during six workshops between February 2017 and November 2018
- other meetings and webinars with the participating jurisdictions' project coordinators and national experts on higher education policies or statistics.

Throughout the publication, the information gathered from these sources is referred to as "adapted from information provided by the participating jurisdictions".

The publication also makes use of structured qualitative data on university autonomy in Europe from the European University Association (EUA) (Bennetot Pruvot and Estermann, 2017[8]); and on higher education academic staff categories from Eurydice (European Commission, EACEA and Eurydice, 2017[9]). Both organisations (EUA and Eurydice) gave permission to the OECD to use their qualitative data collection for additional data collection or validation. For example, qualitative data on the autonomy of professional HEIs and independent private institutions were collected by the OECD through interviews of representatives of these institutions or government officials, based on the EUA tool.

Symbols for missing data and abbreviations

The following symbols and abbreviations are used to convey statistical information in the linked files to the figures presented (*statlinks*) throughout this publication:

b There is a break in the time series, implying that comparisons across time should be made with caution

c There are too few observations to provide reliable estimates

d Difference in methodology

e Estimated value

m Data are not available (missing)

p Provisional value

q Data have been withdrawn at the request of the country concerned.

r Values are below a certain reliability threshold and should be interpreted with caution

w The indicator is overestimated because it includes data from another category

x Data are included in another category or column within the table

z Data are not applicable because the category does not apply

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Executive summary

Higher education provides graduates with favourable economic and social outcomes, but the low basic skills of some graduates is a cause for concern

The share of young people achieving a higher education qualification has increased steadily in recent years. Across the OECD, the proportion of 25-34 year-olds with a higher education qualification is now larger than the proportion with upper secondary education only. Moreover, despite the growth in higher education attainment across the OECD in recent decades, the employment premium enjoyed by higher education graduates has remained steady. Young higher education graduates also attract a strong premium on earnings; on average bachelor's graduates in the OECD earn one-third more, and master's graduates close to two-thirds more, than those with upper secondary or post-secondary non-tertiary education.

Apart from positive economic outcomes, higher education graduates also tend to report more favourable social and health outcomes than those without a higher education qualification. They are less likely to report suffering from depression and more likely to report to be in good or excellent health, to volunteer, to indicate trust in others and to feel a sense of political efficacy than those with upper secondary or post-secondary non-tertiary education only.

However, nearly one-third of higher education graduates have poorer information processing skills than might be expected of graduates at this level. According to the OECD Survey of Adult Skills, a worrying proportion (around 30%) of graduates from OECD higher education systems do not reach the literacy and numeracy proficiency skill level required to carry out moderately complex information processing tasks.

Higher education spending per student is increasing rapidly, with households paying about one-fifth of the costs

Higher education costs more than education at other levels, and spending has increased rapidly in recent years. Between 2005 and 2015, while the number of students in higher education increased by around 10%, total expenditure grew by more than 30%.

Governments continue to be the main source of higher education funding, accounting for two-thirds of expenditure on higher education institutions on average across OECD countries. The widespread provision of grants and scholarships to students, as well as public loans, has helped to make higher education more accessible and affordable. In many OECD countries, the average government expenditure per student on grants, scholarships and loans exceeds the average annual household expenditure on education institutions per student.

Households contribute about one-fifth of the cost of higher education, although funding by other private sources and international sources remains marginal in most OECD countries.

Inequity of access by socio-economic and migration background is a persistent challenge

Many governments maintain horizontal differentiation in the system with the goal of enabling the higher education system to serve a wide variety of students and purposes. In many countries, a binary divide between academically oriented (universities) and professionally oriented (professional HEIs) institutions exists. Available data indicate that professional HEIs in binary systems tend to enrol more part-time students, older students and more students from disadvantaged groups than universities.

However, overall, equal access to higher education is far from a reality. Across the OECD, an average of 60% of today’s young people will enter higher education over their lifetimes. Nevertheless, the most recent evidence available indicates that 18-24 year-olds whose parents do not have a higher education qualification are still between 40% and 60% less likely than other individuals to enter a bachelor’s level programme. Similarly, across OECD countries with available data, the children of foreign-born parents are between 10% and 60% less likely to enter a bachelor’s level programme.

Only 4 in 10 bachelor’s students are able to complete on time, and 2 in 10 do not complete at all

Delayed completion and non-completion of studies is common in OECD education systems. On average, just 40% of new entrants to a bachelor’s level programme graduate within the expected duration of the programme and over one-fifth of students leave without completing a qualification. The high level of non-completion can reflect failures in the guidance process from upper secondary to higher education, low admission standards, inadequate academic support, poor programme quality and the financial cost of education.

Recent policy responses to low completion rates include better matching of applicants with higher education programmes, for example through in-depth information sessions and compulsory, non-binding self-assessment tests. In addition, financial incentives to increase timely completion have been introduced in some jurisdictions through formula funding or performance agreements between the government and higher education institutions.

Young doctorate holders in higher education employment find less job security than their predecessors and their peers in other sectors

According to data from the OECD Careers of Doctorate Holders survey, around one-third of doctorate holders are employed in the education sector on average across OECD countries with available data. This may indicate a limited absorptive capacity in the academic labour market for doctorate holders. However, in general, only a small percentage of doctoral graduates are not employed, signalling a demand for the skills and knowledge provided by doctoral education in the wider labour market, and suggesting that doctorate holders are employable in a variety of economic sectors.

On average across OECD countries, half of academic staff in the higher education sector are under 45 years of age. Evidence from the participating jurisdictions shows that younger academic staff with teaching duties are less likely to have a permanent contract compared to older teaching staff in some jurisdictions. Insecurity about career prospects often associated with early-stage careers in research (and in some countries, the accumulation of debt over this period) can make academic jobs less attractive than jobs in other sectors offering greater job security and benefits for similar levels of skills and experience.

Higher education research and development relies heavily upon public funding, and establishes limited collaboration with businesses on innovation, especially for small and medium enterprises

R&D undertaken by higher education is heavily financed by government funds, which make up two-thirds of the funding for the sector, on average. The links between business, higher education research sectors, and the wider economy and society appear to be less developed than in other sectors of research across the OECD. Together, business enterprises and the private non-profit sector still contribute less than 10% of higher education R&D funding. Surveys of business enterprises indicate that 15% of businesses report co-operation with the higher education sector on developing innovative products or processes. In addition, other evidence suggests that the collaboration with the higher education sector is more active amongst large businesses than amongst SMEs.

However, some OECD jurisdictions are working to increase collaboration between higher education institutions and businesses. In some cases, targeted industrial research funds are awarded by governments to institutions to engage in technology transfer activities, such as licensing, patenting and spin-offs. In other cases, consortia have been established between higher education institutions and private or public organisations to conduct applied research, based on a mixture of public targeted funding and private resources.

There is an increasing focus on engagement activities, but frameworks for measuring activities do not yet exist

Governments and stakeholders are increasingly asking higher education institutions to engage more effectively with the wider world through developing human capital (e.g. through developing entrepreneurial skills and providing continuing education), supporting innovation, promoting regional development and civic engagement, creating a culturally rich environment, increasing environmental awareness and contributing to achieve broader social goals on sustainability. At the same time, funding for engagement activities in higher education appears to be mainly project-based, and mechanisms for institutions to report on engagement outcomes in a systematic and comparable way have not yet been widely developed.

Open access to scientific documents remains limited

Higher education systems can contribute to the wider community through ensuring that the knowledge generated by their research is available for the benefit of all of society. Open access to publications has become a policy target in many OECD countries, and is relevant to the promotion of open science, i.e. the efforts to make the outputs of research more widely accessible in digital format to the scientific community and to society more broadly. Nevertheless, the main model of disseminating scientific research in OECD countries remains one of closed access. Recent analysis of a random sample of 100 000 publications found that only around 10% were published in gold open access journals (i.e. readers are able to access the publication at no charge), on average across OECD countries.

Although quality is difficult to measure, governments are increasingly trying to link funding and other policies to the quality of teaching and research

Although quality in higher education is especially difficult to measure, governments are using a variety of approaches to ensure quality in research and teaching. Research funding systems rely increasingly on bibliometric indicators that yield information about the number of publications and their impact. Policies in several OECD jurisdictions also aim at ensuring the relevance of research for society and economic activities, for example by rewarding applied research with a demonstrable economic impact. Competitive funding is widely used to award financial resources only to the most promising research projects and, more recently, to projects related to teaching. In addition, some OECD jurisdictions have introduced higher education teaching certifications based on peer review and training, with the aim of creating a community of teachers who share best practices for teaching and learning.

Data limitations prevent comprehensive performance assessment of higher education systems, but improvements in measurements are possible

The benchmarking exercise provided an opportunity to review the current state of higher education in OECD countries and identify some pressing performance issues facing higher education systems. Reviewing a set of 45 indicators at the country level demonstrates the complexity of making summary judgments about the performance of higher education systems. At the same time, considering a large volume of information together helps to identify areas of strengths and challenges relative to other OECD countries.

While some experimental measures of efficiency and cost-effectiveness are described in this report, the development of actionable measures of efficiency in the higher education sector is complicated by the multiplicity of inputs, outputs and outcomes that cannot be directly mapped to each other. There are also difficulties in measuring inputs themselves, ascertaining the level of control over the inputs, and attaching an importance weighting to the outputs and outcomes.

Many national governments are working on initiatives to improve the data available to assess the performance of higher education. These initiatives cover areas as diverse as the standardised assessment of student outcomes, implementing large-scale surveys of student satisfaction and collecting more granular labour market outcome information on graduates. International efforts to develop new methodologies and standards for the collection of data on higher education outcomes and policies also represent important steps forward in the development of the evidence base to measure higher education performance.

Chapter 1. Higher education and the wider social and economic context

This chapter describes the wider economic and social context within which higher education systems operate, and the core challenges that higher education systems are facing today.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

1.1. Higher education today

Across the world, countries face challenges related to the economic and social transformations which have come about as a result of globalisation, mass migration, ageing societies and technological development. Higher education is increasingly expected to play a central role in responding to these challenges. A comprehensive OECD review of higher education policy, carried out approximately a decade ago, acknowledged the expanding scope and importance of higher education and the increasing prominence of higher education issues on national policy agendas (OECD, 2008[1]).

Since then, the economic and social context surrounding higher education systems has continued to evolve. The 2007-2008 financial crisis led to a worsening of the economic situation in many OECD countries, while deepening inequalities have created new social divisions. Against this background, higher education systems have continued to grow in scale and scope, on the basis that social and economic benefits attributable to a high-performing higher education system can play a crucial role in both taking advantage of the opportunities and responding to the challenges presented by recent economic and social changes.

Economic success relies on human capital, i.e. “the knowledge, skills, competencies and other attributes embodied in individuals that are relevant to economic activity” (OECD, 1998[2]). Higher education plays a key role in developing high-value knowledge, skills and competencies. Higher education graduates themselves also receive significant economic benefits, such as higher employment rates, higher earnings and faster earnings progression (OECD, 2018[3]).

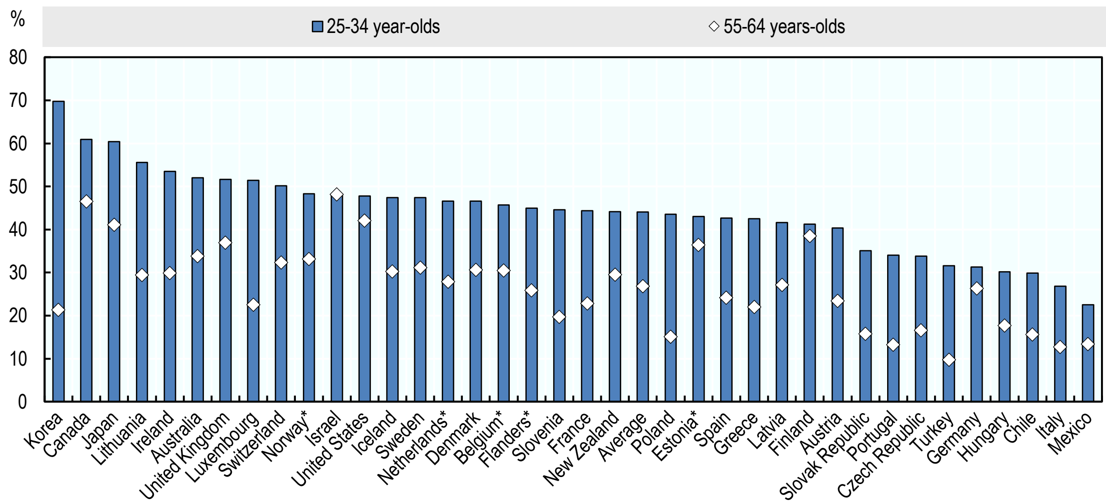
Moreover, in most OECD countries, higher education is the core provider of basic research, which produces the foundational knowledge required for innovation. The applied research and experimental development carried out by the higher education sector also plays an important role in the production of new technologies.

By providing social and cultural contributions to their communities, higher education institutions can help improve general well-being and produce better social and health outcomes, cultural capital, urban and rural regeneration and environmental sustainability (OECD, 2007[4]). These engagement activities have direct benefits for society by improving general health, welfare, and social cohesion; producing lively cultural surroundings; and supporting a clean and sustainable environment.

Given these economic and social benefits, many countries have invested in expanding their higher education systems in recent years. In 2017, on average across OECD countries, 44% of 25-34 year-olds had obtained a higher education qualification, while nine OECD countries, including Canada, Japan and the United Kingdom, achieved attainment rates of over 50% (Figure 1.1). At the same time, many higher education systems outside the OECD have expanded, particularly in emerging Asian countries such as China and India. As a result, the number of 25-34 year-olds with a tertiary education degree in OECD and G20 countries is expected to grow over the next decades, from 137 million in 2013 to 300 million by 2030 (Figure 1.2) (OECD, 2015[5]).

Figure 1.1. Population with higher education qualifications (2017)

Share by age group



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Chile: Data refer to 2015.
Source: Adapted from OECD (2018[6]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en; data provided by the Flemish Ministry of Education and Training.

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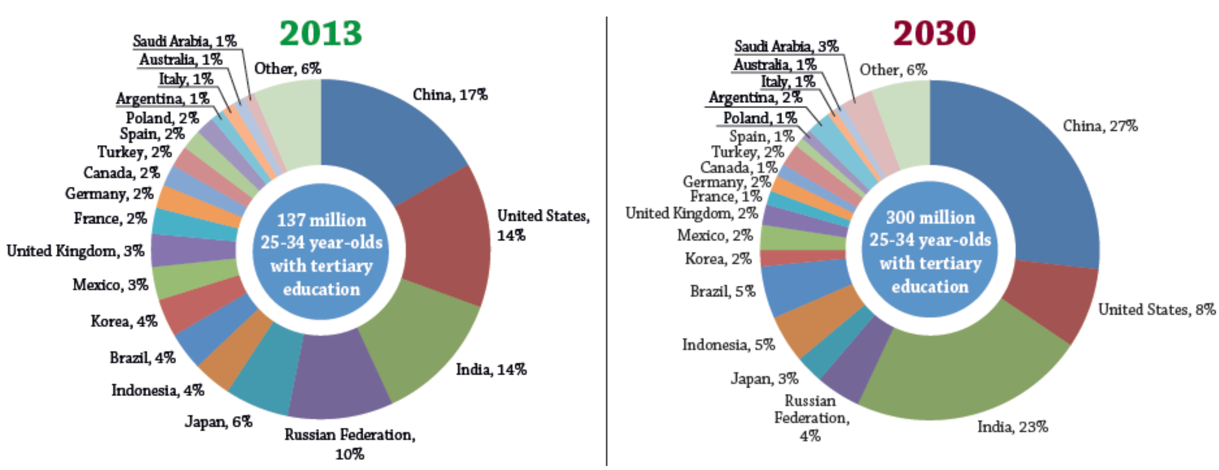
Figure 1.2. Share of 24-34 year-olds with a tertiary degree across OECD and G20 countries (2013 and 2030)



Note: The figures in these graphs are estimates based on available data. The population estimations are based on the OECD annual population projections.
Source: OECD (2015[5]), "How is the global talent pool changing (2013, 2030)?", *Education Indicators in Focus*, No. 31, https://doi.org/10.1787/5js33lf9jk41-en.

The rising demand for higher education has also led to a notable increase in the number and types of higher education institutions worldwide. It is estimated that there are now over 18 000 higher education institutions across over 180 countries offering at least a post-graduate degree or a four-year professional diploma (International Association of Universities, 2018[7]). The diversity of higher education systems today is reflected in different institutional models of higher education institutions, including public, government-dependent private, private for-profit and private non-profit institutions, depending on the national context (see Chapter 2). These different types of institutions may form distinct subsectors in some countries, with disparate governance arrangements.

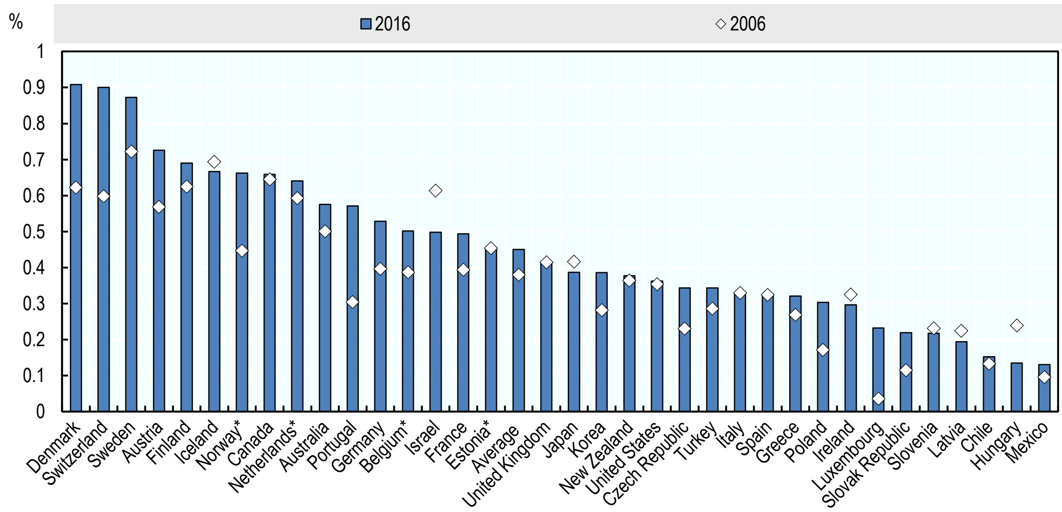
Higher education also caters to increasingly diverse student populations. The traditional cohort of young upper secondary graduates, who tend to study full-time and on campus, has been increasingly joined by part-time and older students who may be full-time employees or carers. Increased student mobility has resulted in greater numbers of international students on many campuses. These groups have different motivations and learning needs, creating a need for a more diverse and flexible higher education provision. Higher education systems in most jurisdictions therefore face the challenge of responding coherently to the continued increase in demand from a complex student population.

Higher education plays an integral role in globalisation and in the knowledge economy, as it facilitates the flow of people, ideas and knowledge across countries. Higher education therefore acts as an engine for ‘brain circulation’ between countries. The number of international students in higher education has increased from 2 million in 1999 to 5 million in 2016, at an average annual rate of 5% among OECD countries and 6% among non-OECD countries (OECD, 2018[3]). Internationalisation can also be found in other forms, such as staff mobility, transnational branch campuses, joint and double degree programmes between institutions in different countries, international internships and training experiences abroad, franchise and twinning arrangements, online education delivered across the world and global research networks.

Moreover, investment in higher education research and development (HERD) increased in most OECD countries between 2006 and 2016 (Figure 1.3). The number of higher education researchers (full-time equivalent) across OECD countries also increased from around 1 200 000 in 2006 to more than 2 300 000 in 2016 (OECD, 2018[8]) (see Chapter 6).

These trends show the extent of the expansion, diversification and globalisation of the higher education sector in recent years across the OECD. But these changes also raise questions about how well higher education is contributing to societies through education, research and engagement activities. Ultimately, there is increasing pressure to demonstrate that the substantial public and private investment in higher education creates positive economic, social, and cultural returns.

Figure 1.3. Higher education expenditure on R&D as a percentage of GDP (2006 and 2016)



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Chile: the 2006 data refer to 2007. Australia, Switzerland: the 2016 data refer to 2015. New Zealand: the 2006 and 2016 data refer to 2005 and 2015.
Source: Adapted from OECD (2018[8]), *OECD Science, Technology and R&D Statistics* https://doi.org/10.1787/strd-data-en.

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1.2. Economic and social background of OECD higher education systems

Each country faces a distinct set of policy issues related to higher education. The macro-economic situation affects the level of spending on higher education, and has consequences for employment and labour market outcomes. Demographic and social trends also influence the environment in which higher education systems operate, along with broader political processes and macro-institutional factors, often shaped by historical circumstances.

In this section, an overview of some economic and social contextual factors which form the background of higher education systems across the OECD is presented, with a focus on the four participating jurisdictions of the benchmarking project (Estonia, the Flemish Community of Belgium, the Netherlands and Norway).

1.2.1. Higher education and the economic context

OECD economies have largely recovered from the crisis…

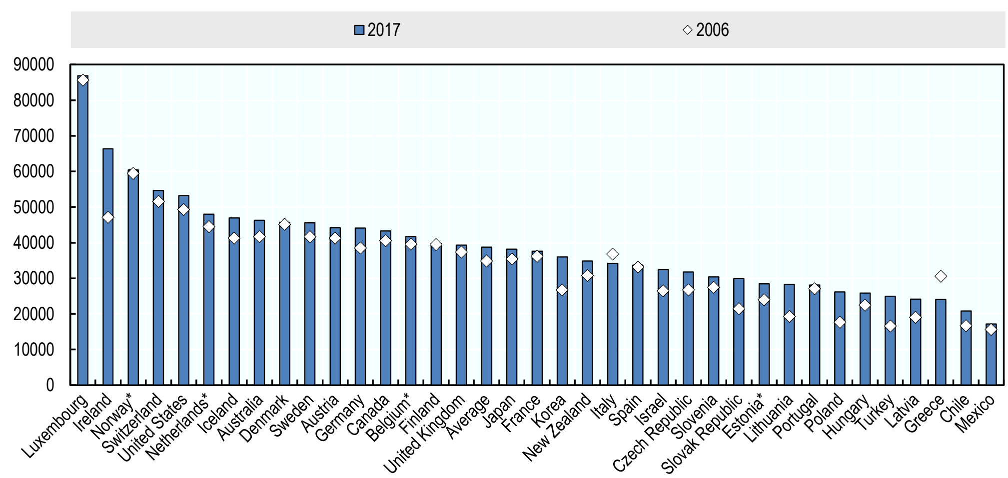
Higher education has a role to play in meeting some of the pressing economic challenges faced by OECD countries, many of which are the legacy of the recent global financial and economic crisis. OECD economies have largely recovered from the effects of the crisis, and while more recently economic growth has slowed in many jurisdictions, Gross Domestic Product (GDP) per capita remains close to pre-crisis levels in several countries (Figure 1.4).

On average across OECD countries, GDP per capita was around USD 39 000 in 2017. The wide variation in GDP per capita across OECD jurisdictions affects the relative abilities of governments to invest in higher education systems. As this report shows, GDP per capita is very closely associated with the level of expenditure per student in higher education, even though it is not strongly associated with higher education expenditure as a fraction of GDP or of total public expenditure (see Chapter 3).

In the four participating jurisdictions, GDP per capita in 2017 ranged from above the OECD average in Norway (close to USD 60 000), Belgium and the Netherlands (between USD 40 000 and USD 50 000), while it was below the OECD average (around USD 30 000) in Estonia. These differences highlight the difficulties that some countries have to maintain and increase investment on higher education systems in a globally competitive environment, despite the policy priority that may be placed by governments on higher education.

Figure 1.4. GDP per capita (2006 and 2017)

Measured in US dollars at constant prices and 2010 PPPs



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Latvia: data for 2006 and 2017 are not comparable due to changes in methodologies.
Source: Adapted from OECD (2018[9]), *OECD Productivity Statistics*, http://dx.doi.org/10.1787/pdtvy-data-en.

StatLink https://doi.org/10.1787/888933940170

Some countries have reduced the disparity between their level of GDP per capita and the OECD average in recent years. This could imply that countries with GDP per capita below the OECD average could improve capacity for higher education spending in the future, depending on other commitments and contextual factors.

….but the majority of countries have increased their debt levels.

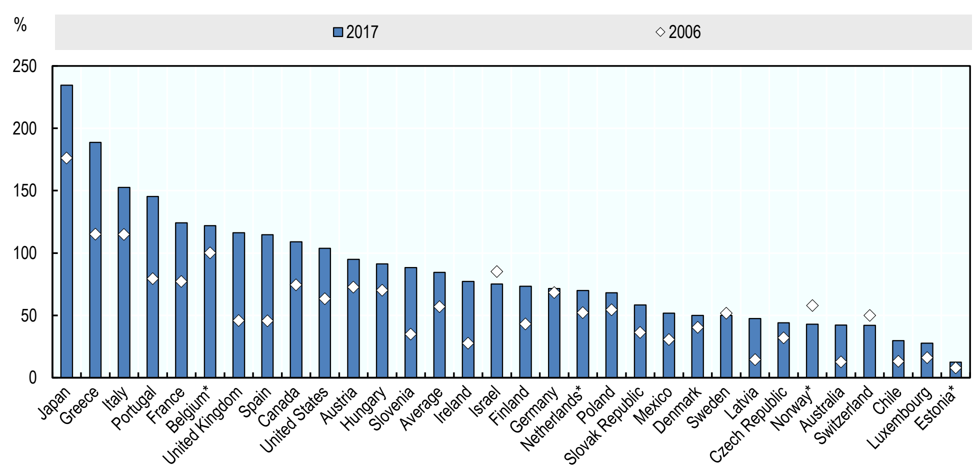
While GDP levels after the economic crisis have generally recovered across the OECD area, the crisis left the large majority of OECD countries with higher levels of government debt (Figure 1.5). This means that governments across the OECD have less room to expand public expenditure in areas in need of resources. For example, capital investment in higher education may suffer from the financial constraints imposed on governments by the post-crisis economic environment; some evidence reviewed in Chapter 3 suggests that higher education capital expenditure tends to increase more than proportionally when the general government expenditure increases.

The levels of government debt vary greatly across the four jurisdictions participating in the benchmarking exercise. Norway was among very few OECD countries that reduced their public debt level between 2006 and 2017, by around 15 percentage points. Estonia has enacted prudent fiscal policies over the past decades which have resulted in a very low (less than 15%) level of public debt, both before the crisis and more recently. Over the same period, the level of government debt increased in the Netherlands, but it was still relatively low in 2017 at 70% of GDP.

In contrast, Belgium had one of the highest levels of government debt in the OECD area, both in 2006 (around 100% of GDP) and in 2017 (120%). This relatively high level of debt could limit the possibilities of finding public resources for higher education in the future, particularly in a country where the large majority of higher education funding comes from the government (see Chapter 3).

Figure 1.5. General government debt as a percentage of GDP (2006 and 2017)

Excluding unfunded pension liabilities



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018. Israel, Japan, Luxembourg, Mexico and Switzerland: the latest available data refer to 2016.
Source: Adapted from OECD (2018[10]), *OECD National Accounts Statistics*, http://dx.doi.org/10.1787/na-data-en.

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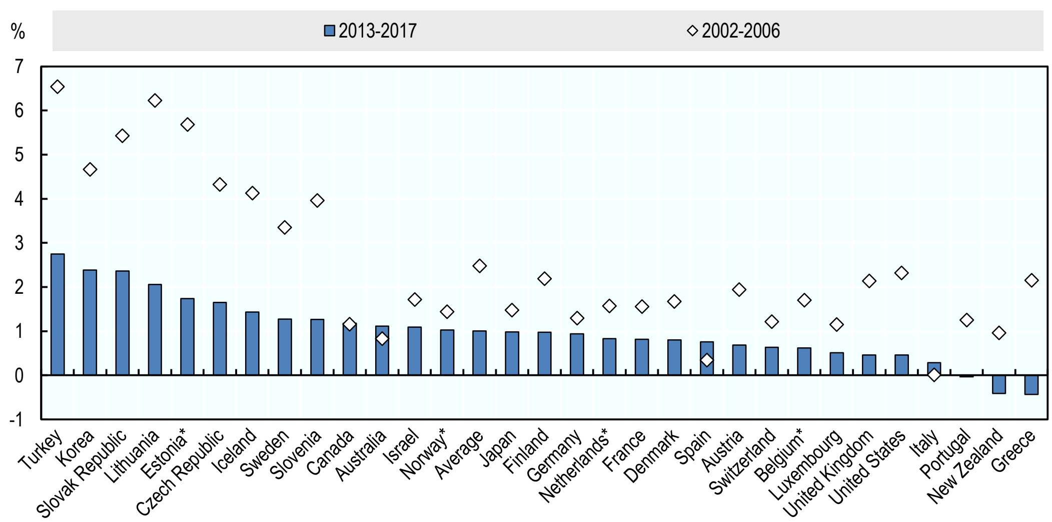
Growth in labour productivity has not recovered to levels seen before the crisis.....

The improvement of labour productivity is high on the political agenda in many OECD countries, as labour productivity growth in OECD countries has not yet returned to its pre-crisis level. Across the OECD area, GDP per hour worked increased by 2.5% per year, on average, between 2002 and 2006, but only by 1% per year, on average, between 2013 and 2017 (Figure 1.6). While the relationship between human capital and labour productivity is complex, lower growth puts greater focus on the role of higher education in increasing labour productivity, as a place where skills are developed and highly qualified workers are trained for their future roles in the workplace.

Across the four participating jurisdictions, Estonia experienced the highest average annual productivity increase (1.7%) during the 2013-2017 period, but also the largest difference in the average growth between 2002-2006 and 2013-2017. Norway's average annual productivity growth over the 2013-2017 period was similar to the OECD average level, at around 1%. The average productivity growth was lower than average in the Netherlands and Belgium for both of the periods 2002-2006 and 2013-2017, with the lowest in Belgium for the period 2013-2017 (0.6%).

Figure 1.6. Annual average productivity growth (2002- 2006 and 2013- 2017)

GDP per hour worked, constant prices



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Countries with a data break in this series during the period 2002-2017 have been excluded (Chile, 2012; Hungary, 2010; Ireland, 2011 and 2017; Latvia, 2006; Mexico, 2010; Poland, 2010).
Japan, Turkey, the United States and the OECD total: the 2013-2017 data refer to 2013-2016.
Source: Adapted from OECD (2018[9]), *OECD Productivity Statistics*, http://dx.doi.org/10.1787/pdtvy-data-en.

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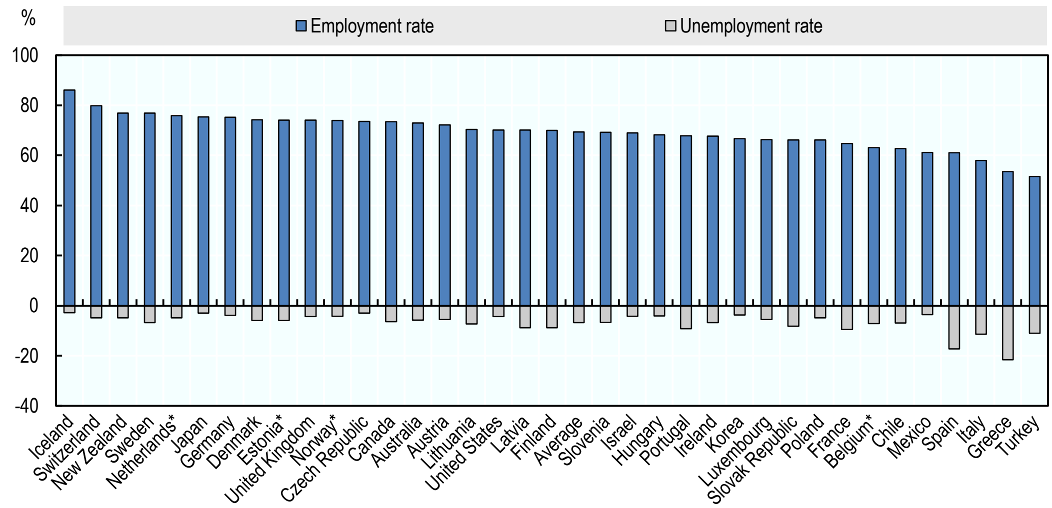
…though employment rates have surpassed pre-crisis levels

The general employment rate in a country is a crucial piece of contextual information to interpret the employment rate of higher education graduates (a key indicator of higher education performance – see Chapter 5). The OECD employment rate was 2 percentage points above the pre-crisis level in 2017, while the OECD average unemployment rate was below the pre-crisis level of 6% and projected to fall further (Figure 1.7) (OECD, 2018[11]). However, prime-age and youth employment rates were only at, or still below, pre-crisis levels in many countries (OECD, 2018[12]).

In 2017, the employment rate was relatively high (around 75%) in Estonia, the Netherlands and Norway, while it was below the OECD average in Belgium (less than 65%).

Figure 1.7. Employment and unemployment rates (2017)

15-64 year-olds



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Source: Adapted from OECD (2018[13]), *Main Economic Indicators*, http://dx.doi.org/10.1787/mei-data-en.

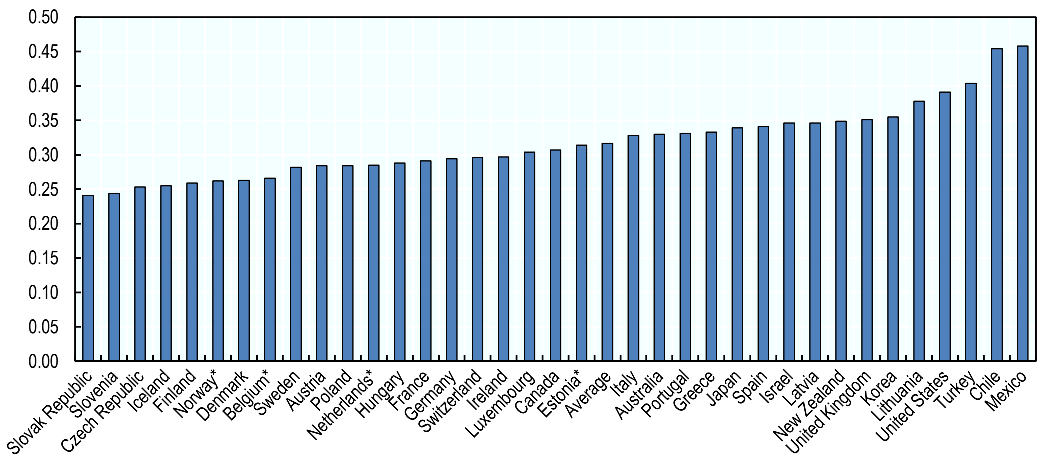
StatLink https://doi.org/10.1787/888933940227

One of the key roles for education in society is to compensate for initial inequalities and provide all students with the skills needed to succeed in the labour market and in life in general (OECD, 2018[14]). Dealing directly with the root causes of income inequality, such as education and skills inequality, is considered more effective than trying to fix the symptoms at later stages of life, through redistribution policies like taxes and transfers (OECD, 2015[15]). However, despite the continuously increasing levels of educational attainment in the population, income inequality in OECD countries is at its highest level in over 30 years, and wealth is even more unevenly distributed.

The Gini coefficient is a key indicator of income inequality. Values close to 0 indicate completely equal incomes, while values close to 1 indicate very high inequality. The Gini coefficient was around 0.3 on average across OECD countries in 2016 (Figure 1.8). It ranged from 0.24 in the Slovak Republic, the most egalitarian country, to 0.46 in Mexico, the country with the most unequal income distribution. Income inequality in Belgium, the Netherlands and Norway was lower than the OECD average, while in Estonia it was just around the average.

Figure 1.8. Income inequality (2016)

Gini coefficient (based on disposable income, post taxes and transfers - new income definition since 2012), 0 = complete equality; 1 = complete inequality



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
The latest available year is 2016 for Finland, Israel, Latvia, the Netherlands, Sweden, the United Kingdom and the United States; 2014 for Australia, Hungary, Iceland and Mexico; 2012 for Japan.
Source: Adapted from OECD (2018[16]), *OECD Social and Welfare Statistics*, https://doi.org/10.1787/socwel-data-en.

StatLink https://doi.org/10.1787/888933940246

1.2.2. Higher education and social conditions

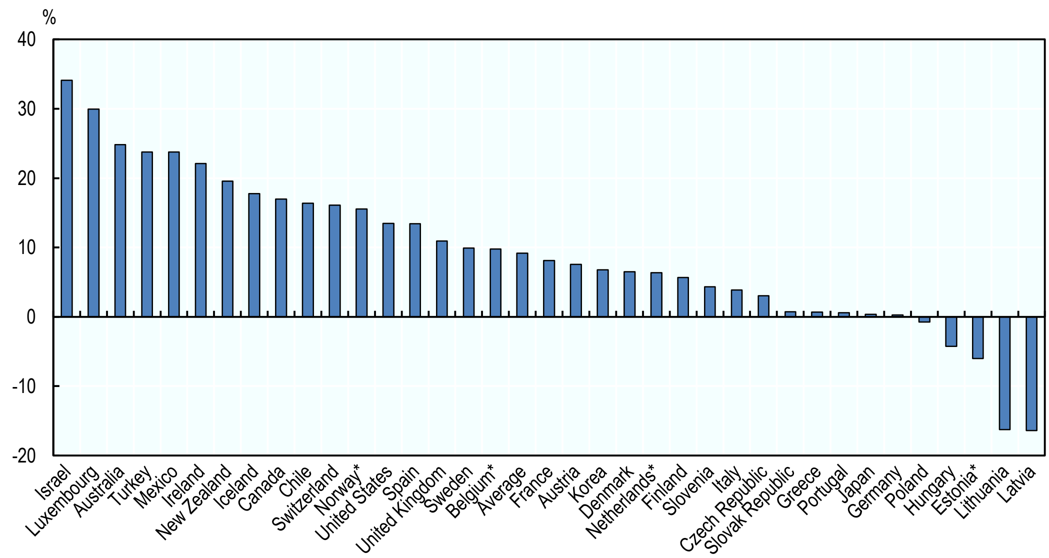
Demographic changes have implications for higher education systems

Demography influences higher education in a variety of ways (OECD, 2008[17]; Ritzen, 2010[18]). A decreasing population, especially among the young cohorts who typically compose the majority of higher education students, can result in difficulties recruiting students, with potential effects on expenditure per student. It can also threaten the survival of some institutions, particularly those located in remote areas or offering less prestigious programmes. Decreasing population can also contribute to tightening labour market conditions, putting pressure on higher education to provide graduates with the necessary skills to boost the economy (OECD, 2017[19]).

On average across OECD countries, the population grew by 9% between 2000 and 2015, but with a very large variation between countries (Figure 1.9). While the population of Israel grew by over 30% in that time period, that of Latvia and Lithuania decreased by more than 15%. The population increased by between 5% and 10% in Belgium and the Netherlands, and by more than 15% in Norway; in contrast, it decreased by 6% in Estonia.

Figure 1.9. Population growth rates (2000-2015)

Reference year: 2000



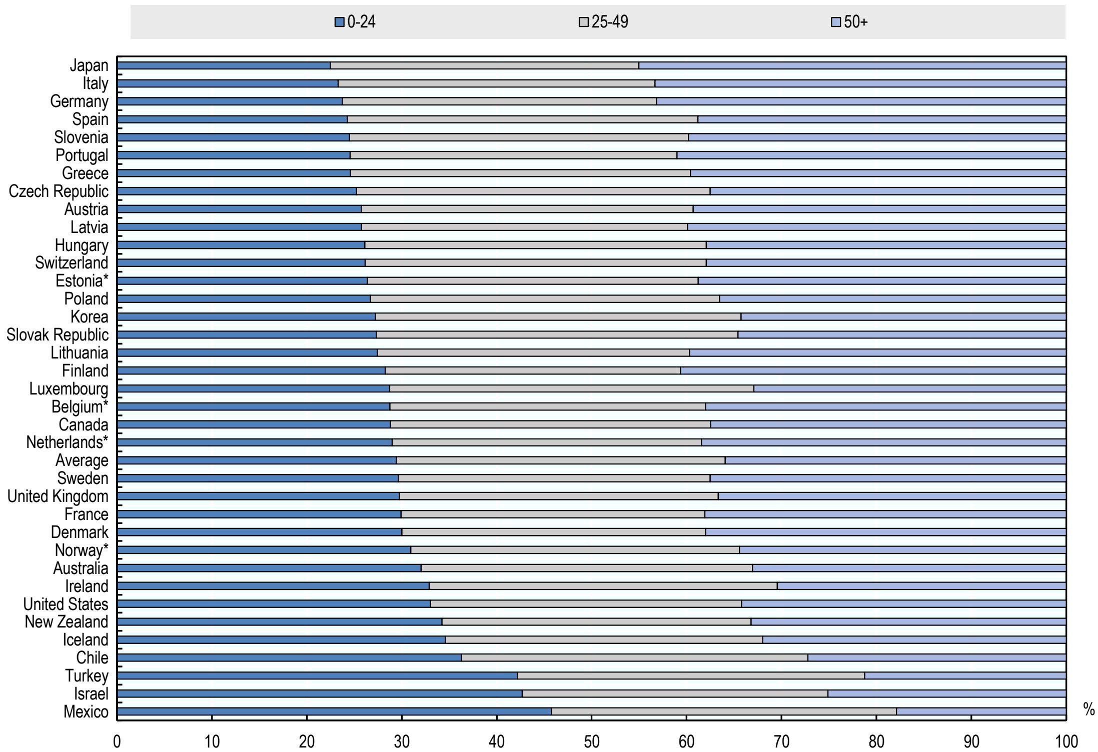
Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Source: Adapted from United Nations Population Division (2018[20]), *2017 Revision of World Population Prospects*, https://population.un.org/wpp/.

StatLink https://doi.org/10.1787/888933940265

Norway has a demographic profile very similar to the OECD average. Belgium, Estonia and the Netherlands presented a slightly older profile in 2015, with almost 40% of individuals aged 50 or older. However, while the share of the population younger than 25 was closer to the OECD average in Belgium and the Netherlands, it was three percentage points lower in Estonia.

A declining population is related to ageing and emigration, which also reflect on the age structure of the population. Therefore, population growth is closely related to the age structure of the population (the correlation between the population growth rates from Figure 1.9 and the share of individuals older than 50 from Figure 1.10 is 0.69). On average across OECD countries in 2015, about 30% of the population was younger than 25, about 35% was 25- 49 years old, and the remaining 35% was 50 or older (Figure 1.10).

Figure 1.10. Age structure of population (2015)



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Source: Adapted from United Nations Population Division (2018[20]), *2017 Revision of World Population Prospects*, https://population.un.org/wpp/.

StatLink https://doi.org/10.1787/888933940284

Migration is increasing across the world

Global migration flows are increasing. The number of international migrants in the world was over 230 million in 2013 (one-third greater than the number in 2000), and it is likely to have grown further in recent years. Migrants can counterbalance the labour shortages caused by declining population, especially those who are highly skilled, who constitute a growing fraction of the overall migrant population. In addition, migrants can establish social, business and cultural international networks from which both their host and home countries can benefit (OECD, 2015[21]).

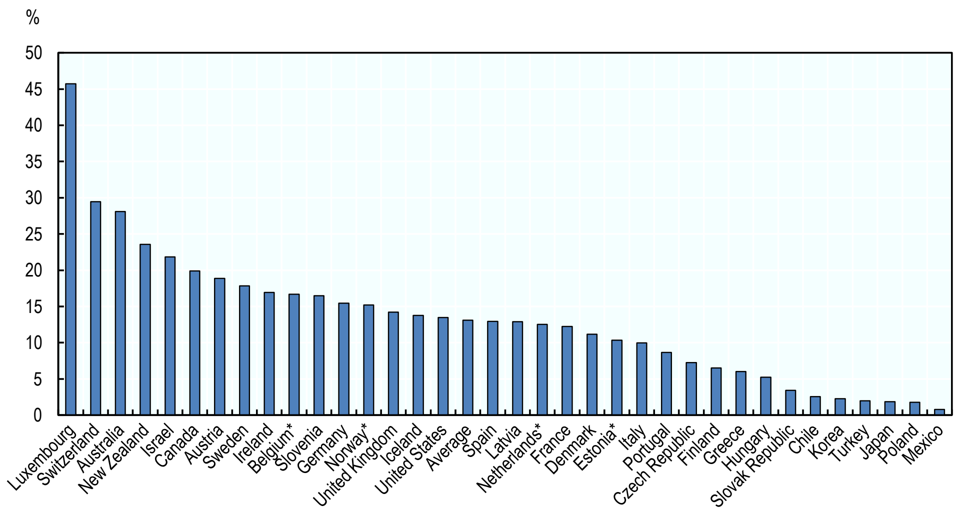
When the share of foreign-born people (and their descendants) in the population is substantial, the higher education system must adapt to ensure that suitable learning opportunities are available. This includes both ensuring accessibility for young second-generation immigrants and providing lifelong learning opportunities for first-generation immigrants as well as for other adults (see Chapter 5).

On average across OECD countries, foreign-born people accounted for 13% of the total population in 2017 (Figure 1.11). In the Netherlands, the share of foreign in the population was close to the average, while in Belgium and Norway it was over 15%.

Estonia presents specific challenges not only in attracting skilled workers, but also in retaining them. The share of foreign-born people in the Estonian population was around 10% in 2017. Emigration has been high in Estonia in the recent past; however, immigration started to exceed emigration in 2015 (Statistics Estonia, 2019[22]).

Figure 1.11. Foreign-born population (2017)

% of the total population



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
The latest available year is 2016 for France, Ireland, Mexico and Turkey; 2015 for Chile; 2014 for New Zealand; 2012 for Czech Republic, Poland and Portugal; 2011 for Canada.
Japan and Korea: data refer to the foreign population rather than the foreign-born population.
Source: Adapted from OECD (2018[23]), *International Migration Outlook 2018*, http://dx.doi.org/10.1787/migr_outlook-2018-en.

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Higher education is associated with more favourable social outcomes across the OECD

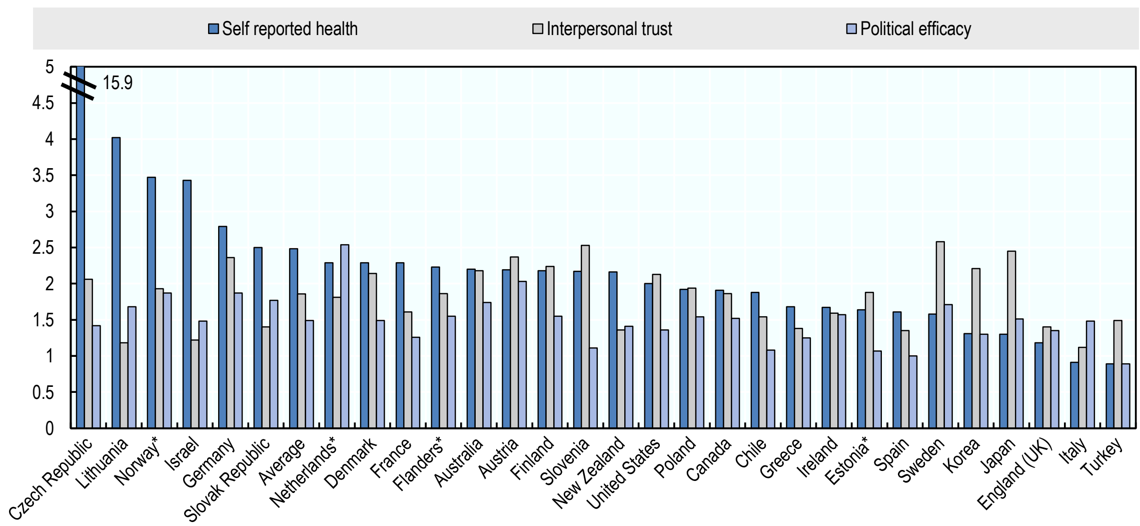
Education is important to supply the skills the economy needs, but it is also important as a way to foster democratic engagement among citizens, civil society participation and other positive social outcomes. The achievement of higher education is generally associated with better well-being and social outcomes, including in health, interpersonal trust and political efficacy.

The proportion of 16-34 year-olds reporting to be in good health is higher than the average across OECD countries participating in the Survey of Adult Skills in Norway, close to the average in the Flemish Community and the Netherlands, and lower than the average in Estonia. The proportion of 16-34 year-olds reporting that they trust others is around the average in the all participating jurisdictions. The proportion of 16-34 year-olds reporting that they have a say in government is higher than the average in the Flemish Community, the Netherlands and Norway, while it is lower than the average in Estonia.

On average across OECD countries and economies participating in the Survey of Adults Skills, adults younger than 35 with a higher education degree have about 2.5 times the odds of reporting to be in good or excellent health, compared to people of the same age with only an upper secondary education degree. They also have almost twice the odds of disagreeing with the statement that only few people can be trusted and 1.5 times the odds of disagreeing that people like them have no say in what the government does (a measure of political efficacy) (Figure 1.12).

Figure 1.12. Relative level of self-reported health, interpersonal trust and political efficacy of higher education graduates, 16-34 year-olds (2012 or 2015)

Odds ratio to report good or excellent health, to disagree with the statements "only few people can be trusted" and "people like me don't have any say about what the government does" (upper secondary education = 1)



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
The adjusted odds ratios are computed through a logistic regression model and take account of differences associated with other factors: age, gender, immigrant and language background and parents' educational attainment. The probability differences are significantly different from 1 for all countries and economies except: Austria, England, Greece, Ireland, Italy, Japan, Northern Ireland, Slovenia, Spain, Sweden and Turkey for self-reported health; Chile, Greece, Israel, Italy, New Zealand, Northern Ireland, the Slovak Republic and Spain for interpersonal trust; Chile, the Czech Republic, England (United Kingdom), Estonia, France, Greece, Italy, Slovenia, Spain and Turkey for political efficacy. Countries are ranked in descending order of the relative level of self-reported health.
Source: Adapted from OECD (2018[24]), *OECD Survey of Adult Skills*, www.oecd.org/skills/piaac/data/.

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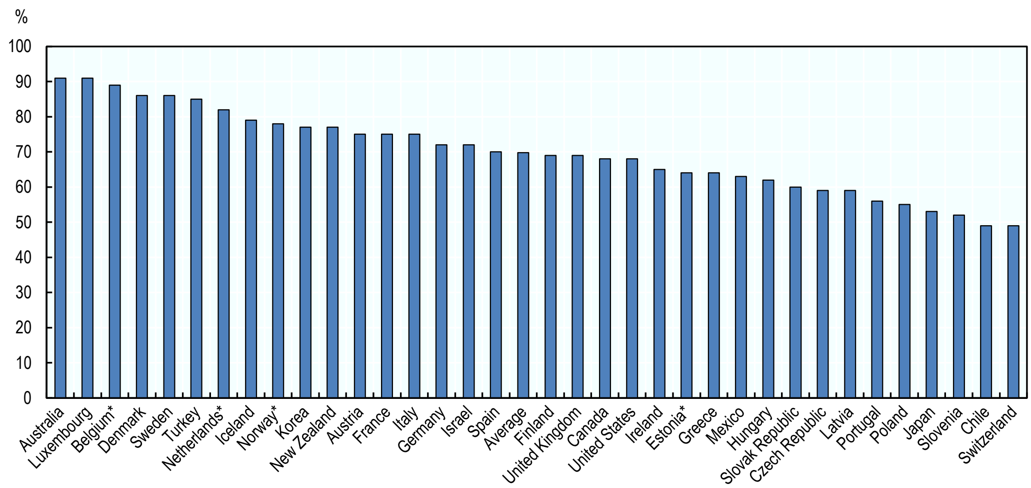
Fostering a sense of political efficacy and participation in democratic life is fundamental to the functioning of democracy. Voter participation provides a good measure of civic and political engagement. However, caution is needed in the interpretation of this measure, which can also be influenced by institutional differences in electoral systems (for example, voting is compulsory in some countries).

On average across OECD countries, around 70% of the population registered to vote cast a vote at the most recent election (Figure 1.13). This proportion was substantially higher than average (around 80%) in the Netherlands and Norway, and reached close to 90% in Belgium, but was lower than average (around 65%) in Estonia.

Figure 1.13. Voter turnout (latest available year)

% of votes cast by the population registered to vote



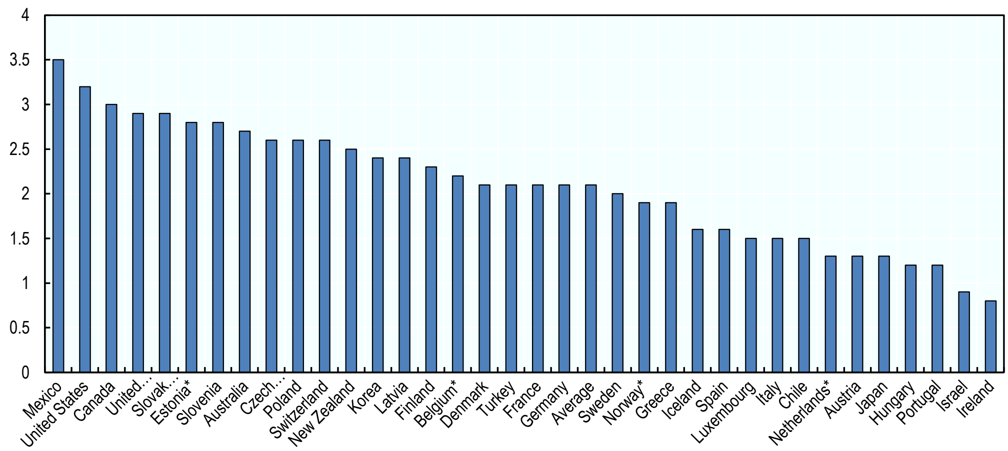
Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
The latest available year is 2017 for France, Korea, the Netherlands and the United Kingdom; 2016 for Australia, Iceland, Ireland, Lithuania, the Slovak Republic, Spain and the United States; 2015 for Canada, Denmark, Estonia, Greece, Israel, Poland, Portugal, Switzerland and Turkey; 2014 for Belgium, Hungary, Japan, Latvia, New Zealand, Slovenia, Sweden; 2013 for Austria, Chile, the Czech Republic, Germany, Italy, Luxembourg, Norway; and 2012 for Finland, Mexico.
Source: Adapted from OECD (2018[25]), *OECD Better Life Index*, http://www.oecdbetterlifeindex.org/.

StatLink https://doi.org/10.1787/888933940341

Voter turnout is not the only indicator of democratic engagement. Another fundamental characteristic of democratic policy-making is the involvement of stakeholders in decision processes. It is difficult to generate a single measure of stakeholder involvement, but Figure 1.14 presents an average across a number of indicators on this topic for 2014. Estonia has a high level of stakeholder engagement relative to other OECD countries according to this measure, while Belgium was just above the OECD average, and the Netherlands and Norway were below average.

Figure 1.14. Stakeholder engagement for developing regulations (2014)

Level of formal stakeholder engagement in developing primary laws and subordinate regulations, a scale from 0 to 4



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
The indicator is calculated as the simple average of two composite indicators (covering respectively primary laws and subordinate regulations) that measure four aspects of stakeholder engagement, namely i) systematic adoption (of formal stakeholder engagement requirements); ii) methodology of consultation and stakeholder engagements; iii) transparency of public consultation processes and open government practices; and iv) oversight and quality control, which refers to the existence of oversight bodies and publicly available information on the results of stakeholder engagement. The maximum score for each of the four dimensions/categories is one and the maximum aggregate score for the composite indicator is then four.
Source: Adapted from OECD (2018[25]), *OECD Better Life Index*, http://www.oecdbetterlifeindex.org/.

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1.3. Performance challenges in higher education

The expansion of access to higher education to a broader range of students has unquestionably produced many benefits for individuals and society, and these benefits create strong incentives to invest in higher education. However, higher education institutions and those responsible for steering and funding systems have had to cope with substantial expansion in a relatively short period of time. As a result, many higher education systems are facing challenges in streamlining their contributions to high quality education, research and engagement and sustaining them into the future in an increasingly competitive and globalised environment.

The continuously increasing costs and funding requirements that have accompanied the expansion of higher education raise concerns about its future financial sustainability. Countries are also grappling with challenges associated with the quality and equity of higher education. While access to higher education has improved for a broader range of students, there are increasing concerns about how well non-traditional students fare in higher education programmes and whether they graduate with high quality degrees. There is also continuing debate about the ability of higher education to meet future labour market demands and broader societal needs.

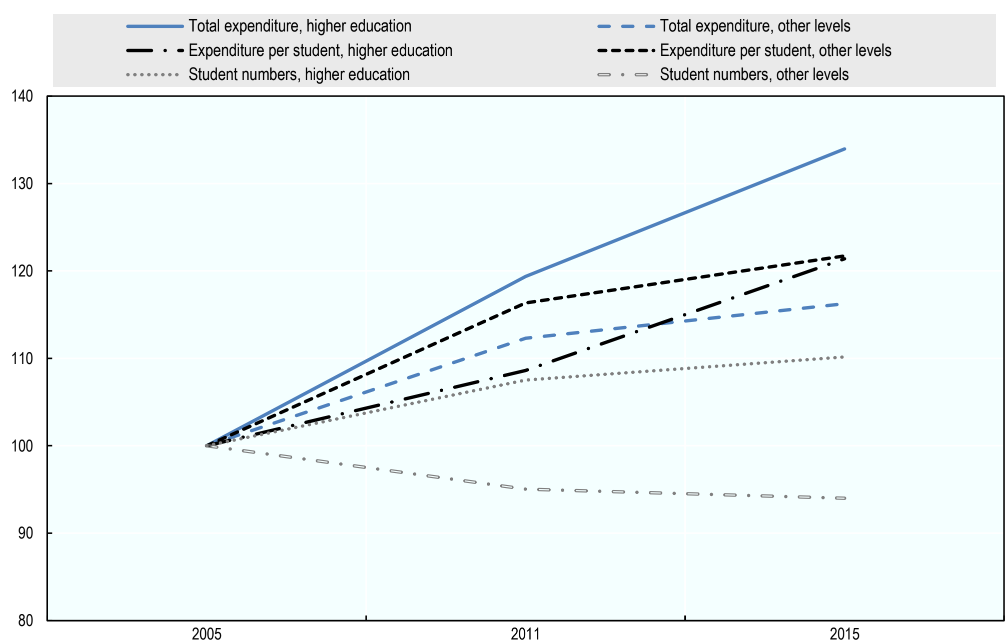
1.3.1. Challenges with financing higher education

Between 1995 and 2004, higher education expenditure per student grew in most countries with available data, although at a substantially lower pace than in other levels of education (OECD, 2008[1]). Since 2005, expenditure per student in higher education has grown at a similar pace as that of other levels of education, on average across OECD countries. At the same time, the number of students in higher education has increased rapidly (by around 10% between 2005 and 2015). Combined with the rising per student cost, this rising number of students produced an increase of more than 30% in total expenditure between 2005 and 2015 (Figure 1.15).

The expansion of expenditure has raised the question of who should pay for higher education. In many OECD countries, governments are the main source of funding. On average across OECD countries, 66% of higher education expenditure was financed by governments in 2015. The public returns on investment in higher education are high in all OECD countries; on average across OECD countries, the total public cost to attain higher education is USD 48 500 for a man and USD 44 700 for a woman, while the total public benefits are USD 188 100 and USD 116 800 respectively (OECD, 2018[3]).

Figure 1.15. Trends in expenditure and students numbers (2005, 2011 and 2015)

Higher education as compared to other levels combined, OECD average, 2005=100



Source: Adapted from OECD (2018[3]), *Education at a Glance 2018*, https://doi.org/10.1787/eag-2018-en.

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To ensure that higher education remains financially sustainable, students and families are increasingly being asked to share the costs of higher education. The proportion of private expenditure is greater in the higher education sector, compared to other education sectors. On average across the OECD, private funding amounted to 31% at the tertiary education level, compared to 9% at the primary, secondary and post-secondary non-tertiary levels in

2015 (OECD, 2018[3]). The contribution of students and their families to funding higher education raises expectations and creates new forms of accountability for higher education institutions, which increasingly need to demonstrate that they deliver value for money.

1.3.2. Challenges of connecting higher education to human capital development

As noted earlier in this chapter, the OECD defines human capital as "the knowledge, skills, competencies and other attributes embodied in individuals that are relevant to economic activity" (OECD, 1998[2]). Future growth of knowledge economies depends on a well-functioning system of education and training that provides opportunities for upskilling and acquiring new knowledge throughout an individual's life.

But there are questions around the effectiveness of higher education systems in contributing to human capital formation. Evidence on the skills levels of graduates, completion rates and the extent to which disadvantaged and non-traditional students can access higher education points to a number of performance challenges.

Graduate skills

There are little data on the learning outcomes of higher education and none available at the system level or internationally comparable level at present. In the absence of an international measure of student learning outcomes, the OECD Survey of Adult Skills has been used to assess skills proficiency among higher education graduates.

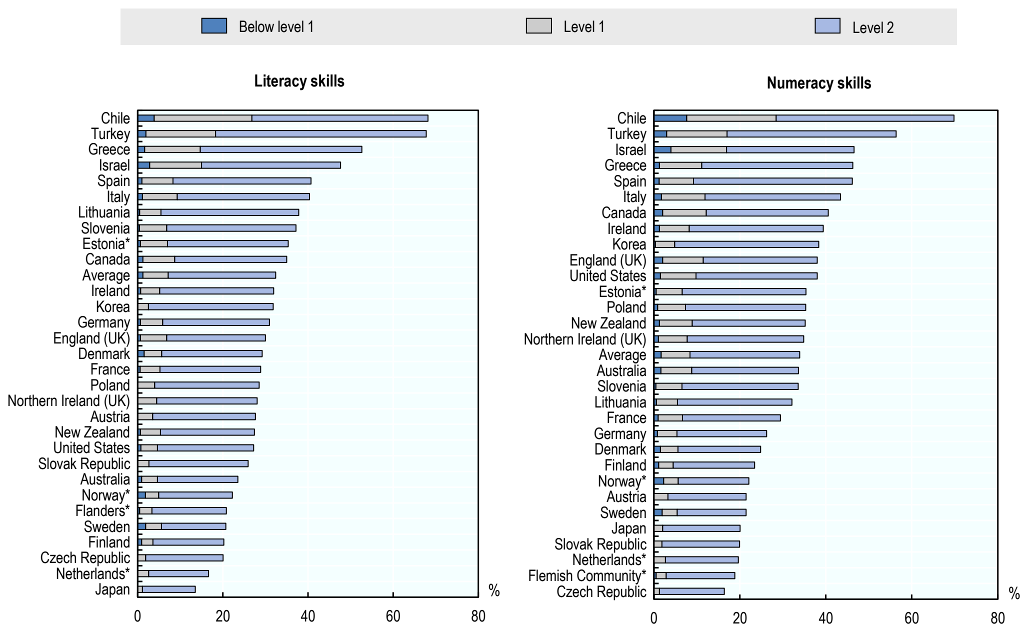
The survey shows that although adults with higher education qualifications, on average, show higher skills proficiency than adults without higher education qualifications, higher educational attainment does not always directly correspond with higher skills. On average across OECD countries, more than 30% of adults with higher education qualifications have low literacy and numeracy proficiency levels, i.e. at or below level 2 (level 1 is the lowest level; level 5 is the highest) (Figure 1.16). This implies that some higher education graduates may not have the adequate information-processing skills needed for employment or to solve the problems of everyday life. It also suggests that some students entering higher education may not be sufficiently prepared and higher education institutions may not able to help them build their skills to an appropriate level.

Improved skills narrow the labour market outcomes gap between individuals with different levels of formally recognised education, but do not close it completely (Lane and Conlon, 2016[26]). Degrees and qualifications are signals that matter in the labour market. However, a low skill proficiency at graduate level can affect labour market and social outcomes and consequently, returns on investment for individuals and society. Those with poor skills are more likely to be unemployed; and those who do find a job will be more likely to earn less than those with stronger skills.

In countries where student loans are the norm, graduates with poorer labour market outcomes may not earn sufficiently to pay back their student loans (i.e. they will default on their loans or not earn enough to meet the thresholds in income-contingent loan schemes). Much of the cost of higher education could then fall on the taxpayer, if the government guarantees the loans or has to accept unpaid debt.

Figure 1.16. Percentage of adults with higher education qualifications at low literacy and numeracy proficiency levels (2012 or 2015)

25-65 year-olds



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018. There are six levels (from below level 1 – the lowest – to level 5 – the highest). Tasks completed successfully at the literacy level 2 require respondents to make matches between the text and information, and may require paraphrasing or low-level inferences. Some competing pieces of information may be present. Some tasks require respondents to cycle through or integrate two or more pieces of information based on criteria; compare and contrast or reason about information requested in the question; or navigate within digital texts to access and identify information from various parts of a document. Tasks completed successfully at the numeracy level 2 require respondents to identify and act on mathematical information and ideas embedded in a range of common contexts where the mathematics content is fairly explicit or visual with relatively few distractors. Tasks tend to require the application of two or more steps or processes involving calculation with whole numbers and common decimals, percentages and fractions; simple measurement and spatial representation; estimation; and interpretation of relatively simple data and statistics in texts, tables and graphs.
Source: OECD (2016[27]), *Skills Matter: Further Results from the Survey of Adult Skills*, https://doi.org/10.1787/9789264258051-en.

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In addition to the risks of graduating with low skills, many students do not graduate at all. On average across OECD countries with available data, around 20% of students who enter a bachelor’s programme leave without a qualification within the theoretical duration plus three years (OECD, 2016[28]). The high level of non-completions can reflect failures in the guidance process from compulsory to higher education, low admission standards, inadequate academic support, poor programme quality and the financial cost of education (OECD, 2008[1]) (see Chapter 5).

Access for disadvantaged and non-traditional students

Despite widening access policies, disadvantaged students remain disproportionately under-represented in higher education, particularly within the more prestigious institutions (Jerrim and Vignoles, 2015[29]). Only one-third of 30-44 year-olds whose parents do not attain upper secondary education attain tertiary education themselves, compared with over two-thirds of adults in the same age group, who have at least one parent who attain tertiary education (OECD, 2017[30]). In addition to being under-represented in higher education, and concentrated in less prestigious institutions and programmes, disadvantaged students tend to have lower progression rates and graduate with lower skills and labour market outcomes (Jerrim and Vignoles, 2015[29]; OECD/European Union, 2015[31]; OECD, 2016[28]).

Countries with rapidly ageing populations and shrinking youth cohorts may become more dependent on developing the skills of older adults. Participation in adult education and training, both formal and informal, is now common in many countries, but the Survey of Adult Skills indicates major differences across countries. Participation rates in adult education exceed 50% in Denmark, Finland, the Netherlands, Norway and Sweden, while in Italy and Greece they remain well below half that rate.

In many countries, the organisation of higher education, including curriculum, study periods and other factors, typically caters to young, full-time students. However, older adults may wish to enter (or re-enter) higher education to re-train or up-skill throughout their working lives. Firms and other organisations may also seek to engage with higher education institutions to provide training for their workers to deal with new products, technologies and business processes.

Many adults may also wish to undertake short courses that do not lead to a qualification, simply to acquire new knowledge and skills for work or personal interests. However, those with existing work and caring commitments may find it difficult to access higher education unless it is more flexible in its delivery.

Internationalisation

Countries that attract international students are tapping the global pool for talent. Some countries have eased their immigration policies to encourage the temporary or permanent immigration of international students in order to benefit from better access to skills. Countries that charge international students the full cost of education also reap significant economic benefits. For this reason, several countries have policies to attract international students on a revenue-generating, or at least cost-recovery, basis. However, this can result in high costs for students and risks limiting mobility to only students who can afford it.

Internationalisation can involve inward and outward mobility of students, but also curriculum changes that promote an international and intercultural dimension to the learning and teaching process. These changes also benefit domestic students who are not able to travel abroad, by providing them with opportunities to develop a global perspective of their study field, and develop cross-cultural perspectives from interactions with international students (OECD, 2019[32]).

However, some countries have less success in attracting international students and researchers, which hinders their competitiveness and the economic impact of their higher education system. It also diminishes the exposure of domestic students to international students, and thus their capacity to operate in global environments later on. The benefits of internationalisation are also vulnerable to changes in government policy on migration or changes in circumstances within sending countries.

Despite general movement towards compliance with the UNESCO/OECD *Guidelines for Quality Provision in Cross-Border Higher Education* (OECD, 2005[33]), it is often too difficult for students and other stakeholders to easily access the information they need to assess the quality of cross-border provision or to understand the process of quality assurance that foreign providers or programmes undergo (OECD, 2015[34]).

1.3.3. Challenges of contributing to knowledge, innovation, social and cultural development

Concerns related to performance also extend into the research mission of higher education. In some countries, there are limited career opportunities for doctoral graduates and other early-career researchers. There are persistent issues with gender equity in research as well. For example, while the rate of women doctoral graduates are on a par with men in some fields, they make up less than one-quarter of engineering graduates. There are also considerable differences across countries in the share of women among authors who are designated as corresponding authors, a proxy for leadership in the context of research collaboration.

Scientific collaboration tends to be associated with research excellence. However, high quality research tends to be highly concentrated in certain countries and major institutions, which can reduce the possibilities for collaboration across the wider higher education system. Scientific collaboration can also be supported through international mobility, and scientists with a history of mobility are more likely to publish in high-impact journals; but resources and processes to promote international programmes and activities are scarce in some countries.

Research is also becoming increasingly specialised, while higher education systems in many countries do not play to their strengths in research. In some countries, the quantity and quality of scientific production do not always coincide; some countries produce most in areas where they do not excel, and less in areas where they have a comparative advantage in terms of the quality of research (OECD and SCImago Research Group, 2016[35]).

Basic research is concentrated in universities and government research organisations, and spending on basic research has been increasing faster than applied research and experimental development. The measure of scientific impact of research tends to be higher for publications that report basic research rather than applied research or experimental development. As a result, higher education institutions often concentrate on basic research and pay less attention to applied research and experimental development. This has an effect on the perception of the contribution of higher education to innovation, with only 10% of product and/or process-innovating firms regarding higher education or government as highly important sources of knowledge for innovation (OECD, 2015[36]). Industry funding accounted for only around 5% of public research funding, on average across the OECD in 2014 (OECD, 2016[37]).

Though the volume of research output has expanded substantially, mounting evidence has highlighted large-scale problems concerning the ability to reproduce results, and the prevalence of questionable research practices, which may affect the reliability of a proportion of output. This has serious consequences for the quality of research and, as a result, the quality of the knowledge which informs decision-making processes across society.

Higher education activities can also produce economic, social, cultural and environmental impact in the wider community, be it at the local, regional, national or global level. Governments and stakeholders are increasingly asking higher education institutions to engage more effectively with the wider world through the provision of continuing education; technology transfer and innovation and social engagement.

However, there are many barriers to making progress with this policy agenda. For example, academics and institutions are typically provided with few incentives to perform well in this dimension (Ćulum, Turk and Ledić, 2015[38]). Measuring higher education's contribution to social cultural and environmental well-being is also problematic (Bornmann, 2013[39]). It is difficult to assess the scientific impact of arts, humanities and social sciences, and even more difficult to measure the societal impact of any kind of research (Van Raan, 2004[40]). Technology transfer is easier to measure (via licencing of patents, royalty income, number of spin-off and start-up companies). For this reason, government policies related to engagement often prioritise the uptake and development of tangible technologies, while mechanisms to support social entrepreneurship and innovation for wider needs have been more limited. ONE does not allow me to edit this source

Finally, higher education systems can contribute to the wider community through ensuring that the knowledge they generates is available for the benefit of all of society. Open access (OA) to publications is relevant to the promotion of open science, i.e. the efforts to make the outputs of research more widely accessible in digital format to the scientific community and to society more broadly. However, in most OECD countries, the share of documents published in OA journals is less than 10%, as the implied citation "prestige" of journals, as measured by citation indicators, is higher for documents published in non-OA journals.

1.4. The OECD benchmarking higher education system performance project

The benchmarking higher education system performance project is a comprehensive review of where OECD countries currently stand across the full spectrum of issues related to higher education performance. The report reviews comparative indicators of the performance of OECD countries across a range of topics, including financial and human resources and the inputs, activities and outcomes of higher education systems. For the four participating jurisdictions, recent policy activity related to each of the topics is also reviewed. The report is structured as follows:

This chapter has provided some context for higher education systems in OECD countries in general and the four participating countries in particular, including their economic and social context, and the core challenges that higher education systems are facing today.

Chapter 2 describes the structure and governance of higher education systems and the policies and practices driving performance in the participating jurisdictions.

Chapter 3 provides a discussion of financial resources in higher education, including the cost of higher education and policies on funding and accountability.

Chapter 4 includes an overview of human resources in higher education, including the profile of higher education staff, working conditions and professional development.

Chapter 5 provides an analysis of the education function of higher education, including policies on equity, participation, internationalisation, digitalisation, lifelong learning and links to the labour market.

Chapter 6 looks at the research function of higher education, including the distribution of research expenditure, the profile of research personnel, internationalisation and research productivity and impact.

Chapter 7 presents an analysis of the engagement function of higher education, covering three main thematic areas: building human capital, contributing to innovation and supporting wider development.

Chapter 8 includes an assessment and reflection on the conduct of the project, the obstacles to measuring higher education system performance which were encountered, key gaps in evidence and lessons learned from the benchmarking process.

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Chapter 2. The structure and governance of higher education of higher education systems

This chapter describes how higher education systems and their activities are structured and governed across the OECD, including in the participating jurisdictions. It also provides an overview of the policy directions that participating jurisdictions are taking to improve system performance.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

2.1. Introduction

Policy priorities and policy outcomes are highly dependent on the environment in which policies are conceived and implemented (OECD, 2018[1]). While indicators on performance can illustrate differences between systems in terms of inputs, activities, outputs and outcomes, contextualising these indicators ensures that the comparison across systems is meaningful. Knowledge of how higher education systems are organised and governed can help to understand and explain performance.

Higher education has a broader range of actors and stakeholders than lower levels of the education system, because of greater diversity of institutions and the stronger influence of market forces. Additionally, the research and engagement functions of higher education often involve the private sector and the wider community. Among each of the stakeholders, actors and contextual elements, there is a complex set of relationships, interconnections and dependencies, which operate at the institutional, local, national, regional or international level (Jongbloed, Enders and Salerno, 2008[2]).

Recent OECD research emphasises the need to take account of the contextual dynamics of complex systems for effective policy-making (Love and Stockdale-Otárola, 2017[3]). More data on inputs, outputs and outcomes have become available in recent years to support higher education policy-making. This chapter describes many of the key features of higher education systems across the OECD. Nonetheless, complex higher education systems are difficult to describe comprehensively. Challenges remain in understanding how system structures, governance, policies and practices work together to produce the results reflected in performance indicators.

2.2. Structure of higher education systems

Many factors influence the structure of higher education systems, including national cultures and traditions, policy objectives, student expectations and labour market needs. As demand for higher education has grown in recent decades, systems have expanded in size and scope, and the issue of designing the most relevant and appropriate system structures is consistently prominent on the policy agenda in many countries (Guri-Rosenblit, Šebková and Teichler, 2007[4]).

The discussion of the structures of higher education systems in this section includes types of higher education programmes, horizontal and vertical divides between institutions; and pathways into and through higher education.

2.2.1. Classifications of higher education programmes

The key international classification of education programmes is the International Standard Classification of Education (ISCED), first developed by UNESCO (United Nations Educational, Scientific and Cultural Organization) in the 1970s and most recently revised in 2011. According to the ISCED 2011 classification, higher education programmes are divided into four levels according to the qualification awarded: level 5 (short-cycle tertiary education programmes), level 6 (bachelor's or equivalent level programmes), level 7 (master's or equivalent level programmes) and level 8 (doctoral or equivalent level programmes) (UNESCO Institute for Statistics, 2012[5]).

Within the ISCED classifications there is a great deal of variety in the structure of programmes across different higher education systems. These differences can make it difficult to recognise qualifications across jurisdictions and can hinder student mobility and the transfer of credits outside national borders. As education institutions and economies in general become more globalised, there have been a number of efforts in recent years to create internationally comparable higher education systems and degree structures to address these issues.

The most significant initiative in this area is the creation of the European Higher Education Area (EHEA) across 48 countries, including the participating jurisdictions. The agreement to develop a system of comparable and compatible qualifications in higher education that could be easily understood and recognised across Europe was a key feature of the Joint Declaration of the European Ministers of Education convened in Bologna on 19 June 1999 (Bologna Declaration) (Bologna Declaration, 1999$_{[6]}$) (Box 2.1). This led to the development of the three cycles in higher education: bachelor's (first cycle), master's (second cycle) and doctoral (third cycle).[1] Most countries in the EHEA, including the participating jurisdictions, have adopted the three-cycle structure.

The overarching framework of qualifications for the EHEA (the EHEA Framework or QF-EHEA), outlining the three cycles and setting the parameters for countries in the EHEA to develop national qualifications frameworks (NQFs), was adopted at the Ministerial Conference in Bergen in 2005 (Bergen Communiqué) (Bergen Communiqué, 2005$_{[7]}$). However, there are some programmes outside the Bologna framework, including long first-degree programmes that lead to a master's qualification in Estonia and Norway (European Commission, EACEA and Eurydice, 2018$_{[8]}$) (Table 2.1).

Table 2.1. Programmes outside the Bologna framework in the participating jurisdictions

Jurisdiction	Programmes
Estonia	Programmes in the following fields of study are based on integrated curricula of bachelor's and master's studies (ISCED level 7): • medicine and veterinary science (nominal duration of six years; 360 European Credit Transfer and Accumulation System credits (ECTS); students awarded a degree in medicine or in veterinary science) • architecture, civil engineering, dentistry, pharmacy and teacher education (nominal duration of five years; 300 ECTS; students awarded a master's degree).
Norway	Programmes in the following fields of study are based on integrated curricula of bachelor's and master's studies (ISCED level 7): • medicine, psychology, and theology (nominal duration of six years; 360 ECTS) • veterinary medicine (five to six years; 330-360 ECTS) • odontology, pharmacy, fish science, architecture, law, teacher education (five years; 300 ECTS).

Note: Table excludes programmes not classified under the International Standard Classification of Education (ISCED) of higher education programmes (e.g. specific teaching programmes in the Flemish Community, which will be replaced by programmes within the Bologna framework from the academic year 2019-2020).

The Flemish Community also offers an advanced bachelor's programme (*bachelor-na-bachelor)* (ISCED level 6) and an advanced master's programme (*master-na-master*) (ISCED level 7) for students who already hold a bachelor's or master's qualification; however, they are included in the first cycle and second cycle respectively (each advanced programmes is at least 60 ECTS).

The Bologna three-cycle structure originally did not include short-cycle tertiary education programmes (ISCED 5 level) in the QF-EHEA. However, at the Ministerial Conference in Paris in 2018 (Paris Communiqué), short-cycle tertiary education programmes were formally included as a stand-alone qualification within the QF-EHEA, as their importance in preparing students for employment and further studies, and in improving social cohesion, was recognised. EHEA countries can decide whether and how to integrate short-cycle programmes into their own national framework (Paris Communiqué, 2018[9]).

In 2016-17, around half of the EHEA systems offered short-cycle programmes as part of their higher education offering (European Commission, EACEA and Eurydice, 2018[8]). Short-cycle programmes are also available in the participating jurisdictions, though they are not always considered as part of the higher education system. For example in **Estonia**, short-cycle programmes were offered until 2009, but they have been re-classified as vocational programmes at lower levels of education.

In **Norway**, short-cycle programmes at the ISCED 5 level are offered through vocational colleges (*fagskole*) that are not recognised as part of the higher education system. Norway also offers a two-year programme (*høgskolekandidatgrad*) at the ISCED 6 level, and students who successfully complete the two-year programme can enter into the third year of a three-year bachelor's programme in the same field.

On the other hand, in **the Netherlands**, short-cycle programmes (associate degrees) were introduced in 2007 as a pilot scheme and were recognised as higher education programmes in 2013. They were originally only offered as integrated programmes within bachelor's programmes at professional HEIs. From 2018, short-cycle programmes have become separate programmes, and are no longer part of bachelor's programmes. In **the Flemish Community,** short-cycle programmes (associate degrees) were introduced in 2009 [2].

Box 2.1. The Bologna Process and the European Higher Education Area

The Bologna Process is a voluntary intergovernmental process at the European level aimed at increasing cross-national comparability in higher education systems by implementing reforms in higher education based on a set of common and fundamental values.

The move towards greater comparability began when the Sorbonne Declaration was signed by France, Germany, Italy and the United Kingdom in 1998. In 1999, the Bologna Declaration was launched and 29 European countries agreed to commit to the creation of compatible and comparable higher education systems. At the Ministerial Conference in Budapest and Vienna in 2010 (the Budapest/Vienna Communiqué), the European Higher Education Area (EHEA) was officially launched. There are currently 48 member states in the EHEA.

To become a member of the EHEA, countries must be party to the European Cultural Convention and declare their willingness to pursue and implement the objectives of the Bologna Process in their own higher education systems.

The Bologna Declaration in 1999 set six goals

- adoption of a system of easily readable and comparable degrees
- adoption of a system essentially based on three cycles (bachelor's / master's / doctoral)
- establishment of a system of credits
- promotion of mobility of students, teachers, researchers and administrative staff
- promotion of European co-operation in quality assurance

- promotion of the necessary European dimensions in higher education.

The EHEA countries have developed an overarching framework of qualifications for the European Higher Education Area (QF-EHEA), common principles for the development of student-centred learning, the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG), the Register of Quality Assurance Agencies (European Quality Assurance Register, EQAR), and a number of common tools, such as the European Credit Transfer and Accumulation System (ECTS) Users' Guide, the Diploma Supplement and the Council of Europe/UNESCO Convention (often referred to as the Lisbon Recognition Convention).

New goals for the EHEA beyond 2020 were discussed at the Ministerial Conference in Paris in 2018 (the Paris Communiqué). They include: promoting active citizenship, linking the EHEA and the European Research Area (ERA), using digital technologies, supporting students from non-traditional backgrounds (including the provision of lifelong learning), enhancing teacher support and improving professional recognition of qualifications.

Source: Bologna Declaration (1999[6]), Joint declaration of the European Ministers of Education convened in Bologna on 19 June 1999 (Bologna Declaration), www.ehea.info/media.ehea.info/file/Ministerial_conferences/02/8/1999_Bologna_Declaration_English_553028.pdf; Working Group on Policy Development for New EHEA Goals 2015-2018 (2017[10]), Policy Development for New EHEA goals: Final Report of Working Group 3, www.ehea.info/media.ehea.info/file/2018_Paris/72/7/MEN_conf-EHEA_WG3_03_950727.pdf.

Qualifications frameworks

Qualifications frameworks aim to make qualification systems more transparent and coherent by describing the knowledge, skills, autonomy and responsibility students will have acquired on successful completion of each level of qualification (European Centre for the Development of Vocational Training, 2010[11]). These descriptors (learning outcomes) indicate the relative complexity of the qualifications at each level. They may also describe the level of autonomy required to demonstrate or apply the knowledge, skills and competences acquired at each level.

The classification of qualifications through a system of levels allows the comparison of qualifications and shows how students can progress from one level to another. In this way, qualifications frameworks help students, those designing and developing higher education programmes, employers and policy makers to understand and recognise qualifications.

Qualifications frameworks are important in promoting mobility within education systems, as well as for the transparency and portability of qualifications internationally. The clear articulation of expected learning outcomes at each level can also contribute to lifelong learning, the recognition of learning and skills, and improving the quality of education (Tuck, 2007[12]).

The QF-EHEA is a meta-framework that can be used to compare different national systems. This promotes comparability and compatibility between the different higher education systems across the EHEA. In 2008, the European Commission developed a broader meta-qualifications framework, the European Qualifications Framework for Lifelong Learning (EQF), which encompasses eight education and training levels from the primary school level through the doctorate level. Individual countries can use the EQF to develop their own NQFs for all levels of education. All participating jurisdictions have developed an NQF that has been referenced to the EQF and self-certified to the QF-EHEA.

Regions outside of Europe are introducing similar initiatives. Countries in the Southern African Development Community (SADC) have developed the Southern African Development Community Qualifications Framework (SADCQF) for school education, technical and vocational education and training, and higher education. The SADCQF aims to facilitate the movement of learners and workers across the SADC region and internationally. It was established in 2011 by the SADC Ministers of Education and is currently being implemented across the region (Keevy, Chakroun and Deij, 2010[13]; Jaftha and Samuels, 2017[14]). In addition, the Caribbean Community (CARICOM) has developed a technical and vocational education and training (TVET) qualifications framework; and the Association of Southeast Asian Nations (ASEAN) has developed a Qualifications Reference Framework (Keevy and Chakroun, 2015[15]).

UNESCO has also established a number of regional conventions in order to strengthen and promote intergovernmental co-operation in recognising qualifications. Recent conventions include the Council of Europe and UNESCO Convention on the Recognition of Qualifications concerning Higher Education in the European Region in 1997 (the Lisbon Recognition Convention), the UNESCO Asia-Pacific Regional Convention on the Recognition of Qualifications in Higher Education in 2011 (the Tokyo Convention) and the UNESCO Revised Convention on the Recognition of Studies, Certificates, Diplomas, Degrees and Other Academic Qualifications in Higher Education in African States in 2014 (the Addis Convention). They outline the principles for recognition of higher education qualifications to help increase transparency and facilitate cross-border mobility of students, academic staff and professionals across the region (UNESCO, 2018[16]). Additionally, in 2016, UNESCO established a committee developing a draft text of a Global Convention on the Recognition of Higher Education Qualifications (UNESCO, 2018[17]).

Distribution of students across programme levels

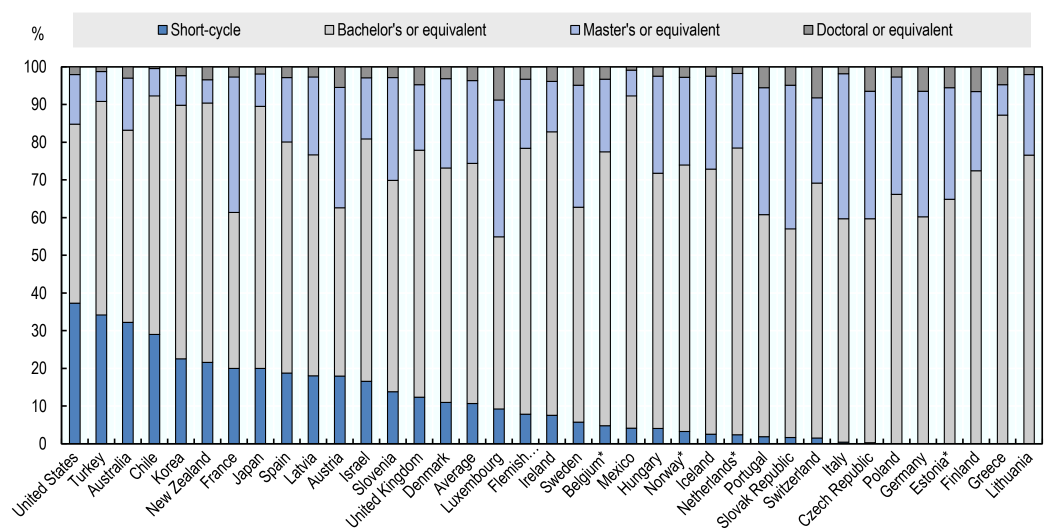
The distribution of students across higher education levels varies across OECD countries. On average, 11% of all students in higher education were enrolled in short-cycle tertiary education programmes in 2016 (Figure 2.1). Some countries, such as Australia and the United States, have relatively large proportions of students enrolled in short-cycle programmes, while other countries, such as Germany and Finland, do not provide education at this level at all. The majority of students (64% in 2016) were enrolled in bachelor's level programmes, while 22% were studying in master's level programmes and 4% were undertaking doctoral level studies.

A greater proportion of students tend to be enrolled in master's and doctoral programmes in European countries than in other OECD countries. In 2016, while students in master's level programmes accounted for more than one-third of all higher education students in some countries, such as Czech Republic, France, Italy and Portugal, the proportion was less than 10% in others, including Chile, Mexico and New Zealand. Doctoral students represented more than 5% of enrolments in Austria, Czech Republic, Estonia, Finland, Germany, Luxembourg, Portugal and Switzerland; while the percentage was less than 1% in Chile and Mexico.

Most students in the participating jurisdictions were enrolled in bachelor's level programmes in 2016, from 65% in Estonia to 76% in the Netherlands, which was above the OECD average of 64% (Table 2.2). Short-cycle tertiary education programmes are not as common in these jurisdictions as they are in other OECD countries; enrolments at this level in the Flemish Community (8%) and the Netherlands (2%) were below the OECD average of 11% in 2016. However, enrolments in these programmes have been increasing rapidly in these two jurisdictions.

The proportion of students enrolling in master's programmes was higher than the OECD average (22%) in Estonia (30%) and Norway (23%), while it was lower than the average in the Flemish Community (18%) and the Netherlands (20%). Estonia had 6% of its higher education students in doctoral programmes in 2016, which was above the OECD average of 4%, whereas the remaining jurisdictions were below the average. The Netherlands had a particularly low share of doctoral students with 1.8% of students enrolled at this level, less than half of the OECD average share.

Figure 2.1. Distribution of student enrolments across ISCED levels (2016)



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Countries are ranked in descending order of the share of students enrolled in short-cycle tertiary education programmes.
Data on doctoral students exclude those who are employed outside of higher education.
Source: Adapted from OECD (2018[18]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en; data provided by the Flemish Ministry of Education and Training.

StatLink https://doi.org/10.1787/888933940417

Table 2.2. Distribution of enrolments across ISCED levels, participating jurisdictions (2016)

	Short-cycle	Bachelor's	Master's	Doctoral
Estonia	-	64.9%	29.6%	5.5%
The Flemish Community	7.9%	70.5%	18.3%	3.3%
The Netherlands	2.4%	76.0%	19.8%	1.8%
Norway	3.3%	70.7%	23.3%	2.8%
OECD average	10.7%	63.7%	21.9%	3.7%

Note: Data on doctoral programmes exclude doctoral students who are employed outside of higher education. See Annex 2A for student enrolment numbers across ISCED levels in the participating jurisdictions.
Source: Figure 2.1.

2.2.2. Classifications of higher education institutions

As noted in Chapter 1, there are over 18 000 heterogeneous higher education institutions across the world, with diverse profiles, missions, organisation and status. The different types of institutions include universities; colleges; polytechnics; professional, vocational and specialist institutions; and research institutions, among others, depending on the national context. These institutions can be public or private and have varying levels of government recognition.

The categories of higher education institutions differ across participating jurisdictions (Table 2.3). In all jurisdictions, there are both public and private higher education institutions. In the Flemish Community and the Netherlands, institutions are further differentiated by whether they have been recognised by the government.

Table 2.3. Higher education institutions in participating jurisdictions

	Types of higher education institutions
Estonia	Universities (*ülikool*) Professional higher education institutions (*rakenduskõrgkool*)
The Flemish Community	Universities (*universiteiten*) University colleges (*hogescholen*) Specialised institutions[3] Other statutory registered higher education institutions Non-statutory registered higher education institutions Non-registered higher education institutions
The Netherlands	Universities (*universiteiten*) Universities of applied sciences (*hoger beroepsonderwijs* (HBO) institutions, formerly *hogescholen*) The Open University (*Open Universiteit*) Recognised higher education institutions Non-recognised higher education institutions
Norway	Universities (*universitet*) Specialised university institutions (*vitenskapelig høgskole*) University colleges (*høgskole*) Private higher education institutions

Higher education institutions can be classified and differentiated in many ways, according to who owns and funds them, their missions and orientations, and their status in relation to other higher education institutions. These differences can lead to the creation of distinct subsectors within a broader higher education system. Institutions are often categorised in groups across the system (horizontal differentiation) according to their missions, profiles and approaches to fulfilling their functions. Differences within the system can also exist on the basis of a formal or informal hierarchy of institutions (vertical differentiation or stratification) (Clark, 1983[19]; Marginson, 2016[20]).

Horizontal differentiation

Horizontal diversity in higher education institutions can help accommodate the varying needs of a heterogeneous society. In addition to varying missions, governance arrangements and internal organisation, other distinguishing features could include legal foundation, size, services and differences in student population (Birnbaum, 1983[21]). Differences between institutions can be historically inherited, or arise from socio-political context, government policy and regulation (Marginson, 2017[22]). Key distinguishing features (Birnbaum, 1983[21]; Teichler, 2007[23]) include:

- types of institutions: universities or other higher education institutions
- sectors of control: public or private
- types of programmes: academic or professional orientation
- levels of programmes: delivery of programmes at ISCED levels 5 to 8 or specific levels
- institutional focus: research or teaching
- modes of teaching: face-to-face, online or blended
- discipline coverage: comprehensive coverage of all disciplinary domains or specialisation in particular fields.

As seen in Table 2.3, there are varying degrees of horizontal diversification in the participating jurisdictions. The key differentiating factor in Estonia, the Flemish Community and the Netherlands is the distinction between universities, which have a predominantly academic focus, and other institutions, which have a predominantly professional focus. This is discussed further in the following section.

Box 2.2. Classification systems of higher education institutions

The United States

Since the 1970s, the United States has used the Carnegie Classification of Institutions of Higher Education to classify higher education institutions according to the highest degree level awarded:

- doctoral universities: associate degrees to doctorates (ISCED 5 to 8)
- master's colleges and universities: associate degrees to master's (ISCED 5 to 7)
- baccalaureate colleges: associate degrees and bachelor's (ISCED 5 and 6)
- associate's colleges: associate degrees (ISCED 5).

There are also special focus institutions (which specialise in a single field or set of related fields) and tribal colleges (which are members of the American Indian Higher Education Consortium).

Each category is further defined with subcategories based on additional factors such as the level of research activity, the number of degrees conferred, the disciplinary focus and student types (Borden, Coates and Bringle, 2018[24]).

Japan

Higher education institutions in Japan are differentiated on the basis of the types and levels of programmes offered (OECD, 2018[25]):

- Universities and graduate schools are academically oriented.
  - universities: bachelor's degrees (ISCED 6)
  - graduate schools: master's degrees (ISCED 7) and doctorates (ISCED 8)
- The remaining higher education institutions are professionally oriented.
  - junior colleges: associate degrees (ISCED 5)

- professional graduate schools: professional master’s degrees (ISCED 7)
- colleges of technology: title of associate (ISCED 5) (these institutions admit lower secondary school graduates and provide practical education over a five-year period)
- professional training colleges: diplomas and advanced diplomas (ISCED 5).

Binary higher education systems

A number of countries operate on a binary system where higher education institutions are divided into two main subsectors based on the types of programmes they deliver. The academically oriented institutions usually have a strong research focus and are able to award doctorates. The professionally oriented institutions, on the other hand, generally have more emphasis on work-based education. Other higher education institutions may exist outside the two main subsectors to fulfil specific educational needs, for example, art, music or military academies and specialist higher education institutions.

Some countries have moved from a binary system to a unified system in recent decades, attempting to minimise horizontal differences. For example, Australia abolished the binary divide between universities and colleges of advanced education in 1987 and created a unified national system. The non-university sector either amalgamated into new universities or merged with existing universities. The United Kingdom also eliminated the binary divide in 1992 and now has a unitary system that is primarily dominated by universities. Similarly, by 2005, the Swedish higher education system had transformed into a uniform system by granting university status to all university colleges.

However, binary systems still exist in a number of OECD countries, for instance Austria, Finland, Germany, Portugal, South Korea and Switzerland. Within the jurisdictions participating in this benchmarking exercise, Estonia, the Flemish Community and the Netherlands have a binary higher education system (Table 2.4). In the Flemish Community and the Netherlands, some higher education institutions exist outside the binary system, such as specialist higher education institutions. However, they do not attract large numbers of students.

Table 2.4. Binary systems in participating jurisdictions

	Higher education institutions mainly offering academically oriented programmes	Higher education institutions mainly offering professionally oriented programmes
Estonia	Universities (*ülikool*)	Professional higher education institutions (*rakenduskõrgkool*)
The Flemish Community	Universities (*universiteiten*)	University colleges (*hogescholen*)
The Netherlands	Universities (*universiteiten*)	Universities of applied sciences (*hoger beroepsonderwijs* (HBO) institutions, formerly *hogescholen*)

There is no formal international naming convention for higher education subsectors in a binary system. The terms “universities” and “professional higher education institutions (professional HEIs)” are used throughout this report when discussing subsectoral differences in the binary systems in the participating jurisdictions.

In Estonia, the Flemish Community and the Netherlands, there is a distinction between universities and professional HEIs to varying degrees, in terms of their governance and legal rights; their functions; and the levels of programmes they can offer. Access to different types of funding also differs between the two subsectors in the participating jurisdictions, particularly research funding, which is largely provided to universities (see Chapter 3).

Estonia has two distinct types of ISCED level 6 programmes: a bachelor's programme (which awards a bachelor's degree, *bakalaureusekraad*) and a professional higher education programme (which awards a professional higher education diploma, *rakenduskõrgharidusõppe diplom*). Bachelor's programmes have a theoretically based curriculum, and aim to broaden the scope of general education and develop the basic knowledge and skills in specific fields of study required to continue at the master's level or to gain access to the labour market. Professional higher education programmes, on the other hand, are based on a curriculum that is focused on practical training for specific professions. At least 15% of the study load in professional higher education programmes must be work-based learning.

Universities and professional HEIs in Estonia are regulated by separate legislation (the Universities Act 1995 and the Institutions of Professional Higher Education Act 1998). In theory, both universities and professional HEIs are able to offer the two types of bachelor programmes. However, in practice, universities mainly deliver bachelor's programmes and professional HEIs predominantly offer professional higher education programmes. Both universities and professional HEIs are able to offer master's degree programmes. However, only universities can offer doctoral programmes (a diagram of the Estonian education system is available in Annex 2B).

The Flemish Community has a binary system with professional HEIs focusing mainly on occupationally specific and labour market relevant education and training, and providing regional coverage to support access. A decree was introduced in 2003 that required all professional HEIs to develop "associations" with a university. The associations are official bodies where co-operation between a university and one or more university colleges is formally established. The key goals of the associations were to align all Flemish programmes with the Bologna structure (Box 2.1), including academically oriented programmes offered by professional HEIs; build better connections between the two sectors; improve efficiency of programme offerings and reduce overlap. The associations also facilitate transfer arrangements for students from one type of institution to another, as well as the development of learning pathways across education levels and subsectors.

Preventing fragmentation of research capacity has become a key priority over time in the Flemish Community, and this has led to a much clearer binary distinction and strengthening of the university sector. A 2012 decree integrated academic bachelor's programmes fully within universities (Williams, 2017[26]). As of the academic year of 2013-2014, with some exceptions, universities offer programmes with an academic orientation (*academisch gerichte*) at bachelor's, master's and doctoral levels, while professional HEIs offer programmes with a professional orientation (*professioneel gerichte*) at short-cycle tertiary education[4] and bachelor's levels (a diagram of the Flemish education system is available in Annex 2B).

The binary system is a key feature of the **Dutch** higher education system, which provides a distinction between universities and professional HEIs with complementary strengths. Universities mainly offer research oriented education (*wetenschappelijk onderwijs,* WO) at bachelor's, master's and doctoral levels. Professional HEIs, on the other hand, deliver higher professional education (*hoger beroepsonderwijs*, HBO) at short-cycle tertiary education and bachelor's levels (and master's level in some cases). Traditionally, professional HEIs were not engaged in research activities. However, they have been encouraged to specialise in applied research in recent years (a diagram of the Dutch education system is available in Annex 2B).

Norway created a binary system in the 1960s and 1970s through the establishment of regional colleges and a process of upgrading a number of specialised colleges (engineering, nursing, etc.). Regional colleges provided short-cycle professional and vocational programmes, as well as some academic oriented programmes for basic, undergraduate and graduate education in areas where no universities operated (Williams, 2017[26]). However, a series of royal decrees in 1981, 1989 and 1991 ended the binary system, and a series of mergers took place in the early 1990s, peaking in 1994 when 98 small regional colleges were merged into 26 public colleges (later referred to as university colleges). The differences between universities and university colleges were reduced when the government brought universities and university colleges under the same legislative framework in 1995.

The Norwegian government has encouraged the merger of universities and university colleges as a way of enhancing competitiveness for resources and students (including through greater geographic coverage), to amalgamate similar study programmes and achieve efficiency, and to strengthen performance (OECD, 2018[27]). Larger and more comprehensive institutions could offer stronger academic programmes, give more programme and module options for students, provide better student services and have a greater capacity for organisational flexibility (Harman and Harman, 2003[28]). During the most recent wave of institutional mergers in 2015-17[5], many university colleges were either incorporated into universities or obtained university status.

Public and private institutions

The divide between public and private institutions is an important feature of many higher education systems. In the UNESCO, OECD and Eurostat (UOE) data manual, public and private higher education insitutions are classified primarily according to the locus of institutional control, rather than by who provides the majority of funding. Control is determined according to who has the majority of power to set policies and design the operations and practices of the insitution.

Private institutions can be further divided into government-dependent private and independent private institutions based on the source of funding (UOE, 2018[29]):

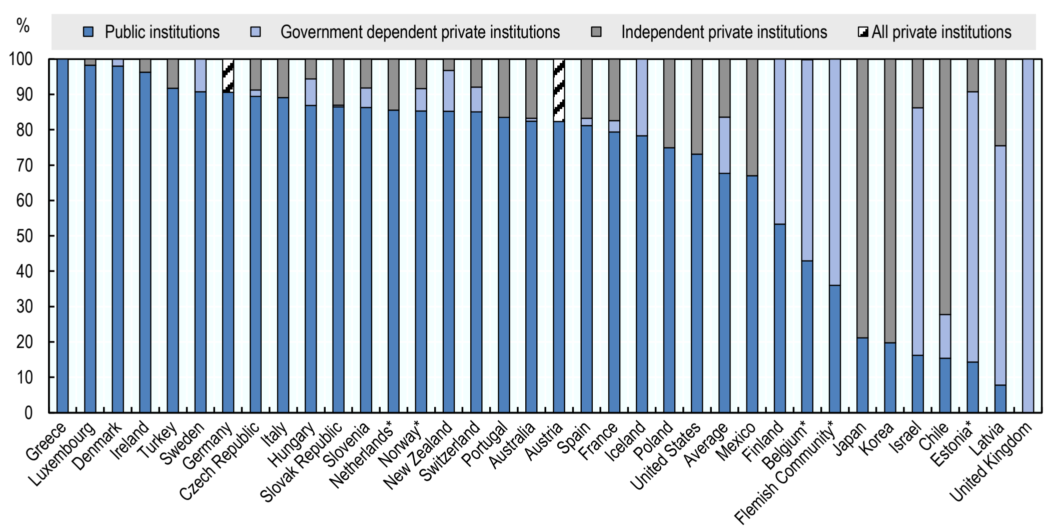
- A government-dependent private institution is one that either receives at least 50 percent of its core funding from government agencies or one whose teaching personnel are paid for by a government agency.
- An independent private institution is one that receives less than 50 percent of its core funding from government agencies, and whose teaching personnel are not paid for by a government agency.

In practice, government-dependent private institutions often comply with the same regulations as public institutions, given that receipt of public funding can be conditional on adhering to these regulations. In the United Kingdom, for instance, all higher education institutions, including universities and colleges, are private, but the majority receive funding from the government and are therefore "government-dependent" and subject to regulations.

Higher education remains predominantly public in most OECD countries. As shown in Figure 2.2, the majority of higher education students in 2016 were enrolled in public institutions in most OECD countries, or, in the case of countries such as Estonia[6] and the United Kingdom, in government-dependent private institutions. In a small number of countries, independent private institutions make up a relatively large proportion of the overall system; they accounted for around 80% of student enrolments in Japan and Korea, 70% in Chile, 30% in Mexico and 25% in the United States in 2016.

In the Netherlands and Norway, approximately 85% of higher education students were enrolled in public institutions in 2016. More than three-quarters of students in Estonia[6] and close to two-thirds in the Flemish Community were enrolled in government-dependent private institutions. In all participating jurisdictions, the proportion of students enrolled in independent private institutions was below 15%.

Figure 2.2. Share of all higher education enrolments by type of institution (2016)



Note: * Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Source: Adapted from OECD (2018[18]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en; data provided by the Flemish Ministry of Education and Training.

StatLink https://doi.org/10.1787/888933940436

The vast majority of private higher education institutions are non-profit, meaning that any financial gains from their activities cannot be distributed to the owners of the institution, and they do not pay tax on their income. However, there is an increasingly important for-profit sector in some OECD countries.

It has been argued that for-profit institutions are more responsive to student needs, particularly those of non-traditional learners, as they need to be self-sufficient and able to respond to market demand (Bennett, Lucchesi and Vedder, 2010[30]). In the United States, they tend to enrol more minority, disadvantaged, and older students than community colleges and other public and private non-profit institutions. In addition, in comparison to community colleges (which are primarily public), for-profit institutions perform better in terms of retention rates for students in their first year and completion rates in short-cycle tertiary education programmes at the certificate and associate in arts levels (Deming, Goldin and Katz, 2012[31]).

However, there are concerns about the quality of education provided by for-profit institutions, as they may be more motivated by the financial bottom line rather than education outcomes (Bennett, Lucchesi and Vedder, 2010[30]; The Institute for Higher Education Policy, 2012[32]). Students from for-profit institutions in the United States, for instance, have poorer employment outcomes than comparable students from other higher education institutions, making it difficult for them to repay their student loans. As a result, they are more likely to default on their student loans. Students from for-profit institutions also report lower satisfaction with their courses and are less likely to consider their education and loans worth the price-tag relative to similarly situated students who attended public and private non-profit institutions (Deming, Goldin and Katz, 2012[31]).

These concerns are exacerbated when government-funded student financial assistance is a key source of revenue of for-profit institutions. This has been found to drive aggressive and, at some times, fraudulent recruitment practices in some institutions in the United States (Public Agenda, 2014[33]). Coupled with concerns about quality in for-profit institutions, this has led to government initiatives to improve their accountability for student outcomes in some countries. The United States, for instance, introduced new Gainful Employment regulations designed to hold for-profit colleges accountable for student outcomes in 2014. These regulations tied eligibility for federal funding to student success in terms of programme-level measures of student debt and earnings (Cellini and Turner, 2018[34]). As a result, the share of enrolments in for-profit institutions, which increased from 4% in 1995 to 11% in 2010, decreased to 7% in 2016 (U.S. Department of Education, 2017[35]).

Recognition of institutions

Higher education institutions have varying levels of recognition by governments which can determine how they operate. In many countries, including Estonia and Norway, higher education institutions need to achieve formal accreditation in order to operate (Section 2.3). However, some countries, including the Flemish Community and the Netherlands, allow higher education institutions without formal accreditation or registration to operate within their jurisdictions. These institutions may be restricted in the qualifications they can award or in their access to government funding.

In **the Flemish Community**, only registered higher education institutions are entitled to award bachelor's and master's degrees. Statutory registered institutions (public or government-dependent private) were recognised by the government prior to the 2004 reforms in higher education and are listed in the Higher Education Register (*Hogeronderwijsregister*). These institutions receive public funding for their education and research activities. Independent private higher education institutions can undergo a formal registration process to be registered by the government. The registration procedures include proof of financial solvency and the establishment of co-operation agreements with recognised institutions to guarantee students can continue their studies if the institution ceases to operate (e.g. in the case of bankruptcy). Other higher education institutions can operate under the constitutional principle of freedom of education; however, their qualifications cannot be called bachelor's or master's degrees.

Public universities and professional HEIs in **the Netherlands** are listed in the Higher Education and Research Act 1993 and receive public funding to support their activities.

Private higher education institutions in the Netherlands do not receive public funds, but may be recognised by the Minister of Education, Culture and Science as a legal entity providing higher education (*rechtspersoon voor hoger onderwijs*) if they undergo a special institutional procedure and their programmes are accredited by the Netherlands-Flanders Accreditation Organisation (NVAO). These institutions are permitted to offer bachelor's and master's programmes, and their accredited programmes are legally recognised. The qualifications awarded are equivalent to those awarded by public institutions. Private institutions that do not undergo these processes are not recognised by the government and operate outside of government regulations. They can apply for programme accreditation through the NVAO if certain conditions are met. Private higher education institutions are not permitted to call themselves universities.

Vertical differentiation

Higher education institutions can also differ in terms of the quality and reputation of individual institutions and likely graduate outcomes (Teichler, 2008[36]), leading to a vertical stratification of the system.

As discussed in Chapter 1, higher education participation is no longer reserved for the elite, with some OECD countries now having a participation rate of more than 50%. But high levels of participation and increased numbers of institutions do not preclude the concentration of top researchers and students in high-status institutions and programmes, even in very egalitarian societies (Marginson, 2016[20]). This tier of institutions exists in many countries and is often comprised of the older and more established institutions, such as the *Grandes Écoles* in France, the SKY universities in Korea (Seoul National University, Korea University, and Yonsei University), the Russell Group in the United Kingdom and the Ivy League in the United States.

Vertical differentiation can also exist within institutions. For example, university colleges in the Netherlands (often called Honours Colleges) are part of a university, but differ from the rest of the institution in many aspects. They are selective and focused on developing talented students, with classes delivered in small groups. These students follow a broad liberal arts and sciences curriculum in their first year before selecting their major in their second year. Students must pay an additional fee on top of the regular tuition fee to attend, and in some cases, need to live in dedicated on-campus resident halls.

Vertically differentiated systems are more likely to generate hierarchical differences in labour market outcomes (including types of occupations, employment rates and wages) (Leuze, 2011[37]). Elite institutions and programmes provide students with an identifiable social advantage (Marginson, 2016[20]) and students with highly educated parents are more likely to enrol in higher-status institutions and programmes, which can increase their advantages in the labour market. Vertically differentiated higher education systems, therefore, can play a role in increasing the correlation between students' socio-economic status and labour market outcomes (Triventi, 2013[38]).

The vertical differentiation between higher education institutions no longer exists only nationally. The advent of the global ranking industry and the competition to attract both funding and international students means many institutions now measure their outputs on a global scale, and aim to achieve "world-class" status. A number of countries have explicit policies in place to create "world-class universities," as certified by their ranking in various global university rankings, such as the Academic Ranking of World Universities (ARWU) (Shanghai Jiao Tong University, China), the QS World University

Rankings (Quacquarelli Symonds, UK) and THE World University Rankings (Times Higher Education, UK). This can result in additional funding and support for top-ranking institutions to help them build their research capacity and attract global talent.

Project 911 (1995) and Project 985 (1998) in China, for example, are both aimed at producing "world-class" universities and improving China's international competitiveness. The initial nine universities selected through the project are known as the C9 League. 39 universities have subsequently received additional financial support from Project 985 to strengthen their performance and promote the growth and reputation of China's higher education system. The significant injection of funds to these institutions has led to an increase in the output of academic papers, many of which are considered to be influential and of high quality, and improve the performance of Chinese universities in global rankings (Yang and Liu, 2018[39]). The Double First-Class strategy introduced in 2015 also aims to expand the number of highly ranked Chinese universities by 2050. 43 universities have qualified for additional support to become "world-class," and another 95 institutions have been selected to develop "world-class" programmes (Peters and Besley, 2018[40]).

Similarly, in Japan, the Top Global University Project was launched in 2014 to provide financial support to universities that are leading the internationalisation of education in Japan. 37 universities have been recognised as global universities. Type A (Top Type) universities are those which are considered to have the potential to be included in the top 100 in world university rankings. Type B (Global Traction Type) universities are recognised as innovative institutions that can lead the internationalisation of Japanese society (Japanese Ministry of Education, Culture, Sports, Science and Technology, 2018[41]).

Competition between institutions can also be a means to promote excellence, especially in research, and has led to the creation of Research Excellence Initiatives in many countries, to identify and promote excellence among institutions (OECD, 2014[42]). For example, in Germany, the Excellence Initiative was introduced in 2005 to encourage excellence in research and doctoral training and enhance the profile and attractiveness of German universities. The Excellence Initiative has three lines of funding. The first line funds graduate schools that provide high-quality doctoral training and stimulating research environments. The second line funds clusters of excellence, which are internationally visible and competitive priority research areas at universities and their non-university partner institutions. The third line finances the institutional strategies of only a small number of universities. In its first phase from 2005-2012, the Excellence Initiative provided funding for 39 graduate schools, 37 clusters of excellence and 9 institutional strategies. In the second phase from 2012-2017, 45 graduate schools, 43 clusters of excellence and 11 institutional strategies received financial support (OECD, 2014[42]).

On the other hand, the trend towards increasing competition between institutions can increase vertical differentiation and possibly decrease horizontal differentiation. The additional financial support for Project 985 universities, for instance, has created a widening gap between the selected universities and other higher education institutions (Zong and Zhang, 2017[43]). It is also argued that the German Excellence Initiative has reduced variety within the German university landscape (Flink et al., 2012[44]). In addition, these policies can drive an even greater emphasis on research over teaching, as most global rankings tend to focus heavily on research performance (Hazelkorn and Gibson, 2018[45]).

As a response to global university rankings, which focus on a narrow range of measures and provide simplified league tables, there have been a number of efforts to provide a broader view of the relative strengths of institutions. For example, U-Multirank is a multidimensional ranking covering various aspects of higher education functions, e.g. education, research and engagement. It ranks higher education institutions into five different performance groups, and is an independent ranking developed with seed funding from the European Commission’s Erasmus+ programme (U-Multirank, 2018[46]).

2.2.3. Access to and pathways within higher education

As discussed in Chapter 1, access to higher education has significantly broadened across the OECD in recent decades, reflecting government policy and investment, and a preceding period of universalisation of secondary education. Many countries have reformed their system structures to promote greater access to higher education, including opening up access to students from different types of secondary education, and developing mechanisms for non-traditional entry.

Admission to higher education

Access to higher education is generally based on an upper secondary education qualification. Applicants may also be awarded entrance scores or points based on their performance in upper secondary schools that are used for higher education admissions processes. Some countries stream secondary school students into academic or vocational pathways, which may determine whether they are able to enter higher education, and the types of higher education institutions and programmes they can enter (diagrams of the education systems in the participating jurisdictions are available in Annex 2B).

However, the level of autonomy institutions have in selecting students for admission to higher education can vary across countries. In some, institutions have the power to set admission criteria (as in Estonia); in others, the admissions criteria is either co-regulated between institutions and an external authority (as in the Netherlands and Norway); or it is entirely regulated by an external authority (as in the Flemish Community) (European University Association, 2018[47]).

In **Estonia**, all individuals with upper secondary education are eligible to apply for all types of first-degree programmes (i.e. bachelor’s programmes, professional higher education programmes or programmes based on integrated curricula of bachelor’s and master’s studies) under the Universities Act 1995 and the Institutions of Professional Higher Education Act 1998. Completion of upper secondary education is certified by an upper secondary school leaving certificate or a certificate of vocational secondary education. However, higher education institutions may introduce further admission requirements, such as entrance examinations, minimum scores on the national examinations, and interviews.

In **the Flemish Community**, a secondary school leaving certificate (a diploma of secondary education) gives individuals access to all types of short-cycle and bachelor's programmes. Individuals are able to achieve this qualification by completing either two years of the third stage of general, arts and technical secondary education or three years of the third stage of vocational secondary education. Access to short-cycle programmes is also granted if applicants hold either a certificate of the second year of the third stage of vocational secondary education or a certificate of a programme of secondary adult education, which had at least 900 teaching periods.

In **the Netherlands**, the Higher Education and Research Act 1993 outlines the different entry requirements for universities and professional HEIs, which are based on completion of one of three different strands of upper secondary education:

- Graduates from the "pre-university education" (VWO) strand (three years) can directly access all types of higher education institutions.
- Graduates from the other senior general secondary education (HAVO) strand (two years) can only access professional HEIs. However, in some cases, they can access university programmes after one year spent in professional HEIs.
- Graduates from vocational upper secondary education (two or three years) do not generally have direct access to higher education. However, they can access higher education after completing some additional years of upper secondary education or post-secondary non-tertiary education (depending on which programmes they have followed).

In **Norway**, admission to bachelor's programmes is regulated through the Universities and University Colleges Act 2005 and national regulations, with higher education institutions formally responsible for admission. Applicants must have a minimum level of achievement in six key academic subjects (English, history, mathematics, natural science, Norwegian and social studies), in addition to achieving the general matriculation standard to access higher education by:

- completing three years of general upper secondary education
- completing three or four years of vocational upper secondary education and training (three years of schooling or two years of schooling and two years of apprenticeship training, which leads to a craft or journeyman's certificate), followed by an additional year with the six key academic subjects.

For many programmes, additional requirements apply, e.g. specific subjects or results from upper secondary education.

In some countries, including the Flemish Community, the Netherlands and Norway, alternative ways of access to higher education are available for individuals who may not meet the usual admissions requirements. In the Flemish Community and the Netherlands, students without an upper secondary degree can be admitted through admissions tests (in the Netherlands, this applies only to students who are at least 21 years old). In the Netherlands, students can also be admitted based on the evaluation of a piece of research. In Norway, individuals over 23 years old and without an upper secondary qualification can access higher education by documenting five years of education and/or work experience and demonstrating basic proficiency in the six key academic subjects.

The recognition of prior learning (RPL), i.e. the recognition of non-formal and informal learning, also provides alternative ways to access higher education. In the Flemish Community and Norway, individuals may access higher education on the basis of RPL. In the Netherlands, individuals apply for RPL in order to fast-track their attainment of upper secondary education qualifications. In Estonia, prior learning can be recognised; however, higher education institutions are not able to admit students solely on the basis of RPL.

Selectivity in admission systems

The level of openness or selectivity in admission to higher education differs across countries, institutions, programmes and levels of study. Where government regulations on admissions exist, they tend to focus on short-cycle and bachelor's level programmes and institutions are more likely to have greater autonomy in admissions to master's and doctorate level programmes.

Around half of the countries and economies with available information on admissions processes to public institutions have at least some institutions with open admission systems (Table 2.5). Open admissions systems provide all applicants with the required qualification level (usually an upper secondary school qualification) with automatic right of access to higher education. This is the case for admissions to short-cycle and bachelor's programmes in the Flemish Community and the Netherlands. Open admission also exists in half of all jurisdictions with government-dependent private institutions and nearly half of those with independent private institutions.

In Norway, admission to first-degree programmes (bachelor's and integrated master's) is open, but based on a point scale within quotas. This system was introduced to address imbalances in higher education and society at large (in terms of age, gender, culture and region). Half of all student places are reserved for those 21 years of age or younger. These "youth quota" applicants are ranked solely on the courses they completed in upper secondary education and their grades. Applicants in the other half of the admission quota, known as the "ordinary quota," can obtain extra admission points based on their age, past education experience and military service. Some applicants within the ordinary quota may re-sit exams to improve their upper secondary school results, thereby improving their chances of admission to their preferred study programme. Norwegian institutions that offer popular programmes can therefore be selective, as demand exceeds the number of places available. In these instances, the highest ranking applicants are offered a place in their preferred institution. By contrast, institutions must accept all eligible applicants in low-demand programmes where there are fewer applicants than places.

Other countries allow institutions to set the admissions criteria and be more selective. In these countries, applicants are usually assessed on the basis of their performance in upper secondary school, and applicants may also be required to have successfully completed pre-requisite subjects at that level. Institutions may also use interviews, portfolios, entrance exams and other mechanisms to assess the suitability of applicants for admission to programmes, as is the case in Estonia.

Even in open admission systems, there are often additional conditions required for entry to specific programmes, and limits on the number of places offered by institutions. The number of places available in medicine, for instance, is controlled in many countries as these are closely linked with national restrictions around medical practitioners. Places in some programmes may be limited due to high demand. In the Netherlands, for instance, the number of places is limited for medicine, veterinary medicine, dentistry, journalism and physiotherapy programmes. Applicants for these programmes are selected through a weighted draw (*loting*), in which a higher average mark in the final school examination gives applicants a higher chance of gaining a place. In addition, some programmes, such as university colleges and art programmes, are selective by nature. Similarly, in Norway, admission to engineering and medicine programmes requires the completion of specific upper secondary courses such as advanced courses in mathematics and sciences.

Table 2.5. Admission and application systems for first-degree programmes (2017)

	Existence of open admission system			Management of applications		
	Public institutions	Government-dependent private institutions	Independent private institutions	Public institutions	Government-dependent private institutions	Independent private institutions
Australia	No	No	No	Centralised and direct to institutions	Centralised and direct to institutions	Centralised and direct to institutions
Austria	Yes	No	No	Direct to institutions	Direct to institutions	Direct to institutions
Canada	Yes	Yes	m	Centralised and direct to institutions	Centralised and direct to institutions	Centralised and direct to institutions
Chile	No	No	Yes	Centralised	Centralised	Centralised and direct to institutions
Czech Republic	No	No	No	Direct to institutions	Direct to institutions	Direct to institutions
Denmark	Yes	a	a	Centralised	a	a
Estonia	No	No	No	Centralised	Centralised	Centralised and direct to institutions
Finland	No	No	a	Centralised	Centralised	a
France	Yes	Yes	m	Centralised and direct to institutions	Centralised and direct to institutions	Direct to institutions
Germany	Yes	Yes	m	Centralised and direct to institutions	Direct to institutions	Direct to institutions
Greece	No	a	a	Centralised	a	a
Hungary	No	No	No	Centralised	Centralised and direct to institutions	Centralised
Iceland	Yes	Yes	a	Direct to institutions	Direct to institutions	a
Israel	No	No	Yes	Direct to institutions	Direct to institutions	Direct to institutions
Italy	Yes	a	Yes	Centralised and direct to institutions	a	Centralised and direct to institutions
Japan	No	a	No	Direct to institutions	a	Direct to institutions
Korea	No	a	No	Centralised and direct to institutions	a	Centralised and direct to institutions
Latvia	a	a	a	Centralised and direct to institutions	a	Centralised and direct to institutions
Luxembourg	Yes	a	Yes	Direct to institutions	a	Direct to institutions

	Existence of open admission system			Management of applications		
	Public institutions	Government-dependent private institutions	Independent private institutions	Public institutions	Government-dependent private institutions	Independent private institutions
Netherlands	Yes	a	m	Centralised	a	m
New Zealand	Yes	Yes	Yes	Direct to institutions	Direct to institutions	Direct to institutions
Norway	Yes	Yes	Yes	Centralised and direct to institutions	Centralised and direct to institutions	Direct to institutions
Poland	No	a	Yes	Direct to institutions	a	Direct to institutions
Portugal	No	a	No	Centralised and direct to institutions	a	Direct to institutions
Slovak Republic	Yes	m	Yes	Direct to institutions	a	Direct to institutions
Slovenia	No	No	No	Centralised	Centralised and direct to institutions	Direct to institutions
Spain	No	a	Yes	Direct to institutions	a	Direct to institutions
Sweden	No	No	a	Centralised	Centralised	a
Switzerland	Yes	Yes	Yes	Direct to institutions	Direct to institutions	Direct to institutions
Turkey	No	a	No	Centralised	a	Centralised
United Kingdom	a	Yes	m	A	Centralised and direct to institutions	m
United States	Yes	a	Yes	Direct to institutions	a	Direct to institutions
Flemish com. (Belgium)	Yes	Yes	m	Direct to institutions	Direct to institutions	m
French com. (Belgium)	Yes	Yes	a	Direct to institutions	Direct to institutions	a

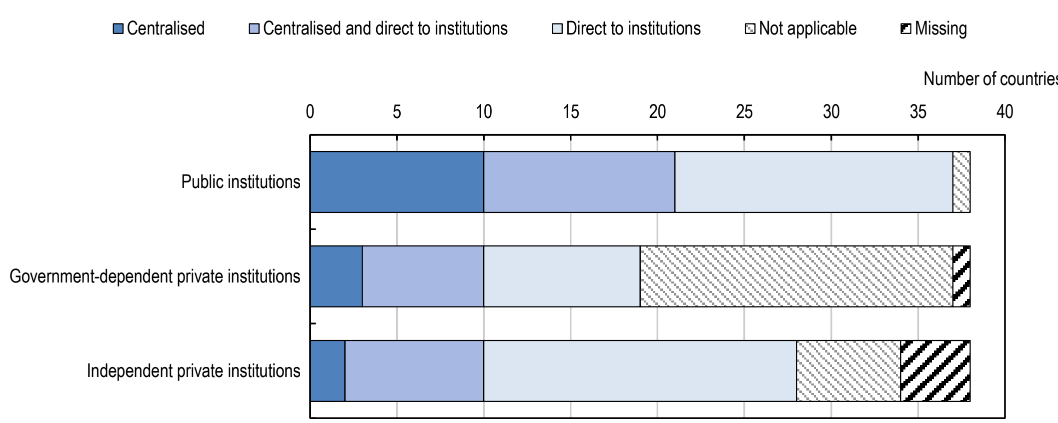
Note: First-degree programmes include i) ISCED level 6 programmes that do not require prior completion of another level 6 programme for entry and ii) ISCED level 7 programmes that do not require prior completion of a level 6 programme for entry. Open admissions systems allow all applicants with the required qualification level an automatic right of access to higher education.
a: Data are not applicable because the category does not apply; m: Data are not available
Estonia: Data are provided by the Estonian Ministry of Education and Research.
United Kingdom: Information relates to the four separate systems across the United Kingdom. In each case, "yes" indicates the policy is in place in at least one of the four countries.
Source: OECD (2017[49]), *Education at a Glance 2017*, https://doi.org/10.1787/eag-2017-en.

Management of applications

The management of applications to enter higher education also varies across countries. Institutions manage direct applications with full autonomy and responsibility in some countries. In others, students submit applications through a centralised government agency, which applies admissions criteria. A third approach used in some jurisdictions entails the use of centralised bodies which act as clearinghouses to manage applications for institutions that make the decisions on criteria, procedures and applications. Centralised application systems to manage entry to programmes are seen as a way to ensure a uniform standard across the jurisdiction (Hoareau McGrath et al., 2014[48]). Some countries use a combination of management practices, depending on the level of study and programme.

In 2017, students applied to public institutions through a centralised system in around one-quarter of countries with available information, while they applied directly to institutions in nearly half of the countries (Figure 2.3). Another quarter of countries combined a centralised application system with a direct application system. In private institutions, a centralised system is less common; students applied directly to institutions in nearly one-half of the countries with government-dependent private institutions and in most countries with independent private institutions. However, a centralised application system was combined with a direct application system in one-third of countries with private institutions.

Figure 2.3. Application systems for first-degree programmes (2017)



Note: First-degree programmes include i) ISCED level 6 programmes that do not require prior completion of another level 6 programme for entry and ii) ISCED level 7 programmes that do not require prior completion of a level 6 programme for entry.
Source: OECD (2017[49]), *Education at a Glance 2017*, https://doi.org/10.1787/eag-2017-en.

StatLink https://doi.org/10.1787/888933940455

In Estonia, students apply to higher education institutions through the Admission Information System (*Sisseastumise Infosüsteem*, SAIS), and institutions assess the applications against their own criteria. In the Netherlands, all students must apply for study programmes through *Studielink*; applications are assessed centrally to establish eligibility for open admissions programmes. In programmes with a fixed number of places, such as medicine, applicants receive a ranking via *Studielink* if the number of applications exceeds the places available. The ranking is determined by institutions based on their selection criteria. Most applications in Norway are processed through the Norwegian Universities and Colleges Admission Service, with some exceptions (e.g. programmes in performing arts where admission is based on tests, and programmes offered by some independent private institutions). The Norwegian Universities and Colleges Admission Service registers all applications, assesses eligibility and assigns admission points based on criteria laid down in a national regulation on admission to higher education, which is revised annually, before the applications are forwarded for final processing at the institution ranked as first priority by the applicant. Students apply directly to institutions in the Flemish Community (Table 2.5).

Different application processes may be used for different levels of study. For example, in the Netherlands, application processes are centralised for short-cycle tertiary education and bachelor's programmes, while they are decentralised for master's and doctoral programmes (i.e. students apply directly to institutions).

Pathways within higher education

Flexible pathways within higher education enable students to move easily between levels of study, programmes and institutions. This can be important in facilitating lifelong learning and enabling students to change programmes or institutions if they realise their first choice was not suitable.

Short-cycle programmes can help create more flexible learning pathways into and within higher education, bringing students who did not follow a traditional pathway into higher education (Adelman, 2009[50]; Slantcheva-Durst, 2010[51]). Pathways from short-cycle tertiary education programmes to bachelor's programmes have been developed in many jurisdictions, including the Flemish Community and the Netherlands.

- **The Flemish Community**: Short-cycle programmes (associate degree programmes) have been delivered by institutions responsible for adult vocational training ("centres for adult education") since their introduction in 2009. However, from 2019 onwards, these programmes will be delivered by professional HEIs. These programmes have been created as an entry point to a bachelor's programme with a professional orientation, and professional HEIs will have to provide pathways from a short-cycle to a relevant bachelor's programme.
- **The Netherlands**: Students who complete a short-cycle programme (associate degree) at a professional HEI can decide to continue for another two years (in case of full-time study) within the sub-sector to obtain a bachelor's degree.

In general, applicants are required to complete a bachelor's programme for entry to a master's programme. However, as higher education institutions tend to be responsible for admissions to master's programmes, the transition from bachelor's to master's programmes differs among programmes. The completion of a bachelor's degree in the same field of study may be required for entry to a master's programme. For instance, in Norway, most master's programmes require a certain number of credits in the same field of study. Holders of a bachelor's degree in a different field of study, therefore, may need to meet extra requirements, such as exams or additional courses.

In some countries, the type of higher education institutions may influence pathways from bachelor's to master's programmes. For example, in the Flemish Community and the Netherlands, graduates from universities can directly access a master's programme in all types of institutions, with some exceptions. However, graduates from professional HEIs are often required to complete a bridging programme before they are able to enter a master's programme at universities. The bridging programmes take between six months (30 ECTS) to one year (60 ECTS) to complete in the Netherlands, and between three-quarters to one year and a half in the Flemish Community (45 to 90 ECTS). These credits are not counted towards a master's qualification.

Higher education institutions tend to be responsible for admissions to doctoral programmes and the transition to doctoral programmes differs among countries and institutions (see Chapter 6).

2.3. Governance of higher education systems

The governance of higher education encompasses the structures, relationships and processes through which, at both national and institutional levels, policies and practices for higher education are developed, implemented and reviewed. It comprises a complex web of the legislative framework; the characteristics of the institutions and how they relate to the whole system; how money is allocated to institutions and how they are accountable for the way it is spent; as well as less formal structures and relationships that steer and influence behaviour (OECD, 2003[52]; OECD, 2008[53]).

Across higher education systems, authority is distributed between the state power, institutional autonomy, and market forces (Clark, 1983[19]), and there are differing relationships between higher education institutions and government, business and communities, as well as internal stakeholder groups. The three mechanisms for governance – state, institutional and market – tend to be present in all higher education systems, though their respective influence varies across jurisdictions.

2.3.1. State governance

The state has long been one of the principal constituent elements of higher education governance. The state develops, implements and evaluates public policies to govern higher education, using a range of policy levers. These can be categorised under four key types of levers: regulation, funding, information and organisation (Hood and Margetts, 2007[54]; Howlett, 2011[55]; van Vught and de Boer, 2015[56]).

- Regulatory policy levers involve laws and regulations, quality assurance processes and standards. Through these mechanisms, governments can set requirements that have legal force. For example, they can establish threshold levels of quality and performance on programmes and institutions; exercise controls on admissions and enrolments; and require higher education institutions to undertake certain actions.
- Financial policy levers include a range of different mechanisms to direct public funds to higher education institutions, e.g. block grants, targeted funding (i.e. money for a particular purpose) and line-item budgets. The typical procedures used to allocate these subsidies include funding formulas, competitive approaches, reference to historical trends, and negotiations between government authorities and institutions. Public funding can also encourage social partners to participate more actively in higher education (i.e. through grants or tax incentives).
- Information policy levers involve the collection, dissemination and communication of information by authorities on different aspects of higher education that may be of interest to relevant stakeholders. For example,

information about labour market opportunities and outcomes can encourage students to select programmes that will lead to better outcomes. Governments can fund initiatives to promote certain fields of study that are short of labour supply, or collect and share data related to graduates' career progression. Governments also generally collect and publish statistical data on the higher education system and either administer or fund surveys on graduate outcomes, the student experience, and so on.

- Governments also have a range of organisational policy levers at their disposal, involving the resources of governments themselves through their ministries, agencies (e.g. quality assurance agencies), quasi-autonomous non-government organisations, public enterprises and partnerships. Some organisational levers are procedural in nature; they shape how policy makers steer the policy process. Others are substantive in nature, where governments act as the direct provider of goods and services.

State governance of higher education has evolved as higher education systems have become larger and more diverse, and institutions have been granted greater autonomy. This has led to the increasing use of incentive structures, rather than regulatory requirements to shape the behaviours of actors in the higher education system towards national policy goals. At the same time, providing greater operational autonomy has been closely associated with a requirement for stronger external assessment of higher education institutions and demands for increased accountability (OECD, 2003[52]; Austin and Jones, 2018[57]).

Quality assurance of higher education

Quality assurance is one of the key mechanisms used to steer higher education and ensure the quality of education and research activities. The purposes of quality assurance include accountability, improvement, monitoring and transparency.

Quality can be monitored externally and internally at a system, institutional, department or programme level. Indicators of quality of education and research can be input, outcome and process focused. They can also be quantitative or qualitative (Krcal, Glass and Tremblay, 2014[58]). Quality assurance activities therefore take different forms, including developing generic guidance, internal processes of self-reviews and external reviews. Three overarching approaches to quality assurance are: accreditation, quality assessment and quality audit (Table 2.6) (OECD, 2008[53]).

- **Accreditation** is an assessment by an external agency on whether an institution or programme meets pre-determined minimum quality standards (Skolnik, 2010[59]). The accreditation is, in other words, the establishment of the status, legitimacy or appropriateness of an institution or programme (or even a module) of study. The criteria used for accreditation can be input, outcome, process or combination of these (Harvey, 2004[60]). In general, accreditation output is a pass/fail decision; it may also be known as registration, licensure or authorisation.
- **Quality assessment** is the process of evaluating the quality of outputs, resulting in a grade, whether numeric (e.g. a percentage or a shorter scale such as 1 to 4), literal (e.g. A to F) or descriptive (e.g. excellent, good, satisfactory and unsatisfactory). There may be a pass/fail boundary along the grade spectrum (Krcal, Glass and Tremblay, 2014[58]).

- **Quality audit** involves an external check on whether procedures are in place to assure quality of an institution and programme and whether explicit and implicit claims of an institution are correct (Woodhouse, 1999[61]; OECD, 2008[53]). It often focuses on processes by which institutions exercise their responsibility to assure academic standards and improve the quality of their provision (Dill, 2000[62]).

Accreditation approaches can serve accountability objectives because of the external locus of control, the graded judgements they produce and the possibility they enable to set a pass mark reflecting minimum quality standards to be met. The quality audit approach, on the other hand, is more compatible with improvement-driven objectives because of their emphasis on processes rather than outcomes and their greater internal locus of control. The quality assessment approach lies between these two approaches, with graded judgements and an emphasis on outcomes suitable for quality signalling in an accountability perspective, while simultaneously leaving scope for improvement recommendations (OECD, 2008[53]).

Table 2.6. Quality assurance approaches

Approach	Question	Focus	Objective
Accreditation	Does an institution or programme meet quality standards?	Comprehensive	Accountability
Quality assessment	How good are the outcomes of an institution or programme?	Outputs	Accountability, improvement
Quality audit	Is there a system to ensure quality? Are claims of an institution correct?	Processes	Improvement

Source: Adapted from Woodhouse (1999[61]), *Quality and Internationalisation in Higher Education*, https://doi.org/10.1787/9789264173361-en; OECD (2008[53]), *Tertiary Education for the Knowledge Society: Volume 1 and Volume 2*, https://dx.doi.org/10.1787/9789264046535-en.

Some form of quality assurance is mandatory in most of the OECD countries. In some countries, a negative evaluation may result in the closure of an institution or the suspension of a programme. The results of quality evaluation may also have an impact on funding (OECD, 2008[53]).

External quality assurance can be administered either directly through government agencies, such as the ministry or department responsible for higher education, or through intermediate agencies. In countries such as the United States, it is conducted by private, non-profit organisations established for this specific purpose (Eaton, 2015[63]).

All participating jurisdictions have established an independent, government-funded quality assurance agency responsible for external quality assurance activities.

- **Estonia**: the Estonian Quality Agency for Higher and Vocational Education (*Eesti Kõrg- ja Kutsehariduse Kvaliteediagentuur*, EKKA)
- **The Flemish Community and the Netherlands**: the Accreditation Organisation of the Netherlands and Flanders (*Nederlands-Vlaamse Accreditatieorganisatie*, NVAO)
- **Norway**: the Norwegian Agency for Quality Assurance in Education (*Nasjonalt organ for kvalitet i utdanninga*, NOKUT).

As the participating jurisdictions are members of the European Higher Education Area (EHEA), their quality assurance agencies comply with the *Standards and Guidelines for Quality Assurance in the European Higher Education Area* (ESG) (European Association for Quality Assurance in Higher Education; European Students' Union; European University Association; European Association of Institutions in Higher Education, 2015[64]), a condition which must be met to be registered on the European Quality Assurance Register (EQAR). In accordance with the criteria set in the ESG, these agencies are all independent from other parties, including higher education institutions, governments and other stakeholder organisations, in order to ensure that procedures and decisions are solely based on expertise. In order to ensure their continued compliance with the ESG, agencies are required to undergo an external review carried out by a panel mostly composed of external experts, including a student member, at least once every five years (European Association for Quality Assurance in Higher Education; European Students' Union; European University Association; European Association of Institutions in Higher Education, 2015[64]).

Nonetheless, the primary responsibility for quality assurance rests with the institutions through their internal quality assurance processes (European Association for Quality Assurance in Higher Education; European Students' Union; European University Association; European Association of Institutions in Higher Education, 2015[64]). Internal quality assurance makes use of available information on the experiences of students and staff in the higher education programmes offered by the institutions, and on students' study progress and outcomes after graduation (see Chapter 5 for the information on students' experience and study outcomes). The views of different stakeholders (students, staff and representatives of the labour market) are taken into account. The internal quality assurance process therefore provides input for the external quality assurance process.

Quality assurance of institutions

Institutional quality assurance is an external quality review process used to assess higher education institutions and ensure that they meet acceptable levels of quality. A key mechanism for the quality assurance of institutions is accreditation (alternatively known as registration, licensure or authorisation). In systems where institutional accreditation is compulsory, it may control an institution's entry to, and continued operations within, a higher education system. In systems where it is voluntary, it may be a mark of quality to assure students, employers and other stakeholders that institutions meet certain educational standards. Even where it is voluntary, failure to be accredited may nonetheless affect an institution's access to public funding. It may also affect students' ability to transfer between institutions, as some institutions may only accept students who have credits or qualifications awarded by accredited institutions.

A small number of countries use a system of self-accreditation, whereby institutions that meet a high level of quality or specific criteria through the quality assurance processes are authorised to establish study programmes and self-accredit their courses. This may entail ensuring programmes meet national standards and gaining approval for programmes through academic boards or similar bodies. As a result, they are not required to seek external accreditation of their programmes (The Quality Assurance Agency for Higher Education, 2015[65]; Chen and Hou, 2016[66]). This system of self-accreditation operates in a number of countries, including Australia, Hong Kong, Malaysia, Norway and the United Kingdom.

All participating jurisdictions have some form of institutional quality assurance in place, which differs in duration, as well as to whether it is compulsory or voluntary (Table 2.7).

In **Estonia**, all higher education institutions need to be accredited at least once every seven years. This period may be reduced to three years if the review panel identifies issues regarding the management, administration, research, or learning environment of the institution. This provides the institution with the opportunity to address the issues within the timeframe. This period may be reduced further to two years if the issues are more serious. If these issues are not resolved, the Minister of Education and Research may submit a proposal to the government of the Republic of Estonia to withdraw the rights of an institution to provide instruction and to issue academic degrees and diplomas.

Institutional review will be introduced in **the Flemish Community** in 2019. Under a current pilot scheme, universities and professional HEIs must undergo a periodic assessment of quality through an institutional review. A positive evaluation is valid for six years. If institutions receive a negative evaluation, they must apply for programme accreditation. Under the new institutional review system, universities and professional HEIs that meet all standard requirements will not need to have their existing programmes accredited by the NVAO, and will be self-accrediting. However, all new programmes will need to be accredited by the NVAO. The institutional review is available only for universities and professional HEIs. Other institutions will need to apply for the programme accreditation.

In **the Netherlands**, higher education institutions may ask the NVAO to conduct an institutional audit, which assesses their capacity to ensure the quality improvement of their programmes. Institutions that receive a positive evaluation are eligible for more streamlined programme accreditation processes. Under the current system, a positive evaluation from the institutional audit is valid for six years, but this will change to an indefinite duration from 2019. Institutions that receive a negative evaluation are required to undergo the standard programme accreditation process.

In **Norway**, all higher education institutions must be accredited by NOKUT at either the institutional or programme level to ensure they have an adequate internal quality assurance system in place. All must additionally undergo periodic audits. This system was introduced as part of reforms to the degree structure and autonomy of institutions on 1 January 2003, replacing the previous “recognition’ and ‘authorisation” system (Schwarz and Westerheijden, 2004[67]).

To be accredited at the institutional level, higher education institutions must demonstrate that their internal quality assurance system complies with national standards. Accreditation is valid until explicitly revoked by NOKUT following an assessment indicating that the institution does not meet the requirements of the Academic Supervision Regulations or the Regulations of Quality Assurance in Higher Education. In addition, all higher education institutions must undergo institutional audit at least once every six years to assess whether their quality assurance practices are satisfactory.

Existing public higher education institutions were automatically granted accredited institution status when the accreditation system was introduced in 2003. New public and private higher education institutions can apply for institutional accreditation, which grants institutions (public and private) the right to self-accreditation of their study programmes. However, the level of programmes they are able to self-accredit depends on the type of institution. Accredited universities have self-accrediting status for all programmes in all fields and at all levels, including doctoral programmes. Accredited specialised university institutions and university colleges can deliver new bachelor's programmes without a programme review. They are also able to accredit new programmes at all levels within their field of specialisation where they have a doctorate programme, meaning that they can offer new master's programmes in that area. Accredited institutions can also apply for institutional accreditation at a higher level; e.g. university colleges can apply for accreditation as a university or specialised university institution.

Table 2.7. Institutional quality assurance processes in participating jurisdictions (2018)

	Estonia	The Flemish Community	The Netherlands	Norway	
Approach	Accreditation	Assessment (until 2018) Audit (from 2019)	Audit	Accreditation	Audit
Compulsory/ voluntary	Compulsory for all institutions	Compulsory for universities and professional HEIs	Voluntary	Voluntary N.B: Either institutional or programme accreditation is compulsory for all higher education institutions	Compulsory for all institutions
Duration	Institutions need to be accredited at least once every seven years (two-three years if conditions not met)	Positive evaluation is valid for six years	Positive evaluation is valid for six years (from 2019, indefinitely)	Valid until revoked following a negative assessment in the audit or reaccreditation procedure	Institutions need to be audited at least once every six years
Self-accrediting status	Yes (within a study programme group the institution has right to provide instruction)	No (until 2018) Yes (from 2019, for existing programmes)	No	Yes Universities: all programmes Other HEIs: bachelor's programmes	N/A

Quality assurance of programmes

Assuring the quality of programmes entails an assessment against threshold standards, which cover a range of functions and processes such as learning and teaching, research and research training, institutional quality assurance, governance, accountability and information.

All higher education programmes in the Flemish Community and the Netherlands must be assessed through quality assurance agencies. In Estonia, programme accreditation and assessment are required at the level of study programme groups (i.e. groups of programmes focusing on the same academic discipline). In Norway, programme accreditation depends on the self-accrediting status of institutions (Table 2.8).

- **Estonia**: programme accreditation is undertaken at the level of study programme groups, granting the right to provide instruction in all programmes in a group. In addition, all study programme groups must be assessed every seven years.

- **The Flemish Community**: All programmes must be accredited once every six years. From 2019, accredited institutions will not need to obtain programme accreditation for their existing programmes.
- **The Netherlands**: All programmes must be accredited once every six years (streamlined or standard depending on the outcomes of the institutional audit).
- **Norway**: Institutions without institutional accreditation must apply to NOKUT for all new programmes. Accredited universities have self-accrediting status for all new programmes, including doctoral programmes. Accredited specialised university institutions and university colleges can provide new bachelor's programmes without programme review. They are also able to accredit new programmes at all levels within their field of specialisation where they have a doctorate programme, meaning that they can offer new master's programmes in that area. All institutions are required to be audited at least every six years. During the audit, an internal accreditation system is reviewed.

Table 2.8. Quality assurance of programmes in participating jurisdictions (2018)

	Estonia		The Flemish Community	The Netherlands	Norway
Approach	Accreditation	Assessment	Accreditation	Accreditation	Accreditation
Requirements for accredited institutions	Programmes in new study programme groups	All study programme groups	All programmes (from 2019, new programmes)	All programmes (streamlined)	Requirements differ depending on type of institution
Requirements for non-accredited institutions	Programmes in new study programme groups	N/A	All programmes	All programmes	New programmes
Duration	Indefinite, unless revoked for specific reasons outlined in legislation	Every seven years	Every six years (until 2018)	Every six years	N/A

Institutions can face serious consequences if the result of their programme accreditation application is negative. In the Flemish Community, institutions must terminate programmes if they receive a negative evaluation in two subsequent programme accreditation processes (programmes that receive a negative review in the first process can ask for a re-evaluation after one to three years). Similarly, in Norway, institutions may lose the right to deliver programmes if they receive a negative evaluation. Programmes that fail to gain accreditation in the Netherlands are not eligible for public funding (i.e. institutions do not receive public funds to support these programmes, and students who enrol in these programmes are not entitled to financial assistance).

Supranational governance

The alignment of national initiatives at the intergovernmental level has also become an increasingly important consideration for many countries when developing national policy.

With the creation of supranational organisations, regional integration has been encouraged in different parts of the world. In this context, regional integration in the field of higher education has also been promoted.

For example, in Europe, the European Union (including its predecessors) has been actively involved in the process of European integration. European integration was initially limited to economic integration; therefore, only vocational training was under the scope of discussion. At that time, education was regarded as a matter of each individual nation based on the principle of subsidiarity. Although the principle of subsidiarity still applies, from around the 1970s, member countries began acknowledging the economic importance of education, particularly higher education, and in 1973, a special division for education and youth was created in the Directorate-General for Research and Science (DG XII) (European Commission, 2006[68]).

The EU's mobility programmes have helped to establish greater regional integration in the field of higher education. Joint Study Programmes were introduced in 1976 and were succeeded by the Erasmus programme in 1987. The development of mobility programmes highlighted the need for comparable and compatible higher education systems (Papatsiba, 2006[69]).

The Bologna Process (Box 2.1) was the second turning point for European countries in relation to higher education governance at a supranational level. As mentioned in Section 2.2.3, the Bologna Process aimed at increasing cross-national comparability in European higher education systems. To help students circulate freely across the EU, the European Credit Transfer System (ECTS) was established within the Erasmus programme in 1989. The ECTS is now a key component of the Bologna Process and has been adopted by most countries in the European Higher Education Area (EHEA), including the participating jurisdictions (European Union, 2015[70]). Following the development of the EHEA qualifications framework, countries in the EHEA have adopted the three-cycle structure.

Regions outside of Europe have also sought to create similar mechanisms using the Bologna Process as a model for higher education integration (Vögtle and Martens, 2014[71]). For example, there have been discussions about the establishment of an African Higher Education and Research Space (AHERS), a Space for Higher Education in Latin America and the Caribbean (ENLACES), and a Common Space of Higher Education in Southeast Asia. In the Asia-Pacific region, the Brisbane Communiqué was presented in 2006, in which governments agreed to collaborate in some areas, such as quality assurance frameworks.

2.3.2. Institutional governance

Internal governance arrangements within higher education institutions can include processes to determine their values, mission and purposes, their systems of decision-making and resource allocation, and their patterns of authority and hierarchy. Decision-making bodies may comprise staff (academic and other staff), students and external representatives (such as employers).

In some countries, a higher education institution is an independent legal entity, whereas in others it is a state agency (Box 2.3). However, increasingly, higher education institutions are autonomous and have the freedom to manage their own affairs without government interference. Institutional autonomy has been introduced, along with accountability mechanisms, to ensure that higher education remains of high quality and relevant to students and other stakeholders. As a result, supervisory or advisory bodies have been created, which play an increasingly important role in strategic planning, budget allocation and in recruiting and overseeing the work of university leaders. Employer participation in governance boards is also becoming a more common practice across systems, either on a voluntary basis or as a result of requirements by state authorities.

Box 2.3. Legal status of higher education institutions

Higher education institutions can be considered as either a state agency or an independent legal entity.

- State agencies: Higher education institutions are treated in the same way as other government agencies, abiding by public service regulations and financed through the public budget. Employees are often regarded as civil servants (OECD, 2008[53]). According to the UOE classification, state agency institutions are defined as public (UOE, 2018[29]).
- Independent legal entities: Having independent legal status means that the institution is legally responsible for its own functioning (OECD, 2008[53]). There are various forms of independent legal status, such as foundations and corporations. Higher education institutions with independent legal status are regarded as private (either government-dependent private or government-independent private) (UOE, 2018[29]).

Granting independent legal status to higher education institutions is a way of providing greater autonomy to institutions.

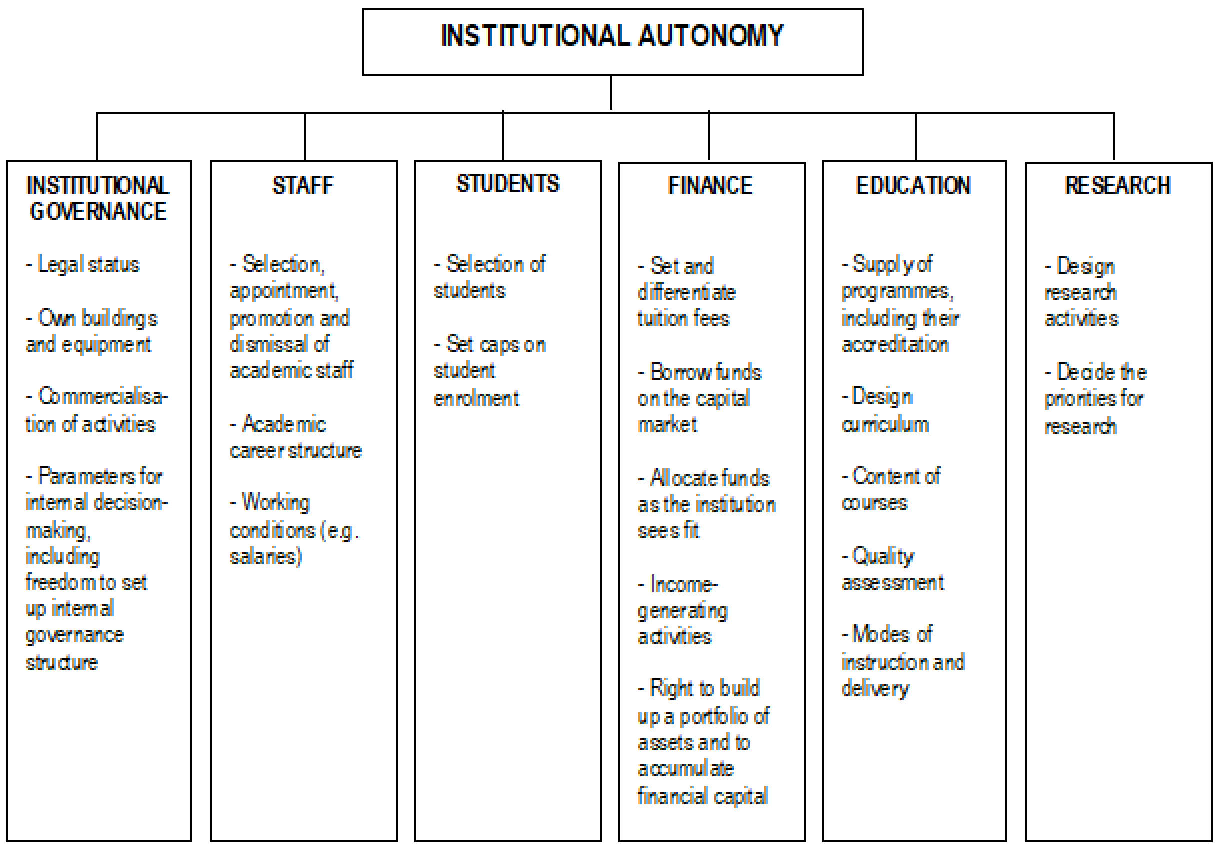
In the 20th century, governments in most OECD countries exercised considerable control and influence over the higher education sector in pursuit of objectives such as economic growth and social equity. However, governments today accept that the central planning approach to higher education is often inefficient, and that a thriving society and economy require institutions to operate with some degree of independence.

Higher education institutions may also be more autonomous than institutions at other levels of education, as they tend to be less financially dependent on the state. In comparison to other education sectors, higher education receives the largest proportion of funds from private sources, such as households and private enterprises – around 30% on average for OECD countries (see Chapter 3).

Higher education institutions are therefore becoming increasingly free to manage their own affairs without interference from the state. Higher education institutions in OECD countries have few restrictions on the internal allocation of funds from block grants; and many can borrow money, keep surpluses, own their buildings and set tuition fees. The levels of staffing, academic and organisational autonomy has also been increasing. Higher education institutions are often free to set the procedures for recruitment and promotion of staff, establish salary scales, decide on the number of students to admit, set admission procedures, create and terminate programmes, design content, choose the language of instruction, and broadly define their governance, management and academic structures and statutes. However, the levels of autonomy differ across countries and between subsectors of higher education, and even between institutions in the same country.

Increased autonomy allows institutions to manage their resources more freely and to quickly respond to the demands of a rapidly changing world. Figure 2.4 provides an overview of the different aspects of institutional autonomy.

Figure 2.4. Aspects of institutional autonomy



Source: OECD (2008[53]) *Tertiary Education for the Knowledge Society: Volume 1 and Volume 2*, https://dx.doi.org/10.1787/9789264046535-en.

The European University Association (EUA) has developed the University Autonomy Tool to determine the extent to which universities are able to make their own decisions. The tool compares and ranks the autonomy of universities in 29 European higher education systems, focusing on four areas: organisational, financial, staffing and academic.

Table 2.9 shows the results for the four participating jurisdictions. A score of 100% indicates full institutional autonomy and a score of 0% shows that institutions have no control over an issue (i.e. controlled by governments and external authorities or legally regulated). The data show that Estonian universities enjoyed the highest degree of autonomy among the four participating jurisdictions in 2016. Estonia had the highest score among 29 European jurisdictions in terms of staffing and academic autonomy.

Table 2.9. University autonomy in the participating jurisdictions (2016) (%)

		Estonia	The Flemish Community	The Netherlands	Norway
Organisational	Selection procedure for the executive head	100	100	0	100
	Selection criteria for the executive head	75	50	100	100
	Dismissal of the executive head	100	100	100	80
	Term of office of the executive head	0	0	100	0
	External members in university governing bodies	100	43	29	57
	Capacity to decide on academic structures	100	100	100	100
	Capacity to create legal entities	100	100	100	100
Financial	Length of public funding cycle	60	60	60	60
	Type of public funding	100	100	100	100
	Ability to borrow money	100	100	100	0
	Ability to keep surplus	100	90	100	80
	Ability to own buildings	100	100	100	80
	Tuition fees for national/EU students at bachelor level	0	0	0	0
	Tuition fees for national/EU students at master's level	0	0	0	0
	Tuition fees for national/EU students at doctoral level	0	0	100	0
	Tuition fees for non-EU students at bachelor level	100	100	100	0
	Tuition fees for non-EU students at master's level	100	100	100	0
	Tuition fees for non-EU students at doctoral level	100	100	100	0
Staffing	Recruitment procedures for senior academic staff	100	100	100	100
	Recruitment procedures for senior administrative staff	100	100	100	100
	Salaries for senior academic staff	100	42	67	58
	Salaries for senior administrative staff	100	42	67	67
	Dismissal of senior academic staff	100	60	20	0
	Dismissal of senior administrative staff	100	60	20	0
	Promotion procedures for senior academic staff	100	100	100	71
	Promotion procedures for senior administrative staff	100	100	100	100
Academic	Overall student numbers	100	0	0	80
	Admissions procedures at bachelor level	100	0	40	60
	Admissions procedures at master's level	100	60	60	100
	Introduction of programmes at bachelor level	80	0	40	100
	Introduction of programmes at master's level	80	0	40	100
	Introduction of programmes at doctoral level	80	60	100	100
	Termination of degree programmes	100	100	100	100
	Language of instruction at bachelor level	100	83	100	100
	Language of instruction at master's level	100	83	100	100
	Selection of quality assurance mechanisms	100	0	0	100
	Selection of quality assurance providers	100	0	0	0
	Capacity to design content of degree programmes	100	100	100	100

Source: European University Association (2018[47]), *University Autonomy in Europe*, www.university-autonomy.eu/.

In the participating jurisdictions, both universities and professional HEIs have similar levels of autonomy with some exceptions (see Chapters 3 and 4).

Compared to public higher education institutions, private higher education institutions, particularly independent private institutions, tend to enjoy higher degrees of autonomy. For example, in the Netherlands, private institutions have higher degrees of financial autonomy (e.g. they are free to set their tuition fees by themselves), and in Norway, they enjoy higher levels of staffing autonomy (e.g. staff working at public institutions are regarded as civil servants).

Accountability

As mentioned, increased autonomy tends to be accompanied by increased accountability. Institutions are increasingly required to demonstrate value for money and show that they have undertaken responsible and relevant activities with public funds.

Accountability can be ensured through various means, including quality assurance frameworks, performance-related funding, market mechanisms and participation of external stakeholders in governing bodies (where external representatives would advise and support the institution regarding its contribution to society, and information on institutional results would be provided to the public) (Hénard and Mitterle, 2010[72]).

Table 2.10 provides examples of policy levers used in participating countries to ensure accountability. These are currently common in many higher education systems, though the emphasis placed on the different types of levers varies from country to country.

Table 2.10. Examples of policy instruments to ensure accountability in higher education

Policy lever	Accountability framework
Regulation	Accreditation of institutions or programmes in order to receive public funding
	Internal quality assurance systems
	Financial accountability mechanisms and use of legal financial audits
	Performance agreements (without funding)
	Annual letters of appropriation and feedback to institutions
	Mandatory appointment of special advisory boards as part of institutional governance structure
Funding	Formula funding
	Performance-based funding
	Performance agreements (with funding)
	Targeted allocations and grants
Information	Educational statistics and aggregated indicators made available by the government for students and other higher education stakeholders
	Annual public reports with performance data on higher education institutions
Organisation	Independent quality assurance agencies
	Establishment of an Inspectorate for Education with a “meta-evaluation” role

2.3.3. Market governance

Market-based mechanisms have become important elements of higher education policy, particularly in systems that engage in market relationships. In these environments, higher education institutions are able to compete for students, staff, research income, etc. Students (as consumers) are given the freedom to choose a provider and product, and providers are given the freedom to enter the market, choose the products to deliver and set their price. Price can influence choice and adequate information on price and quality is a key factor in systems with market-type mechanisms.

These have been reflected particularly in funding reforms (e.g. introduction of performance-based funding and performance contracts), and also in attempts to make provision more demand-driven and tailored to a wider audience, including students, employers and the broader society.

Tensions arising from government regulations and market-based forces have placed some higher education systems in a context of quasi-markets, where elements of autonomy, competition and user-driven processes co-exist with government involvement, particularly in regulatory and financial matters.

In addition, higher education institutions face tension between their role in providing public value and their need to sustain institutional performance in a growing market. As the importance of international university rankings has grown, competition between and within institutions has intensified (Hazelkorn, 2015[73]), increasing the pressure to act in the interests of the institution rather than the common good. Moreover, competitive grant processes and performance-based research funding favour the orientation of research towards the topics which are likely to yield immediate outcomes, rather than primarily prioritising academic or public interests.

The differences between how governments and the most influential rankings measure performance show how national priorities and the objectives of international institutional rankings diverge.

Table 2.11 shows the extent of differences in performance measures used by the three main international rankings and governments, using the performance agreement indicators of the four participating jurisdictions for the purposes of the illustration.

Institutions relate their position in rankings directly with their ability to attract funding from non-government sources, including student tuition fees, endowments or research funding. As shown in the table, institutions must adhere to a different set of performance-related targets to attract funding from government sources. A key objective for governance of higher education is awareness of the tensions created at the institutional level by competing priorities and to reconcile the national social and economic priorities with the objectives of individual institutions (OECD, 2008[53]).

Reconciling this tension is important for both research and education; most basic research is performed in universities and in public research organisations. Public support for such research remains crucial, as it is essential for the development of new scientific and technological knowledge that can lead to innovation to benefit the economy and society (OECD, 2010[74]). But this type of research does not always lead to the types of outputs that are valued in institutional rankings, and often does not lead directly to innovation and knowledge transfer.

Governments can work to influence the relevance of the higher education system by defining systemic objectives and employing a variety of policy instruments to influence alignment of institutions with these objectives. The quality of the planning process and the means by which objectives and incentives are set directly impact higher education relevance.

Table 2.11. Tensions between performance targets for higher education institutions

Performance indicators	Academic Ranking of World Universities (ARWU) (% weight)	QS World University Rankings (% weight)	THE World University Rankings (% weight)	Government-defined funding-related indicators (jurisdictions)
Input and activity-oriented				
Staff-student ratio	No	Yes (20%)	Yes (4.5%)	No
Enrolments from particular student categories	No	No	No	Yes (the Flemish Community)
Credits	No	No	No	Yes (the Flemish Community and Norway)
International staff		Yes (5%)	Yes (2.5%)	
International students	No	Yes (5%)	Yes (2.5%)	Yes (Estonia and Norway)
Doctorate to bachelors ratio	No	No	Yes (2.5%)	No
Institutional income	No	No	Yes (2.5%)	Yes (Estonia)
Research income	No	No	Yes (6%)	Yes (Estonia)
International collaboration		No	Yes (2.5%)	Yes (Norway)
International funding	No	No	No	Yes (Estonia, the Flemish Community and Norway)
Co-financing of research	No	No	Yes (2.5%)	Yes (all)
Gender diversity	No	No	No	Yes (the Flemish Community)
Output-oriented				
Degrees	No	No	No	Yes (the Flemish Community, the Netherlands and Norway)
Completion rates	No	No	No	Yes (Estonia)
Papers published in *Nature* and *Science*	Yes (20%)	No	No	No
Doctoral degrees to academic staff ratio	No	No	Yes (6%)	No
Publications per faculty member	No	No	Yes (6%)	No
Number of publications	Yes (20%)	No	No	Yes (Estonia, the Flemish Community and Norway)
Citations per faculty	No	Yes (20%)	No	No
Number of citations	No	No	Yes (30%)	Yes (the Flemish Community)
Highly cited researchers in subject	Yes (20%)	No	No	No
Alumni with Nobel prizes and Fields medals	Yes (10%)	No	No	No
Staff with Nobel prizes and Fields medals	Yes (20%)	No	No	No
Patents or spinoffs	No	No	No	Yes (Estonia and the Flemish Community)
Outcome-oriented				
Academic reputation survey	No	Yes (40%)	Yes (Teaching 15% and Research 18%)	No
Employer reputation survey	No	Yes (10%)	No	No
Graduates in employment	No	No	No	Yes (Estonia)
National research evaluation results	No	No	No	Yes (Estonia and the Netherlands)
Weighted average of other indicators per faculty	Yes (10%)	No	No	No

Source: Quacquarelli Symonds Limited (2018[75]), *QS World University Rankings*, www.topuniversities.com/qs-world-university-rankings; ShanghaiRanking Consultancy (2018[76]), *ARWU World University Rankings*, www.shanghairanking.com/index.html; Times Higher Education (2018[77]), *World University Rankings*, www.timeshighereducation.com/world-university-rankings.

2.4. Higher education policy directions

Although higher education systems in OECD countries differ in size and structure, some common policy challenges exist. In 2004, the OECD conducted a comprehensive international review of higher education in collaboration with 24 countries, resulting in the synthesis report *Tertiary Education for the Knowledge Society* (OECD, 2008[53]). The report proposed a number of policy options to help meet challenges across the many facets of higher education policy: governance, funding, quality assurance, equity, research and innovation, academic career, labour market relevance and internationalisation (Table 2.12).

Table 2.12. Higher education policy directions recommended by OECD (2008)

Policy objective	Main policy directions
Steering higher education: setting the right course	Develop a coherent strategic vision for higher education and communicate it clearly and effectively
	Establish instruments for a balance between institutional autonomy and public accountability
	Ensure the coherence of the higher education system with extensive diversification
	Build links between secondary and higher education systems, between different types of higher education institutions and with surrounding regions and communities
	Strengthen the ability of institutions to align with the national higher education strategy
	Build consensus over higher education policy within governments and with other stakeholders
Matching funding strategies with national priorities	Develop a funding strategy that facilitates the contribution of the higher education system to society and the economy
	Use cost-sharing between the State and students as the principle to shape the funding of higher education
	Publicly subsidise higher programmes in relation to the benefits they bring to society
	Make institutional funding for instruction formula-driven, related to both input and output indicators and including strategically targeted components
	Improve cost-effectiveness
	Back the overall funding approach with a comprehensive student support system
Assuring and improving quality	Design a quality assurance framework consistent with the goals of higher education
	Develop a strong quality culture in the system and put stress on internal quality assurance mechanisms
	Commit external quality assurance to an advisory role as the system gains maturity, but retain strong external components in certain contexts
	Align quality assurance processes to the particular profile of HEIs
	Avoid fragmentation of the quality assurance organisational structure
Achieving equity	Assess extent and origin of equity issues through systematic collection of data
	Strengthen the integration of planning between secondary and higher education systems
	Consider positive discrimination policies for particular groups whose educational disadvantage is identified
	Provide incentives for higher education institutions to widen participation and provide extra support for students from disadvantaged backgrounds
Enhancing the role of higher education in research and innovation	Improve knowledge diffusion rather than strengthening commercialisation via stronger IPRs
	Improve and widen channels of interaction and encourage inter-institutional collaboration
	Use the higher education sector to foster the internationalisation of R&D
	Broaden the criteria used in research assessments
	Ensure the shift towards project-based funding is monitored and provide a mix of funding mechanisms
Academic career: adapting to change	Give institutions ample autonomy over the management of human resources
	Reconcile academic freedom with institutions' contributions to society
	Improve the entrance conditions of young academics
	Develop mechanisms to support the work of academics
Strengthening ties with the labour market	Co-ordinate labour market and education policies
	Improve data and analysis about graduate labour market outcomes
	Strengthen career services at secondary and higher educational levels
	Enhance provision with a labour market orientation
	Include labour market perspectives and actors in policy development and institutional governance

Policy objective	Main policy directions
Shaping internationalisation strategies in the national context	Develop a national strategy and comprehensive policy framework for internationalisation
	Improve national policy coordination
	Encourage HEIs to become proactive actors of internationalisation
	Create structures to promote the national higher education system
	Develop on-campus internationalisation
Implementing higher education policy	Establish ad-hoc independent committees to initiate higher education reforms and engage stakeholders
	Allow for bottom-up policy initiatives to be developed into proposals by independent committees
	Recognise the different views of stakeholders through iterative policy development
	Favour incremental reforms over comprehensive overhauls, unless there is wide public support for change

Source: OECD (2008[53]) *Tertiary Education for the Knowledge Society: Volume 1 and Volume 2*, https://dx.doi.org/10.1787/9789264046535-en.

2.4.1. Policy directions in the participating jurisdictions

Although higher education is increasingly internationalised, national socio-economic context, challenges and needs are still key drivers of government policy for higher education systems. National contexts can drive policy in differing directions, as can be seen from the higher education and research strategies in the participating jurisdictions.

Table 2.13. Higher education strategic goals in the participating jurisdictions

Country (Strategy Name)	Key goals	Relevant actions
Estonia (Estonian Lifelong Learning Strategy)	**A change in the approach to learning**	Analysis examining whether the content and volume of studies are concordant with curricular objectives will be conducted.
		Tools assessing learners' development of key competences will be created.
		A programme promoting co-operation among stakeholders to be launched.
		Centres of Competence focusing on the areas of teacher education and educational research to be developed.
	The concordance of lifelong learning opportunities with the needs of the labour market	A system monitoring and forecasting labour market needs to be developed.
		Representatives from the labour market will actively participate in developing curricula and designing the learning processes.
		The development of internship programmes to be further promoted.
		The areas of economic growth identified by the government will be prioritised.
	A digital focus in lifelong learning	Training courses and instructional materials will be available for teaching staff to integrate digital technology into the learning process.
		A system will be created to make digital learning resources accessible to all.
		Learning opportunities for adults to acquire digital competences will be created.
	Equal opportunities and increased participation in lifelong learning	Financing principles will be applied to support equal access to higher education.
		Targeted groups will be offered flexible training courses to develop their key competences. The group includes young mothers, the elderly, those who do not speak Estonian, people without secondary education, the unemployed, the disabled and new immigrants.
		A needs-based loan system to be developed.
The Flemish Community (Policy Paper on Education 2014-2019)	**Fully develop talents of all learners**	An international experience to be offered to one-third of students by 2020.
		Higher education institutions will use their resources to have vulnerable target groups involved.
	Strengthening educational institutions	The financing system will be more transparent and competitive.
		The system to align with international developments (such as the Bologna Process).
		Administrative burdens on higher education institutions to be reduced (e.g. quality assurance).

Country (Strategy Name)	Key goals	Relevant actions
	Achieving top quality	The government to increase institutions' responsibility for quality assurance.
The Netherlands (Strategic Agenda for Higher Education and Research 2015-2025)	**World-class education**	Higher education institutions are to recruit additional teaching staff, allowing the provision of more personal and intensive education.
		Extra funds for research on higher education and the introduction of a Comenius grant scheme that stimulates educational innovation (see Chapters 3, 4 and 5).
		All teaching staff need to make their educational material publically available by 2025. Higher education institutions need to be able to accredit massive open online courses (MOOC) provided by other higher education institutions.
	Accessibility, talent development and diversity	Higher education institutions need to invest more in matching and course orientation events for prospective students with the aim of increasing accessibility to higher education.
		The talents and abilities of each student will be carefully considered by tailoring educational content and providing tutoring and mentoring.
		Programmes for talented students will be developed (e.g. honours programmes).
		Finance systems for adult students and part-time students will be developed (e.g. lifelong learning credit).
		Connections between secondary schools, centres of secondary vocational education and higher education institutions will be strengthened. Co-operation between higher education institutions will also be intensified across the subsectors, aiming to provide more flexible study options.
	Social relevance	Sustainable regional collaboration with rich learning environments will be developed by helping teaching staff to strengthen ties with their environment and assisting in the future development of co-operative ventures. The City Deal "*Kennis Maken*" is an example (see Chapter 7).
		Students will be provided full and accurate information about their career prospects in relation to their choice of programme. This includes the development of an active alumni engagement policy and better facilitation of internships and work experience placements.
Norway (Quality Culture in Higher Education, Long-term plan for research and higher education 2019–2028)	**Reinforce quality culture**	Higher education institutions are required to develop pedagogical merit systems by 2019 to encourage more teaching initiatives and to reward important development work.
		Peer review and peer mentoring of teaching and education to be used more.
		The government will set up a national competitive arena for quality in education by assembling a portfolio of tools in order to encourage knowledge, competence and innovative work in developing education programmes (The first call under this scheme was announced in September 2018).
		The Ministry of Education and Research will set up a quality portal to collect indicators and relevant knowledge sources in one place.
	Further emphasis on quality	Three long-term investment plans include funding on improving quality in higher education.
		In 2019, there will be a new call for centres of excellence in education, and a new call through the competitive arena for quality in higher education.

Source: Estonian Ministry of Education and Research (2014[78]), *The Estonian Lifelong Learning Strategy 2020*, www.hm.ee/sites/default/files/estonian_lifelong_strategy.pdf; Flemish Government (2014[79]), *Beleidsnota Onderwijs 2014-2019 [Policy Paper on Education 2014-2019]*, hwww.vlaanderen.be/publicaties/beleidsnota-2014-2019-onderwijs; Dutch Ministry of Education, Culture and Science (2015[80]), *The Value of Knowledge - Strategic Agenda for Higher Education and Research*, www.government.nl/documents/reports/2015/07/01/the-value-of-knowledge; Norwegian Ministry of Education and Research (2017[81]), *Meld. St. 16. Report to the Storting (White Paper): Quality Culture in Higher Education*, www.regjeringen.no/en/dokumenter/meld.-st.-16-20162017/id2536007/; Norwegian Ministry of Education and Research (2018[82]), *Meld. St. 4. Melding til Stortinget: Langtidsplan for forskning og høyere utdanning 2019–2028 (Report to the Storting (White Paper): Long-term plan for research and higher education 2019–2028)*, www.regjeringen.no/no/dokumenter/meld.-st.-4-20182019/id2614131/.

Many OECD countries, including all four participating jurisdictions, also have specific strategies focused on developing the research and innovation function of higher education (see Chapter 6).

2.5. Concluding remarks

In order to assess the performance of higher education systems, it is essential to understand how systems are organised and governed and their general directions with respect to policy. With that in mind, this chapter reviewed the structure, governance and policy orientation of higher education in OECD countries, with a particular focus on the participating jurisdictions. General performance challenges governments are facing related to the structure and governance of higher education systems can be summarised as follows:

- Over the past few decades, the vertical differentiation (stratification) of higher education has been increased in many systems, while horizontal differentiation (diversity) has tended to decrease. Some governments have decided to concentrate their resources on a few institutions in order to be competitive internationally, contributing to further vertical differentiation. At the same time, the differences between the subsectors have been blurred in some countries, including the participating jurisdictions, decreasing the horizontal differences. Vertical differentiation can encourage higher education institutions to compete with each other and may help improve the quality of their provision. However, smaller and more specialised institutions, which meet specific needs of students, cannot always effectively compete with large comprehensive institutions, which could lead to a loss of institutional diversity in the longer term. In addition, the stratification of higher education institutions may increase the correlation between social origins and labour market outcomes.
- Privatisation of institutions can help increase institutional autonomy. However, the quality issues that have emerged in for-profit sectors in some jurisdictions also indicate the need for continued government efforts to monitor the quality of provision at private institutions (particularly private for-profit institutions).
- Higher education institutions face tension between their role in providing public value and their need to sustain institutional performance in a growing market. Governments face the challenge of maintaining a balance between these dual roles, and of building a system in which all the missions of higher education (education, research and engagement) are well valued.
- It is equally challenging to maintain a balance between equity and quality. For example, open admission systems can provide access opportunities to all students; however, some students may not be ready to commence their study. Conversely, more selective admission systems can ensure students have the ability to succeed, but may hinder efforts to broaden students' access.
- Some forms of quality assurance systems are now well established in many OECD countries, including the participating jurisdictions. However, further insight is needed into the effectiveness and efficiency of quality assurance systems. Evaluating policies appropriately also remains a persistent challenge.

Annex 2.A. Number of higher education institutions and student enrolments

Annex Table 2.A.1. Number of higher education institutions by highest ISCED level provided (2017)

		Estonia	The Flemish Community	The Netherlands	Norway
Public	Doctoral or equivalent	6	3	18	18
	Master's or equivalent	2	5	27	3
	Bachelor's or equivalent	6	1	10	a
Private (government-dependent)	Doctoral or equivalent	0	3	m	2
	Master's or equivalent	0	2	m	9
	Bachelor's or equivalent	1	8	m	3
Private (independent)	Doctoral or equivalent	1	0	m	1
	Master's or equivalent	3	11	m	2
	Bachelor's or equivalent	2	1	m	a
Total		21	34	55	38

Note: a: Data are not applicable because the category does not apply, m: Data are not available
Source: Adapted from information provided by the participating jurisdictions. See the reader's guide for further information.

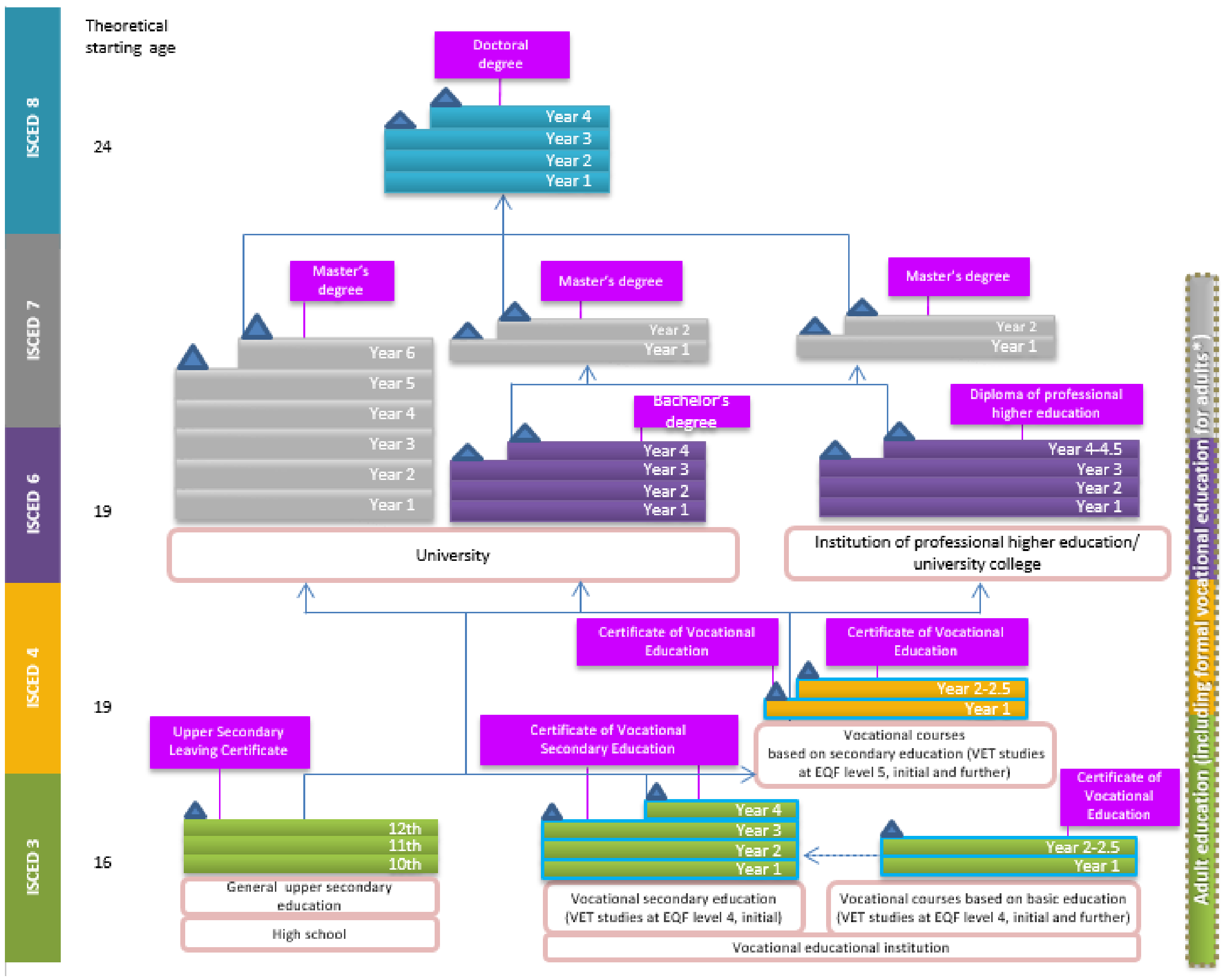
Annex Table 2.A.2. Student enrolments across ISCED levels (2016)

	Estonia	The Flemish Community	The Netherlands	Norway
Doctoral or equivalent	2 833	9 899	15 057	7 787
Master's or equivalent	15 125	54 710	165 567	64 556
Bachelor's or equivalent	33 134	210 358	635 944	196 094
Short-cycle	a	23 499	20 378	9 012
Total	51 092	298 466	836 946	277 449

Note: a: Data are not applicable because the category does not apply
Source: Adapted from OECD (2018[18]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en.

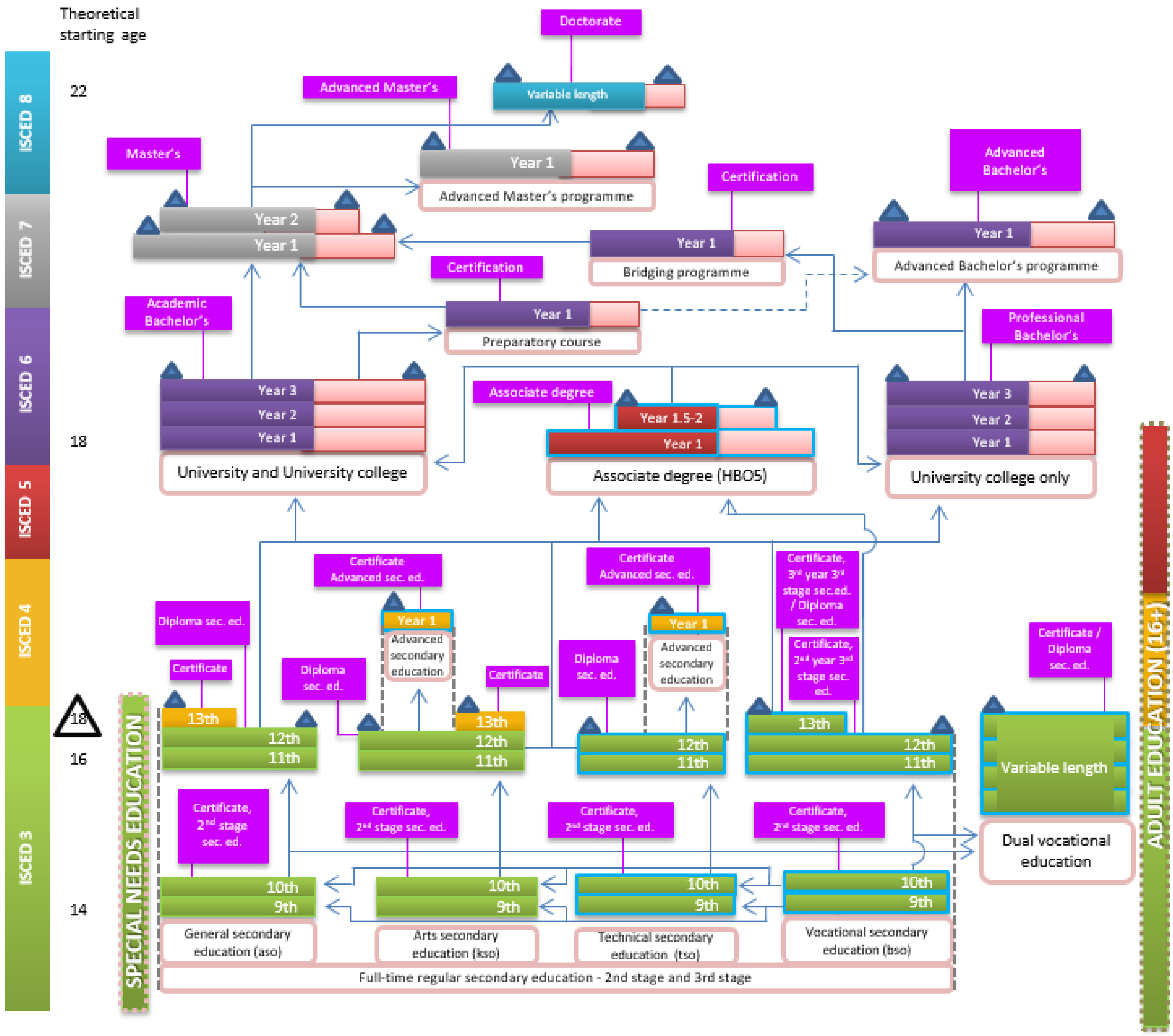
Annex 2.B. Diagrams of the education systems

Annex Figure 2.B.1. Diagram of the education system: Estonia



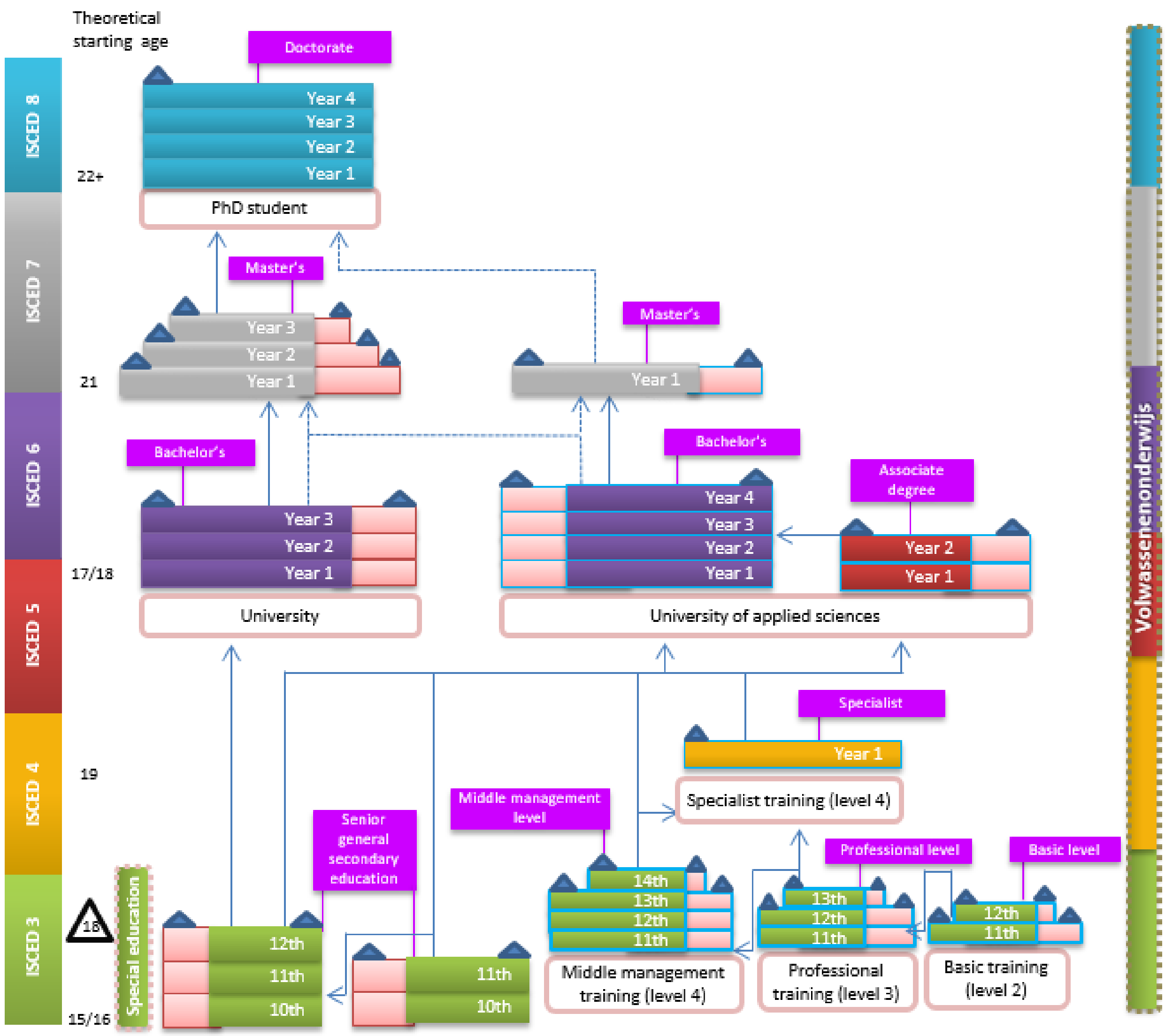
Source: OECD (2018[83]), *Education GPS*, http://gpseducation.oecd.org.

Annex Figure 2.B.2. Diagram of the education system: The Flemish Community of Belgium



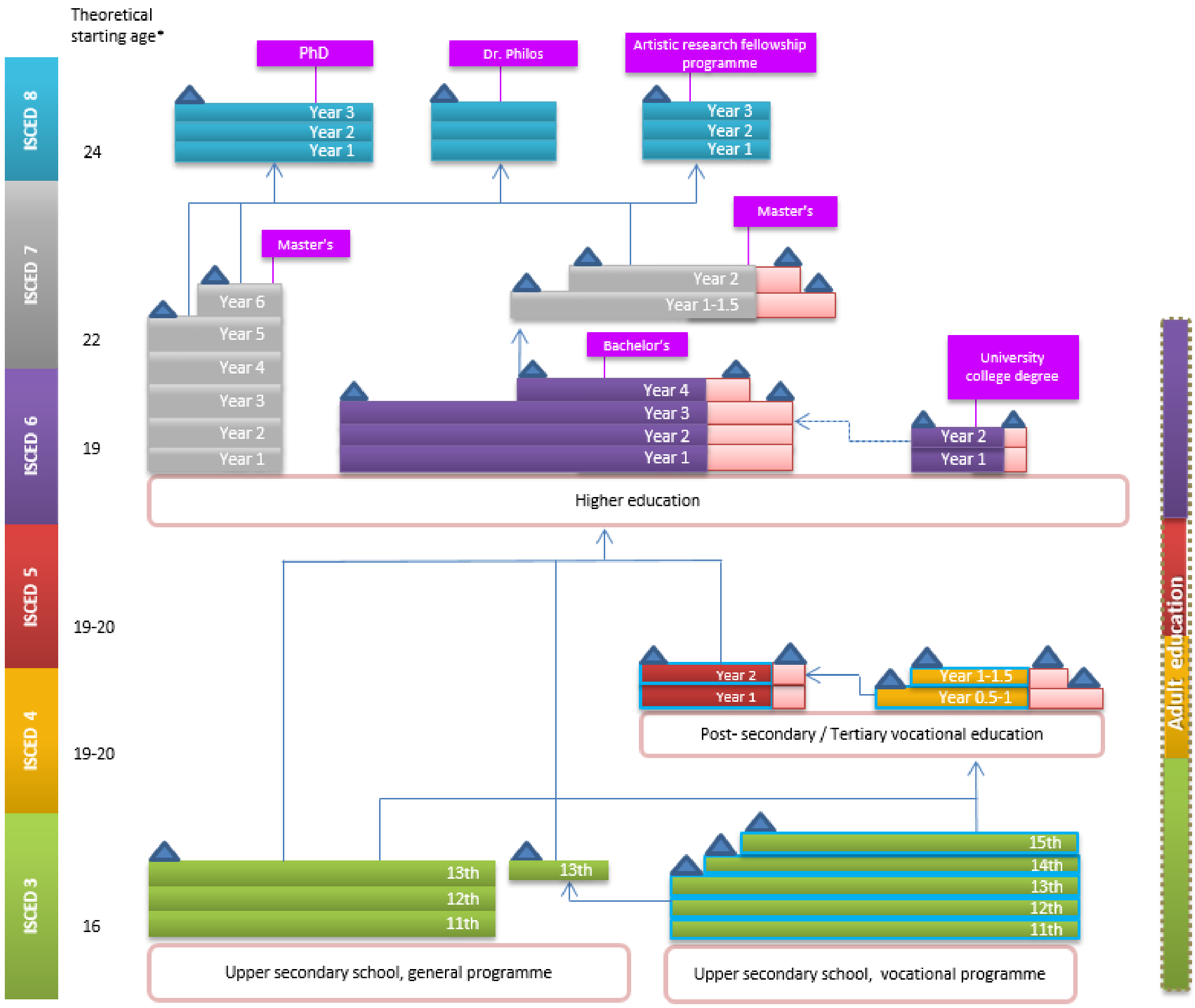
Source: OECD (2018[83]), *Education GPS*, http://gpseducation.oecd.org.

Annex Figure 2.B.3. Diagram of the education system: The Netherlands



Source: OECD (2018[83]), *Education GPS*, http://gpseducation.oecd.org.

Annex Figure 2.B.4. Diagram of the education system: Norway



Note: *Theoretical starting ages refer to the ages as established by law and regulation for the entry to a programme, actual starting ages may vary depending on the programme.
Source: OECD (2018[83]), *Education GPS*, http://gpseducation.oecd.org.

Notes

[1] The Bologna Declaration initially recognised two cycles in higher education: undergraduate and graduate (master's and/or doctoral programmes). Doctoral education was recognised as a third cycle at the Ministerial Conference in Berlin in 2003 (Berlin Communiqué) (Berlin Communiqué, 2003[84]).

[2] While short-cycle programmes in the Flemish Community exist within the Bologna framework (as a part of the first cycle), those in the Netherlands are considered as programmes outside the framework (European Commission, EACEA and Eurydice, 2018[8]).

[3] Specialised institutions include Antwerp Management School, Institute for Tropical Medicine and Vlerick Business School.

[4] In the Flemish Community, short-cycle tertiary education programmes are currently delivered by Centres for Adult Education. However, as of the 2019-2020 academic year, they will be organised by professional HEIs.

[5] The number of Norwegian public higher education institutions decreased from 33 to 21 through the institutional mergers in 2015-17. A number of private institutions also merged during this period.

[6] Estonian universities operate as legal entities governed by public law (Box 2.3). A university is autonomous to the extent provided in the Universities Act 1995. The establishment, merger, division, termination of activities and change of name of a university is decided by the parliament (*Riigikogu*). Currently, most Estonian higher education institutions are registered as government-dependent private in the UOE data collection. They are classified as government-dependent private in order to differentiate their status from state-governed public institutions. However, Estonia may change their UOE classification to public in the near future. Irrespective of legal status (either public or private), all Estonian higher education institutions are under the same regulations set by the parliament (*Riigikogu*), the government of the Republic of Estonia and the Ministry of Education and Research.

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Chapter 3. Financial resources

This chapter provides an overview of how higher education is resourced financially across OECD member countries. It analyses how countries compare in terms of levels of expenditure on higher education, sources of funding, and the allocation of funding throughout the system.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

3.1. Introduction

A key aspect of the framework for benchmarking performance entails looking at how well higher education systems can minimise costs and how they can achieve value for the funds invested in education, without compromising on equity and quality (OECD, 2017[1]).

In a climate of increasing demand for higher education, rapidly expanding costs and greater investment in higher education research, there are growing concerns across OECD member countries about the financial sustainability of higher education systems (see Chapter 1). Policy options addressing these concerns have included limiting the growth in expenditure, particularly during the economic crisis of 2008/2009; implementing mechanisms that tie funding to performance; increasing the share of funding from private sources and reducing the cost of higher education through online learning and open educational resources (Deming et al., 2015[2]; OECD, 2015[3]). Even so, policy priorities in some OECD countries may still require increased higher education funding in some areas, for example for measures related to improving student financial support or the quality of the learning environment (OECD, 2018[4]).

This chapter examines who pays for higher education in OECD countries, how the funding is spent, and which funding mechanisms that are in place in participating jurisdictions to support higher education students and institutions. This chapter also discusses different strategies for student financial support and mechanisms to allocate public funding to public and government-dependent institutions.

The metric data presented covers all OECD member countries, while the policy and practice information covers the four jurisdictions participating in the OECD Benchmarking Higher Education System Performance exercise 2017/2018: Estonia, the Flemish Community, the Netherlands and Norway. For these participating jurisdictions, the chapter also provides an analysis of the university or professional higher education institution (HEI) subsectors, reflecting the interest from a policy perspective in performance differences between higher education subsectors.

The chapter concludes with a brief review of the analysis and a discussion of the main information gaps identified during the benchmarking exercise.

3.2. Measuring expenditure on higher education

Higher education expenditure is a broad statistical concept including expenditure by public and private sources on all higher education activities (education, research and development, and ancillary services for students). It includes expenditure by higher education institutions (for example, salaries paid to the personnel) but also some forms of expenditure outside the institutions (for example, students' expenditure on textbooks).

Higher education expenditure provides a measure of the social investment in complex and advanced knowledge and skills. This is increasingly important as economies move closer to the knowledge frontier, i.e. the innovation of existing products and services becomes more important in generating economic growth (Vandenbussche, Aghion and Meghir, 2006[5]; Aghion, Boustan and Hoxby, 2009[6]).

In international comparative statistics, higher education expenditure is usually expressed in three ways (see also Table 3.1):

- Expenditure on higher education institutions as a percentage of GDP from public and private sources of funds, including international sources, which shows the overall level of investment in higher education at the systemic level. As compared to the following two indicators, this gives a better indication of a society's investment in higher education relative to its economic possibilities.
- Public expenditure on higher education as a percentage of total public expenditure, which indicates the importance of higher education within the public budget. Public expenditure funds higher education as well as many other domains (e.g. social protection, defence). This measure of expenditure indicates how much the government invests in education, relative to these other domains.
- Expenditure per student, which shows the actual amount of resources available to higher education institutions, relative to the number of students. This measure reflects the capacity of institutions to provide services of various types, and to hire staff at competitive salaries.

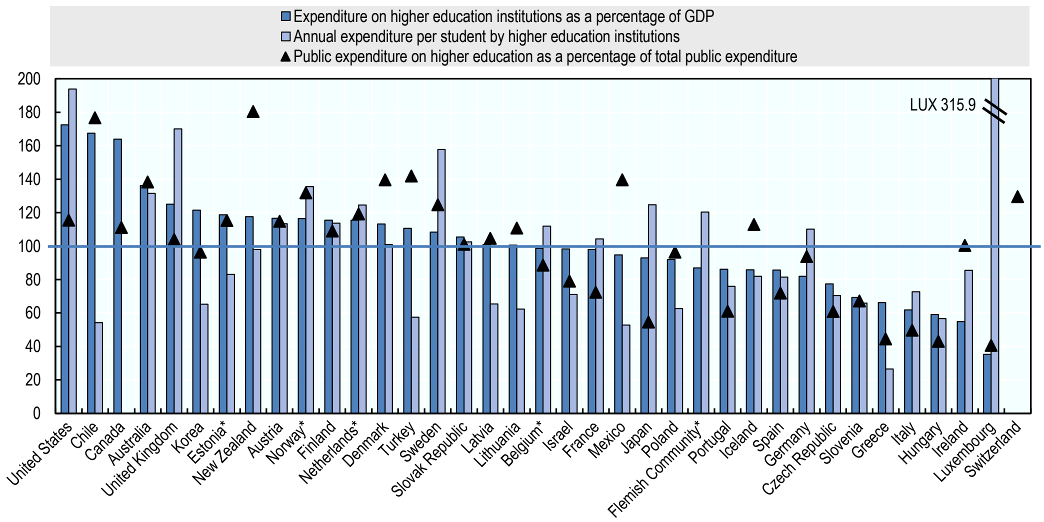
Table 3.1. Calculation of three selected measures of higher education expenditure

	Includes	Excludes	Calculation (total amount divided by)
Expenditure on higher education institutions as a percentage of GDP	Expenditure from all sources (public and private) on institutions	All expenditure outside institutions (e.g. living costs of students, books, private tutoring)	GDP in purchasing power parities (PPP)
Public expenditure on higher education as a percentage of total public expenditure	Public expenditure on institutions and all public grants and loans (including those directly or indirectly financing expenditure outside institutions, such as living costs of students, books, private tutoring)	Private expenditure and expenditure from international public sources	Total public expenditure
Annual expenditure per student by higher education institutions	Expenditure from all sources (public and private) on institutions	All expenditure outside institutions (e.g. living costs of students, books, private tutoring)	Full-time equivalent number of students at all levels of higher education

The relative position of a country regarding expenditure on higher education varies depending on the measure of expenditure used (Figure 3.1). For example, a country can prioritise higher education in the allocation of public expenditure, resulting in a comparatively high level of higher education public expenditure over the total of public expenditure. However, if there are low levels of private expenditure on higher education, it can still have a relatively low level of expenditure on higher education as a proportion of GDP. The level of expenditure on higher education is also related to a number of other factors, including the wealth of a country and the relative size of young cohorts in the population (Box 3.1).

Figure 3.1. Expenditure on higher education (2015)

Selected measures of expenditure on higher education, OECD average = 100



Notes: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
The calculation of the three selected measures of higher education expenditure is summarised in Table 3.1. The OECD average expenditure on higher education institutions as a percentage of GDP is 1.49%, average annual expenditure per student is USD 15 479, and average public expenditure on higher education as a percentage of total public expenditure is 3.04%.
Belgium and the Flemish Community: Data exclude independent private institutions.
Korea: Data exclude expenditure on some educational programmes provided by ministries other than the Ministry of Education (e.g. military academies).
Norway: Educational expenditures are reported as percentage of mainland GDP (excluding off-shore oil and international shipping).
United States: Data include some post-secondary, non-tertiary education that occurs within higher education institutions.
Source: Adapted from OECD (2018[7]), *OECD Education Statistics*, https://doi.org/10.1787/edu-data-en; data provided by the Flemish Ministry of Education and Training.

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The implication of using different measures is very important to keep in mind when assessing the relative position of a country in terms of higher education expenditure. For example, in 2015, Chile spent over one-and-a-half times the OECD average as a share of GDP or public expenditure. At the same time, given that Chile's GDP per capita is below the OECD average, per-student expenditure in this country was only about half of the OECD average. As another example, expenditure per student in Sweden and the United Kingdom was among the highest in the OECD in 2015. However, Sweden's expenditure relative to GDP and the United Kingdom's expenditure relative to total public expenditure were in line with the OECD average.

Box 3.1. Correlates of higher education expenditure

As shown in Figure 3.1, the position of countries can vary considerably depending on which measure of higher education expenditure is considered. This box illustrates some potential drivers of the different measures of higher education expenditure, and shows their statistical association with selected economic and demographic variables across OECD countries between 2012 and 2015 in the table below.

GDP per capita is strongly associated with expenditure per student (r=0.85), but not with the other two expenditure measures. This indicates that, even if countries are willing to invest a higher share of their GDP or public expenditure in higher education, less wealthy countries find it difficult to provide their institutions with the same level of resources as the wealthier ones.

Demographic ratios matter as well. For example, countries with a larger share of the population in the typical age range for enrolment in higher education may have to spend a larger fraction of their wealth on it. In addition, a larger share of young people could put political pressure on governments to prioritise higher education in public budget allocations. The available data suggest that that the share of 18-24 year-olds in the population is positively related to public expenditure on higher education as a percentage of all public expenditure and to the expenditure on higher education institutions as a percentage of GDP.

Finally, higher education's share of total government expenditure is negatively related to the share spent on social protection (including old-age pensions and other welfare transfers) for individuals in old age (i.e., older than the standard retirement age in the country). This reflects the allocation of a limited public budget among different expenditure categories, perhaps also in relation to the age structure of population (as mentioned in the previous paragraph).

Table 3.a. Correlation between selected measures of higher education expenditure and economic and demographic variables (2012 to 2015)

	GDP per capita, PPP USD	Share of the population aged 18-24	Government expenditure on old age social protection as a percentage of public expenditure
Total public expenditure on higher education as a percentage of public expenditure	-0.03	0.65*	-0.48*
Expenditure on higher education institutions as a percentage of GDP	-0.14	0.43*	-0.31
Annual expenditure per student by higher education institutions	0.85*	-0.11	0.05

Note: The correlation coefficients are calculated based on a sample of 33 to 35 OECD countries (96 to 106 observations), depending on the couple of variables. The exceptions are the three correlation coefficients related to expenditure on old age social protection, which are based on a sample of 27-36 OECD countries (100-144 observations). The asterisk indicates results that are significant, at the 5% confidence level, accounting for clustering of the error at the country level.

Sources: Adapted from OECD (2018[7]), *OECD Education Statistics*, https://doi.org/10.1787/edu-data-en; OECD (2018[8]), *OECD National Accounts Statistics*, https://doi.org/10.1787/na-data-en.

Differences in the level of higher education expenditure can be seen in the participating jurisdictions. Expenditure per student in the Flemish and Dutch higher education systems was about 20% higher than the OECD average. When expressed as a percentage of GDP, expenditure on higher education institutions in the Netherlands was also higher than the OECD average, while expenditure was over 10% lower than the OECD average in the Flemish Community.

Estonia spent 1.8% of its GDP on higher education in 2015, about 15% more than the OECD average. Higher education expenditure in Estonia has grown dramatically over the last 15 years; in 2005, it was still close to 1% of GDP, well below the OECD average (OECD, 2016[9]). The current high level of expenditure relative to GDP is mainly due to the financial resources invested by the government (compared to other OECD countries, Estonia has a high level of higher education expenditure as a proportion of total public expenditure) and has been well-supported by international funding through European Union initiatives (see Section 3.4.2). However, expenditure per student in the Estonian higher education system was over 20% lower than the OECD average, consistent with the relatively low level of GDP per capita in Estonia (see Box 3.1).

Norway had one of the highest levels of expenditure per student across all higher education systems in the OECD area. Norway is a relatively wealthy country and its high level of public investment in social services extends to higher education. As a result, Norway spent 4% of its public spending on higher education, one of the highest shares across OECD countries. Due to the relatively small amount of private expenditure on higher education (see Section 3.4.2), Norway ranked lower in terms of the share of GDP devoted to higher education, although still above the OECD average.

3.2.1. Higher education compared to education at other levels

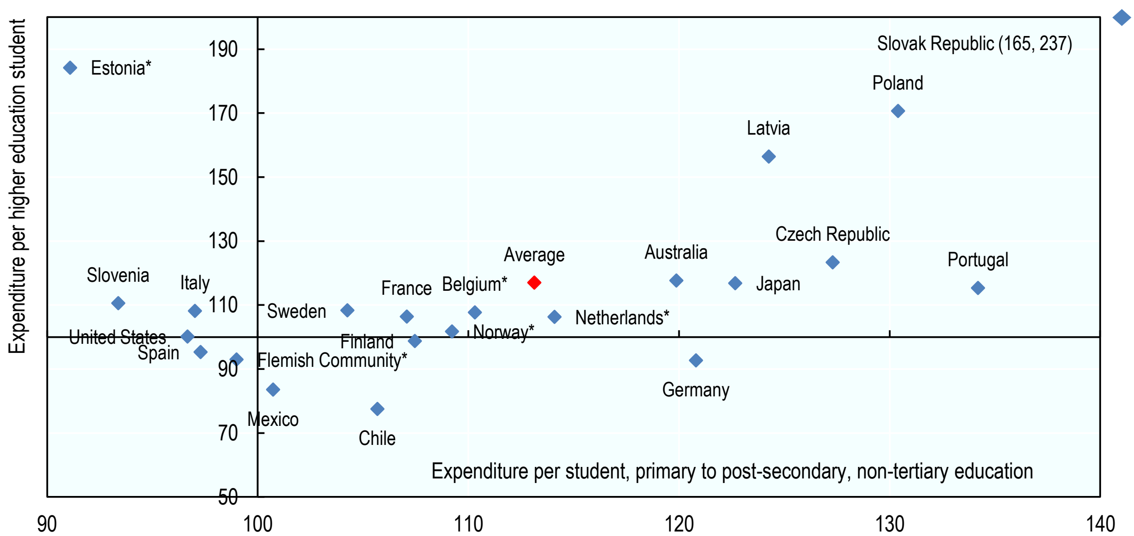
Higher education systems must compete for public funding not only with other policy areas, but also with other sectors of the education system. OECD evidence shows that in the years following the economic crisis of 2008/2009, governments have taken a variety of approaches to distributing expenditure between different levels of education (Figure 3.2).

On average across OECD countries, expenditure per student in higher education and at lower levels of education (excluding pre-primary and early childhood education) grew at a similar pace (about 10% to 15%) between 2008 and 2015. However, this varied by country; for example, in the Slovak Republic, expenditure per student grew by over 60% in this 7-year period for both levels of education, while Iceland saw a contraction by about 20% at both levels. Germany and Korea combined a substantial increase (over 20%) in the expenditure per student at lower levels of education with a decrease in expenditure on higher education.

In Estonia, expenditure per student grew at the highest rate among OECD countries (about 80%) in higher education, partly due to international funding (Section 3.4). However, expenditure per student decreased at lower levels of education. In Belgium, expenditure per student grew at a slower pace in higher education than at lower levels of education, related to the large increase in the number of students and the difficulties to translate this into a concomitant increase in private expenditure (given the low levels of tuition fees) (OECD, 2017[10]). In the Flemish Community, the rate of growth was negative at both levels of education, but the decrease was largest (-7%) at the higher education level.

Figure 3.2. Annual expenditure per student by higher education institutions, 2015 relative to 2008

In equivalent USD converted using PPPs for GDP, by level of education, based on full-time equivalent, 2008=100



Notes: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Belgium and the Flemish Community: Data exclude independent private institutions.
Estonia: The data sources changed in 2013. As a result, the comparison between 2008 and 2015 must be done with caution.
The Flemish Community: The expenditure in 2008 for primary and secondary education included a prepayment of the operating funds for 2009. Therefore, the 2015 relative level of expenditure in primary to post-secondary, non-tertiary education is underestimated for this jurisdiction.
Korea: Data for education levels below higher education in 2015 include KRW 4.7 trillion carried over from previous years.
Sources: Adapted from OECD (2018[7]), *OECD Education Statistics*, https://doi.org/10.1787/edu-data-en; OECD (2018[8]), *OECD National Accounts Statistics*, https://doi.org/10.1787/na-data-en; data provided by the Flemish Ministry of Education and Training.

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While the per student cost of education increased on average at a similar pace in higher education as in other levels across OECD countries, student enrolments have been increasing much faster in higher education (with notable exceptions such as Estonia, where higher education enrolments have decreased since 2005, based on calculations from (OECD, 2018[7])). This has led to a sharp increase in the overall cost of higher education, which characterised this sector since the 1990s (OECD, 2008[11]). As a result, there has been increased attention on the factors behind the cost of higher education (see Box 3.2).

Almost all OECD countries spend more per student on higher education than at other education levels. On average across the OECD, expenditure per student in higher education is around USD 16 000[1], one-and-a-half times higher than in upper secondary education (Figure 3.3). This difference may seem unjustified, as evidence shows that intervention at lower levels of education are more effective than at higher education for improving individuals' skills and successive life outcomes (OECD, 2015[12]). However, important structural factors make higher education more costly than other levels, two of which are particularly prominent: spending on research and development (R&D) in higher education and academic staff salaries.

Box 3.2. Potential reasons behind growing costs in higher education

The growth of per student cost in higher education is influenced by various factors, some related to economic context, some partially under the control of governments and institutions.

Education necessarily requires large volumes of qualified labour among its input resources. The scope for productivity improvements in sectors with requirements for advanced qualifications and skills is not as large as in capital-intensive sectors such as manufacturing, where technology is more directly translated into higher productivity and labour can be more easily replaced with capital. However, the salaries of highly qualified workers in education must keep pace with those in other sectors of the economy in order to retain workers in the sector. This leads to a relative increase in the cost of education as productivity grows in the rest of the economy. This theoretical argument, the "Baumol cost disease", is consistent with the growing costs observed in higher education across OECD countries in recent decades (Baumol et al., 2013[13]).

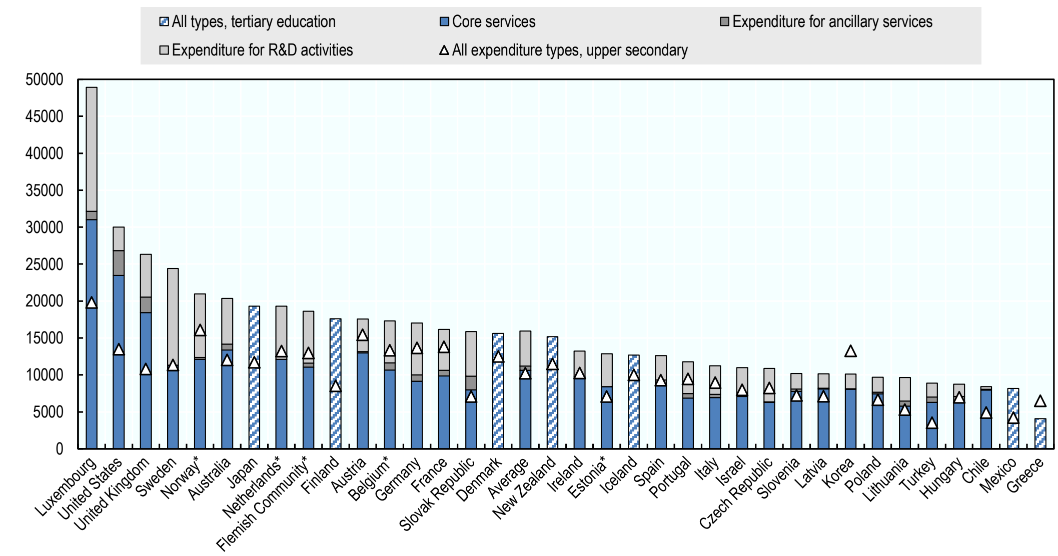
However, not all of the rising costs are attributable to external economic factors. Systemic features also determine cost structures in higher education. For example, the cost of academic staff depends on their career advancement and on their contractual arrangements with higher education institutions. Systems with an ageing academic workforce may incur higher costs due to higher salaries and pension costs. In some countries like Greece and Italy, the majority of academic staff is older than 50. Traditional classroom-based teaching modalities are also expensive, and contribute to rising costs as student numbers grow in many countries. Growing student numbers and the increasing competition among institutions for students and research funding has also contributed to an increase in the demand for administrators and professional staff in higher education, whose costs must also be covered.

Other factors unrelated to staff costs can also influence the growth of per-student cost. For example, there can be inefficiencies in how higher education institutions are run, both within and between individual institutions, such as difficulty adapting their profile in situations of declining enrolments, or redundancy in course offerings maintained by geographically close institutions.

Adapting to these factors to ensure the future sustainability of higher education is one of the key challenges facing governments. Various policy initiatives and systemic reactions have emerged in recent years to mitigate these factors. For example, in the face of increasing staff costs, there is evidence of a casualisation of academic careers, i.e. an increased prevalence of temporary and part-time contracts among academics, which could also lead to changes in the salary cost structure. The future growth in the cost of higher education could also be limited by the increased prevalence of online learning (Deming et al., 2015[2]) and open educational resources. These resources present an opportunity for cost saving, although they can also have substantial development and maintenance costs (OECD, 2015[3]). Governments in many countries are supporting mergers and partnerships between institutions, although there is conflicting evidence regarding the effectiveness of this strategy (Rocha, Teixeira and Biscaia, 2018[14]; Williams, 2017[15]).

Figure 3.3. Annual expenditure per student, by type of services (2015)

In equivalent USD converted using PPPs for GDP, by level of education, based on full-time equivalent



Notes: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Austria: Data exclude R&D expenditure from sources other than the Federal Ministry for Science, Research and Economy.
Belgium and the Flemish Community: Data exclude independent private institutions.
Czech Republic: Data exclude R&D expenditure from sources other than the Ministry of Education.
Korea: Data exclude expenditure on some educational programmes provided by ministries other than the Ministry of Education (e.g. military academies).
United States: Data exclude funds for federal R&D centres administered by universities; data include some post-secondary, non-tertiary education that occurs within higher education institutions.
Source: Adapted from OECD (2018[7]), *OECD Education Statistics*, https://doi.org/10.1787/edu-data-en; data provided by the Flemish Ministry of Education and Training.

StatLink https://doi.org/10.1787/888933940512

Factor 1: Higher education spending includes research and development

Distinguishing between R&D and other expenditure in higher education can be difficult (Box 3.3), but it is clear that R&D represents a significant portion of investment in higher education, accounting for around 30% of higher education expenditure on average across OECD countries.

Once R&D expenditure is excluded, the difference in the average expenditure per student in higher education and in upper secondary education is much smaller (around USD 1 000). This is evident also in the participating jurisdictions. For example, in 2015, annual expenditure per student for all services in higher education was close to USD 20 000 for the Netherlands. However, once R&D is excluded, annual expenditure per student for core and ancillary services was approximately equal to USD 12 000 which was slightly below the level of expenditure per student in upper secondary education. Similarly, Estonia spent around USD 8 000 per student (net of R&D costs), close to the annual expenditure per student for all services in upper secondary education (Figure 3.3).

Education and research in many higher education institutions are closely related, complicating the task of distinguishing between education and research expenditure. As experience shows, "the results of research feed into teaching, and because information and experience gained in teaching can often result in an input to research, it is difficult to define where the education and training activities of higher education staff and their students end and where R&D activities begin, and vice versa" (OECD, 2015, pp. 265-266[16]). The same activity can contribute to both the research and education function of higher education (for example the supervision of doctoral students or the time spent by academic staff reading publications). Countries take a variety of approaches to delineating expenditure between research and core teaching and learning activities (Box 3.3).

Factor 2: On average, academic staff salaries are higher than the salaries of teachers in education levels below higher education

On average, across the 16 OECD countries for which data are available, the average annual salaries of academic staff at public and government-dependent private institutions[2] were 40% higher than those of 25-64 year-old teachers in upper secondary public schools in 2014 (calculations based on OECD (2016[9])). Salaries represent a large part of the overall costs of education institutions, and therefore affect the total cost of higher education. The relatively high salary of academic staff could reflect their qualifications and skills proficiency, which are on average higher than those of teachers at other levels of education (see Chapter 4).

In addition to these two factors, expenditure on ancillary services (i.e. student welfare services such as halls of residence, dining halls and health care; and services for the general public, such as museums) in higher education can play a more important role in certain OECD countries. On average, this accounts for less than 5% of higher education expenditure across OECD countries, a similar fraction as for upper secondary education expenditure. However, in the United States and the Slovak Republic, ancillary services account for a much larger fraction of higher education expenditure (over 10%).

Box 3.3. The distinction between education and research expenditure and other expenditure in the participating jurisdictions

Distinguishing between education (core and ancillary services) and R&D expenditure in higher education is challenging. In principle, labour costs should be allocated to R&D or other functions based on the amount of time spent by each staff member on each function. Other current costs (i.e. the general running costs of institutions) and capital costs should be allocated based on their intended use. However, given the potential difficulties in applying these principles to certain cost items, statisticians may also need to rely on conventions or value judgements (OECD, 2015[16]). As a result, the methods used to identify higher education R&D expenditure versus core education expenditure can differ across countries.

- **Norway** separates R&D and education expenditure based on information collected through surveys aligned with the concepts and definitions described above. Academic staff complete surveys on how they divide their time between R&D and other activities. Statistics Norway uses this information to determine what proportion of labour costs should be attributed to R&D. Other current costs are attributed to R&D or other activities in the same proportion (with a few exceptions). The share of higher education capital expenditure attributable to R&D is based on information collected at the institutional level on the intended use of capital assets.
- In **Estonia**, the information needed to determine the amount of R&D expenditure in

higher education institutions is gathered through an annual survey of all research and education institutions. Both salaries and other costs are allocated to R&D or education by the institutions filling in the survey. The institutions determine the fraction of a cost item that is attributable to R&D or other functions based on their own contextual knowledge, rather than standardised rules or practices at the national level.

- In the **Flemish Community**, higher education institutions are allocated targeted funding for R&D in addition to a block grant, which does not have a specific purpose (see Section 3.7). Statistical units in the Flemish Community calculate expenditure on R&D as the sum of the targeted R&D funding and one-quarter of the block grant. The coefficient of one-quarter is determined at the national level through a survey sent to all higher education institutions in the French and Flemish communities.
- Government funding is allocated to **Dutch** higher education institutions as either research or education funding (see Section 3.7). International statistics on government expenditure on R&D and education in the Netherlands are based on this initial allocation, rather than spending data collected at the institutional level.

3.2.2. Sectoral differences in higher education expenditure

This section examines how expenditure varies across the university and professional HEI subsectors of higher education in the participating jurisdictions. Important differences in the levels of expenditure per student can be observed across subsectors of higher education, which are also likely to be more broadly reflected in other countries (Lepori, 2010[17]). The per-student expenditure in professional HEIs is about half the size of per-student expenditure in universities (Table 3.2). Compared to universities, professional HEIs tend to offer higher education programmes that are less theoretically oriented and more occupationally specific, with a stronger work-based education component (see Chapter 2).

The lower cost per student in professional HEIs can reduce the overall per-student cost in the higher education system. However, to be effective in providing graduates with relevant skills for life and the labour market, it is important that these institutions have adequate resources to support and educate their students. Given the resources required to organise work-based learning and to develop strong links with the world of work and the regional economy, per student costs in professional HEIs may be higher than in universities, exclusive of R&D.

R&D expenditure accounted for a large part of the difference in the cost per student at universities compared to professional HEIs in Estonia, the Flemish Community and the Netherlands in 2015 (Table 3.2). In these three jurisdictions, universities spent about twice as much per student as professional HEIs. When excluding R&D expenditure, universities spent about 40% more than professional HEIs in Estonia, and they spent less than professional HEIs in the Flemish Community and the Netherlands.

While professional HEIs spend much less than universities on R&D in these jurisdictions, they nevertheless carry out some research. In 2015, R&D expenditure in professional HEIs amounted to about USD 200 per student in Estonia, USD 600 in the Flemish Community, and USD 500 in the Netherlands. The R&D expenditure of professional HEIs could increase in the future, given the policies in place in the Flemish Community and the Netherlands to increase the research capacity of these institutions (see Chapter 6).

Table 3.2. Annual expenditure per student by higher education institutions, by subsector (2015)

In PPP USD, based on full-time equivalent

		Estonia	The Flemish Community	The Netherlands
Universities	Total expenditure	14 394	24 321	29 286
	Excluding R&D	9 390	11 137	11 537
Professional HEIs	Total expenditure	6 773	12 787	12 972
	Excluding R&D	6 595	12 173	12 497

Source: Adapted from information provided by the participating jurisdictions. See the reader's guide for further information.

In Norway, the distinction between types of institutions (universities and university colleges) is less relevant, as the differences between them are blurring and they are not considered separate subsectors by the government (see Chapter 2). However, the historical divide between the two is still visible in terms of R&D expenditure per student, which is higher in older institutions traditionally classified as universities (Haegeland et al., 2015[18]).

3.3. Expenditure by resource category

Expenditure on higher education is broadly categorised as either current or capital expenditure. Both categories of expenditure cover fundamental parts of higher education activity, and the ideal mix between the two may vary over time, depending on the different needs of the higher education system in terms of personnel, student services, equipment, new infrastructure, renewal of facilities and infrastructure, and so on.

3.3.1. Current expenditure

Current expenditure is expenditure on goods and services consumed within the current year to sustain the production of higher education services. It covers compensation of personnel as well as other costs such as materials and supplies needed for teaching and other activities, academic staff travel, contracted services such as building cleaning and maintenance, and the payment of rent. Minor expenditure on items of equipment below a certain cost is also considered current expenditure. Current expenditure represents around 90% of total expenditure on average across OECD countries (OECD, 2018[19]).

The distribution of expenditure varies across higher education systems and institutions depending on priorities and organisational structures. For example, some institutions may choose to employ greater numbers of administrative and support staff to ensure academic staff focus on core teaching and research activities. Others may limit the number of support staff, requiring academic staff to undertake administrative tasks. As noted in Chapter 4, the profile of non-academic staff has evolved over time, with increasing numbers of professional staff responsible for various activities. This could result in very different staffing profiles and associated salary costs. Expenditure on personnel, however, can limit the flexibility of institutions to invest in other areas. For example, the entire budget of some universities in Italy is used covering the cost of academic staff (Fiorentino and Sanchirico, 2017[20]).

While salary costs make up the greater part of current expenditure in almost all countries, other current expenditure may play a prominent role in some higher education systems.

For instance, outsourced ancillary services, such as the provision of meals for university students by private companies paid by higher education institutions, are included in other current expenditure.

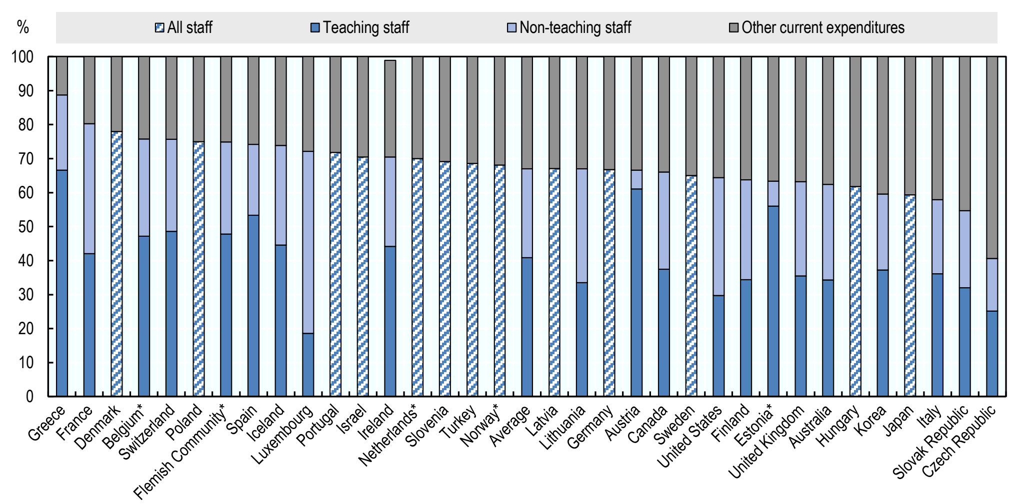
Staff compensation accounts for about two-thirds of current expenditure in higher education, on average across OECD countries (Figure 3.4). About two-thirds of this share is paid to teaching staff (academic staff with teaching duties), while the remaining one-third is paid to other staff. The share of staff compensation in current expenditure ranged from over 80% in France and Greece to around 40% in the Czech Republic in 2015.

Data on other (non-teaching) personnel cannot be further disaggregated, meaning that no internationally comparable statistics are available on the expenditure on administrative staff, researchers who do not teach, and other professionals employed by the higher education institution. The lack of data on other staff categories is a limiting factor in the comparative analysis of human resources in higher education systems (see Chapter 4).

Other current expenditure accounts for one-third of total expenditure, on average across OECD countries.

Figure 3.4. Distribution of current expenditure by resource category (2015)

Distribution of current expenditure on higher education as a percentage of total current expenditure



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Countries and jurisdictions are ranked in descending order of the share of expenditure on all (teaching and non-teaching) staff.
Belgium and the Flemish Community: Data exclude independent private institutions.
Source: Adapted from OECD (2018[7]), *OECD Education Statistics*, https://doi.org/10.1787/edu-data-en; data provided by the Flemish Ministry of Education and Training.

StatLink https://doi.org/10.1787/888933940531

In the Flemish Community, about half of current expenditure is spent on teaching staff, one of the highest shares across OECD countries. The Flemish government determines the level and growth of staff salaries in public and government-dependent institutions through regulation, although some room is left for institutional autonomy in setting salaries. The government also imposes a requirement that no more than 85% of institutional funding be spent on personnel (see Chapter 4).

Estonian higher education institutions allocated over 50% of their current expenditure to teaching staff, above the OECD average, but spent much less than the OECD average on other staff (less than 10% of current expenditure). Salaries, benefits and other aspects of the working conditions of academic staff are generally not regulated, and are left to higher education institutions (see Chapter 4).

Dutch higher education institutions spend around 70% of their budget on personnel, which is slightly above the OECD average (Figure 3.4). Personnel salaries and benefits are determined through a collective labour agreement between the Association of Research Universities in the Netherlands (VSNU) and the Netherlands Association of Universities of Applied Sciences (VH) representing the institutions, and the trade unions representing personnel. The government has no formal role in the negotiations (see Chapter 4).

Norway's share of expenditure on higher education personnel is in line with the OECD average. The large majority of employees of public higher education institutions are civil servants and are under public law and government regulation for recruitment and dismissal. Collective agreements setting salaries and benefits for civil service have been concluded between the Norwegian government, represented by the Norwegian Ministry of Local Government and Modernisation, and the central trade union confederations (see Chapter 4).

3.3.2. Capital expenditure

On average across OECD countries, some 10% of total expenditure is on capital, i.e. expenditure on assets that last longer than one year (OECD, 2018[19]). It includes spending on construction, renovation and major repair of buildings, and expenditure on new equipment, independently of how this expenditure is financed (e.g. through state appropriations or private donations). The share of capital expenditure varies significantly across countries and time, as it often involves large one-off purchases (Box 3.4).

Box 3.4. Capital expenditure on higher education in OECD countries

The share of higher education expenditure spent on capital assets varied substantially across OECD countries in 2014, from less than 5% to more than 20% (OECD, 2017[21]). The interpretation of this variable is difficult because of its intrinsic volatility. This box uses OECD time series to show that changes in capital expenditure are associated with government expenditure growth, but not with changes in higher education enrolment. This result is in line with previous findings for the United States (Tandberg and Ness, 2011[22]), and suggests that, across OECD countries, investment in higher education infrastructure may depend more on the availability of government funds than on infrastructural needs related to changes in enrolment.

Historical OECD data can be used to calculate the percentage change (at constant prices) of higher education capital and higher education total expenditure over the national average of the three previous years. This yields a sample of 270 data points, covering 30 countries from 1998 to 2011. The standard deviation of this measure of change for capital expenditure is four times larger than its average, and also four times larger than the standard deviation for total expenditure (calculations from OECD (2018[7])). This suggests that capital expenditure within a country can change dramatically from year to year, even when compared to the variation in total expenditure.

The high variability of capital expenditure across countries and time is mainly due to the fact that educational expenditure data are compiled on a cash accounting rather than an accrual accounting basis. This means that expenditure is recorded in the year in which the payments occurred.

Measurement on a cash accounting basis is not ideal for some analytical purposes (e.g. estimating the change in the capital stock), but it offers other analytical opportunities, such as studying the determinants of capital expenditure.

The table below shows the results of a regression of the change in capital and total expenditure (over a three-year average) on the three-year growth rate of higher education enrolment, real GDP and real government expenditure. The results show that total higher education expenditure depends on enrolment and government expenditure growth; although a 1% increase in these two variables translates to an estimated change of less than 1% in total higher education expenditure. In contrast, changes in capital higher education expenditure are associated only with real government expenditure growth. The coefficient implies that an additional 1% growth in government expenditure is associated with a 1.6% increase in higher education capital expenditure.

Table 3.b. Determinants of higher education capital and total expenditure (1998-2011)

Regression coefficients and cluster-robust standard errors (in brackets)

	Capital expenditure, change	All expenditure, change
GDP growth	-0.07 (0.43)	0.15 (0.11)
Enrolment growth	0.09 (0.23)	0.18* (0.09)
Government expenditure growth	1.65* (0.61)	0.38* (0.17)
R^2	0.05	0.14
Observations	270	269

Note: the dependent variables are the ratio between real capital (or total) higher education expenditure and its average value in the three preceding years (the change over the previous three-year average has been chosen due to the high volatility of capital expenditure); the independent variables are the three-year growth rates in higher education enrolment, real GDP and government expenditure. The asterisk indicates results that are significant, at the 5% confidence level, accounting for clustering of the standard error at the country level.
Source: Adapted from OECD (2018[7]), *OECD Education Statistics*, https://doi.org/10.1787/edu-data-en.

3.4. Sources of funding for higher education

3.4.1. Categories of expenditure sources

The activities of higher education necessary to generate education, research and engagement outputs and outcomes are funded through a variety of sources (Box 3.5):

- Government (central, regional or local government)
- Households
- Other private entities (including firms, religious institutions and other non-profit organisations)
- International agencies and other foreign sources.

However, there are considerable differences across OECD countries as to how the costs of higher education are shared among governments, students and their families, and other sources.

In some countries, government provides most of the funding to support higher education. In other countries, higher education institutions are able to generate their own revenue through tuition fees and through various commercial activities. In this case, households and other sources may make a considerable contribution towards the costs.

Box 3.5. Funding sources and transfers between sources

Government (public) expenditure refers to spending by public authorities at all levels of government. It includes direct public expenditure on higher education institutions and transfer of funds to private, non-educational entities.

Private expenditure by households refers to expenditure on higher education by students and their families. It includes payment to higher education institutions for tuition fees and other fees for educational and ancillary services provided by the institutions; costs for the purchase of education goods and services outside higher education institutions, such as books and other supplies, and private tutoring; other expenditure outside education institutions (e.g. living costs) if financed with transfers from the government (i.e. public grants, loans and scholarships). When reporting expenditure on education institutions (e.g. Figure 3.3 and Figure 3.5), the expenditure outside education institutions is excluded.

Private expenditure by other (non-household) private entities refers to expenditure by private businesses and non-profit organisations, including religious organisations, charitable organisations, and business and labour associations. This includes payments to higher education institutions; expenditure by private employers on the training of apprentices and other participants in dual programmes, as well as public subsidies to other private entities for the provision of work-based learning; subsidies to students or households. When reporting expenditure on education institutions, subsidies to students or households are excluded.

International sources of funding include public multilateral organisations for development aid to higher education such as the World Bank, United Nations, and non-governmental organisations. In Europe, a large part of international funding comes from European Union initiatives.

The source (public or private) providing financial resources to higher education may be different from the sector spending them due to **transfers between sectors**. For example:

- A grant awarded by a foundation to a student to pay tuition fees; or
- Development aid received by a regional government from an international organisation to modernise the higher education infrastructure.

Education expenditure indicators can be calculated before or after transfers. For example, in Figure 3.1, total public expenditure is calculated before transfers, meaning that government transfers to households are included in public expenditure. In contrast, expenditure on education institutions (as shown, for example, in Figure 3.5) is calculated after transfers, as the transferred funds are included in the category of household expenditure.

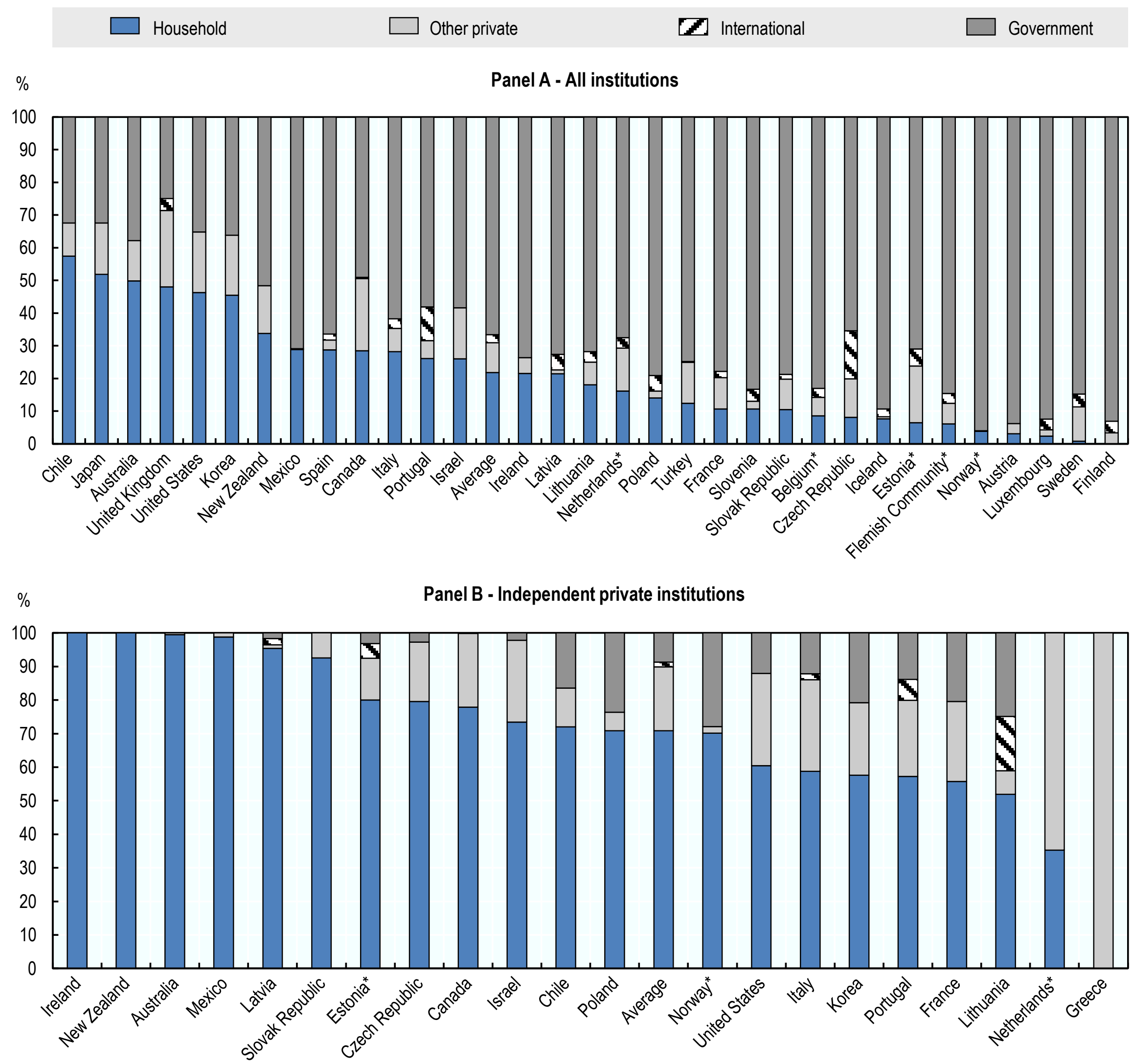
3.4.2. Distribution of funding by source across OECD higher education systems

Higher education is largely publicly funded in OECD countries, although there are substantial differences across systems. For example, in Finland and Norway, almost all expenditure on higher education institutions comes from the government (Figure 3.5) and there are no tuition fees in public institutions (except, in the case of Finland, for students coming from outside the European Economic Area). In other countries, such as Japan, Korea and the United States, the private sector (households and other private sources combined) accounts for around two-thirds of the expenditure on higher education institutions.

On average across OECD countries, household expenditure is the largest non-governmental source of funding for higher education, followed by expenditure by other private entities. The weight of international funding sources is marginal (less than 4% in

2015) in all OECD countries except for the Czech Republic, Estonia, Latvia, Poland and Portugal.

Figure 3.5. Sources of expenditure on higher education institutions (2015)



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018. Australia: expenditure from international sources is included in other (non-household) private expenditure. Belgium and the Flemish Community: Data exclude independent private institutions. The share of international sources for the Flemish Community has been assumed to be equal to the share for Belgium.
Source: Adapted from the 2016 UOE data collection; data provided by the Flemish Ministry of Education and Training.

StatLink https://doi.org/10.1787/888933940550

The distribution of expenditure by source also changes considerably across different types of institutions. While governments mostly fund government-dependent private institutions, independent private institutions rely on the government for less than half of their funding. In 2015, on average across countries with available data, households accounted for over 70% of the expenditure on independent private institutions, and other private sources contributed about 20%. In Australia, Ireland, Latvia, Mexico and New Zealand, households contributed over 95% of expenditure on independent private institutions, while other (non-household) private sources contributed two-thirds of the expenditure on independent private institutions in the Netherlands and virtually all expenditure in Greece (Figure 3.5).

The government contributes the majority of expenditure on higher education institutions in all the participating jurisdictions. In **Norway**, virtually all the financial resources for higher education come from the government. Students pay no tuition fees (except in private institutions), and have access to public loans and grants. Students may also be able to convert a portion of their student loan into a grant if they meet certain conditions such as completing their programme in a timely manner or working in certain regions of the country or in certain professions after graduation. The limited financial burden on households is intended to guarantee the accessibility of higher education for everyone with the necessary qualifications (OECD, 2018[23]). In addition, similar to some other countries with low or no tuition fees, Norway combines this funding model with a progressive tax regime, so the government reaps a relatively large part of the future economic benefits of higher education (OECD, 2016[24]). Expenditure from other private sources is also very low in Norway, as are the levels of international funding.

The share of funding provided by international sources in **Estonia** was among the highest of OECD countries at about 5% of the total in 2015 (Figure 3.5). The share of funding from international sources fluctuates based on the start and termination of different internationally funded programmes. It was much larger in 2013 (around 30%) and in 2014 (around 20%). Furthermore, in 2014, the bulk of this funding supported education with only 20% related to R&D, which is the usual target of international funding. Belgium, the Netherlands and Norway had a more traditional profile with more than 90% of international funding targeted at R&D in the same year (OECD calculations based on the UOE data collection).

Estonia's success in attracting international funding not directly related to R&D results from the effective and efficient use of EU structural and other funds. The government's prioritisation of investment in higher education led to a number of programmes and projects implemented as part of the Operational Programmes co-funded by the European Union. For example, the European Regional Development Fund contributed more than 80% of the joint budget of around EUR 39 million for two of the largest programmes in 2008-2014:

- The Primus Programme, which includes improving the recognition of prior learning and work experience in higher education and the provision of study and career counselling services for students with special needs among its objectives.
- The Dora Programme, which aims, among other things, to improve the awareness of diverse teaching and research practices, and to increase the attractiveness of higher education institutions to international students.

Increasing international funding can help broaden the funding base of higher education. However, it is important to ensure that the activities supported by international funding are aligned with national policy priorities and that they are financially sustainable beyond the duration of the international funding (OECD, 2016[25]). The current allocation of European Structural and Investment Funds to Estonia ends in 2020, at which point

Estonia will have to find alternative sources of funding if it wishes to maintain the same level of resources.

The Netherlands has a relatively large share of funding from private sources other than households compared to many other OECD countries. This has been a feature of the Dutch higher education system since at least the 1990s (OECD, 2008[11]), and is related to government efforts to encourage public-private partnerships in higher education. The research council (NWO), for instance, contributes EUR 275 million annually to the Top Sectors initiative, of which more than EUR 100 million is funded through public-private partnerships, which support the establishment of joint research projects between researchers and businesses.

In **the Flemish Community**, the government contributes the large majority (80-90%) of higher education funding, but higher education institutions are allowed to charge moderate tuition fees and to look for research contracts in the private sector. Private funding therefore plays a larger role in the Flemish Community than in Norway, although it remains less developed than in the Netherlands.

3.5. Household spending on higher education

Household expenditure on education institutions includes tuition fees, other fees charged for educational services (e.g. registration fees and laboratory fees), and fees paid to the institutions for lodging, meals and other welfare services.

In many OECD countries, household spending on higher education can be substantial. Affordability of higher education for students depends both on expenditure on education institutions for tuition and on expenditure outside education institutions (e.g. on books and other items needed for their education, additional tutoring, living costs). For many students, expenditure outside institutions is the largest part of household expenditure on higher education (Hauschildt, Vögtle and Gwosć, 2018[26]; College Board, 2017[27]). However, data on expenditure outside higher education institutions are either not collected internationally or, where national data are available, are difficult to compare. This is a significant data gap in the cross-country analysis of higher education systems.

The burden of household expenditure is reduced in many countries through the availability of support measures such as grants, loans and vouchers. This section examines the tuition fees payable by households in different OECD jurisdictions and the policies and practices that governments have put in place to reduce financial barriers to higher education access.

Grants, loans and tuition fees jointly determine the financial accessibility of higher education. Therefore, governments often combine reforms in tuition fees with reforms in student support (OECD, 2016[9]). For example, governments may increase the availability of student loans to compensate an increase in tuition fees; or they may restrict institutional autonomy on tuition fee setting to prevent institutions from taking advantage of an increase in student aid (Espinoza, 2017[28]; Singell and Stone, 2007[29]).

3.5.1. Tuition fees

The bulk of household expenditure on education institutions consists of tuition fees. In 2016, the average annual tuition fees charged to full-time national students in bachelor's programmes in public institutions ranged from zero (no tuition fees) in around one-third of OECD countries with available data, to over USD 7 000 in Chile and the United States

(OECD, 2018[19]). The level of tuition fees across countries reflects the level of household expenditure on higher education institutions per student reported in Figure 3.6.

Even within the same countries, students can pay very different tuition fees. The requirement to pay tuition fees may depend on the sector (public or private), level of study, nationality of the student, student or family income or other factors.

There are substantial differences in fees between public and independent private institutions in all countries with available data for 2016. In Australia, Hungary, Israel, Italy and the United States, the average annual tuition fee for the bachelor's or equivalent level was over twice as large in independent private institutions as in public institutions. In Japan and Korea, the average annual tuition fee at this level of education was above USD 8 000 in independent private institutions, while it was about USD 5 000 in public institutions (OECD, 2018[19]).

Tuition fees can also differ substantially between national and foreign students (see Chapter 4), affecting both the financial resources of the higher education system and international student flows (OECD, 2017[30]).

In the participating jurisdictions, the proportion of national students paying tuition fees in short-cycle and bachelor's programmes varied from close to 0% in Norway to 14% in Estonia and 100% in the Netherlands and the Flemish Community in 2018 (European Commission/EACEA/Eurydice, 2017[31]).

Table 3.3. Autonomy to set tuition fees, by subsector (2017)

Bachelor's and master's level

Country	Subsector	National/EEA students	Non-EEA students
Estonia	Universities and professional HEIs	No tuition fees for programmes in Estonian	Free to set the level of tuition fees
	Independent private institutions	Free to set the level of tuition fees	Free to set the level of tuition fees
The Flemish Community	Universities and professional HEIs	The level of tuition fees is set by the government	Free to set the level of tuition fees
	Independent private institutions	Free to set the level of tuition fees	Free to set the level of tuition fee
The Netherlands	Universities and professional HEIs	The level of tuition fees is set by the government	Free to set the level of tuition fees
	Independent private institutions	Free to set the level of tuition fees	Free to set the level of tuition fees
Norway	Universities and university colleges	No tuition fees	No tuition fees
	Independent private institutions	Free to set the level of tuition fees (up to a ceiling)	Free to set the level of tuition fees (up to a ceiling)

Notes: In Norway, the Act on Higher Education provides that state allocations and tuition fees should be used for the accredited study programmes concerned and benefit the students. In practice, this means that independent private institutions cannot raise tuition fees above the cost of education.

Source: For universities, Bennetot Pruvot and Estermann (2017[32]), *University Autonomy in Europe III The Scorecard 2017*, www.eua.be/Libraries/publications/University-Autonomy-in-Europe-2017. For professional HEIs and independent private institutions, the OECD collected the information from the Estonian Ministry of Education and Research and from national higher education institution associations (for the Flemish Community, the Netherlands and Norway), based on the instruments developed by the European University Association (Bennetot Pruvot and Estermann, 2017[32]).

Institutions have varied levels of autonomy in setting tuition fees (Table 3.3). In **Estonia**, since the introduction of the higher education reform of 2013, students studying full-time in the Estonian language do not pay tuition fees. Estonian higher education institutions are, however, free to set the tuition fees for programmes which are not taught in Estonian, part-time programmes, and for students who have recently graduated at the same education level as they are enrolled.[3] Students in full-time programmes taught in Estonian can be charged tuition fees (with a ceiling) if they do not show sufficient progress, excluding students with children and disabled or special-needs students (see Chapter 4). Private institutions are allowed to charge tuition fees to full-time students in programmes taught in Estonian, unless they receive public funding for those programmes.

In the **Flemish Community**, the tuition fees in bachelor's and master's programmes at public and government-dependent institutions are determined by law and support the flexibility of higher education in the jurisdiction. There are two components to the fee structure of bachelor's and master's programmes: a fixed amount of around EUR 230 to be paid upon enrolment, independent of the intended study load, and a flexible component that depends on the number of study credits in which a student enrols (a full-year, full-time study load corresponded to an additional fee of about EUR 890 in 2016). Flemish institutions can charge higher fees (up to a certain limit) for students in "advanced" bachelor's and master's programmes, which require a degree at the same level of education for students to be admitted (see Chapter 2). Institutions are also free to charge higher fees to international students from outside the European Economic Area (EEA). In addition, independent private institutions can choose the level of fees they charge to students.

Tuition fees in **Dutch** public institutions are equal across all full-time programmes and fixed by the government at around EUR 2 000 for full-time students in 2017 (starting from 2019, first-year students will have to pay only half this amount). Some students pay higher fees. For example, students enrolled at "university colleges" (institutional units within universities specialising in liberal arts and sciences programmes) pay a higher fee, even though their fees are still capped by government regulations. Students who have completed a higher education programme at a certain level of education and enrol in another programme at the same (or lower) level of education are also charged higher tuition fees (the "one bachelor, one master" policy), though there is an exception to this rule for students enrolling in programmes in teacher training or health and welfare. Institutions are free to set the tuition fees for foreign students from outside the EEA, and independent private higher education institutions are generally free to charge higher fees to their students. Every student eligible for financial support can take out a government loan (about EUR 165 per month) to pay for tuition fees.

There are no tuition fees in public institutions in **Norway**. In 2016, the average annual tuition fee in independent private Norwegian institutions was about USD 6 000 (OECD, 2018[19]).[4] Students in "experience-based" master's programmes (requiring some work experience for admission) can also be charged tuition fees (see Chapter 5).

3.5.2. Reducing household burden through student financial support

The increasing cost of higher education, combined with restraints on the public budget, has led to more cost sharing in higher education between government and students or their families. This can have significant equity implications, as some potential students may be deterred from participating because they do not have the money to pay for higher education, and cannot borrow it because they have no collateral and no credit history (Baum, 2017[33]).

Grants and scholarships, as well as public (or state-guaranteed) loans, aim at attenuating the problem of student credit constraints by providing the needed liquidity. However, they are conceptually different funding mechanisms that affect student behaviour differently (Boatman, Evans and Soliz, 2017[34]; Joensen and Mattana, 2018[35]); as such, after the brief overview of the cross-country comparative evidence presented in this section, these funding mechanisms are dealt with separately in Box 3.6 (grants and scholarships) and Section 3.5.3 (loans).

On average across OECD countries in 2015, the government spent around USD 1 400 on student loans and a similar amount on grants and scholarships. This compared to a total public expenditure per student of approximately USD 16 000, and an estimated household expenditure on higher education institutions of about USD 3 200, on average across OECD countries.

In two-fifths of the countries with data, the average government expenditure per student on grants, scholarships and loans exceeds the average annual household expenditure on education institutions per student (Figure 3.6). This provides an indication of government efforts to ensure that higher education is affordable for everyone. However, many students are likely to spend more on higher education than they receive in grants and loans for various reasons, including:

Student expenditure on factors other than fees, including costs of living, private tutoring, and other goods and services that are not included in Figure 3.6 but may represent a large part of the costs incurred by students

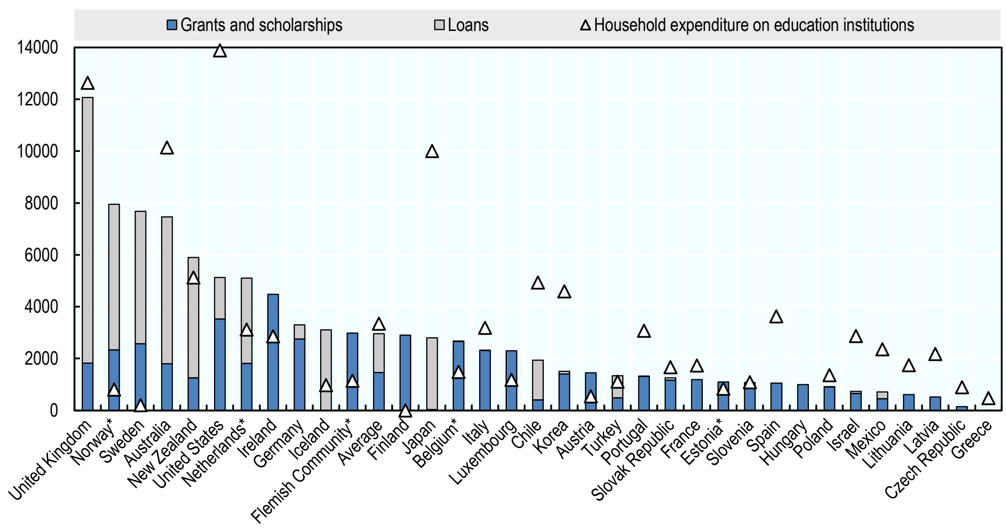
The balance between education-related costs and government transfers differs across students; it can be positive for some students, and negative for others.

In some countries, students contribute a relatively large amount on average to the funding of higher education institutions, which exceeds the average amount of public loans and grants available to them. For example, the per-student household expenditure on educational institutions exceeds the per-student public expenditure on government grants, scholarships and loans by around USD 7 000 in Japan and the United States. In these two countries, the per-student amount of public loans and grants is in line with or larger than the OECD average. However, there is the cultural and political expectation that at least parents who are in a good financial situation will contribute substantially to the higher education of their children (Johnstone and Marcucci, 2010[36]).

The variation between countries in household expenditure on higher education institutions (i.e. tuition and various types of fees), grants and scholarships, and loans is affected by context and cultural norms specific to a region or a country (Johnstone and Marcucci, 2010[36]). In Norway, for example, higher education is considered a public good that fosters inclusiveness and equality in society, and as a result, the majority believe that the cost to participate should be borne by society rather than the individual. On the other hand, in the United States there is a stronger perception that higher education is a private good that leads to individual labour market outcomes and therefore should be funded in part by individual contributions in the form of tuition fees. Societies also differ in their views on whether costs are to be borne by the students or by their families. Countries where it is not considered acceptable that students should depend on their families will tend to make it easier for students to borrow money or to earn income through part-time work.

Figure 3.6. The role of grants and loans in public expenditure (2015)

Public expenditure on grants, scholarships and loans, compared to household expenditure on higher education institutions – in PPP USD per full-time equivalent student



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Source: Adapted from the 2016 UOE data collection; data provided by the Flemish Ministry of Education and Training.

StatLink https://doi.org/10.1787/888933940569

The United Kingdom has among the highest levels of student loans and household expenditure per student in OECD countries. This is mostly due to three major reforms involving loans, tuition fees and other aspects of higher education from 1998 to 2013. Over this period, the average annual tuition fees at the bachelor's level rose from around GBP 1 000 before 2007, to about GBP 3 000 until 2013, and then to around GBP 9 000. The reforms were motivated by a range of factors including concerns that higher education funding was falling below an adequate level to fulfil its mission and the belief that competition usually raises quality (Browne Review Panel, 2010[37]). To ensure higher fees did not deter the participation of disadvantaged students, public income-contingent loans were made available to all students in 2006. Over 85% of students took out a loan in 2013. The 2013 changes appear to have led to a decrease in the number of students, especially among students who are older than 30. However, the socio-economic background of students has not been substantially affected, and existing inequalities have not been exacerbated (Geven, 2015[38]; Murphy, Scott-Clayton and Wyness, 2017[39]).

The average amount of public expenditure on grants and scholarships and loans per student in the Netherlands was about USD 5 000 per year in 2014 (recent policy developments may change the balance of funding, see Box 3.7 and Section 3.5.3). In Norway, it was around USD 8 000 (this amount includes transfers from the government to students, and excludes every form of repayment). In the Flemish Community, the amount of public expenditure on grants and scholarships is around USD 3 000. These amounts exceed the estimated household expenditure in the Netherlands (around USD 3 000) and in Norway and the Flemish Community (around USD 1 000). The amount of public expenditure on grants and scholarships is around USD 1 000 in Estonia, similar to the estimated household expenditure in this country.

Student financial aid is also not evenly distributed across students. On average across 16 OECD jurisdictions with available data for 2016, about half of bachelor's students did not receive any financial aid (OECD, 2017[21]). This proportion ranged from less than 10% in England, Luxembourg and Norway to 80% or more in Austria, Italy and Switzerland. Across 13 countries with available data, around 25% of bachelor's students received some financial aid earmarked for paying tuition fees that was equivalent to or higher than tuition fees. This proportion ranged from over 90% in Denmark to 1% or less in Luxembourg and Mexico. About 25% of students in the Flemish Community benefited from grants or scholarships in 2016, a share slightly higher than in Italy and the United States, but lower than Norway where 86% of students received a grant or a scholarship (OECD (2017[21])).

Box 3.6 Student grant schemes in participating jurisdictions

The participating jurisdictions all have grant schemes in place to support students, although there are differences in their design and operation. Grants are usually made available to students with certain eligibility criteria, including academic merit, enrolment in certain fields of study, or coming from households whose income or assets do not exceed a certain threshold (means-tested grants).

In **Estonia**, students can apply for a means-tested grant. The government also provides some special grants to disabled or special-needs students. In addition, a number of scholarships are reserved for students in particular fields or with good academic results (see Chapter 4).

While **the Flemish Community** does not have a public loan scheme, the amount spent per student on grants is among the highest in the OECD area (Figure 3.6). Grants were not available for students in short-cycle tertiary programmes in 2017, with the exception of programmes in nursing (but they will be available from the academic year 2019-2020). Students who are eligible for a means-tested grant pay a lower fee (a fixed sum of EUR 105). Students who do not qualify for a means-tested grant, but have household income and assets below a certain threshold, also pay lower tuition fees. In addition, several categories of students (e.g. some asylum-seekers, job seekers, detainees and disabled people) qualify for a partial or total exemption from tuition fees in short-cycle programmes.

In 2016, the grant-based **Dutch** student support scheme was replaced by a loan scheme. Students from lower income families (with an upper income threshold of around EUR 50 000 in 2016) are entitled to a supplementary grant from the government.

In **Norway**, all students can receive the "basic support" from the State Educational Loan Fund for a maximum of eight years. The basic support is a loan, but up to 40 % of it can be converted into a grant under specific conditions (see Section 3.5.3). The financial support system also includes some special grants and loans for students in exceptional circumstances (see Chapter 4).

3.5.3. Student Loans

Student loans can be arranged on the private market at prevailing lending conditions, or they can be subsidised or regulated by public authorities ("public loans"). A variety of public loan types is observed across countries (Chapman, 2016[40]).

- Government-guaranteed bank loans: commercial loans between a student and a bank, where the government guarantees to repay the debt if the student defaults on payment. The government may also subsidise these loans in other ways, for example by paying the interest rate while the student is in education.

- Mortgage-style public loans provided directly by the government: government loans with a fixed repayment. The government may apply special clauses and conditions to help ensure students repay the loan (e.g. lower interest rates, conditions for remitting the debt in case of bad health, etc.)
- Income-contingent public loans: loans provided either by the government or by banks (with a government guarantee) where repayment depends on the income of the borrower. Students or graduates do not have to make payments when their earnings are below a certain threshold. In addition, repayments are usually capped at a certain proportion of income.

Students can usually take out a public loan on better conditions than those available in the market. A key feature of public loans in a recent OECD analysis of countries with available data for 2016 was the relatively low interest rate set by government. In New Zealand, there was no nominal interest rate on graduate loans, while in other cases the interest rate was linked to indexes lower than market rates (Table 3.4). For example, in some countries (Japan, the Netherlands and Sweden), the interest rate paid by graduates was equal to or lower than the cost of government borrowing; in others, it was equal to or linked to the inflation rate (Australia, Chile, Turkey, United Kingdom). In Luxembourg, Norway and Poland, the interest rate was indexed to the market rate, but it was cheaper. Governments may also defer the loan repayments until after students have completed their studies in some countries (e.g. Canada, Japan, Norway, Turkey) (OECD, 2016[9]).

Table 3.4. Indexing of the interest rate on graduate loans (2016)

No nominal interest rate	Interest rate equal to the inflation rate	Interest rate equal to or lower than cost of government borrowing	Indexed to (but cheaper than) the market
New Zealand	Australia, Chile (inflation + 2%), Turkey, United Kingdom (inflation + 0% to 3%)	Japan, Netherlands, Sweden	Luxembourg, Norway, Poland

Note: Since the changes to the loan system in 2017, the interest rate in Norway is set at the lower bound of the market rate (average interest rate of the lowest five market mortgage rates offered in the country minus 0,15%).
Source: Adapted from the INES ad-hoc survey on tuition fees and financial support to students.

Most countries with public student loan systems have schemes to reduce or forgive student debt. Student debt can be reduced or forgiven for personal circumstances such as death, disability or a low income. Many countries forgive debt after a certain number of years or by a certain age. For example, in England, any outstanding amounts on loans are forgiven after a certain number of years (25 to 35 years after the first student loan) or once the borrower reaches 65 years of age, depending on when students took out the initial loan. The proportion of graduates whose debt is estimated to be reduced or forgiven is about 70% in England, 15% in the Netherlands and lower in other countries with available data (Table 3.5).

Governments may also use debt relief or forgiveness to help drive public policy. For example, under the Teacher Loan Forgiveness Program and the Public Service Loan Forgiveness Program in the United States, graduates working in some professions may be eligible under certain conditions for the forgiveness of some of their loans (up to a specified amount). In Australia, the government provided an incentive to graduates from certain fields of study to take up related occupations or work in specified locations by reducing their student loan repayments under the HECS-HELP Benefit programme, which ceased in 2017. In Colombia and Japan, good academic results can qualify students for the reduction or forgiveness of part or all of their student loan debt (OECD, 2016[9]).

Table 3.5. Debt from public loans of higher education graduates (2016)

Country	Graduates with debt (% of all graduates)	Average debt at graduation (PPP USD)	Length of typical repayment period (years)	Average annual amount of repayment (PPP USD)	Average annual income of graduates, 1-3 years after graduation	Graduates whose debt is reduced or forgiven (%)	Loans that are not repaid (% of value)	Repaymen ts as a % of all loans
Australia			9		35 801			35.7
Canada		12 856	9.5		43 524		12	
England (UK)			30		30 915	70	40-45	
Estonia	5		4 to 18	2 263	23 703	0.1	0.2	
Finland	50.3	9 033	5 to 15	1 449	39 594	0	1	
Japan		32 172	15	2 207		0		28.9
Latvia	0		5 to 10			1.2	3	
Netherlands	66.7	18 413	15	1 145		15	10	40
New Zealand	78	22 671	8 to 9	1 878	29 843	0 to 0.3		
Norway		26 257	20	1 691		1.2	4	66.3
Poland	5	10 105		1 684		14	0 to 1	
Slovak Republic	1	5 944	7	942	22 731			14.6
Sweden	77	21 432	25	873	33 987	1.5	7	
United States		24 900	10 to 30		34 522			

Notes: The table includes only jurisdictions with data for at least three variables. The reference year is 2015 for New Zealand, 2014 for Australia and Canada, and 2012 for the United States. Additional information can be found in OECD (2018[19]).
Australia, Canada, New Zealand and Sweden (average annual income of graduates); Japan (all variables); New Zealand and Norway (average annual amount of repayment): Data refer to bachelor's graduates.
Canada: Data only include information on the federal portion of student financial assistance, which represents 60% of student loans provided in the provinces participating in the Canada Student Loans Program (CSLP) and excludes the province of Quebec. Data on average debt at graduation exclude short-cycle programmes.
Canada, Estonia and Finland: Data refer to government-guaranteed private loans.
Canada, New Zealand and Sweden (average annual income of graduates): Data refer to bachelor's graduates.
England, Estonia, Finland, Korea, the Netherlands, Poland, Slovak Republic and United States: Data include all higher education graduates.
England and Sweden: Data include only graduates from the EEA and Switzerland.
Japan: Data include interest-free loan amounts only.
Poland: The proportion of graduates whose debt is reduced or forgiven excludes disabled and special-needs graduates.
Source: Adapted from OECD (2018[19]), *Education at Glance 2018: OECD Indicators*, https://doi.org/10.1787/edu-data-en; the Indicators of Education Systems (INES) ad-hoc survey on tuition fees and financial support to students.

In 2016, the average debt from public loans at graduation among borrowing bachelor's students across countries with available data ranged between about USD 6 000 in the Slovak Republic to about USD 32 000 in Japan. It was about USD 18 000 in the Netherlands and about USD 26 000 in Norway. The debt cumulated during studies can be substantial, also relative to the income of recent graduates: for example, in Estonia, New Zealand, Sweden and the United States, the average debt was over one-half of the annual gross income of recent graduates. In absence of mechanisms to reduce or reschedule the repayment, these amounts are an economic burden for some graduates who are less successful in the labour market.

Income contingency[5] and schemes for the reduction or forgiveness of student loans can be important tools to ensure that the level of debt is manageable for graduates. The debate on how to manage student debts have gained prominence in public policy debates, particularly in the United Kingdom (Clark, Hordósy and Vickers, 2017[41]) and the United States, where student loans have been growing steadily as a component of household debt over the last 15 years (Baum, 2017[33]; OECD, 2016[42]).

Because of the conditions described above, public loans can be costly for governments. There are currently no internationally comparable data to measure the actual cost of loans to governments. However, for a few countries it is possible to calculate a measure of the loan system cash flow: the amount of government revenue from the repayment of existing loans, expressed as a percentage of the government expenditure on public loans. This proportion would be 100% in a self-financing loan scheme, i.e. in a loan scheme where the debt repayments of graduates completely finance the loans taken by students. In the existing loan systems, revenues from graduate debt repayments amount to less than two-thirds of government loan expenditure (this percentage is 29% in the Netherlands and 40% in Norway).

Since 2016, the majority of student financial support in **the Netherlands** has been channelled through loans, which have largely replaced grants. As a result, households now bear a greater part of the cost of higher education. The Dutch parliament agreed that the additional income generated by the replacement of grants with loans was to be invested in higher education to improve the quality of teaching and learning (De Boer et al., 2015[43]).

Dutch students pay an interest rate of less than 1%. Loans must be paid back within 15 years but are income-contingent, with payments due when the graduate’s income reaches around USD 17 000 for an individual living alone. After 15 years, the loan is remitted. The government estimates that some 10% of the loan value is not repaid, as compared to 40-45% in the United Kingdom, 7% in Sweden and 4% in Norway. Student financial support is limited in duration in the Netherlands to encourage students to graduate within the expected time (see Chapter 4). Students older than 30 and part-time students are not entitled to the same financial support that is available to other students. However, since 2017 they have been able to borrow up to five times the legal tuition fee through the “lifelong learning credit”, with similar repayment conditions to other students.

Estonia also has a public loan system, which is available to all national higher education students (Estonian citizens or individuals with a long-term or permanent residence permit), even if enrolled abroad. However, the interest rate is relatively high (5% in 2016) and loans are not very common (5% of graduates had some debt in 2016). Take-up rates have decreased since the implementation of the new funding system in 2013, which eliminated the need to pay for tuition fees for most students. Before the revision of public expenditure following the economic crisis of 2008/2009, the student debt was reduced or forgiven in a number of cases, including for graduates who became parents or were employed for at least one year in a central or local government authority (including public agencies and higher education institutions).

In **Norway,** all students admitted to accredited higher education programmes can receive the “basic support”, which in 2017 amounted to up to around NOK 110 000 per year for a maximum of eight years, excluding exceptional circumstances (see Chapter 5,). The basic support is a loan, but part of it (up to 40%, depending on the student's income and assets) is converted into a grant for students who live away from their parents and complete their programme within the expected time (OECD, 2018[23]). The yearly interest rate paid by Norwegian graduates on their student loans was relatively low in 2016, but it has increased in 2017 and it is now higher than 2%. Norwegian graduates repay their debt over a relatively long period (20 years), as compared to 15 in the Netherlands and 9 in Australia and Canada.

3.5.4. Other types of student support

Governments may also use other means of reducing the burden on households, such as tax allowances or other benefits, family allowances, or education vouchers. Vouchers are direct subsidies paid to students to enrol in education (Box 3.7).

Most OECD countries have in place some form of tax allowances for education and training costs, although some conditions usually apply. For example, in almost all countries with tax allowances for education and training costs, these allowances are only available if the training is related to, or even necessary for, work. In addition, minimal thresholds or caps for the cost to be deducted are often in place (OECD, 2017[10]). In Estonia, costs for training provided by higher education institutions can be deducted from taxable income up to a certain ceiling, independently of whether the training is job-related.

In the Netherlands, education costs are tax deductible for people who are not entitled to student financing. The Netherlands Bureau for Economic Policy Analysis (CPB) (2016[44]) evaluated this policy tool, concluding that it is used more often by individuals with a high level of education and income, and that other policy tools (e.g. vouchers) could be more effective in stimulating participation by other individuals. It is important that taxation policies and tax deduction allowances be clear for students, and that incentives be well aligned with the priorities of the government (e.g. encourage timely completion and enrolment in areas relevant to the labour market) (OECD, 2017[10]).

Besides tax allowances, higher education can be indirectly subsidised through a variety of other tax benefits. For example, in all OECD countries (with the exception of Denmark and Iceland) some form of tax relief is available for income earned from grants and scholarships. In Belgium, Denmark, Finland, Norway, and the United States, interest on student debt is tax-deductible (OECD, 2017[10]). In addition, in Belgium (both the Flemish and the French Community), the income threshold above which income tax is paid is increased for families with students living at home and enrolled full-time in higher education.

Family allowances are financial transfers from the government to the parents of higher education students. They usually depend on the number of children enrolled in education and not necessarily on the household's income, expenditure or assets. In 2017, 14 European countries, including France, Italy, Germany and Poland, had some form of family allowances in place to subsidise higher education students' households (European Commission/EACEA/Eurydice, 2017[31]). In the Flemish Community, households receive a family allowance for each student who does not work more than a certain number of hours.

Box 3.7 Experiments using vouchers in the Netherlands and the Flemish Community

Vouchers can be a cost-effective way to increase participation in higher education for under-represented demographic groups (Netherlands Bureau for Economic Policy Analysis, 2016[44]; Adviescommissie "Flexibel hoger onderwijs voor werkenden", 2014[45]; OECD, 2017[46]). In the Netherlands, they can target categories of individuals (like the unemployed or temporary workers) who are less integrated in the Dutch adult training system, which is mostly financed by firms and provided by social partner organisations (OECD, 2017[46]). Several voucher schemes, often of a temporary or experimental nature, have been introduced, including:

- Employees in the private sector can use up to eight vouchers (each worth EUR 1 250) to enrol part time in modules in certain programmes in universities of applied sciences or private independent institutions. Higher education institutions receive no further funding from the government for these students, but may charge a tuition fee of up to EUR 3 750 for a student enrolling in modules equivalent to half of the full-time workload. This experimental funding scheme aims to encourage modular and part-time education among mature students and create a level playing field for funding conditions between public and independent private institutions.
- A maximum of EUR 2 500 was made available in 2017 to unemployed or self-employed individuals and for employees looking for a different job. This voucher could be spent on qualifying education programmes for occupations with high demand in the labour market, for example, environmental inspector, electrical equipment designer, hearing care professional, and German language teacher.

In Flanders and the city of Brussels, vouchers are available for employed individuals undertaking some education or training (including at the higher education level) for professional purposes outside their working hours. The vouchers are directed towards people with at most upper secondary education or to higher education graduates in a “career guidance trajectory” (a type of re-training programme). They have a value of EUR 250, of which half is paid for by the government, and the other half contributed by the individual.

3.6. Higher education funding from other private sources

Higher education institutions can attract financial resources from sources other than the government in a variety of ways, including private donations and the commercialisation of knowledge and research outputs (see Chapter 6). These resources can help ensure not only the financial sustainability of the higher education system, but also its relevance to stakeholders who are called to contribute.

Information on the source of other (non-household) private funding is not available at the national level in an internationally comparable format, but can be found on datasets built at the institutional level. This section uses data from the European Register of Tertiary Education, which only covers European countries, to look at two types of non-government revenue (private third party funding and non-government core funding, Box 3.8) in universities and professional HEIs.[6]

Box 3.8. Third party funding and non-governmental core funding

Private third party funding consists of revenue from private sources (e.g. businesses, religious and non-profit organisations, business and labour associations) that is earmarked for specific activities and institutional units. It includes funding earned through contracts for the provision of research and education.

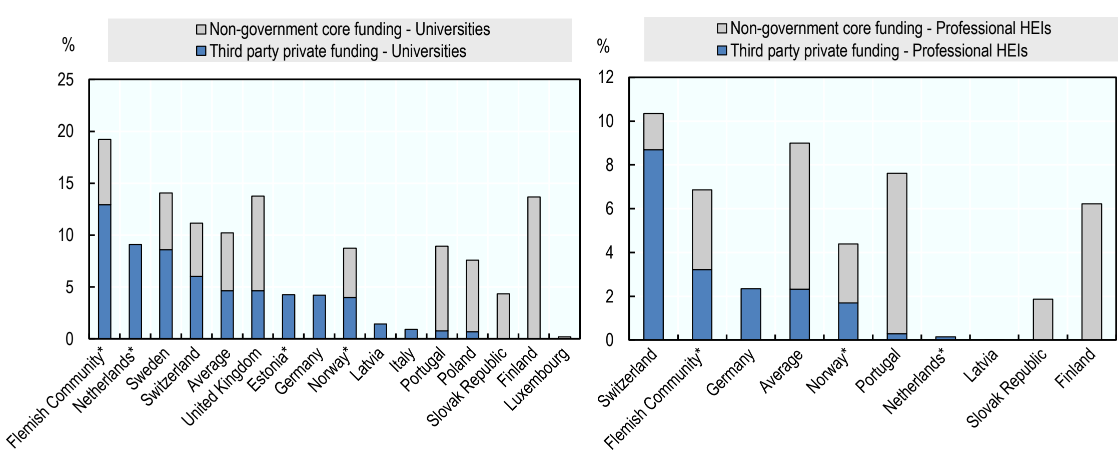
Non-government core funding is defined as funding coming from sources other than the government, which is not earmarked for specific activities. It includes revenue from financial and other assets, donations, and sales from commercial activities.

Revenue of an extraordinary and non-repeating nature (e.g. large donations for the purchase of capital assets) are excluded from both private third party funding and non-governmental core funding (Lepori et al., 2017[47]).

On average across countries with available data, private third party funding accounts for 4% of current revenues of universities, and non-governmental core funding for 6%, with a large variation across countries. For example, while the share of private third party funding accounts for over 8% of current revenues in the Flemish Community, the Netherlands and Sweden; it is close to 4% in Estonia and Norway, and it is marginal in the Slovak Republic (Figure 3.7).

Figure 3.7. Revenue of higher education institutions, by subsector and type of revenue (2015)

Shares of current revenues



Notes: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Estonia: The data come from the Estonian Ministry of Education and Research, instead of ETER.
France: Data on third party private revenues include only research-related revenues
Hungary and Italy: Data on other core funding are excluded from the chart since it includes some public funding
Source: European Tertiary Education Register (ETER) (2019[48]), *ETER Database*, www.eter-project.com.

StatLink https://doi.org/10.1787/888933940588

For the seven countries with available data on professional HEIs, only Switzerland had a larger share of private third party funding in professional HEIs than in universities. The share of non-governmental core funding is also smaller in professional HEIs than in universities for all countries.

Philanthropic donations as a source of income for higher education may also be included in non-governmental core funding or in private third party funding (if they are linked to a specific purpose or institutional sub-unit), except if they are large non-recurring donations. However, despite the importance of this type of funding in some higher education systems (see Chapter 6) there is no internationally comparable data available. Some indicators on philanthropic donations have recently been developed in the area of development and co-operation (Benn, Sangaré and Hos, 2018[49]; OECD, 2018[50]).

The ability of higher education institutions to raise third party or core funding depends, at least in part, on their financial autonomy. Higher education institutions have varying levels of financial autonomy with regard to their ability to borrow money, keep a financial surplus and own their buildings in many countries (Bennetot Pruvot and Estermann, 2017[32]). Institutions that are able to keep any financial surplus they generate and spend it in later years may have a greater incentive to find new sources of revenue. Institutions that are able to own their buildings could possibly generate income from them. Renting out unused facilities could not only generate revenue, but it also make more use of higher education spaces. Institutions are in a better position to generate non-government revenue if they have the legal status of public corporations (with the ability to execute contracts, dispose of property, etc.) than of public agencies bound by civil service regulations (Johnstone and Marcucci, 2010[36]).

Overall, the European University Association (EUA) rates the financial autonomy of Estonian, Flemish and Dutch public universities as "medium high" (as compared to other European public universities). In general, public universities in these three countries are allowed to keep their financial surplus, to borrow money, and to own and sell buildings (Bennetot Pruvot and Estermann, 2017[32]). The same is true in these three countries for other subsectors with available information (public professional HEIs in the Flemish Community and the Netherlands, and independent private institutions in the Netherlands, see Table 3.6). However, in these jurisdictions there are restrictions on the ability of higher education institutions to set tuition fees (Section 3.5.1).

The financial autonomy of Norwegian public universities is rated as "medium low" by the European University Association. Norwegian higher education institutions cannot borrow money. They do not own buildings and properties; most of the properties they use are owned by the government and managed either by the higher education institutions or by a public sector administration company (*Statsbygg*); and the remaining part of the properties are rented on the private market. Public higher education institutions can keep financial surplus, but only up to a certain amount (Bennetot Pruvot and Estermann, 2017[32]). The same constraints apply to government-dependent and independent private institutions (see Table 3.6).

Table 3.6. Elements of institutional financial autonomy (2017)

Ability of higher education institutions to:

		Borrow money	Keep surplus	Own and sell buildings
Estonia	Universities	Yes	Yes	Yes
	Professional HEIs	No	Yes, with some restrictions	No
Flemish Community	Universities	Yes	Yes, with some restrictions	Yes, with some restrictions
	Professional HEIs	Yes	Yes, with some restrictions	Yes, with some restrictions
Netherlands	Universities	Yes	Yes	Yes
	Professional HEIs	Yes	Yes	Yes
	Private institutions	Yes	Yes	Yes
Norway	Universities	No	Yes	Only with external approval
	University colleges	No	Yes	Only with external approval
	Private institutions	Yes	Yes	Yes

Note: Most universities and university colleges in Norway do not own their buildings, but they may be granted authorisation by the government to sell the buildings they use.
Source: For universities, Pruvot and Estermann (2017[32]), University Autonomy in Europe III The Scorecard 2017, www.eua.be/Libraries/publications/University-Autonomy-in-Europe-2017. For other relevant groups of higher education institutions, the OECD collected the information from the Estonian Ministry of Education and Research and national associations (for the Flemish Community, the Netherlands and Norway), based on the instruments developed by the European University Association (Bennetot Pruvot and Estermann, 2017[32]).

3.7. The allocation of public funding to higher education institutions

3.7.1. Dimensions of higher education funding allocation

The means by which public funding is allocated to higher education institutions can have an impact on the outcomes achieved. Well-designed funding mechanisms provide incentives to institutions, students and others to implement policies or change practices. They can be used by governments to ensure that the system is efficient in meeting the strategic goals with the given resources. Governance issues and funding systems are therefore closely connected (Jongbloed, 2010[51]).

The use of different funding mechanisms can also be closely tied to increased autonomy and accountability in higher education (see Chapter 2). As institutions are afforded greater autonomy, governments may have fewer mechanisms at their disposal to steer the system. Funding mechanisms that require institutions to spend the funds of specific activities or are dependent on performance can help governments steer institutions to meet strategic goals. Greater autonomy is therefore often accompanied by a more a robust accountability framework for institutions.

Three key dimensions are involved in the allocation of funding in higher education:

- the allocation mechanism used
- the basis for the allocation
- the level of autonomy in spending allocated funds.

There are three key allocation mechanisms used in higher education: line item budgets, block grants and targeted funding (Table 3.7).

Line item budgets specify how higher education institutions can spend funds received from government authorities or intermediate agencies. In other words, institutions need to spend the budget in accordance with the expenditure items specified in the "line item" budget. In response to a prevailing view that line item budgets, while the most efficient to allocate, do not encourage higher performance, or indeed allow for performance to be objectively measured (OECD, 2008; World Bank, 2016), recurrent[7] public funding provided through line item budgets, has been replaced by block grants in most OECD countries in recent decades.

Block grants consist of financial transfers from the government to higher education institutions to cover several categories of education or research expenditure, and provide institutions with a certain amount of freedom in how they can spend allocated money.

Targeted funding is funding that is earmarked for a particular purpose, often tied to current strategic goals for the system, and may be dispensed in addition to line item budgets or block grants.

The amounts allocated through funding mechanisms can be determined through a variety of methods (basis for allocation), including:

- Historical trends: The amount allocated is based on the amount of funding that has been provided in previous years, which may vary annually according to certain parameters.
- Formula funding: An amount calculated through one or more formulas based on a set of predefined parameters and indicators. Formula funding can use input indicators to measure activity (e.g. number of students enrolled in bachelor's programmes) or output and outcomes indicators to measure performance (e.g. completion rates, publications per academic staff).
- Negotiations between government and higher education institutions: The amount allocated is an agreed sum negotiated between government and higher education institutions. The negotiations may be set out in performance agreements or funding agreements.

Governments may apply each of these methods individually, or combine the elements above. Block grants, for instance, may have components based on historical trends, formula funding and negotiations between institutions and government. This can lead to a large variety of block grant allocation systems across countries (Bennetot Pruvot, Claeys-Kulik and Estermann, 2015[52]). In the case of targeted funding, funds are also often awarded through a competitive process where proposals are made by institutions and assessed by peers or experts.

The third dimension involved in the allocation of funding deals with the level of autonomy institutions have in spending their allocated funds. Higher education institutions often have a large degree of autonomy in spending block grant funding (Bennetot Pruvot, Claeys-Kulik and Estermann, 2015[52]). This recognises institutional autonomy and enables institutions to set and realise their own strategic aims.

Table 3.7. Allocation of public funding to higher education institutions

Allocation mechanism	Basis for allocation	Level of spending autonomy
Block grant	▪ Historical trends ▪ Funding formula ▪ Negotiations between government and HEIs	Autonomy varies from no restrictions on the allocation of funding, to requirements to adhere to broad expenditure categories or requirement to adhere to legal restrictions on internal allocation
Targeted funds	▪ Funding formula ▪ Competitive process ▪ Negotiations between government and HEIs	Funding must be spent on identified purpose
Line item budget	▪ Historical trends ▪ Funding formula ▪ Negotiations between government and HEIs	Funding must be spent on identified purpose

While block grants generally have introduced more freedom in the internal allocation of funds than have line item budgets for institutions, the level of freedom can vary across different higher education systems. Block grants can also be provided with various restrictions, including restrictions on the ability of institutions to move funding between different categories of activity (e.g. between education and research). The European University Association (EUA) Autonomy Tool (Bennetot Pruvot and Estermann, 2017[32]) has defined four categories to measure the levels of autonomy in spending block grants:

- Block grant with no restrictions on the allocation of funding
- Block grant is split into broad categories (e.g. teaching, research, investments and operational costs) and there are no or limited possibilities to move funds between these
- Block grant with internal allocation possibilities limited by law
- Block grant with other restrictions (for example, in Ireland part of the block grant must be spent on widening access for disadvantaged socio-economic groups).

There are no restrictions on how institutions can spend the funding allocated through block grants in any of the participating jurisdictions, giving them a high degree of financial autonomy against this indicator (Bennetot Pruvot and Estermann, 2017[32]).

Targeted funding and line item budgets are allocated for specific purposes and institutions are required to spend the funds on those purposes only.

3.7.2. Basis for allocating block grants

The participating jurisdictions combine historical trends, formula funding and negotiations to determine block grant amounts allocated to higher education institutions (Table 3.8 and Table 3.9). These methods have changed over the last decade in the four jurisdictions, along with other elements of the funding system (Section 3.7.4).

Table 3.8. Basis of allocation of total block grant in participating jurisdictions (2017)

Proportion of total block grant amount

	Historical trends	Funding formula	Negotiations between government and HEIs
Estonia	73%	24% (performance indicators) 3% (achievement of goals in performance agreements)	0%
The Flemish Community	0%	100%	0%
The Netherlands	47% (universities) 12% (professional HEIs)	50% (universities) 83% (professional HEIs)	3% (universities) 5% (professional HEIs)
Norway	68%	32%	0%

Notes: Estonia: research "baseline funding" is included in block grant funding.
The Netherlands: the reference year is 2014; funding earmarked for research schools in universities is excluded from block grant funding; funding earmarked for "practice-oriented research" in professional HEIs is excluded from block grant funding.
Source: Adapted from OECD (2018[23]), *Higher Education in Norway: Labour Market Relevance and Outcomes*, http://dx.doi.org/10.1787/9789264301757-en; information provided by the participating jurisdictions. See the reader's guide for further information.

Table 3.9. Basis of allocation of education component of block grant in participating jurisdictions (2017)

Proportion of education component of block grant amount

	Historical trends	Funding formula	Negotiations between government and HEIs
Estonia	80%	17% (performance indicators) 3% (achievement of goals in performance agreements)	0%
Flemish Community	0%	100%	0%
The Netherlands	31% (universities) 12% (professional HEIs)	63% (universities) 82% (professional HEIs)	6% (universities) 6% (professional HEIs)
Norway	No distinction between education and research components		

Note: The Netherlands: the reference year is 2014.
Source: Adapted from information provided by the participating jurisdictions. See the reader's guide for further information.

Block grant funding based on historical trends

Providing funding to higher education institutions according to historical trends ensures a degree of financial stability for institutions over time. Historical trends account for about 70% of block grant funding in Estonia and Norway, and about 45% in Dutch universities (there are no allocations based on historical trends for Dutch professional HEIs) (reference year: 2017 for Estonia and Norway; 2014 for the Netherlands). In each of these countries, the allocation of this amount is based on different factors.

Estonian, Flemish and Dutch universities receive two separate components of block grant funding for education and research (see Box 3.1).

- In **Estonia**, the historically determined allocation received by each institution is based on the average amount of the education component of block grant funding for the last three years. The education component accounted for about 90% of all block grant funding for higher education in 2017.
- In **the Flemish Community**, both components of the block grant are assigned through formula funding.
- In **the Netherlands**, for each of these two components, a part of the total amount is negotiated between the government and each university based on past allocations (the combined share of the two historically determined allocations over the combined block grant funding is about 47%). Professional HEIs receive a much lower share (12%) of block grant funding based on historical trends.

In **Norway**, the amount of funding that each higher education institution receives though the fixed portion of the block grant is decided based on a long history of specific priorities determined by the parliament (*Storting*) and the government over the years, without direct negotiation with the institutions. Some institutions get additional funding due to maintenance of buildings or special national responsibilities, such as running museums or certain study programmes (particularly at the doctoral level).

Block grant funding based on a formula

In some OECD countries, a portion of the block grant is allocated through formula funding to reward past performance and motivate improvement. The proportion allocated through formula funding can be part of an open or a closed-end budget, which affects the incentives provided to institutions (Box 3.9).

Formula funding accounts for a proportion of block grant funding paid to higher education institutions in all of the participating jurisdictions, but the formulas are different in each case, and may include measures of throughput, output or the volume of education activity (Table 3.11).

Box 3.9. Open-end or closed-end budgets

The amount of overall funding allocated to higher education institutions through formula funding can be decided in advance by the government (closed-end budget) or it can be open depending on how well institutions perform against the indicators (open-end budget). Governments can choose to impose a closed-end budget for some indicators, and leave an open-end budget for others.

When a closed-end budget is chosen, the formula acts as a distributive mechanism to allocate a fixed amount of the budget across institutions. The allocation rewards individual performance but is based on the relative performance of institutions and is therefore a zero-sum game.

With an open-end budget, individual institutions are financially rewarded for good performance against the indicators in the formula, regardless of how well they perform in relation to other institutions. For example, their funding will increase as they increase the number of students enrolled or the number of graduates.

Both closed-end and open-end budgets provide incentives to institutions to improve their performance in terms of the relevant indicators. However, while open-end budgets guarantee an increase in funding to all institutions showing improvement on the indicators, closed-end budgets focus on relative performance, as institutions can increase their share of funding only by performing better than others. This could further stimulate competition among institutions.

Formula funding accounts for 17% of the education component of block grant funding in **Estonia**, and it is explicitly performance-oriented and related to the government's Estonian Lifelong Learning Strategy 2020. It is a closed-end budget that uses six indicators to calculate a proportion of the block grant funds for each institution:

- the share of students enrolled in certain institution-specific fields of study
- the share of foreign students and of students who are studying abroad
- student completion rates within the nominal time
- the ratio of public to private funding from education activities (including tuition fees and other revenues related to education provision)
- the proportion of graduates in employment or further study.

The proportion of students graduating within the nominal time has the biggest weight (35%), which encourages universities to help students complete their studies on time. The weighting on the other indicators reflects additional government priorities: proportion of graduates employed or continuing to master's or doctorate (20%), proportion of students enrolled in fields of study identified as part of the university's mission or area of responsibility (15%), foreign students (10%), revenue from education activities (10%) and outgoing mobile students (10%).

In addition, up to 3% of the block grant funding for universities and professional HEIs is based on the achievement of goals in performance agreements or directives with the institutions. The government negotiates a set of agreed goals in performance agreements with universities and evaluates the achievement of these goals qualitatively. As professional institutions are state agencies directly administered by the Ministry of Education and Research, their block grants are allocated through the "performance directive" of the Minister, which delineates the goals and responsibilities for each institution.

Universities in Estonia also receive block grant funding related to their research activity. A small part of this (5%) is related to research of national significance in the area of the humanities. The remaining part is allocated through a formula based on the number of high-level publications, the number of patents and patent applications, the amount of third party public and private funding, and the number of doctoral graduates.[8]

In the **Flemish Community**, the entire block grant funding amount for each institution is determined through funding formula with a closed-end budget. This is divided into a general component (for all institutions) and a research component (for universities only). The indicators used in the education component include:

- study credits, weighted by field of study and student condition (institutions receive more funding for disabled and special-needs students, working students or those who are beneficiaries of a means-tested grant)[9]
- the number of bachelor’s, master’s and doctoral qualifications awarded
- the number of publications and citations
- the gender diversity of the institution’s research population.

The research component of the block grant in the Flemish Community is allocated through the Special Research Fund (BOF) and the Industrial Research Fund (IOF). The amount of funding allocated is currently based on several indicators (different for the BOF and the IOF) such as the number of master’s and doctoral degrees; the share of women in academic staff; the number of publications and citations; the revenue obtained from licencing of research-related output and EU competitive research programmes; and the number of patents and spin-off companies.

To receive funding from the BOF, each university must document the rules for the internal allocation of resources from the BOF. In addition, every five years it must submit a strategic policy plan that outlines how the resources from the BOF will be spent, as well as the university’s general research strategy. The strategic policy plan must show how the university will ensure:

- quality control and adequate evaluation of research
- good governance mechanisms for research policy
- adequate representation of women and immigrants in the research workforce
- adequate support to the career development of all researchers
- dissemination of the results.

Universities, as well as associations between universities and professional HEIs (see Chapter 2), must report annually on how they used the BOF and the IOF. In addition, the two funds are evaluated every five years by the government. The evaluations look at what the universities (or associations) have achieved with the funds, the role of these funds in the broader policy landscape and how the current policy regulations of the funds can be improved.

In **the Netherlands**, 63% of the education component of the block grant to universities is based on a funding formula (6% on performance agreements and 31% on historical trends). For the professional HEIs, funding formula determines 83% of the block grants, while 12% depends on historical trends and the remaining 5% is negotiated through performance agreements. The education component is determined by:

- the number of students who complete their programmes within the expected duration of study (three or four years for a bachelor's or short-cycle programme; one to three years for a master's programme, depending on the programme)
- the number of short-cycle, bachelor's and master's qualifications awarded.

Both enrolment and degrees are weighted by field of study, reflecting the different cost per student in different disciplines within higher education (Table 3.10).

Table 3.10. Weights for students and degrees in different fields of study in the funding formulas used in the Netherlands (2017)

Fields of study	Universities	Universities of applied science
Low weighting: economics, law, social sciences, humanities	1	1
High weighting: education, agriculture, technology and health	1.5	1.28
Top weighting: medicine	3	1.5

Source: Adapted from information provided by the participating jurisdictions. See the reader's guide for further information.

The research component is only allocated to universities in the Netherlands and is based on the number of bachelor's, master's and doctoral qualifications awarded. Universities receive twice as much for a master's qualification awarded than for a bachelor's. The formula funding is closed-end with respect to all indicators. Universities used to receive a fixed sum for each doctorate awarded, but the budget for this indicator became closed-end in 2017. Professional HEIs receive a small allocation for applied research, amounting to about 3% of block grant funding.

In **Norway**, formula funding accounts for about 30% of block grant funding, with similar indicators to the general component in the Flemish Community (except for the indicator on gender diversity). However, the Norwegian formula also includes the number of international exchange students and the amount of funding from the Norwegian Research Council, the EU and public and private third party funding.

Norway uses a combination of open and closed-end budgets for the block grant components based on funding formula. Funding awarded on the basis of the number of credits awarded, the number of graduates, and the number of international students is an open-end budget, and can therefore increase as volumes increase. The remaining indicators, i.e. the number of publications and revenue from the Norwegian Research Council, the EU and private sources is a closed-end budget, so higher education institutions can only increase their share of revenue by performing better than other institutions.

Table 3.11. Formula funding indicators used in the four participating jurisdictions (2017)

Indicators	Estonia	The Flemish Community	The Netherlands	Norway
Enrolments			Yes (only students within expected duration of study)	
Credits		Yes		Yes
Degrees (including doctoral)	Yes (only doctoral)	Yes	Yes	Yes
Enrolment/credits/degrees in specific fields of study	Yes (institution-specific)		Yes	
Extra weight for enrolment/credits/degrees for particular categories of students (e.g. under-represented socio-economic background)		Yes		
Foreign or international exchange students	Yes			Yes
Completion rates	Yes			
Graduates in employment or education	Yes			
Publications and citations	Yes (universities)	Yes		Yes
Funding from private sources or commercialisation of research output	Yes	Yes (universities)		Yes
Gender diversity among researchers		Yes		
Funding from EU and national research council	Yes (universities)	Yes (universities)		Yes
Patents	Yes (universities)	Yes (universities)		

Source: Adapted from information provided by the participating jurisdictions. See the reader's guide for further information.

Block grant component based on negotiation or performance agreement between government and institutions

Some countries also determine a proportion of the block grant through a negotiation between the ministry and individual higher education institutions. The agreements can be in the form of performance agreements or funding agreements. They may use funding formula or other methods to determine the allocations. Two of the participating jurisdictions use this method: Estonia and the Netherlands.

As noted above, universities and professional HEIs in **Estonia** may receive up to 3% of the block grant funding based on the achievement of goals outlined in performance agreements or directives. The government negotiates a three-year performance agreement with each university, which specifies the goals for the university, the associated funding and other obligations (e.g. the fields of study in which a university cannot open full-time programmes; targeted funding assigned by the government to the university). The agreement reflects the mission and objectives of the university and the strategic goals of the government, and takes into account the needs of the labour market and the interests of local government and registered professional associations. Performance agreements are contracts under public law and the associated funding is delivered through a funding agreement between the ministry and university.

For the period 2013-15, the Estonian government negotiated goals individually with each university, resulting in a large number of specific goals included in performance agreements. The subsequent round of performance agreements, covering the period 2016-18, included a set of more general and broad goals (Table 3.12). The government evaluates the fulfilment of the goals qualitatively.

Table 3.12. Examples of goals in the 2016-2018 performance agreements: Estonia

Provide academic staff with opportunities for training and self-development on new teaching methods and digital skills
Provide teaching career opportunities to professionals from outside higher education
Develop evaluation systems for academic staff
Increase the international mobility of students and academic staff
Increase the number of graduates in information and communication technology and related disciplinary areas
Cooperate with secondary schools to make higher education more accessible (e.g. through online courses for secondary school students)
Provide opportunities for flexible study provision and lifelong learning, particularly for students from under-represented demographic groups
Develop admission procedures which take into account the motivation of applicants
Reduce the number of students leaving higher education without a degree
Use reports on labour market skills needs (OSKA reports – see Chapter 5) to improve the labour market relevance of study programmes
Collaborate with other higher education institutions and other stakeholders for the development and improvement of education programmes

Source: Adapted from information provided by the participating jurisdictions. See the reader's guide for further information.

Performance agreements were introduced in **the Netherlands** in 2012 to cover the period 2013-16. This model is being replaced by "quality agreements" (Box 3.10) from 2019. The 2013-16 performance agreements provided the basis for around 6% of the education component of block grant funding. The block grant allocation in the performance agreement was determined through two separate processes:

1. attainment of seven "quality and study success" mandatory indicators (Table 3.13) and additional goals (both quantitative and qualitative) proposed by the institutions themselves: around 70% of the total amount allocated
2. competitive process: around 30% of the total amount allocated.

Table 3.13. Mandatory "quality and study success" indicators in the 2013-2016 performance agreements: The Netherlands

1	Completion rate within the expected graduation time (plus one year) in bachelor's programmes
2	Share of students leaving the institution without completing a programme one year after beginning their studies
3	Share of first-year students switching to another programme in the same institution
4	Quality in teaching and learning, measured by one of the following indicators: ▪ share of students in excellence tracks (see Chapter 4) ▪ student satisfaction scores ▪ share of programmes evaluated as "good" or "excellent" by the Dutch/Flemish Accreditation Organisation (NVAO)
5	Face-to-face contact hours with academic staff per first-year bachelor's student per week
6	Qualifications of teaching personnel: academic staff holding a teaching qualification (for universities) or academic staff holding a master's or doctoral degree (for professional HEIs)
7	The share of overhead costs over total expenditure

Source: Adapted from information provided by the participating jurisdictions. See the reader's guide for further information.

Box 3.10. The transition from performance agreements to "quality agreements" in the Netherlands

The Netherlands introduced performance agreements in 2012 to achieve three broad strategic goals: improve education quality and completion rates; enhance differentiation and profiling in education and research; and enhance the transfer and exchange of knowledge.

The performance agreements were evaluated in 2017 and, following extensive consultation with higher education institutions and other relevant stakeholders, are to be replaced by "quality agreements" for the period 2019-24. The quality agreements will use the additional funding available following student financial aid reforms, which resulted in the replacement of most student grants with loans after 2016 (Box 3.6).

While the 2013-2016 performance agreements were contracts between the government and individual institutions, the quality agreements will be negotiated between the executive board of higher education institutions and their student and staff representatives. The following procedure underlies the establishment and evaluation of quality agreements:

- The executive board of institutions, students and staff jointly draft the quality agreement in line with the government's strategic agenda. Other stakeholders (e.g. local governments) may also be involved.
- The accreditation agency (NVAO) ensures compliance with the relevant procedures for drafting the agreement, and ensures that the agreement is in line with the government's strategic agenda.
- The NVAO will periodically check the progress of institutions in meeting their goals. Funding tied to the quality agreement will be allocated to institutions if they perform well against the goals. Institutions not progressing satisfactorily will be given additional time to improve performance. If the progress continues to be unsatisfactory after this additional time, the funding for the institution will be reduced.
- At the end of the period covered by the agreements (2024), the NVAO will provide a final assessment of performance in terms of how well institutions have met their goals. If the assessment is negative, the funding tied to the quality agreement is converted into competitive funding through the Comenius Fellowship program (see Chapters 4 and 5). Academic staff and administrators from under-performing institutions can apply for this funding with proposals to improve learning and teaching in the institution.

A review committee established by the Dutch government assessed proposals for the performance agreements to evaluate their feasibility, alignment with the government's strategic goals and ambition (De Boer et al., 2015[43]). This committee monitored the progress and outcomes of the performance agreements based on information provided in university and professional HEI annual reports; and published a yearly report on progress at the system level (European Commission, 2018[53]). Those institutions that did not reach the goals set out in the performance agreement in 2016 had their funding reduced. This affected six out of 37 professional HEIs.

Institutions also competed for additional funding to support projects to meet the strategic goals set out in the performance agreements. The Centres of Expertise (Section 3.7.4) were established through this component of the performance agreements.

3.7.3. Targeted funding

Targeted funds refer to amounts of money awarded by government authorities or intermediate agencies (e.g. funding councils and research authorities) to higher education institutions that are allocated for a particular purpose – e.g. improving teaching quality, fostering better management practices and encouraging partnerships with the private sector.

Targeted funds can be aimed, for instance, at funding specific items or services (e.g. costs of building a research lab). Alternatively, governments may provide targeted funding intended to achieve a specific goal, without specifying the services of items to be used to achieve it. For example, from 2008 the Dutch and Flemish governments provided funding to institutions to improve study outcomes (e.g. completion and graduation rates) among students from certain demographic groups. The institutions had the freedom to use these funds through a variety of projects that were aimed to reach this goal. These funding schemes were terminated in 2013 (the Netherlands) and 2014 (the Flemish Community), and no funding has since been allocated to these specific initiatives.

In **Estonia**, targeted funding is used to achieve the government's strategic objectives for higher education. A component of targeted funding is included in the yearly funding agreement signed between the government and institutions. For example, funding has been provided to open university libraries to the wider public; to increase admission to nursing and teacher training programmes in certain institutions; and to support a merger between a public university and a private institution. In addition, targeted funding is used to allocate capital expenditure through the "research infrastructure roadmap" (see Chapter 6).

The **Flemish** government awards annual funding to institutions that must be spent on three activities: student facilities, other infrastructure ("investments"), and teacher education. Institutions can spend the funding for teacher education as they see fit, without many administrative requirements. The criteria for the utilisation of the targeted funding for investments and student facilities are specified in the law. Institutions must prepare an expenditure plan and report on spending for student facilities and investments.

Another example was the decision by the Dutch ministry, in its 2015 strategic agenda, to allocate EUR 20 million per annum from a special budget (*Studievoorschot*) for facilitating digitalisation and improving digital teaching infrastructure in higher education.

Governments may also provide targeted funding to other organisations in the higher education system to achieve certain aims. For instance, in **Norway**, funding is provided to student welfare organisations providing ancillary services (e.g. housing, meals, sport and health services) at a subsidised price (see Chapter 4). All higher education institutions (except vocational colleges, which are excluded from the analysis of this section) must have an arrangement with a student welfare organisation to provide these services.

Competitive funding

Targeted funding is often awarded on a competitive basis, as governments try to improve performance and steer institutional behaviour in higher education, on the basis that competition drives quality. Competitive funds are usually attached to a project or are targeted towards the achievement of specific objectives or priorities defined by the funder (Bennetot Pruvot, Claeys-Kulik and Estermann, 2015[52]). Institutions submit an application, usually assessed by an external panel of experts.

Competitive funding plays an important role in government research funding (see Chapter 6), but can also be used for a range of different projects in education. For example, competitive funding has been used to stimulate innovative digital and online learning projects in the Netherlands and Norway (see Chapter 5).

In the **Netherlands**, the Comenius Fellowship awards competitive grants for projects stimulating innovation in teaching (see Chapters 4 and 5). The grant amount can be EUR 50 000 (for individual modules), EUR 100 000 (for projects at the programme level) or EUR 250 000 (for innovations at the institutional level). The Comenius Fellowship scheme started in 2017 with a budget of EUR 500 000 for 10 grants for innovation at the module level, and will gradually expand to around 110 grants and a budget of around EUR 20 million in 2022.

3.7.4. Changes in the higher education funding systems of the participating jurisdictions from 2000 to 2018

The funding systems of the participating jurisdictions have gone through major reforms in the last two decades, reflecting the broader shift across the OECD in recent years towards a greater focus on autonomy and performance (OECD, 2008[11]). This section provides an overview of the funding allocation mechanisms used at the time of the 2002-2008 OECD Thematic Review of Tertiary Education, as well as subsequent changes, to show how they have evolved over time.

In **Estonia**, in 2006, most government funding of higher education was allocated as a block grant based on the number of government-commissioned study places in each higher education institution (Estonian Ministry of Education and Research, 2006[54]). The number of commissioned study places depended on the forecasted need for graduates in each discipline, as determined through a consulting process by the government, higher education institutions and other stakeholders. Students qualifying for commissioned study places could enrol for free, while others had to pay tuition fees.

Estonia introduced a new funding system in 2013, which intended to use formula funding to determine a large share (70-75%) of the block grant amount. The formula included a number of input indicators (e.g. the number of entrants and full-time students), output indicators (e.g. the number of graduates in different fields of study) and indicators related to national performance goals (e.g. the proportion of foreign students, the proportion of graduates employed or enrolled in higher education). In addition, more grants and scholarships targeted students demonstrating economic need, whereas previously they were mostly based on academic merit. In 2017, the funding model was revised further to reduce the performance element to 20% and provide greater stability compared to the previous model, which led to sudden fluctuations in funding (European Commission, 2018[55]) causing a reduction in the funding level for some institutions.

In the **Flemish Community**, the main change in the higher education funding system over the past two decades has been the phasing out of the historically determined funding allocation (Flemish Ministry of Education and Training, 2006[56]). This passed from 100% of funding in 1996, to 20% in 2000, to 0% in 2008. In addition, the indicators set in the formula determining the research component of the block grant have been expanded between 2007 and 2017 to include funding from private sources or commercialisation of research output, gender diversity among researchers, and funding from EU and national research council and patents.

In the **Netherlands**, the biggest change in higher education funding since 2006 has been the replacement of the grant system with a loan system (Box 3.6). This could have resulted in significant savings for government, but the government agreed to allocate these funds to higher education to improve the quality of learning and teaching. The funds generated by the replacement of grants with loans are allocated to institutions through performance agreements (Box 3.10). Loans have been made income-contingent to help graduates manage their debt, whereas in 2007, repayments were mostly of a mortgage type (OECD, 2008[11]).

There have not been significant changes in how block grant funding is allocated between 2007 and 2017 in the Netherlands, but there have been some changes to the indicators used in the funding formula. For instance, the funding formula in 2007 included the number of first-year students (OECD, 2008[11]; De Jonge and Berger, 2006[57]); this has been replaced by the number of students who complete within the expected graduation time.

The **Norwegian** system has not fundamentally changed since 2006. However, the use of line item budgeting was replaced by formula funding in the 2002 funding reforms aimed at increasing spending efficiency and autonomy in higher education institutions (Norwegian Ministry of Education and Research, 2006[58]). The funding formula changed in 2017 to include two new indicators, the number of graduates and public and private third party funding, along with the modification of some existing indicators.

3.8. Concluding remarks

This chapter reviewed the funding of higher education systems, a crucial input to their mission of providing education and research and engaging with the wider world. It discussed relevant higher education policies with a particular focus on four jurisdictions, and highlighted gaps in the existing information base. This concluding section reviews some key messages from the chapter, along with current information and data gaps. Key performance areas discussed in the chapter are summarised, including some indications of where an improvement of the information base would be particularly useful to assess performance.

- Higher education is a labour-intensive sector, with expenditure on staff accounting for two-thirds of current expenditure on average across OECD countries. The input of academic and non-academic staff is essential to the quality of output (see Chapter 4). International data on expenditure on staff only make a distinction between expenditure on teaching personnel and other staff. A further breakdown into expenditure for researchers and non-academic staff could provide useful insight for the benchmarking exercise.

- In many countries, expenditure on higher education institutions constitutes only a relatively small part of household expenditure in education, most of which occurs outside institutions (e.g. living costs of students, books, private tutoring). However, data on expenditure outside higher education institutions are either not collected internationally or scarcely comparable. This is a significant data gap, which makes cross-country comparisons of the total cost of higher education less transparent to the student. As a result, it is more difficult to assess higher education systems on the economic criteria.

- In many countries, public loans are a very important instrument to provide financial support to students. On average across OECD countries, each student receives about USD 1 500 in loans, a similar amount as for grants and scholarships. Currently, international statistics measure the gross financial amount that the government transfers to students as loans. This could differ from the net present value of the cost to the government, for example before loan repayments from graduates are ignored.

- Other (non-household) private funding is an important source of funding from a strategic point of view, as it reduces the burden on the government and household sectors and incentivises engagement between higher education institutions and the wider world (see Chapter 7). This source of funding, which accounts for about 10% of higher education expenditure across OECD countries, could make funding more sustainable and ensure that the output of higher education is relevant to the wider world. To investigate non-household private funding more in depth, this chapter used data from the European Tertiary Education Register. However, an important limitation of this dataset is that it covers only European countries. Alternative data sources will need to be identified for other countries in future rounds of benchmarking.
- Donations from households, non-profit organisations and businesses constitute an important source of higher education financing in some OECD countries. They can contribute to a diversified and sustainable funding system. However, no internationally comparable data on this are available yet.
- The government can allocate public funding to higher education institutions through various mechanisms, differing in the incentives they provide to institutions and in how much autonomy they allow institutions in spending the funds received. The role of these mechanisms in steering the higher education system makes of them important tools to improve its effectiveness. The comparative analysis of funding systems would benefit from information on the financial amounts allocated through each of the main mechanisms (block grant, formula, targeted and competitive funding, performance agreements).
- This chapter discussed some of the differences between groups of institutions within the higher education system (public, government-dependent and independent private institutions; universities; and professional HEIs). Different types of institutions are one way of ensuring diversity in higher education. They can also offer some opportunities for cost saving; the per-student expenditure in professional HEIs is about half that of universities, even though the level of expenditure per student is similar across the two subsectors when R&D is excluded. However, the analysis was limited by the limited availability of internationally comparable data.

The benchmarking of higher education systems relies on the comparison across countries of quantitative indicators, as well as on qualitative information on national policies and on higher education practices. Some examples are given in Table 3.14. These initiatives represent the distinctive approaches by the participating jurisdictions to respond to some selected policy challenges.

The qualitative data on higher education policies have been collected from the four participating jurisdictions through an ad-hoc questionnaire, given the absence of a systematic data collection on higher education policies. The standardisation of qualitative policy and contextual information is increasingly recognised as beneficial to promote effective comparative analysis and achieve better value for analytical resources invested by allowing for information to be easily reused and enhanced. For example, the development of a dynamic policy database for higher education could improve the comparability and utility of the qualitative evidence base.

Table 3.14. Selected policies from the participating jurisdictions (2017)

	Motivation	Policies
Estonia	Steering institutional behaviour through measurable indicators	▪ Formula funding accounts for 17% of the education component of block grant funding in Estonia, and it is directly related to the government's Estonian Lifelong Learning Strategy 2020. ▪ The formula is based on six indicators, all explicitly performance-oriented: the proportion of students graduating within the nominal time; the proportion of graduates employed or continuing to master's or doctorate; the proportion of students enrolled in fields of study identified as part of the university's mission or area of responsibility; the proportion of foreign students; revenue from the private sector for educational activities; and the share of outgoing mobile students. ▪ To ensure financial stability, 80% of the education component of block grant is based on its average amount over the past three years. ▪ Universities in Estonia also receive block grant funding related to their research activity, a large part of which is allocated through a formula based on research performance indicators.
The Flemish Community	Targeting financial support to low-income students	▪ All student financial support in the Flemish Community is provided through grants and scholarships. ▪ The main financial support mechanism is a means-tested grant for students with household income and assets below a certain threshold. ▪ Students who are eligible for a means-tested grant and other students from low-income households pay a lower fee. ▪ Beneficiaries of means-tested grants also benefit from other equity-related policies, for example, a reserved quota for international mobility grants (see Chapter 5).
The Netherlands	Directing funding towards institutional performance goals	▪ The funding generated through the replacement of most student grants with loans is re-directed towards higher education institutions through the "quality agreements". ▪ While performance agreements are contracts between the government and individual institutions, quality agreements are negotiated between the executive board of higher education institutions and their student and staff representatives. ▪ The progress of the institutions towards their goals is monitored by the accreditation agency (NVAO). ▪ If the progress is not sufficient, the funding tied to the quality agreement is converted into competitive funding for the improvement of teaching.
Norway	Helping students cover study and living costs	▪ All higher education students can receive the "basic support", a loan amounting to up to NOK 110 000 per year for a maximum of eight years. ▪ Up to 40% of the basic support can be converted into a grant for students who live away from their parents and complete their programmes within the expected time. ▪ The yearly interest rate paid by Norwegian graduates on their student loans was relatively low in 2016 (but increased in 2017). ▪ The debt can be repaid over a long period (20 years).

Source: Adapted from information provided by the participating jurisdictions. See the reader's guide for further information.

Notes

[1] For the conversion in USD, the OECD (2018[8]) purchasing power parity (PPP) conversion rate for the reference year of the respective charts has been used.

[2] An institution is considered private if its overall control is not retained by a public agency. A private institution is government-dependent if at least 50 percent of its core funding comes from government agencies or if its teaching personnel is paid by a government agency. Otherwise, it is considered an independent private institution. Due to their reliance on public funding, government-dependent private institutions are often subject to regulation very similar to that of public institutions.

[3] This rule is very similar to the Dutch "one bachelor, one master policy" described within this section. However, the Estonian rule differs because it does not apply to students who enrol in a programme after at least three times the nominal duration of the programme from matriculation at the same level of education. For example, students can study for free if they start a new bachelor's programme 9 (or more) years after their first matriculation to a bachelor's programme. A similar exception to the "one bachelor, one master policy" for students in areas related to health and welfare and teacher education exists in Estonia and the Netherlands (see Chapter 4).

[4] In contrast, the difference between public institutions and government-dependent private institutions in average annual tuition fees at the bachelor's or equivalent level is minimal for all countries with available data (OECD, 2016[9]). For example, in the Flemish Community, government-dependent private institutions are constrained by the same regulations on tuition fees as public institutions.

[5] Income-contingent loan schemes exist in Australia, Chile, the French Community of Belgium, Great Britain, Korea, the Netherlands, New Zealand, and the United States.

[6] As discussed in Lepori et al. (2017[47]), private third party funding and non-government core funding could, in some instances, include revenue from the household sector (e.g. a family living in a building owned by a university and paying rent). This kind of revenue would be classified among other (non-household) private expenditure in the UOE data presented in this chapter.

[7] Recurrent funding comprises all funding except that having an extraordinary and non-repeating character (Lepori et al., 2017[47]).

[8] In Estonia, the research component of block grant funding is awarded to all institutions that receive a positive evaluation of their research activities by the Estonian Research Council. This evaluation is carried out by a panel of experts and remains valid for seven years. In principle, UAS could also receive research funding through the same process, but no UAS have applied for the evaluation of research activities to date.

[9] In the Flemish Community, the funding formula is based on the number of credits awarded to students at the master's level. For bachelor's programmes, until a student has been awarded 60 credits within a bachelor's programme (the equivalent of a full-year, full-time workload), the formula rewards the number of credits in which a student enrols (independent of whether they successfully complete them). After the student completes 60 credits, the formula rewards the credits awarded to the student, meaning that the institution receives funding only for completed modules. This situation is different from what happens in Norway, where only the credits awarded are considered in the funding formula.

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Chapter 4. Human resources

Staff, particularly in their interactions with students, are essential to the functioning of higher education systems. This chapter describes the levels and characteristics of human resources in higher education in OECD countries. It looks at human resources in terms of staff profiles, student-to-staff ratios, types of contract, salaries and career trajectories. Further detail on human resources related specifically to research can be found in Chapter 6.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

4.1. Introduction

Higher education is a labour intensive sector, where a wide range of academic staff are involved in various institutional activities including education, research and engagement with the wider world. Higher education institutions also rely on the support of non-academic staff to ensure the strategic, technological, administrative, financial and operational aspects of their mission.

Academic staff represent a core pillar of higher education, developing and imparting skills, knowledge and information through their interaction with students. The quality of academic staff, as producers and transmitters of knowledge, is directly related to the performance of higher education systems (OECD, 2012[1]). There is also a growing body of staff with responsibility for various outward-looking functions such as engagement with social partners and the community, technology transfer, entrepreneurship, continuing education and internationalisation.

Ensuring higher education institutions have highly-skilled, competent and motivated staff is a key performance issue for governments and institutions. Various factors can affect an institution's ability to recruit and retain high quality staff. These include financial incentives, such as salary and other income or benefits, and qualitative aspects of the job, including the work itself, as well as working conditions, job security, career paths and processes for progression and promotion, professional development and staff mobility (Metcalf et al., 2005[2]). Additional factors include policies and practices for recruitment, staff qualification requirements, and the prevalence of academic inbreeding, i.e. the appointment of faculty members who graduated from the institution employing them (Altbach, Yudkevich and Rumbley, 2015[3]).

Many governments and institutions are facing significant challenges relating to human resources in higher education, including attracting talented younger people to academia; gender imbalances, particularly at senior levels; and increasing salary and pension costs.

There is also a growing pressure to maintain and improve the quality of higher education, both on academic staff and on their employers (higher education institutions). As noted in Chapter 1, the number of students is increasing in many countries. The costs of higher education – for governments, students and their families – are also growing, increasing awareness of expected returns on public and private investments and value for money. In addition, nearly one-third of higher education graduates demonstrate low literacy and numeracy skills on average across OECD countries. These factors have driven a greater focus on the quality of learning and teaching in higher education, including the importance of teaching methods (OECD, 2012[1]). There is also an ongoing emphasis on research performance for higher education institutions and academics as well as increased expectations for higher education institutions and staff to engage with the broader community.

This chapter presents data and specific policy and practice information on key themes related to the staffing of higher education, including the profiling of staff by age and gender, working conditions, and career prospects. The information presented mostly relates to academic staff, although other staff categories are also discussed in Section 4.2.5. Chapter 5 presents complementary analysis on factors related to ensuring the quality of higher education personnel in terms of teaching excellence and appraisal. The quality of research and related factors is addressed in Chapter 6.

4.2. Profile of staff in higher education institutions

Higher education systems differ in the age and gender composition of their staff, as well as their precise duties, job titles and categories. This section discusses the profile of higher education staff, with particular emphasis on academic staff, as less data and information is available on other higher education staff. It explores the differences in staff categories and job titles among the four participating jurisdictions. It also provides an overview of staff age and gender composition across OECD countries, their implications and related policies, with a focus on the participating jurisdictions.

4.2.1. Academic staff

Academic staff primarily carry out teaching or research, often both. It includes people in very different staff categories (Box 4.1) within all types of higher education institutions (e.g. private, public, professional higher education institutions, universities, etc.). Academic staff also perform various engagement activities and service roles, which support the broader missions of their institutions and their own professional interests and development.

Cross-country comparisons of academic positions and human resource policies are difficult due to differences in titles, qualifications and tasks required for each position. Specific country traits also lead to differences between systems, including regulations of academic labour markets, types of institutions, and the role of teaching, research and non-academic positions (Arnhold et al., 2018[4]). Box 4.1 presents the variety of job titles that can be given to staff at different levels in the participating jurisdictions and associated regulations.

Doctoral candidates can also be categorised as academic staff in some countries. In Norway, for instance, doctoral candidates have employee status with a contract linked to the doctorate degree and compliant with labour legislation. In the Netherlands, around half the doctoral candidates are employees of the institution, around 45% work outside academia and are considered external candidates, and the remainder are enrolled as students (EC, EACEA, Eurydice, 2017[5]). Further description of the characteristics of doctoral education in the participating jurisdictions can be found in Chapter 6.

Box 4.1. Academic staff categories

There is not a standard categorisation of academic staff categories valid across all OECD countries, although some related classifications exist. For example, at the international level, a taxonomy for researchers can be found in the Frascati Manual (OECD, 2015[6]). In Europe, individual taxonomies for research careers have been developed by the European Science Foundation (ESF), the League of European Research Universities (LERU), and the European Commission (Scholz et al., 2009[7]; EC, 2011[8]; OECD, 2015[6]; Boulton, 2010[9]).

Job titles for academic staff in the participating jurisdictions can be grouped in three categories using the definitions developed by European Commission, Education, Audio-visual and Culture Executive Agency (EACEA) and Eurydice (2017[5]):

- Junior categories refer to academic staff in the early stage categories of academic employment, without substantial research or teaching experience. In the participating jurisdictions, job titles in this category include: instructor, teacher and lecturer, as well as early stage researcher, junior researcher, doctorate research fellow and senior research fellow.

- Intermediate categories include academic staff with substantial research or teaching experience, typically granting them the right to lead research projects and to teach at postgraduate level. This category includes titles such as research fellow, post-doctoral fellow, senior assistant, lecturer, senior lecturer, senior teacher, teaching assistant, assistant professor and associate professor.
- Senior categories refer to the highest ranks of academic staff, including professors, senior researchers and scientific directors. Job titles for this category of staff include professor and senior researcher.

Table 4.a. Academic staff categories in higher education institutions in participating jurisdictions (2017)

Category	Estonia	The Flemish Community	The Netherlands	Norway
Junior categories	▪ Early stage researcher (*Nooremteadur*) ▪ Teacher (*Õpetaja*) ▪ Assistant (*Assistent*) ▪ Instructor (*Instruktor*)	▪ Graduate teaching & research assistant (*Assistent*) ▪ Senior research fellow (*Doctor-assistent*) ▪ Junior researcher	▪ Student assistant (*Student assistent*) ▪ Doctorate candidate (*Promovendus*)	▪ Lecturer (*Høgskolelektor/ Universitetslektor/ Høyskolelærer*) ▪ Doctorate research fellow (*Stipendiat*)
Intermediate categories	▪ Lecturer (*Lektor*) ▪ Research fellow (*Teadur*) ▪ Senior assistant (*Vanemassistent*)	▪ Practice tutor (*Praktijklector*) ▪ Tutor (*Lector*) ▪ Assistant professor (*Docent*) ▪ Associate professor (*Hoofdocent*) ▪ Teaching assistant (Praktijkassistent)	▪ Post-doctoral researcher (*Onderzoeker*) ▪ Lecturer (*Universitair docent*) ▪ Associate professor (*Universitair hoofddocent (UHD) - Senior lectere*) ▪ Assistant professor (*Universitair docent (UD) - Lecterer*)	▪ Post-doctoral fellow (*Postdoktor*) ▪ Lecturer (*Forstelektor*) ▪ Associate professor (*Forsteamanuensis*)
Senior categories	▪ Associate professor (*Dotsent*) ▪ Professor ▪ Senior research fellow (*Vanemteadur*) ▪ Research professor (*Juhtivteadur*)	▪ Professor (*Hoogleraar*) ▪ Full professor (*Gewoon hoogleraar*)	▪ Professor (*Hoogleraar/professor*)	▪ Docent (*Dosent*) ▪ Professor (*Professor*)

Note: In Norway and the Flemish Community, contract research staff remunerated from external funds have not been included in the table. Some categories in the Flemish Community exist only in professional HEIs, such as those found in the intermediate categories (practice tutor (*Praktijklector*) and tutor (*Lector*)).
Source: EC, EACEA and Eurydice (2017[5]), *Modernisation of Higher Education in Europe - Academic Staff 2017*, https://doi.org/10.2797/408169; information provided by the participating jurisdictions. See the reader's guide for further information.

4.2.2. Staff qualifications

Academic staff qualifications give an indication of staff competences. The primary qualification for academic staff is usually an advanced degree at the master's or doctorate level, which largely prepares them for a research career. However, this can vary across countries and depend on the level of programmes delivered. Specific qualifications, ranging from education degrees to specific certificates on teaching in higher education or research, are also becoming more important in some countries.

To ensure certain standards in higher education, governments may monitor staff qualifications or impose qualification requirements for access to certain job titles. Information on qualifications and their requirements across OECD countries is not generally available, but evidence shows that they differ among participating jurisdictions.

In **Estonia**, legislation defines each academic position (Box 4.1); the minimum qualification and experience requirements for each position are regulated in the Standards of Higher Education (KHS). For example, KHS sets a master's degree as a requirement for junior positions, and a doctoral degree for senior positions. In 2017, 94% of academic staff with teaching duties across all institutions had a master's or doctoral degree, and this proportion was much higher in universities (99%) than in professional HEIs (75%). Only around 1% of academic staff did not hold a higher education qualification. This proportion was negligible in universities, while it was 4% in professional HEIs.

In **the Flemish Community**, legislation defines the qualification requirements for academic positions. For example, academic staff require at least a bachelor's degree for the lowest rank of teaching, and a doctoral degree for some intermediate positions (e.g. assistant professor and associate professor) and senior categories available to the "autonomous" academic staff.[1] For other intermediate categories, such as teaching assistant (university and professional HEIs) and lector (professional HEIs), staff must have a master's degree.

In **the Netherlands**, the government sets targets on minimum qualifications for academic staff in public institutions, with 80% of staff required to have at least a master's degree.

In **Norway**, there are national regulations on the minimum qualification standards for the various categories of academic staff (Norwegian Act on Universities and University Colleges (*Universitets og høyskoleloven*, 2005), with supporting detailed regulation (*Forskrift om ansettelse og opprykk*, 2006) (Frølich et al., 2018[10]). In 2016, around 9% of academic staff with teaching duties in higher education did not have a higher education qualification, 8% of them had a short-cycle tertiary education qualification, and 74% had either a master's or a doctoral degree.[2] Qualification requirements are regulated for each of the major positions (professor, associate professor, senior lecturer and lecturer). Professors are required to have scientific or artistic competence in alignment with national and international standards and proven pedagogical competence, while lecturers need a master's degree (or relevant professional practice) in addition to pedagogical competence (Frølich et al., 2018[10]). Institutions will accept both doctorate holders and professionals without a doctorate degree but with documented relevant academic competence for associate professor positions. A legal requirement has been put in place, in which peer review of qualifications is a condition for employment in positions at the medium and senior levels.

Qualifications required for teaching

Criteria for career advancement take into consideration qualifications and achievements in research and teaching, although, in some countries, achievements in research are valued more highly than teaching skills (OECD, 2008[11]). Nevertheless, there is increasing focus on improving teaching skills in higher education. For example, a 2013 report by a High Level Group on the Modernisation of Higher Education in the EU recommended pedagogical training for academic staff, with mandatory continuing professional development by 2020. The report also recommended that recruitment and promotion be linked to teaching performance (High Level Group on the Modernisation of Higher Education, 2013[12]).

Individual countries have also taken measures to enhance the consideration of teaching skills when evaluating candidates for teaching positions (e.g. Australia, the Netherlands, Norway and Sweden) (VSNU, 2018[13]; Australian Government, 2015[14]; Frølich et al., 2018[10]).

The Standard of Higher Education (KHS) in **Estonia** requires all staff in teaching positions to have teaching skills and experience. Specific training or teaching qualifications are not required by legislation, but higher education institutions have the autonomy to set them as a requirement. For example, teaching and supervising experience are part of the competences required for doctoral graduates, although the extent to which they must have engaged in these activities during their doctoral programmes is not specified. The KHS also authorises specialists (with at least secondary education and three years of work experience within their profession) to teach practical courses in professional HEIs (referred to as "instructors"). In addition, the government encourages teaching qualifications by including them in performance agreement goals.

In **the Flemish Community**, the *Codex Hoger Onderwijs* (Codex) presents a policy framework for academic staff. There are no specific teaching qualifications required in the Codex, but teaching activities may be undertaken during graduate programmes (master's and doctoral). The Codex does, however, stipulate a minimum amount of time dedicated to the preparation of doctoral degrees. For example, graduate students who undertake teaching activities, as well as research assistants at universities and university colleges, must spend at least half of their time on the preparation of their doctorates.

Teaching qualifications for academic staff in universities and professional HEIs have been developed in **the Netherlands** to strengthen quality of teaching. The university teaching qualification (UTQ) was developed by universities in response to a call by government for better teaching skills (Dutch Ministry of Education, Culture and Science, 2011[15]; 2015[16]) (Box 4.2). The UTQ has contributed to a greater recognition of teaching in higher education and more focused evaluations of lecturer training and teaching. It has also provided a stronger basis for assessing staff quality and human resource policies in the accreditation process (VSNU, 2018[13]). The share of teachers holding a UTQ certificate has been included among the compulsory indicators in the performance agreements with universities (see Chapter 3) in 2012, and as of 2016, 70% of teachers at universities held an UTQ.

Professional HEIs have introduced a policy requiring all teachers with at least a 0.4 full-time equivalent workload to obtain teaching qualifications developed specifically for the subsector – an initial or lower level qualification (*Basis Didactische Bekwaamheid*, BDB), and a further qualification, which builds on the BDB, for senior teaching staff (*Senior Kwalificaties Onderwijs*, SKO).

In **Norway**, criteria for different positions, including professor, associate professor, docent and senior lecturer are described in the Regulations for Employment and Promotion, 2006 (*Forskrift om ansettelse og opprykk, 2006*). Academic staff have two different career tracks: research-oriented (predominantly in universities) and teaching-oriented (predominantly in university colleges) (Frølich et al., 2018[10]).

Box 4.2. University Teaching Qualification (UTQ), the Netherlands

The University Teaching Qualification (UTQ) is a certificate that attests to the teaching competences of staff in scientific and academic education in Dutch universities.

The generic UTQ competences were developed in 2008 and include:

1. Testing, assessment and feedback
2. Education and ICT plus blended learning
3. Diversity and inclusion
4. Ongoing professionalisation.

The key components of the UTQ entail:

- Evaluation of the staff member's teaching portfolio
- Mentoring by a senior lecturer or teaching expert
- Participation in a community of teachers to learn from peers and reflect on teaching practices.

Source: Association of Universities in the Netherlands (2018[13]), *Professionalisation of University Lecturers: The UTQ and Beyond,* http://www.vsnu.nl/files/documenten/Professionalisation%20of%20university%20lecturers.pdf.

4.2.3. Age structure of academic staff

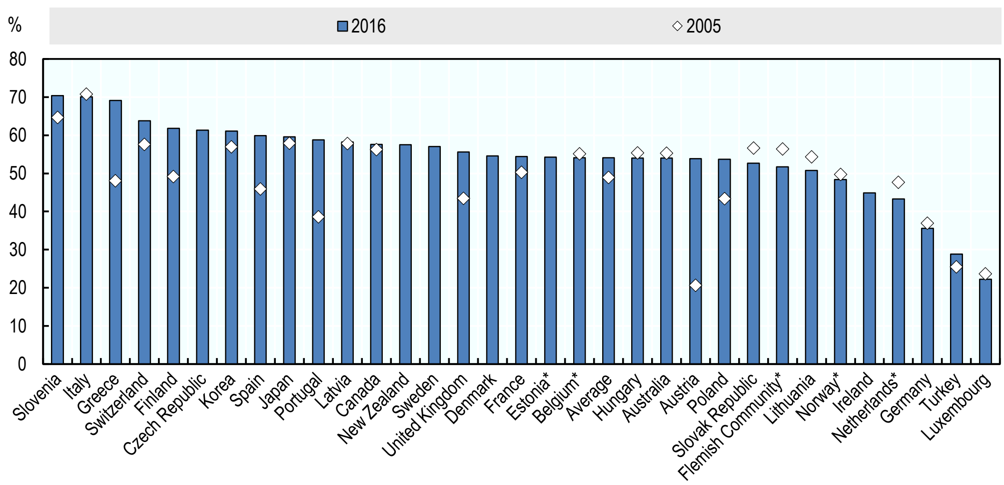
The age structure of the academic workforce has been a concern in many OECD countries since at least the 2000s (OECD, 2008[11]). On average across OECD countries and economies, the majority of academic staff is 45 years of age or older, though the share can reach as high as 70% in some countries (Italy and Slovenia). The share of staff older than 44 increased from 49% to around 54% between 2005 and 2016 (Figure 4.1).

In contrast, in the participating jurisdictions, the share of staff older than 44 decreased in the same period (2005 data for Estonia is not available). Apart from Estonia, which has a level similar to the OECD average, the participating jurisdictions also have a smaller share of staff over the age of 45, compared to the OECD average. This is particularly the case in the Netherlands, where the proportion of staff aged 44 or over is more than ten percentage points below the OECD average.

Older age profiles in some countries are partly related to demographic and social changes leading to an extension of the working life into an older age. The structure of the academic career path in some countries is also a factor, where a long career ladder means that it can take a considerable amount of time for academic staff to work their way up to the professorial level (OECD, 2008[11]). It can also be affected by long training periods for doctoral students in some countries and the age of new academics. For example, while training periods of three to four years are common among the participating jurisdictions, in the case of the United States, doctoral candidates can take from six to nine years to complete, depending on the subject and institution (see Chapter 6).

Figure 4.1. Share of academic staff in higher education older than 44 years old (2005 and 2016)

Full-time equivalent



Notes: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Instead of 2016, data refer to 2013 for Australia and Ireland, 2014 for Denmark and Poland, and 2015 for the Czech Republic.
Austria, Latvia, Luxembourg and Norway: Data refers to 2010 instead of 2005.
Czech Republic: Data for 2005 excludes staff who are not only paid through the government budget.
Belgium and the Flemish Community: Data exclude independent private institutions; data on short-cycle tertiary education refer only to the Flemish Community.
Canada, France and Norway: Data for 2005 and 2016 are not entirely comparable because of methodological changes in the data sources or the underlying methodology.
Italy: Data for 2005 excludes private institutions.
Spain: Data for 2005 exclude university research staff without teaching duties.
Source: Adapted from OECD (2018[17]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en; data provided by the Flemish Ministry of Education and Training.

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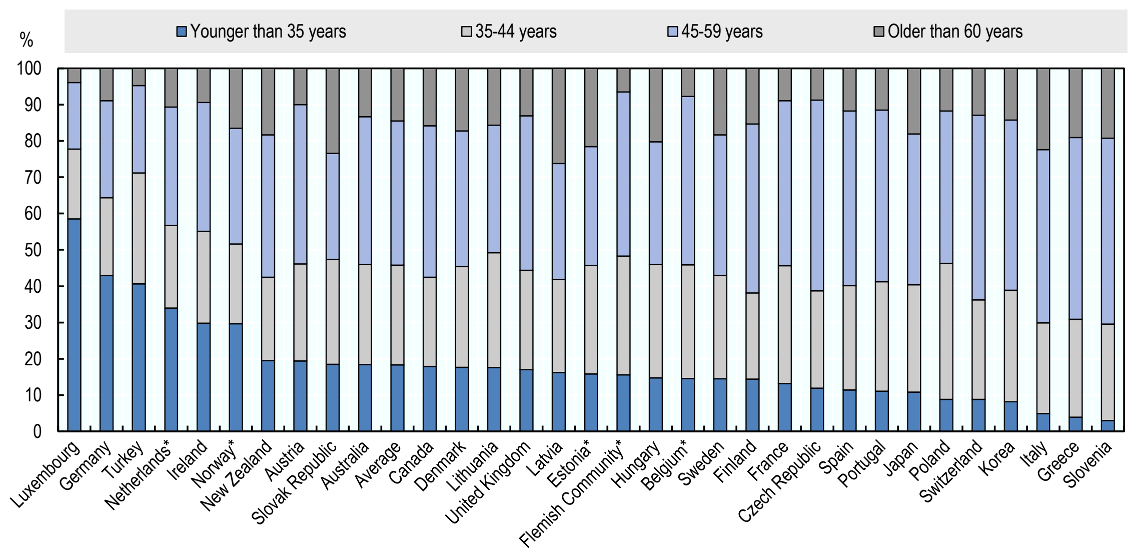
A substantial share of older academic staff may have implications for the sustainability of a higher education system. On average across OECD countries, around 15% of academic staff in higher education is 60 or older, some 40% is between 45 and 59 years of age, about 27% is between 35 and 44, and about 18% is younger than 35 (Figure 4.2). In a number of countries, such as Germany, Luxembourg and Turkey, academic staff tend to be younger, with over 40% under the age of 35. Luxembourg in particular has a majority of staff (almost 60%) aged less than 35, and less than 4% of staff are over 60.

However, this younger profile is the exception more than the rule. In Estonia, Hungary, Italy, Latvia and Slovakia 20% or more of academic staff is 60 or older. There are also six countries (Poland, Korea. Greece, Italy, Slovenia and Switzerland) where the share of staff younger than 35 is less than 10%.

The high share of academic staff in higher education older than 60 in the participating jurisdictions (around 22% in Estonia and 17% in Norway) implies that it will be necessary to attract a large number of younger academic staff in the near future, as the older employees retire. The ability to attract younger staff appears to vary across jurisdictions. The Netherlands has one of the largest shares of academic staff younger than 35 (about one-third), while in Norway this share is about 30%, and in Estonia and the Flemish Community it is 16%, just below the OECD average.

Figure 4.2. Share of academic staff in higher education, by age group (2016)



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Higher education systems are ranked in descending order of the share of academic staff aged younger than 35 years. For the definition of academic staff, see Box 4.1. Data exclude post-secondary, non-tertiary education in Japan and exclude short-cycle education in Luxembourg. Data refer to public institutions for France and Ireland, and exclude independent private institutions for Norway.
*Sou*rce: Adapted from OECD (2018[17]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en; data provided by the Flemish Ministry of Education and Training.

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Legislation around the age of retirement also can affect the age profile of staff. For instance, in the United States, the Federal Age Discrimination in Employment Act came into effect in 1993 for higher education institutions, eliminating the requirement to retire at 70. This was initially thought to have a minimal impact on higher education. However, an empirical study of data from a large metropolitan research university (from 1981 to 2009) indicated that 60% of faculty are expected to remain employed beyond 70 years-old (with the projections of 15% retiring at 80 years-old or over) since the change in law (Weinberg and Scott, 2013[18]). Box 4.3 outlines requirements around the retirement age in the participating jurisdictions.

An ageing academic staff can have significant budgetary implications, as older staff are more likely to be in senior positions and therefore have higher salaries. Current staff in some OECD countries may be members of generous pension schemes that were developed at a time when there were less staff who retired earlier. The effects of massification of higher education systems in the 1960s and 1970s in many countries, with the commensurate recruitment of large numbers of academic staff, are now leading to greater concerns about the workforce and budget implications. In some jurisdictions it is becoming more difficult for younger people to enter the academic workforce or find stable employment. Indeed, younger academic staff are more likely to work under precarious contracts (Section 4.3.2).

Box 4.3. Retirement age in participating jurisdictions

In **Estonia**, requirements around the retirement age vary for different categories of academic staff. Some staff are entitled to remain at work past the retirement age. They can receive the title of professor emeritus or docent emeritus, on the condition of having reached the age of retirement with at least 10-15 years of working experience (depending on the type of higher education institution). A professor emeritus or docent emeritus is entitled to a salary (according to the procedures established by the council), which is paid by the government (Eurydice, 2018[19]).

In **the Flemish Community**, in 2011, the retirement age and the required number of years of service were raised with no fixed minimum age limit. Tenured staff with at least 20 years of work experience at a university college may now opt to go on the reserve list full or part-time prior to retirement (and may be entitled to an allowance). The reserve list start date is aligned with the applicant's minimum pensionable age. A revised reserve list scheme was approved by the trade unions in 2012 with new criteria according to the year of birth and years of work. As of 2012, staff members may continue working after retirement age (65) while respecting the rules for combining pension and paid work (Eurydice, 2018[19]).

In **the Netherlands**, the General Old Age Pensions Act (AOW) defines the age for retirement, and access to an old age pension. The government is implementing incremental changes, so that by 2021 the retirement age will be 67 years-old (currently 66 years). The retirement age will be linked to life expectancy by 2022, with higher education staff entitled to supplementary pension (in addition to the one available for civil servants). Pensions will be based on average salary up to the age of entitlement. Pensions prepared before that date are based on the final salary (Eurydice, 2018[19]).

In **Norway**, social security and pension rights are regulated by law. The retirement age is 67 years and the government has set the maximum deferral age for retirement at 75 years.

Many OECD countries have policies aimed at attracting young academic talent, while some also have initiatives for retaining and training both younger and older staff, as seen in the participating jurisdictions (see Box 4.4). For example, Australia's higher education institutions target early career academic staff with teaching and research skills training and mentoring programmes. In Canada, funding initiatives also focus on young academic staff, providing support and mentoring programmes, in addition to increasing the number of senior academic positions (Hanover Research Council, 2009[20]).

Box 4.4 Policies related to attracting young talent to academia in the participating jurisdictions

Estonia's Research, Development and Innovation Strategy makes information on academic career paths widely available to youth from Estonia and abroad (Estonian Ministry of Education and Research, 2014[21]). Dedicated programmes include the Dora Plus programme (focused on learning and teaching) and the Mobilitas programme (focused on R&D). Both programmes are largely funded by the EU and aim to raise awareness of employment opportunities among young international researchers (and post-doctoral researchers) and support mobility through grants.

In **the Flemish Community**, the Pegasus programme (a programme co-financed by the European Union under the Marie Curie research funding scheme) funds one-year and three-year fellowships for incoming and outgoing young post-doctorate researchers (91 by 2016). Selected fellows are offered the same employment conditions as other researchers employed by the institutions at the same level, in line with the European Charter and Code (EC, 2016[22]).

The **Dutch** government and other stakeholders are responding to a forecasted shortage of engineers and scientists in all sectors of the economy, including higher education. The National Science Pact 2020, signed in 2013 by various stakeholders (including businesses, public authorities and educational institutions), promotes science and engineering programmes to pupils, and as a career for young graduates (Techniekpact, 2015[23]). In addition, the Pact has encouraged recruitment efforts towards young researchers working abroad.

The Research Council of **Norway** (RCN) has launched initiatives to increase an interest in research, such as the Science Knowledge Project for children (*Nysgjerrigper*), the *Proscientia* project (promoting interest in research and science among young people aged 12-21 years-old) and an Annual Science Week. The RCN works in collaboration with other stakeholders, such as the Norwegian Contest for Young Scientists. It also funds awards such as the Young Excellent Researchers award; applicants need to prove scientific quality, leadership skills, and international experience (Benner, Mats; Öquist, 2014[24]).

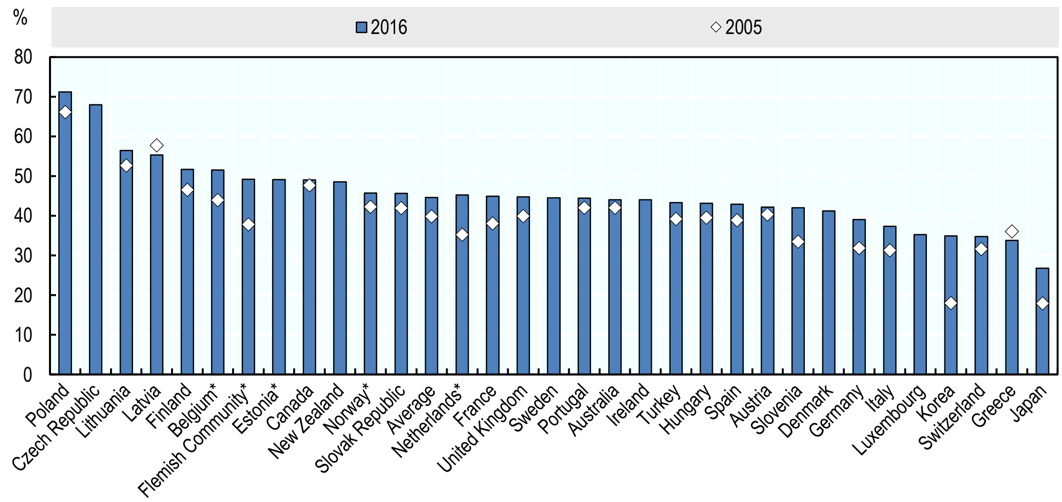
4.2.4. Gender balance among academic staff

Despite progress, female representation remains an issue in academia, especially in certain fields and in senior positions. Women tend to be underrepresented at senior levels of academia and management in higher education. Only 13% of higher education institutions in 27 EU countries were headed by women in 2009 (Morley, 2014[25]). Studies also show that the underrepresentation of women at senior levels of higher education is an important factor in explaining gender pay gaps. For example, reports on pay disparities in UK higher education institutions show an average gender pay gap for academics of around 12%, with the widest gap in favour of men for non-academic staff at the senior management level at 14%; in some institutions this gap can be over 25% (UCU, 2015[26]).

Overall, the gender gap is closing among OECD countries in terms of participation in the academic workforce; the average share of women among academic staff increased by five percentage points from 2005-2016 (Figure 4.3). Among participating jurisdictions with available data, the Flemish Community and the Netherlands had the largest increase in the share of women among academic staff over this period. The Flemish Community increased the share of women to 49% in 2016, from 38% in 2005; and the Netherlands increased to 45% in 2016 from 35% in 2005.

Women accounted for 45% of academic staff of all ages in higher education in 2016, on average across OECD countries. This share ranged from one-third or less in Greece and Japan to more than two-thirds in the Czech Republic and Poland. In Estonia and the Flemish Community, women accounted for close to half of the academic staff.

Figure 4.3. Share of women among academic staff in higher education, all age groups (2005 and 2016)



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018. See Figure 4.1 for notes on academic staff trend data.
Source: Adapted from OECD (2018[17]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en; data provided by the Flemish Ministry of Education and Training.

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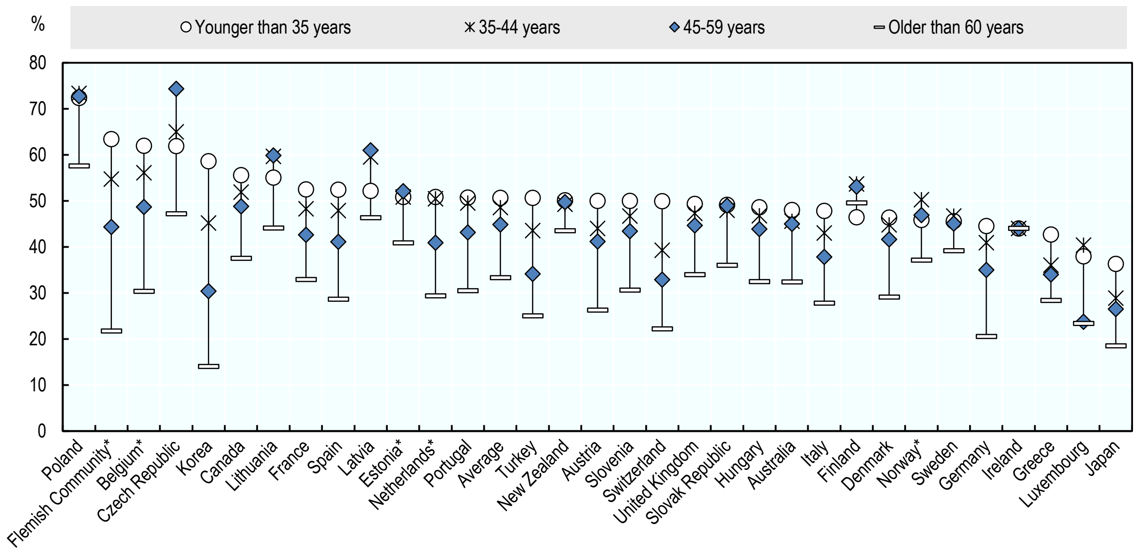
Women are better represented in younger age groups, accounting for about 50% of academic staff younger than 35 on average across OECD countries, a substantially larger share than among academic staff of all ages (Figure 4.4). The share of female academic staff younger than 35 is larger than their overall share among all ages in all countries except for the Czech Republic, Finland, Latvia and Lithuania (who already have a relatively large share of women among academic staff). This suggests that future representation of women among academic staff in the OECD could increase, if young female academics are retained.

The share of women among academic staff in the 35-44 and 45-59 age groups is lower than in the youngest age group in most countries, and the share of women among academic staff aged 60 and older is the lowest, on average across OECD countries (about one-third). The share of women among academic staff aged 60 and older is largest in Poland (almost 60%) while in Japan less than 20% of academic staff over 60 are women (Figure 4.4).

The share of women among academic staff younger than 35 is over 60% in the Flemish Community, one of the highest shares among OECD countries. Women in this age group represent just over half of all academic staff in Estonia and the Netherlands, and around 45% in Norway. The share of female academic staff aged 60 or older is relatively high in Estonia and Norway (about 40%), while it is below 30% in the Flemish Community and the Netherlands (Figure 4.4).

Figure 4.4. Share of women among academic staff in higher education, by age groups (2016)



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Data refer to public institutions for France and Ireland, and exclude independent private institutions for Norway.
Source: Adapted from OECD (2018[17]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en; data provided by the Flemish Ministry of Education and Training.

StatLink https://doi.org/10.1787/888933940664

The gender gap at senior levels of academia is persistent in many OECD countries, including the United States and Canada. In the United States, only about 39% of women achieved tenure positions in 2015 (National Center for Education Statistics, 2016[27]). Similarly, a study covering the length of service and average years of experience of university presidents in Canada from 1840-2011 showed that female representation increased during the 1980s to close to 20% in the mid-1990s, but has since stagnated (Turpin, De Decker and Boyd, 2014[28]).

In Australia, national frameworks such as the Australian Vice Chancellors' Committee Action Plan for Women Employed in Australian Universities, 1999 to 2003, supported female leadership in higher education (Winchester and Browning, 2015[29]). This action plan and subsequent initiatives led to the inclusion of equity strategies and performance indicators in the institutional planning of many higher education institutions. Monitoring gender representation in academia over the past three decades has shown a significant improvement in gender balance. In the mid-1980s, women composed only 20% of academic staff (6% of senior positions), while in 2014 this share had increased to 44% of academic staff (31% of senior positions) (Winchester and Browning, 2015[29]). Nonetheless, a 2016 report by Universities Australia indicates that only 15% of chancellors and 25% of vice chancellors in Australia were women in 2016. Furthermore, while the majority of university councils were gender balanced and the majority of academic board chairs were women, they only represented 20% of chairs of key boards and committees. In addition, only 34% were heads of faculties or schools (Universities Australia, 2016[30]).

In Japan, where the share of women in academia is the lowest in OECD countries with available data (Figure 4.3), the government has addressed gender inequity through the

Promotion of Women's Participation and Advancement in the Workplace Act 2016 (Japanese Gender Equality Bureau Cabinet Office, 2016[31]). In response, the Association of National Universities in Japan developed an Action Plan for 2016-2020 to improve gender equity in Japanese public universities, with targets to increase the share of women in faculty by 10% on average, and the share of women at the senior level (e.g. presidents, chairmen and vice-presidents) by 12% on average (The Japan Association of National Universities, 2017[32]).

Table 4.1. Initiatives that promote gender equity among academic staff in participating jurisdictions (2017)

	Estonia	The Flemish Community	The Netherlands	Norway
European Charter for Researchers and the Code of Conduct for Recruitment of Researchers (EU initiative)	Endorsed by five organisations, including the Research Council and the Academy of Arts	Endorsed by 20 organisations, including higher education institutions, ministries, funding and research organisations*	Endorsed by 10 organisations, including the Association of Universities on behalf of all members	Endorsed by 22 organisations, including the Research Council of Universities Norway
European Research Area and Innovation Committee (ERAC) (EU initiative)	Member	Member*	Member	Observer
European Research Area (ERA) Roadmap (EU initiative)	Implementation Plan 2016-2019	Belgian ERA Roadmap 2016-2020*	Top Action Priority in the ERA Roadmap 2015-2020	Norwegian ERA Roadmap 2016–2020
National initiatives: funding		Inclusion of a gender diversity indicator (the share of women in research positions at different levels) in indicators for research formula funding – 2% of the Special Research Fund (see Chapter 3)	Funds for the recruitment of 100 female professors (*Westerdijk Impuls*) (NWO, 2017[33]); Government target: 200 new female professors by 2020; Government grants for women in physics research (NWO, 2017[33])	Additional funding for institutions appointing female faculty members
National initiatives: networking		Public-private co-funding of research fellowships for women in biomedical sciences (with the involvement of L'Oréal Belgilux, the Flemish Research Foundation and other organisations (FWO, 2018[34])	The Dutch Network of Women Professors (LNVH), of over 1 100 female (associate) professors, promotes equal representation of women within the academic community (LNVH, 2018[35])	Several networking platforms (e.g. Women's Information Network of Europe), store and share information and academic publications on gender related studies; and connect doctoral students and junior researchers
National initiatives: monitoring processes	Monitor gender balance when hiring researchers, allocating grants and filling positions in decision-making bodies (Research and Development and Innovation Strategy 2014-2020)	Gender monitoring programme that reviews and assesses policies. Further monitoring is also undertaken by the Flemish Interuniversity Council	All higher education institutions are encouraged to increase the diversity of staff (including gender, migrant background, etc.), monitor and report on progress in this area (Dutch Ministry of Education, Culture and Science, 2017[36])	

Note: *Initiatives implemented at the national (Belgian) level.
Source: Adapted from information provided by the participating jurisdictions. See the reader's guide for further information.

Numerous initiatives have been put in place in recent years at EU and national levels to promote gender equity among academic staff in Europe (Table 4.1). Many national policy actions in the participating jurisdictions are aligned with EU policy initiatives such as the Charter and the Code of Conduct for the Recruitment of Researchers, the European Research Area Innovation Committee and the European Research Area,[3] all of which embed principles and encourage practices to promote gender balance at all levels. However, available evidence suggests that the gender gap is not closing in certain fields of work, for example technology and engineering, as well as in the commercialisation of research (see Chapter 6). Internationally comparable data on gender balance by seniority would be required to assess whether there is still a gender gap in the most senior positions across countries.

All participating jurisdictions are also recipients of the Marie-Sklodwaska-Curie Actions (MSCA), another EU initiative. A 2012 study prepared indicated that female academics are generally found to be less mobile than their male peers, at least in terms of international mobility (Euraxess, 2017[37]). The MSCA provides grants to researchers at all stages of their careers supporting international, intersectoral and interdisciplinary mobility (EC, 2018[38]). MSCA practices for gender equality include training on unconscious gender bias for evaluators of proposals; equal opportunities in projects regarding support for researchers and project supervision; balanced gender representation in decision-making bodies, with a higher representation of women in the MSCA Advisory Group; and a higher weight on gender dimension as a component of the research itself (Euraxess, 2017[37]).

Gender equity is also promoted through many practices at the national level (Table 4.1), indicating government efforts to improve the system effectiveness in terms of equity. In **Estonia**, the Gender Equality Act 2004 (*Soolise võrdõiguslikkuse seadus 2004*), amended in 2014, makes references to the responsibility of educational and research institutions, as well as employers, to promote equality between men and women (Estonia Official Gazette, 2013[39]). Gender balance is also included in R&D objectives within the Research and Development and Innovation Strategy when filling positions, allocating grants and composing decision-making bodies (Estonian Ministry of Education and Research, 2014[21]).

In **the Flemish Community**, the Flemish Ministry of Higher Education and Training, and the Ministry of Work, Economy, Innovation and Sport are jointly responsible for gender equality in research. Following a consultation process in 2012 which included input from faculty deans and other stakeholders, regulations were developed to set targets for the participation of both genders in public universities' decision-making bodies (i.e. university boards, research councils and selection juries).

In **the Netherlands**, gender equality and diversity are featured in the strategic plans of many higher education institutions and promoted through gender equity frameworks. For example, the *Westerdijk Talentimpuls* programme offers universities the opportunity to apply for premiums if they appoint female researchers as professors (Table 4.1). The Ministry of Education, Culture and Science has also made a one-off investment of EUR 5 million for the appointment of 100 female professors. An amount of EUR 50 000 (per appointment) can be applied to additional salary costs associated with the promotion of UD/UHD (Box 4.1) to professor, or with the research budget of the appointed professor.

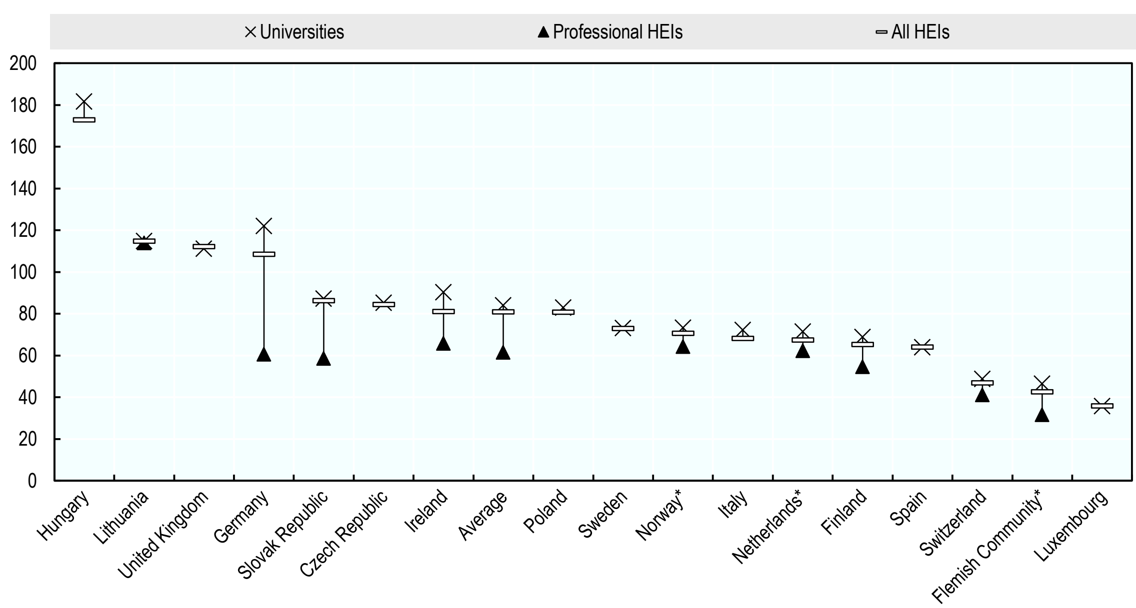
In **Norway**, all public institutions are obliged by law to take active steps to promote gender equality (Norwegian Research Council, 2017[40]). The Research Council of Norway is responsible for initiating, implementing and monitoring research activities on gender equality in higher education. The Committee for Gender Balance and Diversity in Research provides advice on matters related to the recruitment and promotion of women in research in senior and management positions in higher education institutions.

4.2.5. Non-academic staff categories

The role of non-academic staff in higher education has gained prominence due to an increase in numbers in recent decades in some countries. In the United Kingdom, data collected by the Higher Education Funding Council for England (HEFCE) for 2015 and 2016 indicated that more than half of the staff employed in higher education institutions were professional and support staff (non-academic). The number of non-academic staff has increased by 6% since 2012-2013 (a substantial increase, although not as large as the increase in academic staff by 9%) (HEFCE, 2017[41]; HESA, 2017[42]).

Research suggests that the ratio of non-academic staff to academic staff may not have varied over time, although the nature of non-academic staff work has evolved over time to meet changing needs. For instance, in Australia, the ratio of 1.3 non-academic staff to academic staff members is the same as it was before the 1990s, when a large number of support staff were engaged in tasks such as typing documents (Watts, 2017[43]).

Figure 4.5. Non-academic staff per 100 academic staff, by subsector (2015)



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Flemish Community: Data may exclude academic staff working in academic hospitals; data for professional HEIs exclude staff that is not paid by the institutions.
Norway: Data include only staff working a minimum of 40% of a full-time workload.
Source: Adapted from European Tertiary Education Register (2018[44]), *ETER Database*, www.eter-project.com.

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Figure 4.5 shows the ratio of non-academic staff per 100 academic staff in European countries by subsector. Among countries with available data, the Flemish Community has one of the lowest ratios of non-academic staff to 100 academic staff when looking at all higher education institutions, while the Netherlands and Norway are closer to the average.

Overall, universities tend to have higher ratios than professional HEIs. This may reflect their distinct nature of work, i.e. the need for support staff in R&D activity. Figure 4.5 also highlights that different systems appear to have very different requirements for non-academic staff, which may indicate differences in the functions carried out by different job categories across countries.

The expansion which has occurred in many higher education systems has also created changes in the profile and tasks of administrators, technicians and support staff. Increased internationalisation, engagement, technology transfer and commercialisation of research has led to the creation of more specialist positions (Di Leo, 2017[45]). Demands for accountability have also led to greater numbers of staff responsible for reporting. The development and implementation of technology-led programmes (including online delivery) has required staff to often perform a hybrid role (a mix of academic and non-academic) that requires expertise in the areas of innovation, technology and pedagogy.

Non-academic staff are increasingly highly qualified and well paid, professionalised and demanding more specialised career paths (Fahnert, 2015[46]). As a result, many higher education systems have witnessed a "managerial revolution" of non-academic professionals in management and specialist roles in the university administration infrastructure. Their impact on higher education performance is as yet unclear (Baltaru, 2018[47]), but highly skilled specialist staff could, in principle, contribute to a more efficient use of resources in higher education.

4.2.6. Senior management in higher education institutions

Table 4.2. Senior management roles in higher education (2017)

	Estonia	The Flemish Community	The Netherlands	Norway	Examples from other jurisdictions (universities)
Level 1 (Chief Executive)	Universities and professional HEIs: rector	Universities: rector; Professional HEIs: general director	Universities: rector, president	Universities and university colleges: rector	Chancellor, vice chancellor, president, provost, principal
Level 2	Universities and professional HEIs: chancellor/ director for non-academic units	Universities: vice rector	Universities: vice president	Universities and university colleges: vice rector	Deputy vice chancellor, pro-vice chancellor
Level 3	Universities: dean; Professional HEIs: head of department, director	Universities: dean; Professional HEIs: head of department	Universities: dean	Universities and university colleges: dean	Dean

Source: Eurydice (2018[19]), *National Education Systems*, https://eacea.ec.europa.eu/national-policies/eurydice/national-description_en; information provided by the participating jurisdictions. See the reader's guide for further information.

The transformation of universities in many countries from collegial communities of academics into hierarchical organisations incorporating elements of private sector management has led to changes in the way universities are managed (Broucker and De Wit, 2015[48]). However, senior management roles in higher education, from the executive head (rectors, presidents, vice chancellors, general directors, etc.) to deans or heads of faculties (Table 4.2), are usually held by academic staff. This reflects the long tradition of internal governance in higher education and the importance of maintaining a strong relationship and credibility with the academy.

However, in the modern higher education institution, a strong academic background needs to be complemented by management and business skills to deal with large and diversified funding streams, multiple internal governance structures, and an external representative profile (locally, nationally and internationally) (Middlehurst, 2013[49]). Senior managers need to be able to engage effectively in complex negotiations with government and understand a vast array of laws and regulations related to higher education.

The processes to select senior management staff and the selection criteria and qualifications for these roles vary across countries, reflecting management practices within jurisdictions. In some countries, legislation prescribes mandatory qualifications and selection criteria for executive heads, including the academic staff level. Requirements vary across the participating jurisdictions, as seen in the qualification requirements for executive heads in universities (Table 4.3). The process to select senior management may entail an election by staff or the appointment by the council or board (executive heads) or senior managers (those below executive heads). The European Universities Association (EUA) Autonomy Tool notes four categories of selection procedures for executive heads in European universities:

- elected by a specific electoral body that is usually large, representing (directly or indirectly) the different groups of the university community (academic staff, other staff, students), and whose votes may be weighted
- elected by the governing body that is democratically elected within the university community (i.e. the body that decides on academic issues)
- appointed by the council/board of the university (i.e. the governing body that decides on strategic issues)
- appointed through a two-step process in which both the senate and the council or board are involved (Bennetot Pruvot and Estermann, 2017[50]).

The election or appointment of executive heads in some jurisdictions needs to be validated by external authorities, such as minister or head of government.

Some jurisdictions have specific protocols for the selection of executive heads of higher education institutions. For example, in Estonia, the selection process for the appointment of executive heads of universities is organised differently in four universities, according to the University Act (UnA) (*Ülikooliseadus*, 1995), as Tartu University and Tallinn University of Technology have separate Acts (Estonia Official Gazette, 1995[51]). While in Tartu University they are elected by council and senate, in Tallinn University of Technology they are elected by university council (the highest decisive body). In professional HEIs under the Ministry of Education and Research, the selection process requires a public competition. The candidates are selected by an electoral body composed of seven members, where two are named by the ministry, two by the academic body (one of them being a student), two by the advisory body, and one representing organisations and companies from the field of professional HEIs. (Table 4.3).

In addition, in Estonia there is no practice or mechanism for external validation concerning the selection of the rector. However, the Minister of Higher Education and Research appoints five out of 11 members of the university council and the senate for the two largest universities in Estonia (Tartu University and Tallinn University of Technology). Meanwhile, the position of vice rector is defined in legislation (Estonian Ministry of Education and Research, 2014[21]). Professional higher education institutions have ministry representatives in their committees (Table 4.3). In the case of universities, according to the UnA, the most senior member of the council shall enter into a contract with the rector for five years.

Table 4.3. Selection of executive heads of higher education institutions in participating jurisdictions (2017)

	Estonia	Flemish Community	The Netherlands	Norway
Selection criteria	▪ Universities: open to all professors ▪ Professional HEIs: open to all Estonian citizens who are professors or have at least a master's degree	Universities: determined at the institutional level	Universities: determined at the institutional level	Universities: determined at the institutional level
Selection process	▪ Universities: rectors are elected in accordance with procedures established under the statute of each institution ▪ Professional HEIs: elected in accordance with the procedure established by a government regulation	Universities: determined at the institutional level	Universities: members of the executive board, i.e. the president, vice president and rector of the university, are selected by the supervisory board (*Raad van Toezicht*)	Universities: determined at the institutional level. A change in the law (April 2016), has made the appointment of the rector by the university board the main model to be used by universities, rather than an election model
External validation of decision	Not required	Not required	Universities: must be confirmed by the Minister of Science and Education	Not required

Note: In Norway, around half of the universities appoint their rector through the university board or council, while the other half elect their rector through a process involving the university staff and students.
Source: For universities, Bennetot Pruvot and Estermann (2017[50]), *University Autonomy in Europe III The Scorecard 2017*, www.eua.be/Libraries/publications/University-Autonomy-in-Europe-2017. For professional HEIs and independent private institutions, the OECD collected the information from the Estonian Ministry of Education and Research and from national higher education institution associations (for the Flemish Community, the Netherlands and Norway), based on the instruments developed by the European University Association (Bennetot Pruvot and Estermann, 2017[50]).

As demands for efficiency and effectiveness increase, executive heads are being asked to lead in a more proactive way, acting as CEOs of higher education institutions. They need to prove management (including financial matters), leadership and business skills (Dinya, 2010[52]), although the provision of training is not done systematically across (nor within) countries. This may have an effect on the capacity of higher education institutions to implement reforms and perform efficiently.

4.3. Working in higher education

High quality working conditions are necessary to attract and retain excellent academic staff. Across the OECD countries covered in the Changing Academic Profession (CAP) international survey in 2007, 2008 or 2010, there is a perception that working conditions for academic staff are deteriorating. On average across these countries, the surveyed staff reported working 48 hours a week and almost half of them considered their job as a source of considerable personal strain (Section 4.3.7) (Teichler, Arimoto and Cummings, 2013[53]). In addition, evidence from the OECD Survey of Adult Skills shows that higher education offers young doctorate holders careers with similar job satisfaction, but less job stability than other sectors of employment (Box 4.5). Good working conditions can help to ensure an effective and sustainable higher education system; satisfied staff have the right environment to produce better outputs and can be more easily retained in the profession.

Box 4.5. Job stability and job satisfaction among doctorate holders

Within a representative sample of 16-65 year-olds in OECD countries and economies participating in the OECD Survey of Adult Skills, 26% of doctorate holders younger than 45 worked in higher education at the time the survey was conducted (in either 2012 or 2015), a proportion slightly (but not significantly) lower than among 45-65 year-olds (28%).

Doctorate holders in the 45-65 age group working outside higher education were slightly less satisfied with their job than those working in higher education, but they were also slightly more likely to report holding a permanent job (neither result is significant). The differences between those working in higher education and other sectors were sharper among doctorate holders younger than 45. In particular, younger doctorate holders in higher education were about 2.5 times less likely to be employed on a permanent basis than those working in other sectors (this difference is significant at the 1% confidence level).

Table 6.a. Job stability and job satisfaction among doctorate holders (2012 or 2015)

Percentage reporting to be satisfied or very satisfied with their job and to have indefinite contracts, by sector of employment and age group

	Satisfied with their job		With indefinite contracts	
Age group	Younger than 45	45-65	Younger than 45	45-65
Higher education	70%	88%	24%*	69%
Other sectors	83%	79%	61%*	73%

Note: * The difference between higher education and other sectors is significant at the 5% confidence level (also when controlling for country fixed effects). The sample size for the test is 582 for Column 1, 574 for Column 2, 519 for Column 3, and for 475 for Column 4.
Source: Adapted from OECD (2016[54]), *OECD Survey of Adult Skills*, www.oecd.org/skills/piaac/data/.

These results are consistent with the findings from recent studies. However, the difficulty in developing a sampling frame containing the full population of doctorate holders (McDowell, 2016[55]) implies that such evidence is often not generalizable. For example, based on an online survey, Sinche et al. (2017[56]) found that US doctorate holders in research-intensive (including academic) and non-research-intensive careers had similar levels of job satisfaction. Starting from the premise that longitudinal data on career destinations for doctoral graduates are not routinely collected in Australia, McGagh et al. (2016[57]) review a small number of existing studies suggesting that doctorate holders working in the academic sector have lower job stability than others. In addition, based on a survey of recent doctoral graduates from selected universities in various European countries, the European Science Foundation (2017[58]) found that doctorate holders in universities were less likely to be employed on permanent contracts than in other sectors, while enjoying similar levels of job satisfaction.

4.3.1. Career paths in academia

Clear and well-designed academic career paths help ensure the sustainability of higher education systems. An ideal academic career path will attract excellent staff, reward productivity, promote stability, enable high quality teaching and innovative research, and help to build a "world-class" reputation (Altbach and Musselin, 2015[59]). Career paths in academia entail training,[4] employment contracts, hierarchy and the option of tenure (Pechar and Andres, 2015[60]).

Employment contracts can be permanent or fixed term (for an overview of permanent and non-permanent staff, see Section 4.3.2). Permanent or indefinite contracts in higher education are often referred to as tenure. Staff on a tenured appointment are employed under a permanent contract following a probation period and can only be dismissed for a specific cause or under extraordinary circumstances. The process to obtain tenure may comprise an agreed evaluation procedure with a peer-reviewed assessment of academic accomplishments. However, the tenure system and academic staff career structures remain very much national in form, with substantial variation across countries (OECD, 2008[11]).

There are different types of tenure due to different contexts; for example, in many European countries, academic staff have the status of civil servants, in which case they already have special treatment for job termination (only under special circumstances). Academic tenure in North America follows a long probation period and rigorous (internal and external) peer review. In some countries, the career model of tenure has been abolished (e.g. the United Kingdom), and employment contracts are limited to permanent and fixed term.

While there is no single model for career paths across countries, initiatives such as the European Union's Charter for Researchers and the Code of Conduct for the Recruitment of Researchers facilitate academic mobility and help higher education institutions in the region ensure that an academic's experience is recognised equally across the EU countries. Associated guidelines for the recruitment process of academic staff include advice on qualification requirements, working conditions and entitlements (i.e. career development prospects), information to include in the advertisement for the post and what is expected from applicants in their curriculum vitae (EC, 2005[61]) (see Chapter 6).

Table 4.4 provides a brief description of national frameworks for the career structure of academic staff established in the participating jurisdictions.

Estonia and Norway have similar criteria for career progression (i.e. accomplishments as a researcher, teacher and academic qualifications). The career structure is the same for all higher education institutions in Norway. In addition, criteria for recruitment of new staff in Norway are laid down in regulations that apply to all higher education institutions (including some restrictions on the composition of selection panels and promotion requirements). The same criteria may vary in the Flemish Community and the Netherlands, as they are determined at the institutional level.

In the Flemish Community, within the Codex framework, higher education institutions define their own standards and procedures for professional ethics and evaluation, as well as the appointment and dismissal of officials. If institutions use non-government funds, candidates can be hired without going through the required recruitment procedure for academic staff, which includes public advertising and a formal selection process (EC, EACEA, Eurydice, 2017[5]). In the other participating jurisdictions, higher education institutions enjoy a large degree of autonomy in the hiring of new staff, provided that the vacancies are made public.[5]

Table 4.4. Academic career structure, public institutions (2017)

	Estonia	The Flemish Community	The Netherlands	Norway
Criteria for career progression within the national career structure	Accomplishments as a researcher; academic qualifications	Determined at the institutional level	Determined at the institutional level	Accomplishments as a researcher and teacher (academic qualifications, alternate academic career path)
Basis for promotion to a higher position	Position needs to be vacant	Position needs to be vacant	Determined at the institutional level	Promotion is possible upon fulfilment of given requirements or on a vacant position

Note: National academic career structure varies according to the type of higher education institutions. The information in this table applies to all public and government-dependent universities and professional HEIs.
Source: Adapted from information provided by the participating jurisdictions. See the reader's guide for further information.

Higher education institutions have a relatively high level of autonomy in deciding on promotion processes in the participating jurisdictions. Academic staff can be promoted only when a position is vacant in Estonia, the Flemish Community and Norway (universities). Meanwhile, in the Netherlands, rules for promotion are determined at the institutional level.

In Norway, the criteria for promotion are similar to those for recruitment (including the restrictions) (Norwegian Ministry of Education and Research, 2006[62]). Employees may initiate the promotion process by requesting the appointment of a panel of academics to take a decision on their promotion, e.g. from associate professor to professor. The recruitment process follows public administration rules. Working conditions that are not directly specified in the civil service regulations (such as salaries and provisions on career development) are drawn from collective agreements between unions and higher education institutions (Eurydice, 2018[19]).

Based on the categories presented in Box 4.1, Table 4.5 presents a typical career path in academia in the participating jurisdictions.

In the case of Estonia, existing statutes (UnA, Standard of Higher Education) in addition to presenting staff categories and responsibilities, also state the minimum qualification requirements, requirement for public competition and open application procedures for the election of teaching and research staff (with exceptions when the competition has failed or the position is of temporary nature).

Estonian higher education institutions are free to promote academic staff, with minimum requirements set in legislation. A typical academic career follows four steps (Table 4.5). A doctorate is a requirement for a professorship under the Universities Act 1995 (Estonia Official Gazette, 1995[51]). Appointments to professorial positions in public universities are usually based on research performance and the successful supervision of doctoral students. Performance and experience in other levels of teaching is also considered, but it receives less weight in the evaluation of a candidate. Associate professors (*dotsent* –

teaching as main activity) are also required to have a doctorate, but the successful supervision of doctoral students is not as important (Estonian Ministry of Education and Research, 2014[63]). There is a growing interest from higher education institutions in adopting a framework of regulations that applies to academic career models, including the awarding of tenure (Kanep, 2017[64]). Such developments are being prepared within the new higher education legislation.

Table 4.5. Typical career path by type and subsector in participating jurisdictions (2017)

	Step 1		Step 2		Step 3		Step 4		Step 5		Step 6
Estonia	Teacher	→	Lecturer	→	Associate professor	→	Professor				
The Flemish Community	Graduate teaching and research assistant	→	Senior research fellow	→	Assistant professor	→	Associate professor	→	Professor	→	Full professor
The Netherlands	Doctorate fellow (paid position)	→	Post-doc (*onderzoeker*)	→	Senior lecturer	→	Professor				
Norway	Lecturer, research fellow, post-doc	→	Associate professor	→	Professor						

Source: EC, EACEA and Eurdydice (2017[5]), *Modernisation of Higher Education in Europe - Academic Staff 2017*, https://doi.org/10.2797/408169; information provided by the participating jurisdictions. See the reader's guide for further information.

In the Flemish Community, there are six steps to reach the most senior academic level. Higher education institutions are free to promote senior academic staff (although the promotion of administrative staff is more regulated) (Table 4.5). The Flemish government also introduced a number of measures to provide more career stability to staff. Tenure track for assistant professors was introduced in 2008, leading to a position of associate professor with an ongoing contract upon positive evaluation at the end of a five-year tenure period. The government has set a target of success rate for the Research Foundation Flanders (*Fonds voor Wetenschappelijk Onderzoek* (FWO)) grant applicants of at least one-third, from the current 20% to allow sufficient competition among researchers, without discouraging the submission of proposals. The aim is to retain Flemish researchers who would apply abroad otherwise, and also to attract researchers from abroad.

To ensure the sustainability of human resources in higher education, the Human Resources in Research database in Flanders has been tracking academic career progression of researchers connected to one of the five main universities since 1990-91, collecting data on gender, discipline and funding. This data provides a solid base for the planning and monitoring of short-term research contracts at entry and doctoral level, post-doctoral appointments, tenure positions and retirement (Debacker and Vandevelde, 2016[65]).

There are four main steps in the academic career in the Netherlands (student assistant, lecturer, senior lecturer and professor) (Table 4.5). Tenure tracks are a common step in Dutch career paths. Each institution can autonomously define the length of tenure track contracts (within the existing regulation) and the criteria for conversion to an ongoing contract. The Netherlands also offers tenure track options for positions that are more focused on teaching, such as lecturer. Under a job classification system (*universitair functieordeningssysteem*, UFO) (Section 4.2.2), all Dutch university employees are assigned a job profile at a corresponding level.

The government has also implemented two programmes to assist professional higher education institutions in improving the beginning of new teachers' academic careers, as well as introduce new teaching ideas and practices in the higher education system. The Vliegende programme aims to attract, select, and guide new teachers in their goals with the aim to improve the career development of teachers (career launch and retention of good teachers). The Comenius programme recognises outstanding and innovative teaching by offering fellowships to academic staff, thereby increasing the status of teaching within higher education institutions and advancing the careers of fellows (see Chapters 3 and 5).

The typical academic career in Norway goes from lecturer, to associate professor, and then professor (Table 4.5). At large universities, the typical career starts as a doctoral fellow, then on to post-doc, associate professor and professor. While the associate professors and professors are more common in universities, lecturers are most prominent in other institutions. Career progression follows the rules applying to civil service and the criteria laid down in the regulations on qualifications requirements and promotion for academic staff.

4.3.2. Permanent and non-permanent staff

Academic staff careers have changed significantly over recent decades. Previously, they were based on a two-stage process, with a first period characterised by apprenticeship, selection and time-limited positions; and the second beginning with access to a permanent position (OECD, 2008[66]). However, academic staff nowadays have varying types of contracts, leading to different levels of job security. Similar to many other regions, higher education staff in the European Union can be classified according to the type of contract with which they are employed (EC, EACEA, Eurydice, 2017[5]):

- Hourly contract staff denotes staff employed and paid by the hour, usually on termly or annual contracts (including "zero hours contracts" with no guarantee of work).
- Fixed-length contract staff refers to staff on contracts which expire at the end of the period specified.
- Ongoing contract staff refers to staff on contracts without an expiration date; these are also referred to as indefinite or permanent contracts.

Internationally comparable data on job performance and satisfaction of staff with different contract modalities are not available. Although, according to Education International, a federation of teachers' unions, employment on fixed-term contracts negatively affects the motivation and professional identity of academic staff, harming the ability of higher education institutions to carry out their missions (Stromquist, 2017[67]). In addition, job security is considered important for academic freedom (Box 4.6).

Box 4.6. Academic freedom in higher education institutions

Academic freedom is generally characterised as the freedom to teach and conduct research (for academics) and to learn (for students) without constraints imposed from outside the academic community, although it is a concept inherently difficult to define (Altbach, 2001[68]; Åkerlind and Kayrooz, 2003[69]). It is related to working conditions through regulations at the institutional, national and international levels, while shaped in direct and more subtle ways by the dynamics of relationships between academic staff, non-academic staff, students, communities and governmental bodies. The reconciliation of academic freedom with institutions' contributions to society points requires institutions to develop frameworks that link institutional goals to individual academic work. Such reconciliation efforts aim to benefit society and make the academic profession more attractive (OECD, 2008[11]).

The 1997 UNESCO Recommendation concerning the Status of Higher Education Teaching Personnel (UNESCO and ILO, 2008[70]) identified a number of elements which support academic freedom, including institutional autonomy; individual rights and freedoms; self-governance and collegiality; and tenure (Karran, 2009[71]). In terms of self-governance and collegiality, UNESCO recommended that academic staff should have the right and opportunity to participate in governing bodies and be able to elect the majority of representatives to academic bodies. Furthermore, it suggested that collegial decision-making should encompass decisions regarding the administration and determination of policies of higher education, curricula, research, extension work, the allocation of resources and other related activities. However, self-governance will not ensure academic freedom if it translates into bad management; and tenure may limit the freedom of young, non-tenured academic staff to criticise the academic establishment (OECD, 2008[11]).

Academic freedom is ensured by legislation in all the participating jurisdictions, through Acts related to higher education or through the constitution (Estonia Official Gazette, 1992[72]; Legal Affairs and Parliamentary Documentation Department, 2017[73]; Dutch Ministry of the Interior and Kingdom Relations, 2002[74]; Norway Acts and Regulations, 2005[75]).

There are also no internationally comparable data covering a large number of OECD countries on the share and profile of staff by type of contract, although some data have been collected by academics and various organisations. In Australia, only one of four newly appointed faculty is hired on an ongoing basis (Ryan et al., 2013[76]). In Canada, one-third of university faculty members are on fixed-length positions and not on a tenure track, and in the United States, this applies to 70% of new faculty appointments as reported by Education International (Stromquist, 2017[67]). In France, approximately 60% of the total faculty are adjunct faculty (academic staff in fixed-length contracts) (ILO, 2018[77]). The share of academic staff without ongoing contracts also differs by gender, with women representing on average more than 60% of the fixed-length or hourly positions across European countries (Stromquist, 2017[67]). In addition, women in Europe represent more than 30% of the professors (permanent faculty position) in only six countries whose institutions are listed in the European Tertiary Education Register (Stromquist, 2017[67]).

Table 4.6 shows the percentage of staff with ongoing contracts across different age groups for the participating jurisdictions (this data excludes staff without teaching duties and doctoral students with temporary contracts). In all jurisdictions, having an ongoing contract is equivalent to tenure in terms of job security, as the labour law protects workers with ongoing contracts from dismissal without just cause. In addition, Norwegian public institutions, Dutch public universities and the Flemish Community (in that which relates to autonomous academic staff) must follow the stricter regulations applying to civil servants for the dismissal of staff with ongoing contracts.

Table 4.6. Share of teaching staff with ongoing contracts, by age (2016)

Academic staff with teaching duties, excluding doctoral students

Age group	Estonia	The Flemish Community	The Netherlands	Norway
34 and younger	46.9	9.8	25.2	23.1
35-44	44.7	47.4	72.0	59.9
45-59	42.4	73.1	93.4	77.5
60 and older	46.9	79.4	93.5	85.3
All ages	44.8	51.9	74.4	70.4

Note: For the definition of academic staff, see Box 4.1.
Source: Adapted from information provided by the participating jurisdictions. See the reader's guide for further information.

In **Estonia**, 45% of academic staff with teaching duties across all age groups are on ongoing contracts. The share of ongoing contracts does not differ much across age groups, with very close values for the age groups 60 and older and 34 and younger. The share is slightly lower in the age group 45-59 years (42%). In principle, academic staff in Estonia should be employed with ongoing contracts, after an open competition process designed by the university council or, for professional HEIs, by the ministry. Fixed-length or hourly contracts can be used if a position cannot be filled through regular procedure. Temporary employment with the same employer cannot last longer than five continuous years, after which the work relationship must end or the person should be offered an ongoing contract.

In **the Flemish Community**, the total share of academic staff with teaching duties in ongoing contracts is 52%. Fixed-length contracts are much more common across younger academic staff. The share of academic staff younger than 34 in this type of contract in the Flemish Community is about 10%. In contrast, the share of academic staff in ongoing contracts is above 70% for the age groups 45-59 and 60 and older.

In **the Netherlands**, the share of academic staff with teaching duties in ongoing contracts for all ages is about 74%, much higher than for Estonia and the Flemish Community. The share is in line with the cap of 22% of fixed-length or hourly contracts set in 2015 by the Association of Universities in the Netherlands (VSNU, 2015[78]). Collective labour agreements in the Netherlands have ensured more contractual stability for academic staff including a maximum duration (six years) for work on fixed-length or hourly contracts with the same employer and a limit to the number of renewals (two) of hourly or fixed-term contracts (Dutch Ministry of Education, Culture and Science, 2017[36]).

In **Norway**, the share of academic staff with teaching duties in ongoing contracts for all ages is 70%. The remaining 30% in temporary posts include contract staff hired with funds external to the institutional budget. The shares show a higher percentage of staff in fixed-length positions in the youngest age group, as just 23% of staff younger than 35 have an ongoing contract.

4.3.3. Part-time academic staff

Working hours for academic staff differ across countries, institutions and staff categories. In this discussion, part-time staff are defined as academic staff employed for less than 90% of the normal or statutory working hours in the same job or role at a given level of education. This implies that part-time academic staff may work additional hours outside the education sector.

Part-time academic staff working outside the academic sector may help establish enduring links with the world of work, thus contributing to the effectiveness of higher education in preparing students for the labour market. It has been argued that part-time positions help institutions reduce costs, more easily adjust to fluctuations in enrolments and increase flexibility for employees. Others argue that part-time staff are often underpaid and lack benefits such as medical insurance (Benjamin, 2015[79]).

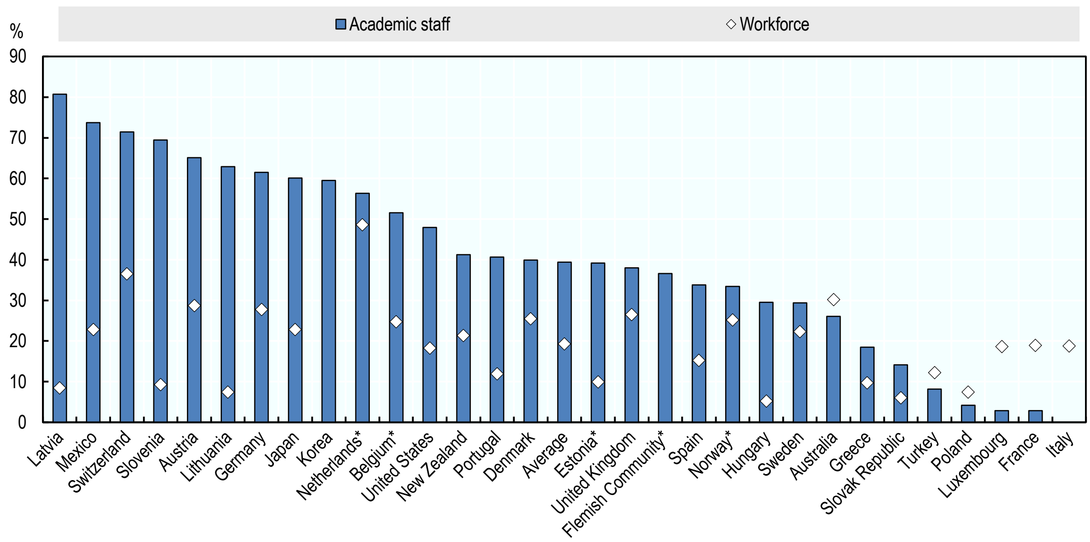
Some academic staff may also be working in enterprises or other organisations which can bring benefits to both sectors. Academic staff working part-time in enterprises or other sectors can bring research expertise into the business environment and public sector. Non-academic professionals working part-time as lecturers in higher education can also help bring valuable professional experience into the classroom (Arnhold et al., 2018[4]).

Among EU countries, the variation in working hours for academic staff is often due to factors related to professional norms, system structures, institutional expectations, and the proportion of staff by academic field (EC, EACEA, Eurydice, 2017, p. 71[5]). Part-time work (as well as work on fixed-length contracts) is associated more with junior and intermediate staff categories across EU countries. On average across EU systems with different subsectors, the average number of working hours is lower for academic staff in universities than other subsectors (EC, EACEA, Eurydice, 2017[5]).

On average across OECD countries, around 40% of academic staff in higher education are employed by higher education institutions part-time. Latvia, Mexico and Switzerland present the largest share of part-time academic staff. Among the participating jurisdictions, the share of part-time academic staff is higher than the OECD average in the Netherlands (over one-half), while the share is around the average in Estonia. About 35% of academic staff are employed part-time in the Flemish Community and about one-third in Norway (Figure 4.6). While in some countries, such as the Netherlands, a large share of part-time academic staff goes hand in hand with a large share of part-time workers in the overall economy, in other countries, such as Latvia, this appears to not be the case. In Norway, most of the part-time academic staff has their main employment outside of academia (according to background information from the Norwegian Ministry of Education and Research).

Figure 4.6. Share of higher education academic staff working part-time (2016)

As compared to the share part-time workers in the workforce; based on headcount



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Data on academic staff refer to 2013 for Australia and Turkey, 2014 for Denmark, France and Norway, and 2015 for Poland. Data for Belgium, Denmark, the Flemish Community and France exclude independent private institutions. Data include post-secondary non-tertiary education for France, Portugal and the United States and exclude short-cycle tertiary programmes for Australia.
Source: Adapted from OECD (2018[17]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en; data provided by the Flemish Ministry of Education and Training.

StatLink https://doi.org/10.1787/888933940702

It must be noted that the incidence of part-time work among academic staff in higher education and among workers in the population are not directly comparable because of the differences in their definitions. Part-time workers are those who usually work less than 30 hours per week in their main job (OECD, 2017[80]), so an academic who is classified as part-time academic staff may not be classified as a part-time worker (and vice versa). Despite this limitation, comparing the two series allows an investigation of whether the share of part-time academic staff is related to the labour market context of a country. There is a mild positive relationship between the two series in Figure 4.6 (correlation coefficient of 0.29), suggesting that while the share of part-time academic staff is somewhat associated with the prevalence of part-time work in a country, many other factors play a role in determining it.

In 1998, the Dutch government set a standard work year (the exact number of work hours per year) as 1,659 hours, for all sectors of education. The working intensity is negotiated with the employer, and the extent to which an individual works (part-time or full-time) is referred to as the "working hours factor". Academic staff can choose to work 36, 38 or 40 hours. The government has implemented a system of age-related leave, where employees with a contract of at least 0.4 full-time equivalent and at least three years of experience (within the last five years) in professional higher education institutions, are entitled to an annual sustainable employability budget (45 hours for full-time employees – 40 hours for the period between 2015 and 2019). Employees in similar position who are within 10 years of retirement (with at least five years of work experience in higher education) are also entitled to reduce their annual hours by 20% for five years (Eurydice, 2018[19]).

4.3.4. Salaries of academic staff

Higher education systems vary in their approaches to compensation of staff. In Europe, many countries determine salaries through collective bargaining, while a few countries classify academic staff as civil servants, in which case salaries follow public sector rules.

In the United Kingdom, a national Framework Agreement for the Modernisation of Pay Structures is in place since 2006, as a result of national negotiation. The Framework provides a reference salary base with five salary grades for the majority of higher education staff (academic and non-academic staff). Based on the framework, higher education institutions can create their own salary and grading structures (UCEA, 2013[81]). Another approach is that of countries that develop collective agreements by subsector (e.g. Finland and Malta) (ILO, 2018[77]). Meanwhile, in the United States, academic staff salaries can differ significantly within the country. There are different salary regimes within higher education institutions and unions negotiate with employers at the local level (i.e. enterprise agreements), rather than at the national level. (Angermuller, 2017[82]).

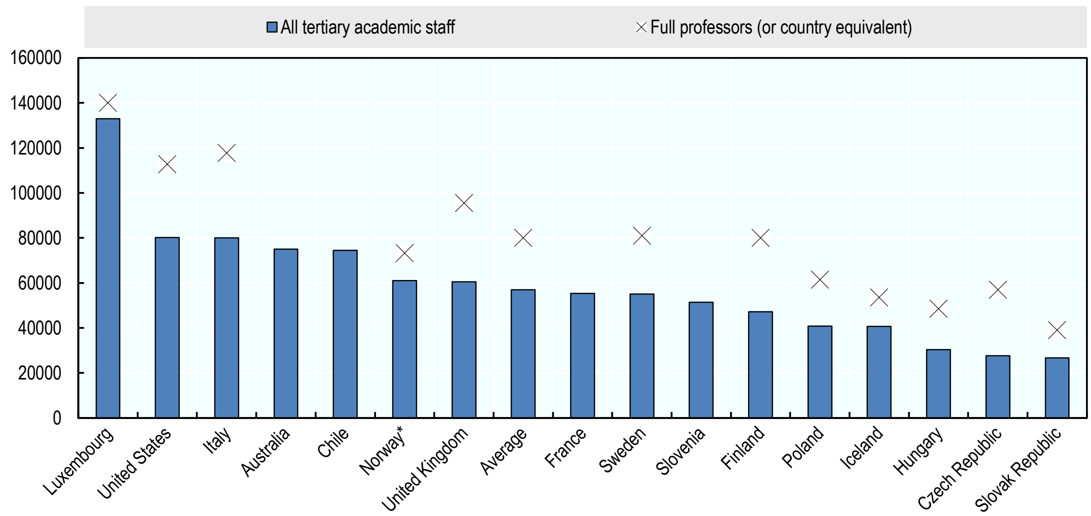
Some countries have adopted performance-based pay, aiming for a more economic higher education system. For example, in Finland, the salary of academic staff entails two components: the position-specific salary and the personal performance salary component. For the first, the requirement level is assessed within six months from the start date (and is only reassessed if management notices changes in duties to an extent that calls for a reassessment or if there is a request for reassessment) (The Finnish Union of University Researchers and Teachers, 2016[83]). The second component is often based on performance appraisal (see Chapter 5).

Across the OECD higher education systems with available data for 2014, the average annual salary of teaching staff (academic staff with teaching duties) in public and government-dependent private higher education institutions ranged from less than USD 30 000 in the Slovak Republic to over USD 130 000 in Luxembourg. The average salary for all teaching staff was equal to about USD 60 000 in Norway, while the average salary for full-time professors was about USD 73 000 (Figure 4.7).

The average annual salary of full professors (or staff with an equivalent title), in countries where data is available, is higher than the average for all teaching staff. The difference in salary between full professors and all teaching staff ranges from USD 7 000 in Luxembourg to USD 38 000 in Italy. Full professors are at the top of the academic hierarchy. Their activities usually entail both teaching and research, and a doctoral degree is usually a requirement for this job title (although it is not officially required in the Netherlands). However, this job title may be understood slightly differently in different countries, so that the comparability of the data in Figure 4.7 is not perfect.

Figure 4.7. Average annual salaries of teaching staff in public and government-dependent institutions (2014)

Calculations based on full-time equivalent in USD converted using PPPs



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Data exclude academic staff without teaching duties for all jurisdictions. Staff working at the short-cycle tertiary level are also excluded in Finland, Italy, Luxembourg, Norway, Poland, the Slovak Republic and Slovenia. Data include only universities for Finland, and only professional HEIs for the French Community of Belgium.
Source: Adapted from OECD (2016[84]), *Education at a Glance 2016: OECD Indicators*, https://doi.org/10.1787/eag-2016-en.

StatLink https://doi.org/10.1787/888933940721

Salaries of higher education teachers[6] are nominally higher than those of teachers at lower levels of education comparable to other teachers and graduates, but are around similar levels once their higher levels of attainment and skills are accounted for (Box 4.7).

Box 4.7. Higher education teachers in the Survey of Adult Skills

Academic staff tend to be very skilled and highly qualified, as graduation from doctoral or master’s programmes with a strong research orientation is often required to enter the profession. Therefore, a relatively high salary can be considered as a structural characteristic of higher education (see Chapter 3).

Across OECD countries and economies participating in the Survey of Adult Skills (PIAAC), higher education teachers are 25 times more likely to have an advanced research degree than other higher education graduates, and almost 50% more likely than secondary education teachers to score at the highest numeracy proficiency levels (levels 4 and 5) (see table below). Individuals at these proficiency levels can understand a broad range of mathematical information that may be complex, abstract or embedded in unfamiliar contexts.

Higher education teachers earn 17% more than secondary education teachers and 24% more than other higher education graduates, after controlling for age, gender and the average earnings of graduates in each economy. However, once their higher levels of education attainment and numeracy skills are taken into account, they earn a similar amount as secondary education teachers and other higher education graduates.

Table 4.b. Skills, education attainment and earnings of higher education teachers (2012 or 2015)

Across OECD countries and economies participating in the Survey of Adult Skills (PIAAC), as compared to secondary education teachers and other graduates

	Higher education teachers	Secondary education teachers	Other higher education graduates
Proportion reaching numeracy proficiency level 4 or 5	40*	28	23
Proportion with an advanced research degree	45*	1	2
Hourly earnings, relative to other higher education graduates	124*	106*	100
Hourly earnings, relative to other higher education graduates, conditional on skills and having an advanced research degree	105	104	100

Note: The asterisk indicates statistics that are significantly different (5% confidence level) from “other higher education graduates”. The relative hourly earnings refer to the average hourly earnings, including bonuses, for wage and salary earners, measured in USD at purchasing power parity (PPP). It is derived from a regression of log earnings on two binary variables (for higher education and secondary education teachers), age, gender and the average earnings of graduates in each economy. The numeracy proficiency score and a binary variable for having an advanced research degree have been added as control variables for the regressions whose coefficients are displayed in the fourth row. All estimates are based on a sample of 670 higher education teachers, 1 590 secondary education teachers and 36 519 other higher education graduates across the 30 OECD countries and economies participating to the Survey of Adult Skills (PIAAC).
Source: Adapted from OECD (2016[54]), *OECD Survey of Adult Skills*, www.oecd.org/skills/piaac/data/.

Table 4.7. Determination of academic salaries in public and government-dependent institutions in participating jurisdictions (2017)

	Estonia	The Flemish Community	The Netherlands	Norway
Basis to determine academic salaries	Case by case negotiation between higher education institution and individual academic staff (and salary scale at the level of the higher education institution)	National salary scales	Salary scale at the level of higher education institution (within the collective agreement negotiated between the association of universities or professional HEIs and the staff unions)	National salary scale (collective agreement) and negotiations between higher education institution and trade unions at the institutional level
Criteria influencing progression within the national salary scale	Determined at the institutional level	Qualifications and years of experience in the job	▪ Universities: years of experience in the job, performance evaluations ▪ Professional HEIs: years of experience in the job, field of expertise, performance evaluation, academic qualifications and experience in the industry	Criteria agreed through negotiations between higher education institution leadership and trade unions within the higher education institution

Note: A salary scale is based on a minimum and a maximum salary, with several intermediary grades of pay, which are due at the time of salary increase.
Source: Eurydice (2018[19]), *National Education Systems*, https://eacea.ec.europa.eu/national-policies/eurydice/national-description_en; information provided by the participating jurisdictions. See the reader's guide for further information.

The autonomy of institutions to determine the salary for senior staff, both by promoting and by increasing the salary within a given grade, varies greatly from country to country (see Chapter 2). The basis for determining and increasing salaries for academic staff also varies across countries (see Table 4.7 for participating jurisdictions).

In **Estonia**, higher education institutions have full autonomy over the decision of salary levels for academic staff. Salaries differ according to the position, work load, number of years worked and qualification. Participation in R&D projects may also affect the income of academics (Eurydice, 2018[19]).

In **the Flemish Community**, salary scales are defined through regulation and reflect qualifications and years of work experience, therefore determining the evolution of the compensation through time, according to the work experience within the job and the individual qualifications. In recent years, additional salary scales have been added for assistant and associate professor at universities. In Flemish universities, it is the institutions that pay the salaries for academic staff. In the case of professional HEIs, most of the salaries are paid directly by the government. To avoid situations in which personnel compensation constitutes an excessive share of institutional expenditure, the government requires that no more than 80% of institutional funding can be spent on personnel.

In **the Netherlands**, there is a single salary scale system that frames negotiations around the starting step (*trede*) on a scale (*schaal*) (The Young Academy, 2018[85]). Salaries in public institutions are negotiated between the associations of higher education institutions and the unions representing their employees. There are no regulations concerning salaries in the private higher education sector. Within the labour agreement, there are also arrangements for the award of performance-based allowances or bonuses. The rate of salary increase between one year and the next can be doubled for staff with an excellent performance evaluation. When reaching the maximum of the salary scale for their job title, staff members can be allocated a permanent allowance (up to 15% of their salary) in recognition of their performance (Eurydice, 2018[19]). In addition, the Public and Semi-Public Sector Senior Officials (Standard Remuneration) Act states that senior government officials' salaries must not exceed those of government ministers. This Act applies to salaries of senior officials of organisations in the semi-public sector, such as universities (The Young Academy, 2018[85]).

In **Norway**, a national minimum salary is defined for each category of staff. Higher education institutions have full autonomy to pay more than the minimum salary. Publicly funded higher education institutions must abide by the Civil Service Act and conditions drawn from previous collective agreements apply to all higher education institutions. Academic staff are considered to be civil servants for regulatory purposes (Box 4.8), and are entitled to social security, pension rights, parental leave, kindergarten coverage, etc. Some of these benefits, such as social security and pension rights are regulated by law. Salaries and career prospects are set out in collective agreements (Eurydice, 2018[19]).

Likewise, salaries for senior management staff can vary greatly among participating jurisdictions. For example, Estonian universities have the autonomy to decide their salaries. Universities in the Flemish Community may also decide on salaries, however they are restricted to conditions that apply to civil servants (including salary grids). Salary bands are negotiated with other parties in Dutch and Norwegian universities (Bennetot Pruvot and Estermann, 2017[50]).

Box 4.8. Regulatory frameworks for higher education staff in the participating jurisdictions

In Estonia, regulations to define academic positions (including categories and their responsibilities) and their minimum qualification requirements are outlined in the legislation for universities (Universities Act - *Ülikooliseadus* 1995), professional HEIs (Institutes of Professional Higher Education Act - *Rakenduskõrgkooli seadus* 2003), associated regulations, and the Standards of Higher Education (Estonian Official Gazette, 2009[86]). The Research and Development Organisation Act (RDOA - *Teadus- ja arendustegevuse korralduse seadus* 2002) provides the requirements for research staff, who may also perform teaching activities (Estonian Official Gazette, 2014[87]).

In the Flemish Community, the *Codex Hoger Onderwijs* (Codex) presents the policy framework for autonomous academic staff, including staff categories, responsibilities, minimum qualifications, requirements for recruitment and criteria for evaluation. Autonomous academic staff (i.e. assistant, associate or full professors) are considered to be civil servants, hence following the applicable regulations (and are entitled to a government pension). This group represents 58% of all academic staff (EC, EACEA, Eurydice, 2017[5]). Contract research staff, i.e. staff on scholarship or on contract, usually paid with international, private or public third party funding (see Chapter 3), are outside of this regulatory framework.

In 2003, the Dutch government created a job classification system (*universitair functieordeningssysteem*, UFO) for all academic and non-academic staff in Dutch universities (VSNU, 2003[88]). This job classification includes an overview of the job titles and levels with 115 job descriptions; and a Competence Instrument list linking 32 staff competences to academic job profiles (VSNU, 2003[88]). Detailed terms and conditions of employment (including salary scales) for permanent staff can be found in the Collective Labour Agreement of Dutch Universities (*Collectieve Arbeidsovereenkomst voor de Nederlandse Universiteiten* - CAO NU) (The Young Academy, 2018[85]).

In Norway, similar to the autonomous academic staff in the Flemish community, all staff in public higher education institutions are civil servants, following the applicable regulations.

4.3.5. Ratio of students to academic staff

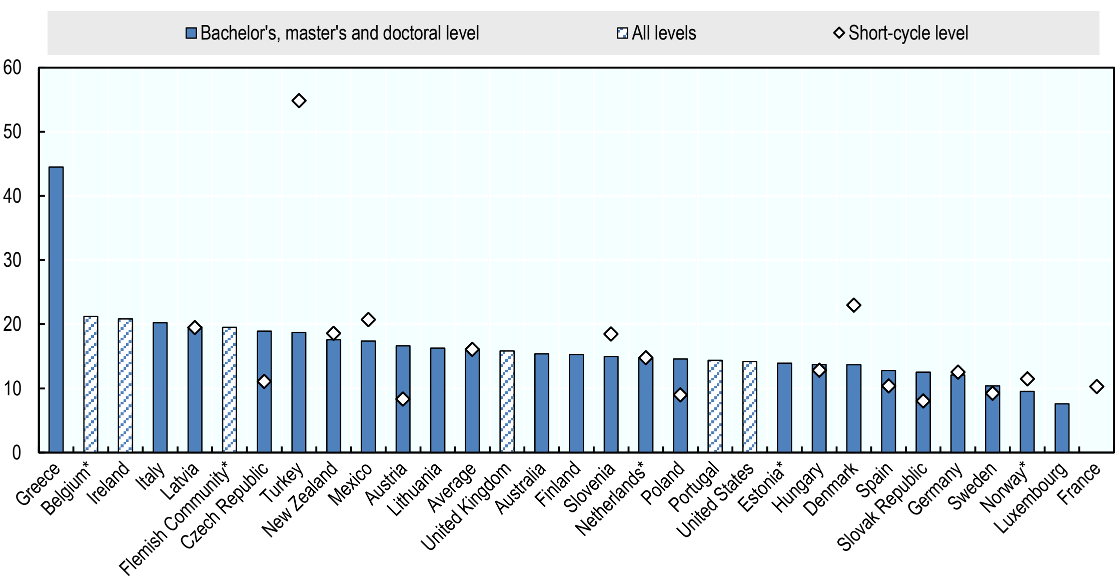
Academic staff interact with students in a range of ways, including through lectures, tutorials, seminars, laboratories, and so on. They also provide individual students advice and feedback outside the classroom. Student-staff ratios are often used as a proxy for quality in higher education on the basis that fewer students per academic staff member means that staff are able to give students more attention and therefore help them learn. However, the indicator fails to provide a direct relationship between the time allocated on teaching, research and engagement and the number of students. While the indicator is still commonly used to inform student choice through rankings and by institutions (as a proxy to assess quality), it provides an incomplete picture and does not guarantee good quality of teaching or access to academic staff.

Gibbs (2010[89]) identifies a range of dimensions of quality and examines the extent to which they could be considered a valid indicator. Variables related to learning and teaching include class size, the amount of class contact and the amount of feedback provided to students. Class size, for instance, can affect the quantity and quality of the effort teaching staff put into study and how engaged they are. However, these variables interact with numerous other dimensions of quality in higher education, including the quality of students and academic staff, the selectivity of institutions, resources, and the nature of research, as well as the outcomes of the educational processes.

On average across OECD countries, there are 16 students per academic staff member in higher education (Figure 4.8). The ratio of students to academic staff is 45 in Greece for bachelor's, master's and doctoral programmes combined, and it exceeds 50 students per staff in Turkey for short-cycle tertiary education programmes. In contrast, the ratio of students to academic staff is close to 10:1, or lower, in Luxembourg, Norway and Sweden for bachelor's, master's and doctoral programmes combined. For short-cycle tertiary education programmes, this ratio is 10:1 or lower in Austria, France, Poland, the Slovak Republic, Spain and Sweden. There are 14 students per academic staff in all levels in Estonia, 20 in the Flemish Community (excluding junior academic staff, e.g. post-doctoral researchers), about 15 in the Netherlands and 10 in Norway.

Figure 4.8. Ratio of students to academic staff in higher education institutions (2016)

By higher education level; estimates based on full-time equivalent



Notes: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Data for the Flemish Community exclude junior academic staff (e.g. employed doctoral students and post-doctoral researchers).
France, Portugal and the United States: data include post-secondary non-tertiary education. For Luxembourg, short-cycle tertiary education is not included.
Ireland: data refer to public institutions only.
Source: Adapted from OECD (2018[17]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en; data provided by the Flemish Ministry of Education and Training.

StatLink https://doi.org/10.1787/888933940740

Table 4.8 presents the ratio of students to academic staff by subsector in Estonia, the Netherlands and the Flemish Community (in contrast to Figure 4.8, data for the Flemish Community in Table 4.8 include junior academic staff). The number of students per academic staff member in the Flemish Community, the Netherlands and Estonia is substantially higher at professional HEIs when compared to universities. In the Flemish Community and the Netherlands, the ratio of students for each member of academic staff is more than two times higher in professional HEIs than in universities.

The higher number of students per academic staff in professional HEIs is probably due to the lower research intensity, which implies a lower allocation of academic staff per student. However, internationally comparable data on the repartition of academic staff workload between teaching and research would be needed to answer this question more precisely.

Table 4.8. Ratio of students to academic staff in higher education institutions, by subsector (2016)

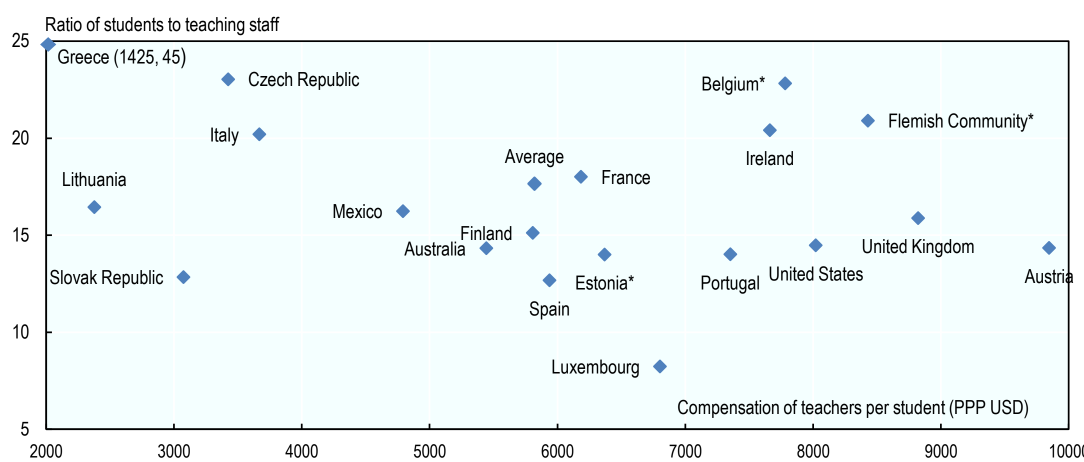
Estimates based on full-time equivalent

	Estonia	The Flemish Community	The Netherlands
Universities	14.7	6.7	8.2
Professional HEIs	19.0	15.4	18.4

Source: Adapted from information provided by the participating jurisdictions. See the reader's guide for further information.

Figure 4.9. Ratio of students to academic staff and expenditure on compensation of academic staff per student (2015)

Based on full-time equivalent



Notes: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
See Figure 4.8 for notes on the ratio of students to academic staff. The expenditure on compensation of academic staff excludes the salary of staff without teaching duties.
Source: Adapted from OECD (2018[17]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en; data provided by the Flemish Ministry of Education and Training.

StatLink https://doi.org/10.1787/888933940759

A low student-to-staff ratio can reflect a large financial investment in academic staff in a higher education system, but this can also be related to expenditure on staff compensation. For example, Figure 4.9 indicates that Austria spends the most in comparison to the average on academic staff per student, while also having a below-average student-staff ratio. However, this is not always the case. In the Flemish community, the student-staff ratio is relatively large despite a high level of expenditure on academic staff per student. The level of staff compensation in Greece is much lower, and the student-staff ratio is substantially higher than the average. The same applies to the

Czech Republic, to a lesser extent. This is probably due to the relatively low level of academic staff salaries in these countries.

Some countries have developed new methods to track the cost of higher education activities. An example is the Transparent Approach to Costing (TRAC) in the UK, in place since 1997. Institutions collect data on the time allocation by academics, and this data shows a wide range of time spent on teaching across academic staff (HEFCE, 2018[90]). This aligns with previous conclusions that lower student-staff ratio is not necessarily an indication of higher interaction between student and staff.

4.3.6. Academic staff mobility

Academic mobility does not only refer to international mobility, but also to institutional mobility and inter-sectoral mobility. Academic staff experience institutional mobility when moving for work to a different higher education institution. A lack of institutional mobility is referred to as inbreeding (Horta, 2013[91]; Sugimoto, Robinson-Garcia and Costas, 2014[92]).

Inter-sectoral mobility

Inter-sectoral mobility denotes a job transfer from higher education to another sector of the economy, or vice versa. This type of academic mobility can give access to new social networks, as well as new scientific and technical human capital, which results in higher productivity (Dietz and Bozeman, 2005[93]). New perspectives and experiences are brought to higher education while the economy at large benefits from the sharing of ideas and knowledge. Professionals moving to higher education from other sectors can help integrate the needs of the world of work into the curriculum, and strengthen the links between higher education and the economy, increasing higher education labour market relevance.

Just as international mobility aims to achieve brain circulation (see Chapter 6), mobility between industry and academia should ideally achieve knowledge circulation. However, research indicates that the movement between academia and industry is mostly unidirectional, with university-trained researchers moving to industry, but with low or almost no movement in return (from the industry to academia) (Scholz et al., 2009[7]). Reasons outlined for this include the lower salary levels in academia, the different working cultures, restrictions in employment legislation of researchers in public universities, and limited resourcing interactions with small and medium-sized enterprises (SMEs) (Scholz et al., 2009[7]; Scholz, 2012[94]). There also appear to be bottlenecks for those professionals who go to the private sector for long periods of time and try to return to academia (Scholz et al., 2009[7]).

Good practices to help bridge the industry-academia gap include: academic or industrial sabbaticals, secondments and part-time professorships or industrial sabbaticals, and the reassessment of merit parameters so that they acknowledge the needs of academia and the industry (Scholz et al., 2009[7]; Scholz, 2012[94]). This can be done through initiatives such as industrial doctoral programmes (industry-oriented research, partly funded by the industry). On the other side, for researchers working in the private sector, incentives to support peer-reviewed publications, while in compliance with intellectual property rights rules, can be encouraged (Scholz, 2012[94]).

Inter-sectoral mobility is well established in professional HEIs in the Flemish Community and the Netherlands. In Belgium and the Netherlands, over one-third of doctorate holders are employed in the business enterprise sector (Cameron, Horta and Vandevelde, 2014[95]).

The Research Council Norway has developed recommendations to support the European Union's efforts to address "grand challenges", which include inter-sectoral mobility across academia, the industry and public sectors (including public research institutes, health trusts, business enterprises, public administration, etc.) (Borchgrevink, 2013[96]). Initiatives include the Industrial PhD Scheme (managed by the Research Council through a scheme that aims to fund industry-oriented doctoral research fellowships) (Millard, 2014[97]).

International mobility

International academic mobility is the movement of academic staff across borders to perform teaching or research activities. It has been argued that academic mobility affects the productivity and quality of academic staff output (Horta, 2013[91]; Sugimoto, Robinson-Garcia and Costas, 2014[92]). Internationally comparable data on the mobility of academic staff are not available, with the exception of some specific mobility programmes.

European temporary mobility schemes such as Erasmus+ play a role in fostering academic staff mobility in all participating jurisdictions. Erasmus+ funds short stays abroad (with a typical duration of a few days) for teaching assignments (e.g. the development of teaching material or of inter-institutional education co-operation) or professional development. In the period 2014-2016, around 170 000 higher education staff have been mobile through Erasmus+ in EU countries, of which around 60% went abroad to teach and 40% for professional development (EC, 2017[98]).

Many European countries established national mobility centres in the context of the EURAXESS network (Ferencz, Irina; Wächter, 2012[99]). Some programmes are common to all participating jurisdictions, such as Erasmus+ and Fulbright. Others are specific to some regions, such as Nordplus[7] for Estonia and Norway.

Academic mobility can be temporary and possibly related to internationally or nationally funded programmes (e.g. Erasmus+), or it can be permanent (staff moving abroad for a new job without the intention to return). International staff mobility can be integrated in national immigration and other policies; some examples include the design of special pension schemes, the provision of social security and childcare, special tax, salary and career arrangements for mobile staff, and special provisions regarding work and residence permits (Bennion, Alice; Locke, 2010[100]).

In Belgium, the government and higher education institutions try to stimulate international and interregional mobility as well as co-operation. One example is the Belgian inter-community exchanges for higher education within the framework of the Prince Philippe Fund for the development of common course material. Another example is Erasmus Belgica, a collaboration project between the communities of Belgium supporting staff and students participating in education in different linguistic communities (Eurydice, 2018[19]).

In Estonia the government offers scholarships to encourage incoming mobility and outgoing mobility of staff working in Estonia. Examples include:

- The Dora Plus programme supporting international visiting doctoral students, and attendance to conferences, seminars and other professional activities abroad by Estonian young researchers;
- The Kristjan Jaak scholarship programme, offering secondments abroad to teaching staff and researchers up to 35 years-old;
- Government scholarship programmes for academic staff of foreign universities coming to work in Estonia and the organisation of summer schools and other international events; and
- The Mobilitas Plus programme, financing Estonian and international researchers who work abroad and want to move to work in Estonia (Eurydice, 2018[19]).

The Flemish Community, the Netherlands and Norway have mechanisms for monitoring incoming and outgoing mobility, while Estonia has mechanisms for monitoring only outgoing mobility.

In the Netherlands, the development of initiatives to foster academic mobility falls under the responsibility of higher education institutions. The Association of Universities in the Netherlands and the Netherlands Association of Universities of Applied Sciences have developed regulations on salaries and remuneration, and have agreed on a plan to guarantee social security provision for staff involved in mobility programmes (background information from the Dutch Ministry of Education, Culture and Science).

Norway has also developed a few programmes that enhance academic co-operation with non-European countries. For example, the UTFORSK programme supports academic co-operation at an institutional level with Brazil, China, India, Japan, Russia and South Africa. Similarly, the INTPART programme funds collaboration at an institutional level with the above six countries, Canada and the United States. In addition, the government funds a number of programmes supporting training experiences abroad for interested staff. Internationally mobile staff reported that mobility has improved their competences (e.g. by exposing them to new teaching methods), in addition to providing opportunities to develop their international network (Nordhagen and Dahle, 2017[101]).

Institutional mobility

Endogamy (academic inbreeding) refers to academic staff whose last degree was earned at the institution where they currently work. This happens to some extent in all higher education systems, and in some cases it can also be an indication of institutions' attractiveness and their ability to retain excellent academics.

Endogamy is not necessarily a negative outcome in a higher education system. Academic staff working in the institutions from which they hold a degree may still experience institutional mobility in the academic career, for example of a temporary nature. Some evidence suggests that if these staff are mobile at least once in the course of their academic career, they have a similar research performance as other academic staff. In addition, they may contribute disproportionally more to teaching and outreach activities (teaching and engagement) (Horta, 2013[91]). Nevertheless, there is little research on the relationship of endogamy with the three functions of higher education (teaching, research and third mission).

High levels of endogamy may also signal that higher education institutions deviate from merit-based recruitment practices (Altbach, Yudkevich and Rumbley, 2015[3]; Lundgren, Pipping and Åmossa, 2018[102]). Endogamy has been associated with lower publication rates and less internationally-oriented publications, as inbred academic staff tend to focus on the knowledge within their institutions rather than the international developments of their subject domain (Horta, Veloso and Grediaga, 2010[103]). Higher education institutions with a high rate of endogamous staff could also become more rigid and slower to respond to social needs, decreasing their social legitimacy (Horta, Veloso and Grediaga, 2010[103]) as well as ability to update teaching methods and contents. Causes of endogamy include, among others, the absence of a fluid national academic labour market, the economic context (i.e. limited apartment rentals or housing prices), and cultural values (Altbach, Yudkevich and Rumbley, 2015[3]).

Internationally comparable data on endogamy are not available for the OECD area, but evidence from European countries shows that it is quite common. Researchers estimate high shares of academic staff holding a doctoral degree from the institution where they work in many countries, including Belgium (52%), the Netherlands (40%) and Norway (56%) (Seeber and Lepori, 2014[104]). In Estonia, in 2017, more than half of academic staff held their highest level degree from the institution where they worked. Endogamy in Estonia also appears more common in universities than in professional HEIs. According to national data, in professional HEIs the share of endogamy is about 15% and in universities it is four times higher (about 60%).

In the Flemish Community, about 60% of the academic staff at universities who started their employment between 2010 and 2014 held a doctorate degree from the university where they worked. This share declined after 2014, the year in which association between universities and professional HEIs was completed (see Chapter 2).

4.3.7. Staff professional development

Higher education learning and teaching is informed by research and professional practice (UNESCO, 2012[105]), making it necessary for academic staff to learn and keep up to date with new ideas and methods. In many OECD countries, systematic approaches to the professional development of academic staff have not been traditionally embedded in the higher education system (OECD, 2008[11]), except for sabbatical leave (Box 4.9). A number of countries are supporting education and training programmes for doctoral students and academic staff. Nonetheless, the overall focus of professional development for academic staff tends to be towards the development of research skills rather than teaching skills.

Development of the professional capacity of teachers and researchers does not come without challenges. For example, the more successful academic staff are in their activities and roles, the higher the expectation on their performance in engagement (in addition to their core activities, namely, teaching and research) (Enders, 2007[106]). This added responsibility (combined with increasing number of students, concerns with quality levels and worldwide competition) can lead to additional work pressure and stress in higher education. Findings from a systematic review of the literature on stress in higher education indicate four main problem areas: workload and time constraints; professional role identity and content; disincentives and mismanagement; leadership and organisation (Persson, 2017[107]). Opportunities for professional development and appraisal (see Chapter 5) of higher education staff aim to contribute to their performance and well-being.

Box 4.9. Sabbatical leave

A sabbatical term is a period of leave (usually one semester to one year) that academics can use for professional and personal development. Sabbatical leave can enhance the well-being of academics and reduce their stress (Davidson et al., 2010[108]), as well as giving them opportunities to update their skills (Otto and Kroth, 2011[109]).

Regulations on sabbatical leave relate to the duration and frequency of paid and unpaid sabbatical leave. In many European countries, sabbatical leave is only available for academic staff at the most senior ranks, such as professors (EC, EACEA, Eurydice, 2017[5]). Internationally comparable data on the number of staff on sabbatical leave are not available, although some information on the duration and conditions for the leave are available for European countries.

Table 4.c. Academic staff sabbatical leave regulations in participating jurisdictions

Most recent available year

	Estonia	The Flemish Community	The Netherlands	Norway
Remuneration	Paid	Paid	Negotiated at the institutional level	Negotiated at the institutional level
Duration	1 semester	Up to 2 years during the academic career	Negotiated at the institutional level	Negotiated at the institutional level
Frequency	Every 5 years	Negotiated at the institutional level	Negotiated at the institutional level	Negotiated at the institutional level

Source: Adapted from European Commission, EACEA, Eurydice (2017[5]), *Modernisation of Higher Education in Europe - Academic Staff 2017,* https://doi.org/10.2797/408169; Research Council of Norway (2018[110]), *Evaluation of Norwegian education research*; Association of Universities in the Netherlands (VSNU) (2015[78]), *Collective Labour Agreement of Dutch Universities,* https://www.vsnu.nl/files/documenten/CAO/Januari%202016/CAO_NU%20ENG%20jan2016.pdf.

In Estonia, sabbatical leave is a right for all academic staff, not only those at senior levels. Paid sabbatical leave can take place every five to seven years and it can last one semester. In the Flemish Community, a member of the autonomous academic personnel can take up to two years of paid sabbatical leave over one's entire career. For countries where there is no specific legislation concerning sabbaticals, as in the case of the Netherlands and Norway, it is common that such arrangements are decided at the institutional level, indicating a high level of institutional autonomy on academic staff leave.

Among EU countries, there are almost no large-scale continuing professional development (CPD) initiatives focusing on teaching skills. Most initiatives in this area are isolated examples of individual higher education institutions (Eurydice, 2017[111]). In Australia, the Research Workforce Strategy 2020 has identified research skills definition and career development as key policy priorities (Australian Government, 2011[112]). Box 4.10 provides more examples of professional development strategies for academic staff.

Box 4.10. Professional development strategies in the higher education sector

A number of countries across the OECD have developed strategies aimed at enhancing the development of academic staff. For example, the National Research Council (NRC) in Canada works with the education community to provide innovation support, strategic research, and scientific and technical services, such as career tools and resources for researchers (including behavioural competences) (National Research Council Canada, 2018[113]). Professional development programmes are provided to faculty (mostly new instructors) targeting specific core competences and the use of technology in teaching and learning (Jacob, Weiyan and Ye, 2015[114]). Faculty self-reports indicate a positive impact on teaching, faculty interest and enthusiasm, self-confidence, sense of belonging and educational leadership. Evaluations on the effectiveness of such teaching development programmes are not common (Jacob, Weiyan and Ye, 2015[114]).

In other cases, dedicated government agencies are also training providers. This is the case of the Training and Educational Korea Institute of R&D Human Resources Development (KIRD), which offers transferable skills training programmes for researchers and master's students, as part of its Long-Term Development Strategy for 2020 (e.g. leadership, English academic writing, research methods and data analysis, intellectual property management and research performance) (OECD, 2012[115]).

In Poland, the Foundation for Polish Science (FNP) is a non-profit organisation that supports science, and is one of the largest sources of R&D funding in the country. FNP has developed training and mentoring initiatives to give researchers the opportunity to improve their research project management, research team management, interdisciplinary collaboration, technology transfer and entrepreneurship skills through the "Skills programmes" (Foundation for Polish Science, 2016[116]). These programmes include: the Skills-coaching and Skills-FNP programmes, which provide coaching and mentoring to young scholars to progress in their scientific careers; the Skills-science and Skills-engage competitions to foster interdisciplinary research among young scientists and the dissemination of results; Skills training for academics at all levels of seniority on the management of scientific research, technology transfer and enterprise, and scientific communication; and the Skills-internships programme aiming to provide work-based learning to young researchers.

In **Estonia**, higher education institutions undertake the responsibility to provide professional development opportunities, which include teaching, training and supervising skills of academic staff. The government provides targeted funding, through the Mobilitas Plus programme, which is largely financed by the European Union, to support the participation of researchers in training programmes and study visits, nationally and abroad. The targeted funding for agreed delivery contributes to control costs. Until 2014, the Primus programme (also funded by the European Union) funded some pedagogic training for academic staff.

The Flemish Community has been providing targeted funding (EUR 4 million per year, as of 2013) for training in a wide range of transferable skills to doctoral students and junior researchers (but also to senior academic staff) employed both in academia and industry (the OJO programme – *Omkadering Jonge Onderzoekers*). Some institutions made this training a compulsory component of their doctoral programmes. Training focuses on career guidance and transferable skills (e.g. project management, grant writing, communication, and research ethics). Attendees also have the opportunity to develop research-specific skills through their interaction with group members, mentoring relationships, as well as exposure to new methods and techniques (Wastyn and Steurs, 2014[117]) (EC, 2016[22]). For example, at Ghent University, doctoral students and post-docs are offered external mentoring support, career coaching programmes and courses on transferable skills as part of their doctoral training (Euraxess, 2016[118]). In addition, Flemish higher education institutions receive some targeted funding for the training and education of their staff (see Chapter 3).

In **the Netherlands**, there have been some changes in the past years in the collective labour agreement in research universities concerning career development regulations for academic staff. Training is to be provided to staff on fixed-length or hourly contracts and doctoral students in research writing proposals, in order to facilitate career progression. Professional HEIs have also adopted a common set of guidelines for professionalisation, including: allocation of at least 6% of the annual budget and a share of working hours to training or education for academic staff; additional incentives for continuing education, life-long learning and opportunities for professional development. For example, teaching personnel (or supporting staff) with a workload of at least 0.4 full-time equivalent are entitled to at least 40 hours per year of training and education (Box 4.1). The UTQ also supports assessment and professional development for teaching skills of academic staff (Section 4.2.2).

The Dutch government has also introduced Vliegende Start; a programme to introduce new teaching ideas and practices in higher education. Vliegende Start is focused on professional higher education institutions, and aims at attracting, selecting, and guiding new teachers in their goals with the aim to improve the career development of teachers.

Additionally, in the Netherlands, higher education institutions are adopting the Career Framework for University Teaching, designed to support the career progression of academics on the basis of their contribution to teaching and learning. It offers a pathway for academic career progression and an evidence base with which to demonstrate and evaluate teaching achievement. The framework can be adapted to higher education institutions' academic career structures and progression points, and used at each stage of the academic career, including appointment, professional development, appraisal and promotion. The Framework's design draws on educational research, feedback from the higher education community and global best practice. It was developed in partnership with pedagogical experts and partner universities from across the world (Graham, 2018[119]).

In **Norway**, as a follow-up of the 2017 White Paper 'Quality Culture in Higher Education', a requirement to undergo educational training will take effect in 2019, both for employment and promotion in academic posts.

4.4. Concluding remarks

This chapter explored data, policies and practices related to higher education staff and concerning their profile, working conditions, mobility and professional development. The analysis of human resources in this chapter focused on academic staff, but also considered other staff categories. The remainder of this section reviews some key messages from this analysis of human resources in higher education, and identifies some important information gaps which limited the analysis.

- Higher education institutions rely on the support of non-academic staff to ensure the strategic, technological, administrative, financial and operational aspects of teaching, research and engagement. If their utilisation is well planned, non-academic staff can fulfil these tasks more efficiently than if they were assigned to academic staff. The benchmarking exercise uses data from the ETER project to estimate the non-academic to academic staff ratio, but this is limited to European countries. There is no internationally comparable data available on academic and non-academic staff for the further exploration of the size, tasks and role of non-academic staff.

- Two-fifths of academic staff work part-time, on average across OECD countries. However, this indicates little about whether part-time work is used as a strategy to ensure better work-life balance of academic staff, to reduce costs or to encourage academic staff to work some time outside higher education (and contribute to the development of an effective connection with the world of work). A better understanding of part-time work among academic staff would require collection of more detailed data on work intensity, and also of data on the distinction between academic staff who are effectively working part-time and staff who have other jobs outside higher education (i.e. share of academic staff holding multiple jobs).

- There is not a very clear relationship between the ratio of students to academic staff and expenditure on compensation of academic staff. However, neither of these two measures is an accurate indicator of the input to the teaching process, because it is not possible to distinguish between the time spent by staff teaching and doing research. Data on the teaching time of academic staff would allow better evaluation of the efficiency of higher education systems in producing the outcomes discussed in the following chapters.

- The available evidence from past surveys of academic staff suggests that they may be working well over 40 hours a week in some countries, and that they may be subject to a considerable level of work-related strain. Staff satisfaction and motivation are key to ensuring the sustainability and effectiveness of higher education systems. The collection of comparative data to explore the opinions, level of stress and working conditions of academic staff would yield an up-to-date view of these issues.

- Academic staff can play very different roles within higher education institutions, based on their seniority and specialisation. Having agreed definitions of academic staff categories would facilitate the investigation of a range of policy-relevant topics, such as gender representation in academia and the role of teaching and research among staff.

- Women are bridging the gap in terms of participation in the academic labour force, but the available evidence suggests that they are still under-represented at the top of the academic hierarchy. Data on gender representation disaggregated by seniority level would allow to provide evidence across countries more systematically, and to assess how effective higher education systems are in terms of providing an equitable working environment.

- Working conditions differ among academic staff. For example, professors can earn much more than other academic staff in some countries, while young academic staff are much more likely to be employed on a temporary basis in some jurisdictions. Data by academic staff categories would contribute to the understanding of academic staff working conditions at different career stages. This would help designing policies to improve the sustainability and effectiveness of the higher education system, by making it easier to retain and motivate academic staff.

The participating jurisdictions responded to some of the challenges related to academic staff with specific policies. Table 4.9 summarises some selected policies presented in the chapter.

Table 4.9. Selected policies from the participating jurisdictions (2017)

	Motivation	Policies
Estonia	Giving higher education institutions autonomy in staff decisions	▪ Higher education institutions have full autonomy over the decision of salaries for academic and non-academic staff ▪ Higher education institutions have autonomy over promotions and salary increase ▪ Some restrictions are placed on the hiring of academic staff through temporary contracts
The Flemish Community	Bridging the research gender gap	▪ Inclusion of a gender diversity indicator (the share of women in research positions at different levels) in indicators for research formula funding ▪ Public-private co-funding of research fellowships for women in biomedical sciences ▪ Regulations on set targets for the participation of both genders in public universities' decision-making bodies (i.e. university boards, research councils and selection juries).
The Netherlands	Improving staff teaching qualifications	▪ The university teaching qualification (UTQ) was developed by universities in response to a call by government for better teaching skills ▪ The UTQ attests to the teaching competences of staff in scientific and academic education in universities in the Netherlands (e.g. assessment and feedback, inclusion of diverse students) ▪ The share of teachers holding a UTQ certificate has been included among the indicators in the performance agreements with universities ▪ The certification of competences is based on peer evaluation, mentoring and participation in a community of teachers from different institutions ▪ Professional HEIs also developed a teaching qualification, divided into an initial or lower level qualification and a further qualification for senior staff
Norway	Stimulating interest in research and a research career among young people	▪ The Research Council of Norway (RCN) runs various initiatives to increase interest in research and a research career, such as the Annual Science Week, the Science Knowledge Project for children (*Nysgjerrigper*) and the *Proscientia*.

Source: Adapted from information provided by the participating jurisdictions. See the reader's guide for further information.

The policies reviewed in this chapter constitute only a part of the policy solutions designed across OECD countries to tackle the most pressing challenges facing human resources in higher education. Future benchmarking exercises would benefit from a more systematic and standardised data collection of human resource policies in a larger number of countries.

Notes

[1] In the Flemish Community, autonomous academic staff refers to academic staff with civil servant status who work in universities.

[2] Short-cycle programmes at the ISCED 5 level are not recognised as part of the higher education system in Norway and are offered through vocational colleges (see Chapter 2). However, Norway offers a two-year bachelor's programme at ISCED 6 level (*høgskolekandidat*) and students who successfully complete the two-year programme can enter into the third year of a bachelor's programme.

[3] The ERA Roadmap, a tool developed by EU member countries with related stakeholder groups and the Commission, aims to provide a framework for change. It was launched in May 2015 for the period 2015-2020 with a defined set of goals (Council of the European Union, 2015[123]). Participating jurisdictions have developed national plans on their contributions towards achieving the goals in each of the priority areas, including gender equality in Research (Table 4.1). In addition, ERAC has been established, which includes a Standing Working Group on Gender in Research and Innovation, with the goal to facilitate the exchange of practice and the monitoring of gender policy in research and innovation at the European level (Council of the European Union, 2018[121]).

[4] Academic training is covered more extensively in Chapters 5 and 6.

[5] Flemish institutions have considerable autonomy to hire and promote staff, but applicants for some positions must meet some language requirements. Academic staff whose role will require the delivery of courses (*titularis van een vak*) must demonstrate a high level of proficiency in the Dutch language. Applicants to administrative positions must also demonstrate proficiency in the language, but at a lower level. Similarly, the Estonian Language Act (*Keeleseadus*) also requires proficiency by academic staff in the Estonian language (Riigi Teataja, 2011[120]). Lecturers and researchers whose first language is not Estonian do not have to abide by the proficiency regulations before five years of work experience in Estonia. In addition, regulations also require language proficiency in Estonian at the level C1 for Directors (Heads), their Deputies and Heads of Study Affairs of education institutions (Riigi Teataja, 2013[124]).

[6] Higher education teachers here follow the definition used in the Survey of Adult Skills (Standard Classification of Professions – ISCO). "University and higher education teachers prepare and deliver lectures and conduct tutorials in one or more subjects within a course of study at a university or other higher educational institution. They conduct research, and prepare scholarly papers and books" (ILO, 2012[122]). Educational attainment in Box 4.7 also follows the classification of the Survey of Adult Skills (ISCED 1997), with "advanced research degrees" instead of doctoral degrees.

[7] The Nordplus programme supports teacher mobility in various ways. Among various purposes, the programme aims to contribute to the establishment of a Nordic-Baltic educational region, contribute to quality and innovation in higher education and promote Nordic languages.

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Chapter 5. Education

This chapter discusses the performance of higher education systems with regard to education and the many aspects of teaching and learning. The metric benchmarking presented covers all OECD member countries, while the policy and practice benchmarking covers the four jurisdictions participating in the benchmarking higher education system performance exercise: Estonia, the Flemish Community, the Netherlands and Norway. Where possible, the selected indicators are broken down by higher education level (e.g. bachelor's, master's, etc.) and field of study. Where data are available, this chapter also provides an analysis of the university or professional higher education institution (HEI) subsectors, reflecting policy interest in differences in performance of the different subsectors in their higher education systems.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

5.1. Introduction

The provision of opportunities for highly specialised education is a central function of higher education (UNESCO Institute for Statistics, 2012[1]), and it entails a wide range of coordinated activities by higher education institutions. This chapter presents data, policies and practices related to the performance of the education function of higher education systems. The discussion covers student access, both as part of initial education or later on as lifelong learning; the digitalisation and internationalisation of higher education; the students' experience within the system and whether they complete their studies; and the skills, labour market and social outcomes of graduates. However, this chapter does not systematically cover pedagogical practices at the teacher and student level due the lack of internationally comparable data on learning practices outcomes.

Higher education needs to continuously adapt to changing student needs. Students play various roles within higher education; they are an input to the system (as applicants and entrants), as well as active co-producers of the teaching and learning process (the activity stage of the education process, as it is labelled in Chapter 1). As graduates, they are also outputs of the system. Finally, their skills and knowledge help to create a range of outcomes as they contribute to society and the economy as citizens and employees (OECD, 2017[2]).

The size and composition of the student body are in continuous flux across OECD member countries. The total number of new entrants to higher education increased by around 30% between 2005 and 2016, on average across 12 OECD countries with available data, but very large variations in growth exist between countries. For example, while the number of new entrants almost tripled in Turkey and almost doubled in Mexico, numbers remained largely unchanged in Finland and the United Kingdom over the same period. Falling numbers are also in evidence in some cases; new entrants decreased by about one-fifth in Lithuania and by around one-third in Poland (OECD calculations from (OECD, 2018[3])).

In most OECD countries and economies, higher education is serving a younger and more internationalised student body than even a few years ago (OECD calculations from (OECD, 2018[3])), though specific national situations are very varied. Overall, among 12 OECD countries with available data, the average proportion of students younger than 25 increased by 4 percentage points between 2005 and 2016. Between 2013 and 2016, the international student body in OECD countries grew around 1%, continuing observed trends over a longer period of increases in the share of foreign students (OECD, 2018[4]).

Part-time student numbers are also fluctuating across countries. In about half of OECD countries, the number of part-time students increased from 2013 to 2016. This may be related to an increase in the number of students with work and family commitments and/or in the provision of part-time programmes in these countries. In other countries, part-time students are decreasing. For example, the proportion of part-time students decreased by over 5 percentage points in Finland, Poland and the Slovak Republic (OECD calculations from (OECD, 2018[3])).

A comprehensive assessment of performance of the education function of higher education systems would require a greater set of metric data than currently available. A discussion of some of the current data gaps is contained in the conclusion of this chapter (Section 5.10). Nevertheless, the analysis in this chapter highlights some important messages about higher education performance. More people than ever now have access to higher education; around 60% of young people are expected to enter a higher education programmes in their country during their lives. Moreover, those who complete higher education have better basic skills, and they are more likely to find jobs. But the extent to which countries can foster effective systemic outcomes varies across the OECD.

The evidence presented in this chapter also shows that opportunities to enter higher education are not equally distributed: young people whose parents do not have a higher education qualification are between 40% and 60% less likely than other individuals to enter a bachelor's programme at least once. In addition, successful completion of higher education differs across countries. On average, around 30% of new entrants to bachelor's programmes have not completed three years after their expected time of graduation. Completion is particularly low among males and in some fields of study, for example, information and communication technologies (ICT).

Ensuring high quality, equitable and relevant education in the face of a continuously changing student profile is one of the core challenges of higher education. The high-performing systems of the future will be those that are able to anticipate and adapt the educational offering to meet student needs even as they become more diverse. As this chapter will show, a variety of policy responses aim to position higher education systems to overcome challenges related to the education function, including in the four participating jurisdictions. These include initiatives to better match students to suitable programmes for their needs and goals, financially supporting students, improving links between higher education and the world of work, and systematically collecting data on labour market demand and outcomes.

5.2. Access to higher education

The labour market and society of today require advanced knowledge and skills to prosper. A highly skilled workforce is recognised as a crucial ingredient for a strong innovation system which contributes to growth and a more socially inclusive society (OECD, 2015[5]). Further increasing participation in higher education in order to meet societal and labour market needs has been high on the public policy agenda of governments across most OECD countries, particularly in bachelor's and long first-degree higher education programmes (OECD, 2017[6]).

Participation in higher education has already improved dramatically in recent decades (see Chapter 1 and Box 5.8). Despite this improvement, expanding access to higher education remains an important policy goal. In 2017, half of OECD countries had campaigns in place to attract students to higher education. In addition, throughout the OECD area, governments use tuition fee and student financial support policies to improve participation across all demographic groups (OECD, 2017[6]).

5.2.1. Entry rates to higher education

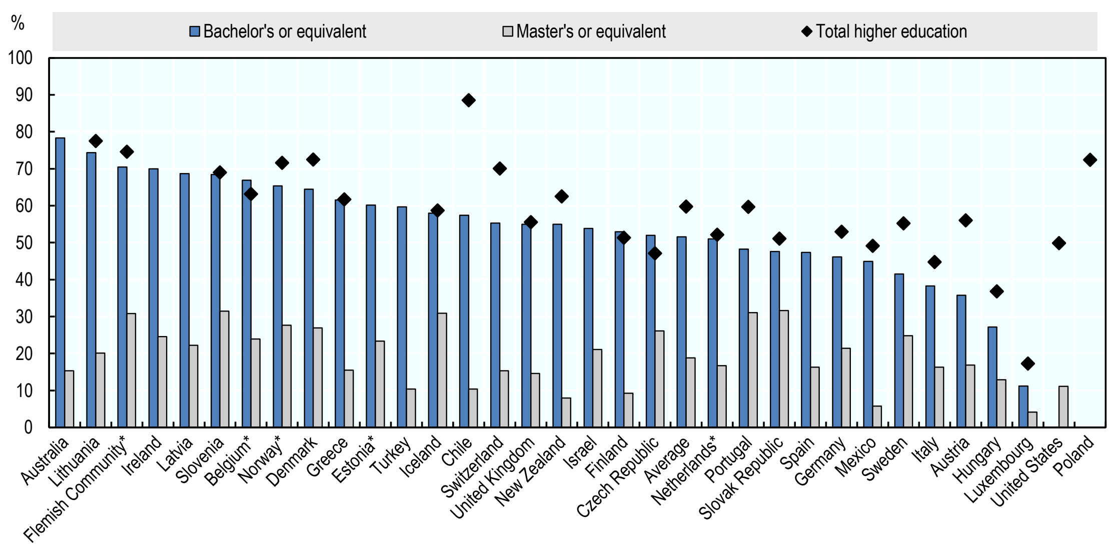
On average across OECD countries, it is estimated that around 60% of young adults will enter higher education (excluding international students) (Figure 5.1).[1] In the Flemish Community and Turkey, almost all adults are expected to enter higher education. In Turkey, many of them enter in short-cycle tertiary education programmes (short-cycle programmes) (Figure 5.2). In Australia and Lithuania, around three-quarters of young adults are expected to enter a bachelor's programme at least once in their lifetime. Over 30% of young adults are expected to enrol in master's programmes in the Flemish Community, Iceland, Portugal, the Slovak Republic and Slovenia, but the rate is lower in all other countries.

Participation in bachelor's programmes in all of the participating jurisdictions is in line with or above the OECD average (Figure 5.1). The Flemish Community and the Netherlands have open admission systems for short-cycle and bachelor's programmes that enable all applicants with the minimum qualification requirement to enter higher education. Entry to higher education in Estonia and Norway is more selective, but qualified applicants are usually able to find a place within the system (see Chapter 2). Throughout the chapter, the data for Estonia include all entrants instead of only new entrants, i.e. students entering a programme at a given higher education level for the second or further time are also included.

Master's programmes are also popular in the participating jurisdictions with the expected entry rate in Estonia, the Flemish Community and Norway higher than the OECD average. For the Netherlands, it is slightly lower than the OECD average, but data for this country exclude new entrants in private institutions.

Figure 5.1 First-time entry rates, by higher education level (2016)

Sum of age-specific entry rates, excluding international students



Notes: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
The age-specific entry rates are the entry rates calculated for each age cohort in the population.
Estonia: Data include all entrants instead of only new entrants.
Netherlands: Data refer to public institutions.
Turkey: The data for total higher education are not reported because not consistent with data for the single levels of higher education.
Source: Adapted from OECD (2018[3]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en; data provided by the Flemish Ministry of Education and Training.

StatLink https://doi.org/10.1787/888933940778

New entrants by higher education level and subsector

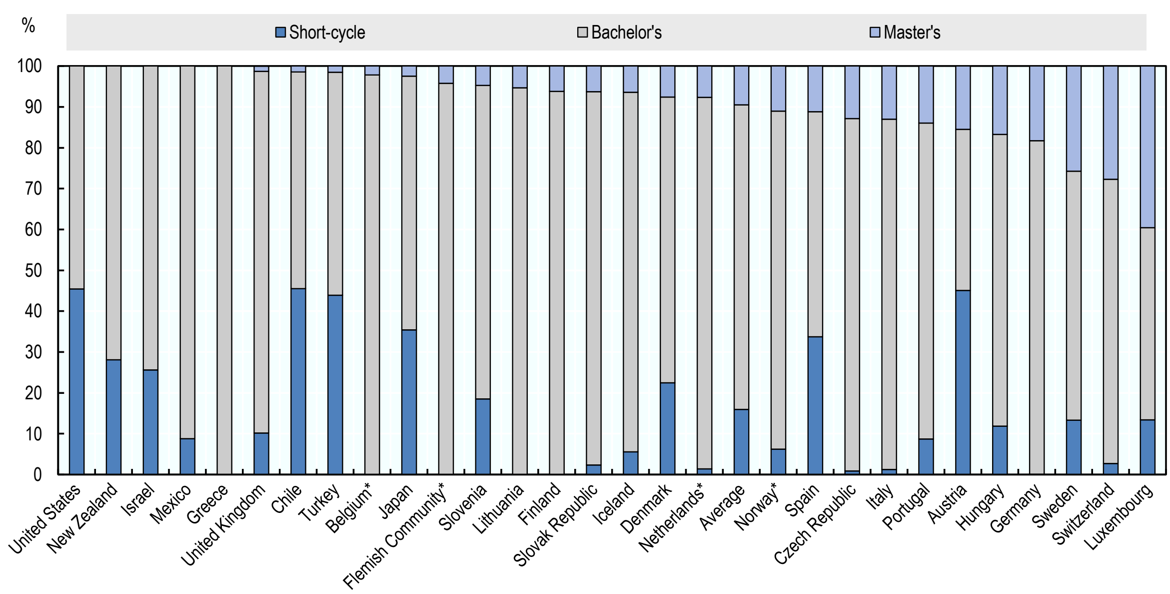
The distribution of new entrants by higher education level, shown in Figure 5.2, sheds some light on the structure of higher education systems. New entrants are those who have entered a study programme at a certain level of education for the first time in their life.

Bachelor's and short-cycle programmes are the point of entrance into higher education for most new entrants. On average across OECD countries, around three-quarters of new entrants enrol in a bachelor's programme, and around one-sixth in a short-cycle education programme.

New entrants can also access higher education at the master's level, typically in long first degrees of at least 5 years that do not require a previous higher education qualification for entry. On average across OECD countries, around 10% of new entrants follow this route into higher education.

Figure 5.2. New entrants to higher education by higher education level (2016)

Share of students entering higher education for their first time through a programme at the short-cycle, bachelor's or master's level



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Countries and economies are ranked in ascending order of the share of new entrants enrolled at the master's level. The share of students entering higher education for the first time through a doctoral programme is negligible in all higher education systems. Data on new entrants to short-cycle programmes are missing for the Flemish Community.
Netherlands: Data refer to public institutions.
Source: Adapted from OECD (2018[3]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en; data provided by the Flemish Ministry of Education and Training.

StatLink https://doi.org/10.1787/888933940797

In some higher education systems, such as Finland and Germany, the share of new entrants to short-cycle education programmes is zero or negligible. This indicates that this type of programme does not exist in the higher education system or it only plays a marginal role.

Short-cycle education programmes (ISCED 5 level) were offered in Estonia until 2009, but they have since been re-classified as vocational education at lower levels of education. They are a relatively recent development in the Flemish Community and in the Netherlands. Short-cycle programmes at the ISCED 5 level are not recognised as part of the higher education system in Norway and are offered through vocational colleges (see Chapter 2). However, Norway offers a two-year programme at ISCED 6 level (*høgskolekandidatgrad*) and students who successfully complete the two-year programme can enter into the third year of a bachelor's programme in the same field (see Chapter 2).

The participating jurisdictions also differ in the distribution of new entrants across subsectors. The existence of different subsectors enrolling a substantial share of students is a way to ensure some diversity of institutions and programmes in the higher education system. System diversity is associated with greater participation across countries, as students with diverse education needs can be accommodated (Reimer and Jacob, 2011[7]). Diversification can also lead to lower costs, as the education provided in professional HEIs tends to be less research-based (see Chapter 3) than in universities. Therefore, diversity can potentially contribute to the sustainable expansion of the higher education system.

In 2016, out of all new entrants to bachelor's level programmes, 31% were enrolled in professional HEIs in Estonia, 62% in the Flemish Community, and 69% in the Netherlands. This reflects differences between the higher education systems and the roles played by different subsectors. In the Flemish Community and the Netherlands, the share of new entrants in professional HEIs declined substantially between 2005 and 2011. While in the Flemish Community this share increased again after 2011, in the Netherlands the negative trend remained unchanged, resulting in a decline by 8 percentage points between 2005 and 2016 (Table 5.1). In Estonia, the share of entrants in professional HEIs remained relatively stable between 2011 and 2016.

Table 5.1. Share of new entrants in professional HEIs, bachelor's level (2005 to 2016)

	2005	2011	2014	2016
Estonia		31	29	31
The Flemish Community	64	55	60	62
The Netherlands	77	73	71	69

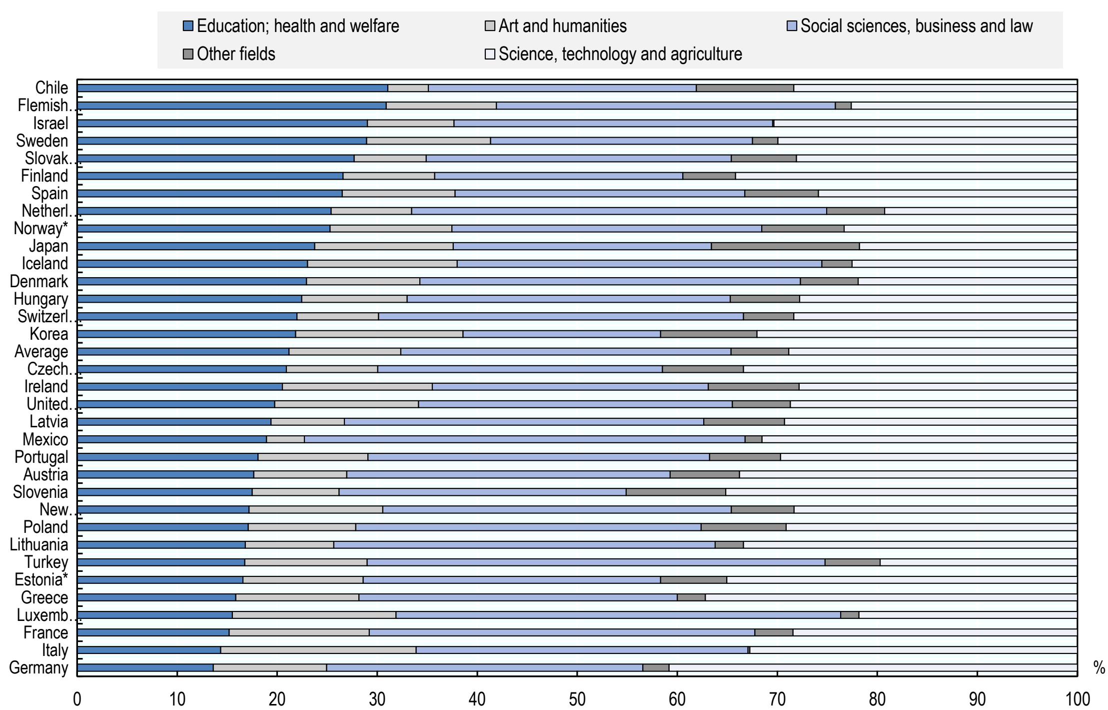
Note: The share of students in professional HEIs is calculated over the total number of new entrants in universities and professional HEIs. Institutions that are not classified in one of these two groups by the national statistical offices are excluded (for example, the Open University in the Netherlands).
Estonia: Data include all entrants instead of only new entrants.
Source: Adapted from information provided by the participating jurisdictions. See the reader's guide for further information.

Norway has three main types of higher education institutions: universities, specialised university institutions, and university colleges (see Chapter 2). These institutions were brought under the same legislative framework in 1995 (although the process of harmonising the legislative framework had started even earlier), and the differences between the two subsectors have gradually faded over time. Since 2003, Norwegian university colleges can be accredited as universities if they fulfil the requirements. A recent policy of institutional mergers further reduced the differences between subsectors, as some university colleges were either incorporated into universities or obtained university status as a result of the mergers. The fading distinction between the two subsectors did not diminish the degree of programme differentiation in Norway, where diversity in institutional profiles and missions remains an important policy goal.

New entrants by field of study

The distribution of new entrants across fields of study differs widely by country. Education and health and welfare, for example, account for over 30% of new entrants in Chile and the Flemish Community, and for less than 15% in Italy and Germany. Technical fields of study related to science, technology and agriculture represented over 40% of new entrants in Germany, and less than 20% in the Netherlands and Turkey (Figure 5.3).

Figure 5.3. Share of new entrants at all levels of higher education by field of study (2016)



Notes: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Data for all the ten fields of study in the ISCED classification are available in the *statlink* table.
Data refer to the sum of all new entrants to each level of higher education, rather than the sum of new entrants to higher education.
"Social sciences, business and law" refers to the fields of study of social sciences, journalism and information; and business, administration and law.
"Science, technology and agriculture" refers to natural sciences, mathematics and statistics; engineering, manufacturing and construction; ICT; and agriculture, forestry, fisheries and veterinary.
"Other fields" refers to generic programmes and qualifications; services; and field unknown.
Australia: New entrants who enrol in more than one field of study are counted more than once, rather than being pro-rated across fields of study.
Estonia: Data include all entrants instead of only new entrants.
Japan: Data on information and communication technologies are included in other fields.
Netherlands: Data refer only to public institutions, and exclude part of new entrants at the doctoral level.
Source: Adapted from OECD (2018[3]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en; data provided by the Flemish Ministry of Education and Training.

StatLink https://doi.org/10.1787/888933940816

Among the eleven broad fields of study in the ISCED classification (UNESCO Institute for Statistics, 2014[8]), business, administration and law account for the largest share of new entrants across all fields of study in most OECD countries, including in Estonia, the Flemish Community, the Netherlands and Norway. On average, over 20% of new entrants were enrolled in this field of study in 2016. This share was similar to that of Estonia and the Flemish Community, while it was about 5 percentage points higher than in Norway and 5 percentage points lower than in the Netherlands.

Some 16% of new entrants were enrolled in engineering, manufacturing and construction programmes, and 13% in health and welfare, on average across OECD countries. Around 10% studied arts and humanities, and about the same proportion choose social sciences, journalism and information. Education; natural sciences, mathematics and statistics; agriculture, forestry, fisheries and veterinary; and services each accounted for less than 10% of new entrants.

In all fields, the variation across countries is considerable. For example, in Estonia, the proportion of entrants in ICT was about 10%, twice as large as the OECD average. In Chile and Mexico, the proportion of new entrants enrolling in arts and humanities was below 5%, while it was well above 15% in Korea. Education was chosen as a field of study by less than 5% of new entrants in Italy, and by about 20% of them in Israel.

Table 5.2. New entrants to bachelor's programmes by field of study and subsector (2016)

	Estonia			The Flemish Community			The Netherlands			Norway
	Universities	PHEIs	All HEIs	Universities	PHEIs	All HEIs	Universities	PHEIs	All HEIs	All HEIs
Education	6.8	0	6.3	1.2	17.7	7.8	1.3	11.6	9.7	10.5
Arts and humanities	17.5	9.4	12.7	13.3	7.2	11	7.4	7.1	8	12.8
Social sciences, journalism and information	9.6	0.7	7.6	11.7	5.3	10	23.8	5.1	12.5	13.3
Business, administration and law	21.8	20.1	21.3	26.2	21.3	23.9	29.1	27.8	29	17
Natural sciences, mathematics and statistics	8.8	0.6	6.3	5.6	1.7	3.9	13.4	1.8	6	6
Information and Communication Technologies	10.5	11.7	8.9	1.1	5.6	2.8	2.7	4.9	3.1	4.1
Engineering, manufacturing and construction	12.6	19.5	18.3	18.7	8.8	13.8	10.4	10.1	9.1	12.2
Agriculture, forestry, fisheries and veterinary	2.1	0	2.1	2	2.1	2.1	1.1	1	1.1	0.8
Health and welfare	4.5	25.4	10.1	20.3	27.7	23.1	10.8	20.7	15.7	14.8
Services	5.7	12.6	6.4	0.1	2.7	1.5	0.1	9.9	5.7	7.7

Note: PHEIs refers to professional HEIs; HEIs refers to higher education institutions.
Estonia: Data include all entrants instead of only new entrants. Almost all entrants studying ICT have been enrolled in universities since 2017/18, as a professional HEI specialising in this field was merged with a university.
Source: Adapted from information provided by the participating jurisdictions. See the reader's guide for further information.

The distribution of new entrants by field of study varies substantially by higher education subsector (Table 5.2). Across participating jurisdictions with available data, there are some common trends. For example, natural sciences, mathematics and statistics account for a much larger share of new entrants in universities, possibly due to the more theoretical nature of programmes in this field. In contrast, health and welfare and services students make up a greater share of new entrants at professional HEIs across the jurisdictions with available data. This is linked to the mission of professional HEIs to provide occupationally specific and labour market relevant programmes.

However, there are substantial differences across countries in the distribution of new entrants by field of study in each subsector. For example, the share of new entrants in arts and humanities was about twice as large in universities as in professional HEIs in the Flemish Community, but it was similar across subsectors in the Netherlands. The field of ICT accounted for a much smaller share of enrolment in universities than in professional HEIs in the Flemish Community and the Netherlands, but not in Estonia. In Estonia, the share of new entrants in ICT in universities, compared to professional HEIs, will increase further in the coming years due to the merger of a professional HEI focused on this field of study with a university.

Programmes in the field of education are only delivered in universities in Estonia, whereas they are mainly delivered in professional HEIs in the Flemish Community and the Netherlands. In the Flemish Community, universities only offer teacher education programmes for which a master's degree is required. Some teacher education programmes are taught in institutions called "centres for adult education" in the Flemish Community, but these will be moved to professional HEIs in the near future. In the Netherlands, teacher education has been an almost exclusive responsibility of professional HEIs since their recognition as higher education institutions in the 1980s. However, recently the minister has agreed to a joint proposal by the research universities to enable two-year education master's programmes, with a view to creating teacher education programmes that are more embedded in current research.

Universities and professional HEIs do not only differ by the fields of study they offer, but also in terms of the range of fields of study offered at the institutional level. When professional HEIs began operating in the Flemish Community and the Netherlands in the 1970s and 1980s, they tended to specialise in one or very few subject areas. This has changed due to a number of mergers between professional HEIs. Nonetheless, professional HEIs continue to be more focused on one or a few subject areas, compared to universities (Lepori and Kyvik, 2010[9]).

The programmes that institutions choose to offer and the programmes in which students choose to enrol can be influenced by government action. Governments often use a range of policy levers to encourage higher education institutions to deliver specific programmes that address labour market needs. In addition, they may also use financial incentives and information levers such as labour market information and awareness campaigns to encourage student enrolments in certain fields of study.

Estonia has been experiencing labour market shortages in the ICT sector over recent years and is currently also experiencing shortages in managerial, specialised education, legal and health care professions (OECD, 2017[10]). The proportion of students enrolled in the fields of study of education and health and welfare in Estonia is below the OECD average. Estonia has introduced a number of policies under its Lifelong Learning Strategy for 2014-2020 to encourage enrolment in these fields of study and address the associated labour market needs, including:

- Government-funded scholarships for students in teacher education: around one hundred scholarships were awarded to students in 2017. Higher education institutions select the beneficiaries of these scholarships based on their grades, study progress and on the field of study that they intend to teach after graduation.

- The selective *Noored Kooli* ("Young People to the Schools") scheme: bachelor's graduates from various fields of study can work as teachers for two years and receive training equivalent to one year of full-time study (60 ECTS). They can subsequently have these credits recognised in a teacher education programme.
- Exemption from tuition fees: students in teacher education and nursing do not pay tuition fees, regardless of their study progress.
- Exemption from the "one bachelor, one master" policy (see Chapter 3): this policy is not applied to teacher education and nursing programmes. Students enrolled in these programmes and studying in the Estonian language pay no tuition fees regardless of whether they have already gained a qualification in a different field of study in recent years.

The Digital Agenda 2020 for Estonia (Ministry of Economic Affairs and Communications, 2014[11]) sets out a range of measures to foster the use of ICT and the development of smart solutions in Estonia and thereby increase economic competitiveness, the well-being of people and the efficiency of public administration. As part of this strategy, Estonia is seeking to double the number of people employed in the ICT sector by 2020. It aims to achieve this through activities supported under the Estonian Lifelong Learning Strategy 2020, and has set a target of 29% of graduates in mathematics, science and technology and 800 ICT graduates per year by 2020 to meet labour market needs in the ICT sector. Initiatives under the Lifelong Learning Strategy 2020 are complemented by actions in the Digital Agenda 2020 that seek to promote ICT careers and studies, and raise the quality of higher education in ICT fields of study (Box 5.1).

As noted above, the proportion of entrants to ICT programmes is twice as large as the OECD average, at 10% in 2015. Maintaining this level of enrolments will be necessary to achieve graduate goals by 2020. The proportion of graduates from the "smart specialisation" fields of study (Box 5.1) was around 25% between 2013 and 2016, and the number of graduates in ICT studies (as defined at the national level) has grown from 485 in 2013 to 717 in 2017 (Estonian Ministry of Education and Research, 2018[12]), showing substantial progress towards the Lifelong Learning Strategy 2020 targets.

Box 5.1. Initiatives to encourage enrolments in ICT fields of study in Estonia

Estonia has introduced a range of policies to help achieve its targets for graduates from ICT fields of study:

- Scholarships aimed at encouraging full-time enrolment in the "smart specialisation" fields of study: Scholarships are provided to either 30% or 50% (depending on the field of study) of students in programmes in fields of study such as natural sciences; mathematics and statistics; ICT; and engineering, manufacturing and construction, depending on national priorities. The beneficiaries of the scholarships are chosen by higher education institutions, usually based on their grades and study progress. These scholarships are financed by the European Union through the European Social Fund.
- IT Academy: The Estonian Ministry of Education and Research funds the IT Academy, a joint initiative between higher education institutions, ICT companies and the government, that aims to develop the skills needed for the ICT industry

and build the sector by delivering highly qualified and specialist graduates with strong ICT skills. StudyITin.ee is managed by the Information Technology Foundation for Education (HITSA) and supported by the telecommunication company Skype Technologies. A range of initiatives are funded through the IT Academy including:

- Scholarships for master's students in ICT programmes: Students in computer science, cyber security, computer and systems engineering, and software engineering at Tallinn University of Technology and the University of Tartu are provided a scholarship of EUR 160-300 per month.
- Funding to support research in ICT: In 2018, an annual grant of EUR 3 million was provided to Tallinn University of Technology and the University of Tartu to support R&D in six key ICT areas selected by the IT Academy Steering Committee, which consists of representatives of the Ministry of Education and Research, the Ministry of Economic Affairs and Communications, and ICT companies. The measure is financed from the state budget and runs from 2018 to 2022.
- Grants to help students develop ICT skills: In 2018, grants (maximum of EUR 75 000 per project) were provided to higher education institutions to develop ICT curricula and to develop discipline-specific ICT skills in other curricula. Preference is given to projects that value co-operation and aim to develop higher economic growth and export capabilities.
- Infrastructure funding under the ASTRA programme 2014-2020 to support the delivery of ICT programmes: The government provides capital funding to support the construction of facilities to deliver ICT programmes, e.g. the new IT centre of the University of Tartu. This programme is partly financed by the European Union.

- A co-operation agreement ("research and technology pact") between interested ministries and other public and private parties. These parties are developing an action plan to popularise the ICT field of study among young people, increase the quality of the education in this field and encourage young people to work in the ICT sector.

The Netherlands is using a range of policies to address shortages of technically trained staff and the growing demand for knowledge and skills related to the application of technology in professions, including those outside of the technology sector (Techniekpact, 2016[13]). In 2012, the Netherlands, in its Science and Technology Master Plan, set a goal of 40% of secondary education and higher education graduates in science and technology programmes by 2025. This builds on an earlier plan (*Deltaplan bèta en techniek*) from 2003, which promoted the participation of both male and female students in science and technology.

The Dutch education community, business sector and government jointly developed the Technology Pact 2020 (*Techniekpact*) in 2013 to improve alignment between education and the technology job market, and address skills shortages in the area. The Pact includes measures that promote science and technology programmes, combat non-completion in higher education programmes, and encourage graduates from relevant programmes to work in science and technology related jobs. Leading firms pledged to provide 1 000 scholarships annually for high-performing science and technology students from 2016-17.

In 2017, twelve scholarship programmes had been established in six of the nine "top sectors" (Chapter 5) and 559 "top sector scholarships" were awarded in 2015-16. The Netherlands also has an agency (*Platform Bèta en Techniek*) in place since 2004 with the aim of promoting participation in study areas related to science and technology. Despite these efforts, the share of new entrants in ICT and in engineering, manufacturing and construction was below the OECD average in 2015 (Figure 5.3). Only 11% of new entrants in ICT programmes were female, and 21% in engineering, manufacturing and construction programmes (this is below the OECD average for both fields).

The Dutch Government has also introduced a package of initiatives to attract young people to enter teacher education programmes, and keep pace with a rising demand for early childhood education and care (ECEC), primary school and secondary school teachers. The "one bachelor, one master" policy (Chapter 3) is not applied in education and health and welfare programmes, thereby ensuring that all students enrolled in these programmes pay lower tuition fees regardless of whether they have already gained a qualification in a different field of study. In addition, the Government has agreed to a joint proposal by the research universities to allow two-year master's programmes in education to attract people into the profession. The proportion of new entrants in the field of study of education is 10% in the Netherlands, slightly above the OECD average.

In **Norway**, to address shortages in the teaching profession, graduates from teaching education programmes working as primary education teachers for at least three of the first six years after graduating can have part of their public loan (up to NOK 55 000) converted into a grant starting in 2025. Until that date, teachers who specialise in science, foreign languages or the Sámi language can receive another NOK 50 000 in debt relief, and those who work in Northern Norway up to NOK 20 000 (OECD, 2018[14]). About 10% of new entrants study education in Norway, above the OECD average.

5.2.2. New entrant profile

Countries can influence the profile of new entrants in higher education in a variety of ways. For example, student financial support can be targeted towards people with low income, and special provisions can make it easier for students with young children, or disabled and special-need students, to study at their own pace. As another example, advertising campaigns are sometimes designed to encourage women to enrol in fields of study related to science and technology, where most new entrants are males. This section explores some of the metric data related to the profile of new entrants, and the policies participating jurisdictions are using to influence the entrant profile, either in terms of student composition or of their programme choice.

Skills on entry

The quality of the potential pool of students is a crucial factor in the functioning of higher education. Incoming students need to have the appropriate foundation to succeed in higher education and acquire advanced skills and knowledge. The prerequisite skills can be developed in the workplace for older learners, but are most commonly developed in schools.

In absence of data on the skills of students entering (or potentially applying to) higher education, the results from the OECD Programme for International Student Assessment (PISA) on the reading proficiency of 15-year-olds can be used as a proxy. PISA results provide some information about the skills of the young students in the late stages of compulsory education, and are relevant as the majority of students still enter higher education immediately or shortly after completing second level education. At the student level, better results in the PISA assessment are correlated with the intention to enrol in higher education (OECD, 2017[15]) and, in those countries with available evidence, they are also related to better school-to-further education transitions (Borgonovi et al., 2017[16]).

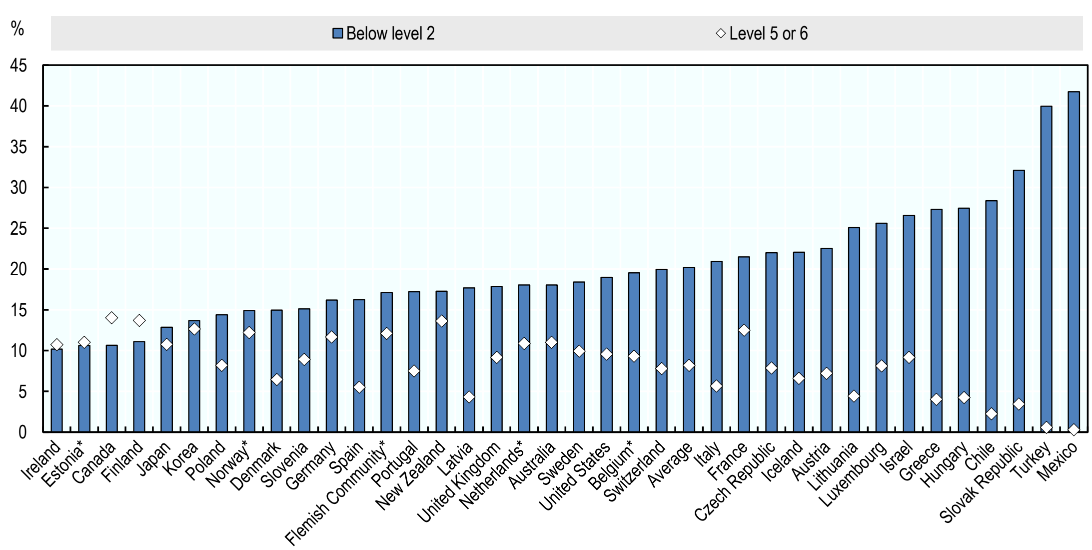
On average across OECD countries, 80% of 15-year-old students reach proficiency level 2 in reading in the PISA assessment (Figure 5.4). Level 2 is considered the baseline level of proficiency to participate effectively and productively in life.

The disparity between education systems is substantial. While in some education systems (e.g. Canada, Estonia, Finland and Ireland) about 90% of students reached proficiency level 2, in Mexico and Turkey less than 60% did. Participating countries in the benchmarking project tend to be among the best-performing countries. In the Flemish Community, the Netherlands and Norway, the proportion of students reaching level 2 in reading was between 80 and 85%.

Some 8% of 15 year-old students across OECD countries reach proficiency level 5 (the highest level of proficiency) in reading. This means that they can fully understand a text whose content or form is unfamiliar, and solve tasks requiring critical evaluation or hypothesis formulation. Over 10% of 15 year-old students reach this level in about one-third of the education systems, including Estonia, the Flemish Community, the Netherlands and Norway.

Figure 5.4. The reading proficiency of fifteen year-old students (2015)

Students at selected levels of proficiency in reading, as a percentage of all 15 year-olds



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018. Proficiency levels in PISA range from below level 1 (low proficiency) to level 6 (high proficiency).
Source: Adapted from OECD (2018[17]), *OECD Programme for International Student Assessment*, www.oecd.org/pisa/.

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Overall, **Flemish** 15 year-olds have consistently achieved results above the OECD average in PISA tests since they were first administered in 2000. For example, in mathematics, the Flemish Community performs just below top performers such as Hong Kong (China), Japan or Singapore, and obtains similar scores to students in other leading countries in PISA – Estonia, Korea and Switzerland (OECD, 2016[18]; Nusche et al., 2015[19]).

The performance of **Estonian** students in the PISA assessments has improved substantially since 2006, and in 2015, it was among the best in Europe in reading, mathematics and science proficiency. A students' socio-economic background has a smaller impact on performance in Estonia than in other OECD countries (OECD, 2016[20]).

The performance of 15-year-olds in **the Netherlands** in reading, mathematics and science is above the OECD average. However, the performance of Dutch students has declined substantially since the start of the century. Between 2012 and 2015, the Netherlands experienced a particularly large performance decline in mathematics and science, while other leading education systems, such as Estonia, Japan and Singapore, improved their student performance in these two subjects (OECD, 2016[18]; OECD, 2017[21]).

Norway, meanwhile, is among the best-performing OECD countries in the PISA reading assessment, but it ranks closer to the OECD median in mathematics and science. There has been sustained progress in PISA's reading component over time, and scores for mathematics and science increased between the 2012 and 2015 (OECD, 2016[18]; OECD, 2018[22]).

Another possible source of new entrants to higher education is older adults (aged 25-64). Many of these adults are in the workforce and have an upper secondary or post-secondary non-tertiary education qualification, but no previous higher education qualification. Individuals in this socio-demographic group have relatively good literacy skills: around 40% score at least at level 3, on average across OECD countries and economies participating in the Survey of Adult Skills. This proportion is even higher in the participating jurisdictions: 42% in Estonia and the Flemish Community, 48% in Norway, and 60% in the Netherlands (OECD calculations based on the Survey of Adult Skills).

New entrants by age

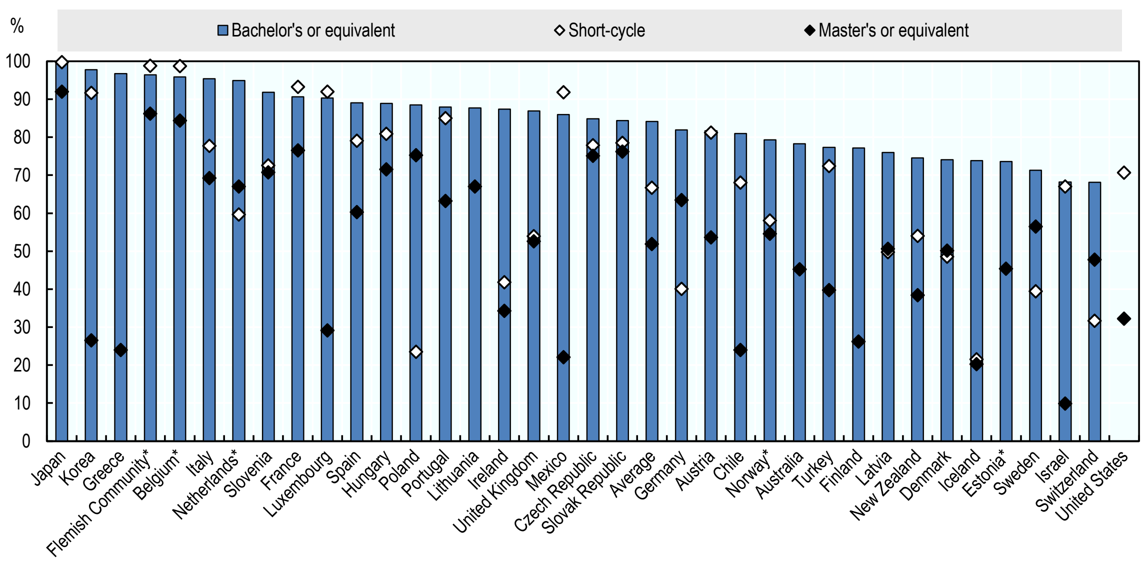
The share of the population in the age group 15-24 is projected to decrease by around 2% from 2015 to 2030, on average across OECD countries (see Chapter 2). This rate of decrease is smaller in all participating jurisdictions: Belgium (0.9%), Estonia (0.7%), the Netherlands (1.6%) and Norway (1.7%) (United Nations Population Division, 2018[23]). Without counterbalancing factors, such as an increase of take-up in lifelong learning, a decrease in the size of young cohorts would translate in a decrease in the number of entrants and students (OECD, 2009[24]). This could result in higher education systems operating below their current capacity and an increase in costs per student (Ritzen, 2010[25]). A decrease in student numbers concentrated in specific regions could be particularly detrimental to the regional role played by higher education institutions (see Chapter 7).

Across OECD countries, over 80% of new entrants to bachelor's programmes were younger than 25 in 2016. In some higher education systems, e.g. in the Flemish Community and the Netherlands, around 95% of new entrants to bachelor's programmes were younger than 25. At the other end of the range, only about two-thirds of bachelor's students in Switzerland were under 25. In Norway, the proportion of new entrants younger than 25 was around 80%, in line with the OECD average, while in Estonia it was around 75%. The share of new entrants younger than 25 tends to be lower at the short-cycle level (around two-thirds, on average across OECD countries) and at the master's level (around one-half).

The Netherlands has a very high proportion of students younger than 25. Part-time students, and students who enter their programme when they are older than 30, are not eligible for student financial assistance in the Netherlands, which could deter older students from enrolling either part-time or full-time.

Figure 5.5. New entrants younger than 25 in higher education, selected education levels (2016)

New entrants who are younger than 25 as a proportion of all new entrants at the same education level



Notes: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
The average for bachelor's and master's programmes is calculated across countries with available data for both series, while the average for short-cycle programmes is calculated separately.
Estonia: Data include all entrants instead of only new entrants.
Netherlands: Data refer to public institutions.
Source: Adapted from OECD (2018[3]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en; data provided by the Flemish Ministry of Education and Training.

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The proportion of new entrants under the age of 25 to bachelor's programmes in Norway is just below the OECD average. As noted in Chapter 2, Norway uses a quota system to ensure both first-time students under the age of 21 (often those straight from secondary school) and those older are able to access higher education. Half the quota is reserved for students in the "first-time quota" and these students are admitted on the basis of performance in upper secondary school. The other half is reserved for older applicants who gain extra points for factors such as age, past education experience and military service. Some applicants within the latter quota have to re-sit exams to improve their upper secondary school results. The Norwegian higher education system is flexible and has quite high levels of part-time students who tend to be older (Section 5.3.1).

Data on the age distribution of new entrants by subsector are not generally available across OECD countries, but the age distribution of first-time graduates in the participating jurisdictions suggests that the share of older students is higher at professional HEIs than at universities, at least at the bachelor's level (Table 5.3). In Estonia, about one out of three bachelor's graduates from professional HEIs was 30 or older; nearly twice the proportion as at universities. In the Netherlands and the Flemish Community, between 7% and 8% of first-time graduates from professional HEI bachelor's programmes were in this age group, compared to 2% for university bachelor's programmes.

The higher proportion of older graduates in both universities and professional HEIs in Estonia could be partly due to the fact that Estonian data cover all graduates instead of only first-time graduates (i.e. students graduating at a given higher education level for the second or further time are also included). The higher proportion of older graduates could also be due to the structure of the education system. Estonian students, on average, complete upper secondary education when they are almost 19, about the same age as in Norway, but six months older than in Belgium and two years older than in the Netherlands (OECD, 2017[6]). In addition, an increasing number of Estonian students choose not to start higher education immediately after graduating from upper secondary school. Finally, the low proportion of students who complete their programme within the expected timeframe (Section 5.7) can also affect the age of graduation.

Table 5.3. Share of first-time graduates older than 30 by subsector, bachelor's level (2016)

	Estonia	The Flemish Community	The Netherlands
Universities	18.4	2.0	1.5
Professional HEIs	34.5	7.7	7.1

Note: First-time graduates are students who graduate for the first time at a given level of education during the reference period.
Estonia: Data include all graduates instead of only first-time graduates.
Source: Adapted from information provided by the participating jurisdictions. See the reader's guide for further information.

The higher share of older adults among graduates of professional HEIs is consistent with their tendency to enrol in vocational programmes at lower levels of education (OECD, 2016[26]), and also with past evidence on non-traditional student participation across higher education systems (Schuetze and Slowey, 2002[27]). Many programmes at professional HEIs, including bachelor's programmes, are occupationally oriented with an emphasis on work-based learning. These characteristics may help adults to reintegrate into a learning environment and develop skills that will increase their employability. The cognitive development of adults is linked to the processing and re-organisation of their own experiences, so the connection with life and work experience can facilitate adult learning (Merriam, Caffarella and Baumgartner, 2007[28]).

New entrants by gender

On average across OECD countries, women represent around 55% of new entrants to higher education. They account for the majority of new entrants in all four participating jurisdictions. However, there are large differences in female participation across fields of study. On average across OECD countries, women represent over 75% of new entrants in the fields of study of education and health and welfare, and over 60% in the fields of humanities and art and social sciences, journalism and information. In contrast, they account for less than 25% of students in engineering, manufacturing and construction and in ICT (OECD, 2018[3]).

These gender imbalances generally hold for the four participating countries as well. However, the degree to which the imbalance exists varies significantly. For example, the share of female new entrants in health and welfare is particularly high (over 80%) in Estonia and Norway. The share of women studying ICT is particularly low in the Flemish Community (7%). In some fields, the gender imbalance is less important in the participating jurisdictions than on average across OECD countries. For example, in Estonia over 25% of the ICT cohort are women (well above the OECD average, even though the gender difference is still considerable) and the Netherlands is one of the few OECD countries to have gender parity among new entrants in the arts and humanities (OECD, 2018[3]).

Several policy initiatives in the participating jurisdictions aim at closing the gender participation gap in the STEM fields of study (natural sciences, mathematics and statistics; engineering, manufacturing and construction; and ICT):

- The **Flemish** government annually monitors the participation of women in STEM programmes, and promotes information campaigns to encourage enrolment of women in this field.
- The **Dutch** government ran a number of information campaigns and targeted initiatives to increase female enrolment in STEM fields of study in the 1980s and 1990s. In the 2000s, the government turned towards more general efforts to enrol more students (including females) in STEM programmes. The share of women in STEM programmes is still relatively low in the Netherlands, but it has increased between 2004 and 2015 from 16% to 24% in professional HEIs and from 31% to 39% in universities (source: background information from the Dutch Ministry for Education, Culture and Science).
- In **Norway**, a recent media campaign was launched to encourage female enrolment in STEM fields of study.

New entrants from under-represented groups

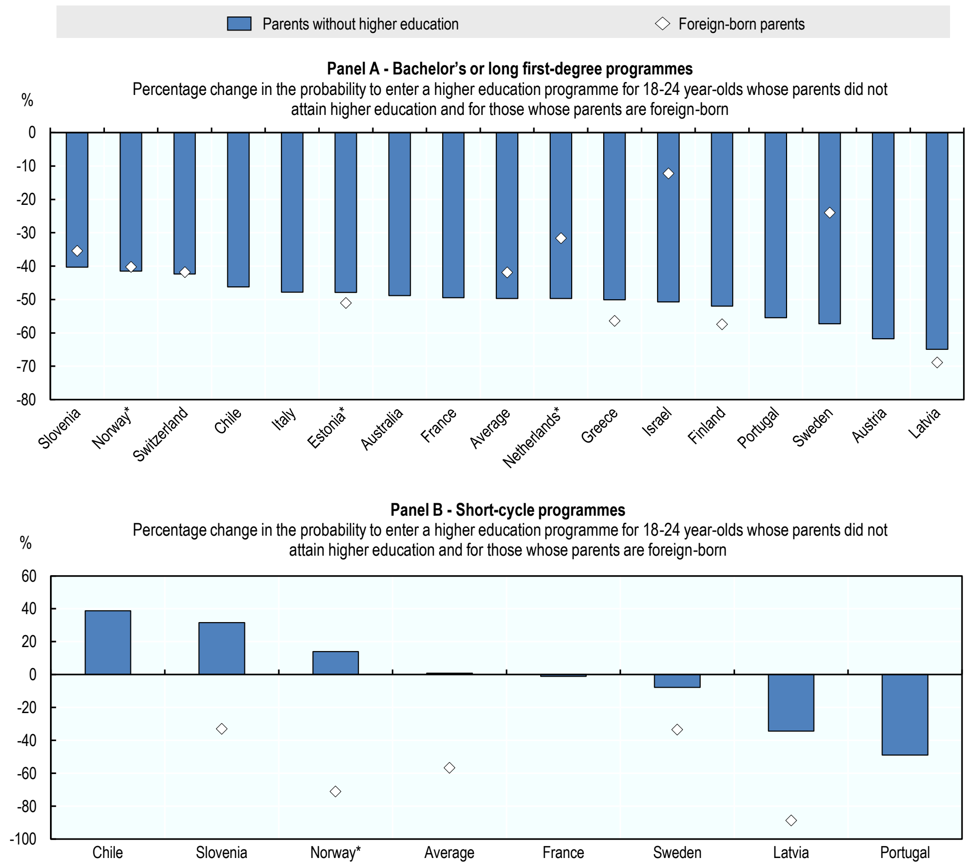
Effective higher education systems guarantee high quality provision while ensuring equitable participation in and outcomes of higher education (OECD, 2017[2]). Inequality is on the rise across OECD countries, but education can play a fundamental role in bridging social gaps while ensuring sustainable economic growth (OECD, 2015[29]). Numerous background and circumstantial factors can jointly affect the outcomes of a person's life (Aaberge and Brandolini, 2015[30]). Key factors that can affect access, participation and outcomes across demographic groups in higher education include socio-economic background, race and ethnicity, gender, age and disability. However, demographic groups under-represented in higher education can vary across countries, and they are measured in different ways and to different extents. As a result, there are limited internationally comparable data on under-represented groups of students in higher education. This report focuses on socio-economic background, using parental education and immigrant background of entrants to higher education. In addition, circumstantial factors such as disabilities or the presence of dependent children are discussed within this section.

In countries with available data, there is substantial inequality of access to higher education based on the aforementioned factors (Figure 5.6). Young people with no family background in higher education are much less likely than average to enter a bachelor's programme (or a long first degree). For example, in 2015, young people aged between 18 and 24 whose parents do not have a higher education qualification were between 40% (Slovenia) and 60% (Latvia) less likely than other individuals to enter a bachelor's programme at least once. Young Norwegians whose parents do not have a higher education qualification were about 40% less likely than other individuals to enrol in a bachelor's programme. In Estonia and the Netherlands, they were around 50% less likely.

Flemish data are not directly comparable with the data presented in Figure 5.6, but they show that parental education has an impact on youth participation in higher education. Overall, 66% of Flemish students leaving upper secondary education in 2015 (either with a diploma or not) entered a higher education programme in the Flemish Community within three years. That figure rises to 83% for graduates whose mother had a higher education degree and falls to 55% for students whose mother did not (OECD calculation based on Flemish administrative data).

In all countries with available data, the proportion of 18-24 year-olds without parents with higher education is substantially lower among new entrants in bachelor's or long first-degree programmes than in the overall population. On average across OECD countries with data, while about two-thirds of the population does not have parents with higher education, the share of this group among entrants to these programmes drops to around one-half. This profile is similar in the participating jurisdictions (Table 5.4).

Figure 5.6. Access rate gaps for 18-24 year-olds in selected critical demographic groups, relative to other individuals (2015)



How to read this chart: Panel A: In Slovenia, 18-24 year-olds without parents with higher education are about 40% less likely to enter a bachelor's or long first-degree programme than other 18-24 year-olds. Panel B: In Chile, 18-24 year-olds without parents with higher education are about 40% more likely to enter a short-cycle programme than other 18-24 year-olds.

Notes: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.

The percentage change in the probability to enter higher education is derived as the distance from 100% of the ratio between: the share of individuals entering a programme at the specified level of education for the first time among the total population in the critical demographic group; and the share of individuals entering a programme at the specified level of education for the first time among the total population in the complementary demographic group. Students whose parents are foreign-born exclude international students. The average is calculated separately for the two series "parents without higher education" and "foreign-born parents".

Australia, Austria, Estonia, France, Greece, Lithuania, Portugal, and Switzerland: The year of reference is not 2015 for all series. Australia, Austria, Finland, Italy, Slovenia, and Switzerland: Data on international students are included in population data. Estonia, Lithuania: Data do not refer to new entrants but to first-year students. Finland, Greece, Italy, and Portugal: Data on international students are included among new entrants. France, Italy: Data refer to a specific cohort of new entrants. Greece: Population data include only students living with their parents. Israel: In most cases, parental education has been inferred on the basis of mother's number of years in education. Netherlands: For a large proportion of new entrants (about 40%), parental education is unknown. Switzerland: Data include all, and not only new, entrants.

Source: Indicators of Education Systems (INES) Survey on Equity in Tertiary Education.

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Table 5.4. Proportion of 18-24 year-old new entrants to bachelor's and long first-degree programmes by parental education (2015)

	Proportion of new entrants whose parents do not have a higher education qualification	Proportion of overall population whose parents do not have a higher education qualification
Estonia	31%	46%
The Netherlands	56%	72%
Norway	39%	52%

Notes: See notes to Figure 5.6.
Source: Indicators of Education Systems (INES) Survey on Equity in Tertiary Education.

While students whose parents have not obtained higher education are less likely to enter a bachelor's or long first-degree programme than their peers, this does not mean that they do not participate in some form of education and skills development. In some countries (e.g. Chile, Norway and Slovenia), young people between 18 and 24 whose parents do not have a higher education qualification are more likely to enter short-cycle programmes than other individuals in the same age group. However, it should be noted that short-cycle programmes at ISCED level 5 are not considered part of the higher education system in Norway and are delivered through vocational colleges (*fagskole*) (see Chapter 2).

The immigration status of parents can also be a socio-economic factor that influences participation in higher education. The children of foreign-born parents (excluding international students) represent 15% of all 18-24 year-olds in the population on average across OECD countries with available data. However, they represent only about 10% of new entrants of the same age group to bachelor's and long first degree or equivalent programmes, on average across these countries. There is a similar profile among the participating jurisdictions (Table 5.5). Contrary to individuals without parents with higher education, children from foreign parents are not over-represented in short-cycle programmes (when compared to their share in the population) in any of the four countries with available data (Figure 5.6).

However, there is more variability across countries with regard to students from immigrant backgrounds, with the bachelor's entry rate gap for these students ranging from about 10% in Israel to over 60% in Finland in 2015. In Norway and the Netherlands, the gap was around 40%, and in Estonia it was around 50% (Figure 5.6).

Table 5.5. Proportion of 18-24 year-old new entrants to bachelor's and long first-degree programmes by parental immigrant background (2015)

	Proportion of new entrants with foreign-born parents	Proportion of overall population with foreign-born parents
Estonia	5%	9%
The Netherlands	13%	19%
Norway	10%	15%

Notes: See notes to Figure 5.6.
Source: Indicators of Education Systems (INES) Survey on Equity in Tertiary Education.

The differences in the results obtained with the two measures of socio-economic background could be partly explained by the heterogeneity of second-generation immigrants. In general, individuals with two foreign-born parents have been shown to be at a disadvantage with regard to accessing higher education. However, some second-generation immigrants, for example those whose families come from certain regions, are equally likely or more likely than children from native-born parents to access higher education (Mühleck, 2013[31]).

The aspirations of students from an immigrant background are also an important factor to consider. Many migrants leave their country of origin with the intention of improving the economic conditions and well-being of themselves and their families. Their ambition to succeed is likely to have an impact on their children, who tend to be more strongly motivated to succeed than their peers. After accounting for socio-economic status and academic proficiency, immigrant 15-year-old students are eight percentage points more likely to expect to complete higher education than their native peers, on average across OECD countries and economies. However, many immigrant children are unlikely to realise their academic ambitions because they lack the necessary foundation of skills (OECD, 2018[32]).

In addition to socio-economic background, other characteristics can influence access to higher education. For a variety of reasons, disability can be a barrier to higher education. Disabled and special-needs students are less likely than other students to have the necessary entry requirements (typically, an upper secondary qualification) and they may be less prepared at the end of secondary education. Those who succeed in entering higher education may need special support and arrangements, even though they may be reluctant to report their special education needs to higher education institutions. In addition, they may lack the self-assurance needed to interact with other students and to succeed in academic work. Despite the difficulties to overcome, enrolling in and completing higher education is very important for disabled and special-needs people, as it substantially increases their employability and reduces the risk of being left out of the labour market and education system and becoming marginalised (OECD, 2011[33]).

Other life circumstances can also affect individuals' probability to enrol in and complete higher education. Having children to take care of makes it more difficult to balance time between child care, study and, in some cases, paid work. In some cases, staff and other students may have difficulties in adapting their behaviour to include students with children in the learning and social environment of the classroom, and institutions may not be able to accommodate their need for flexibility (Brooks, 2012[34]; Marandet and Wainwright, 2010[35]). Students with children also have different financial requirements than other students (Hauschildt, Vögtle and Gwosć, 2018[36]). This can reduce their willingness to enrol in higher education. The share of students with children tends to be very small at entry, and it increases slightly at graduation. For example, in Estonia, 4% of first-year 18-29 year-old students have at least one dependent child, compared to around 30% of all people in the same age group. In Norway, 3% of new entrants have children, compared to 5% of first-time graduates and 11% of all 18-29 year-olds (Table 5.6).

Table 5.6. Proportion of individuals with dependent children among new entrants, first-time graduates, and among all 18-29 year-olds (2015)

Bachelor's and long first-degree programmes, 18-29 year-old age group

	Canada	Estonia	Finland	Germany	Israel	Lithuania	Norway	Slovenia	Sweden	Switzerland	United States
New entrants		4.4	4.2		4.8	1.5	2.7	0.3	3.0	1.5	
First-time graduates	8.3		6.6	4.5	14.5		5.1	4.4	5.7	1.4	13.0
Overall population	13.5	31.0	14.8	16.5	19.4		11.0	12.4	14.1	8.2	20.7

Notes: Data include international students for Finland (all series), Germany (first-time graduates), Canada, Slovenia, Switzerland and the United States (population).
Canada: Year of reference is 2010.
Estonia and Lithuania: Data refer to first-year students instead of new entrants and to all graduates instead of only first-time graduates. Year of reference for new entrants is 2013 for Estonia and 2016 for Lithuania; for population it is 2011 for Lithuania.
Finland and Switzerland: Data include all graduates and new entrants (not only first-time graduates and new entrants); year of reference for new entrants is 2016 for Finland, and 2013 for Switzerland.
Germany: Data include only academic programmes and refers to 2013.
Slovenia: Data for population refer to 2011
United States: Data refer to 2012 for new entrants and population, and to 2008 for first-time graduates
Source: Indicators of Education Systems (INES) Survey on Equity in Tertiary Education.

A variety of policies have been put in place in the participating jurisdictions to support equity in higher education, ranging from targeted student financial support to provisions allowing students in particular conditions to proceed at their own pace (Table 5.7). For example, each of the participating jurisdictions offers means-tested or special grants to students in particular conditions. In addition, in Estonia, the Netherlands and Norway, disabled and special-needs students and students with children are granted exemptions from some academic obligations, allowing them to progress at their own pace.

Jurisdictions also vary in their overall approach to tackling this issue (Table 5.7). For example, Norway takes a "mainstreaming" approach to equity in higher education, where financial support in the form of grants and loans is provided to all students, rather than targeted at special groups. This could contribute to Norway's relatively high share of disadvantaged students among new entrants to bachelor's programmes. In contrast, the Netherlands monitors access to opportunities and various services (including higher education) by identified socio-demographic characteristics such as migrant status, but also gender, age, disability, or sexual orientation (OECD, 2018[37]).

Governments may also have a range of other policies to require or encourage higher education institutions to broaden participation and address equity issues through various initiatives such as admissions policies; recognition of prior learning; the provision of higher education in regional and remote areas, and to meet cultural needs.

Table 5.7. Selected policies to improve equity in higher education (2017)

	Estonia	The Flemish Community	The Netherlands	Norway
Universal system of loans or grants	Yes		Yes	Yes
Means-tested grants	Yes	Yes (combined with reduced or no tuition fees)	Yes	
Tuition fees	No tuition for full-time students in Estonian-taught programmes	Capped tuition fees (dependent on student or parental income)	Capped tuition fees	No tuition fees in public institutions
Special provisions for disabled and special-needs students	Special grants; no tuition fees, independently of study progress	Reserved quota of international mobility grants	Special grants, exceptions to BSA	Special grants and loans
Special provisions for students with children	No tuition fees (independent of study progress); right to study during their academic leave		Special grants, exceptions to BSA, special funding arrangements for single parents	Special grants; academic leave for up to 49 weeks
Alternative ways of access to higher education for individuals who may not meet the usual admissions requirements (Chapter 2)		Yes	Yes	Yes
Special provisions for Indigenous minorities	Scholarships for young expatriate Estonians (Compatriots Programme) and Finno-Ugric people (Kindred Peoples Programme), covering tuition fees, living and travel costs			Study programmes in the three Sámi languages, and one specialised institution providing higher education responding to the needs of the Indigenous Sámi community (Sámi University of Applied Sciences, 2018[38])

Notes: BSA stands for Binding Study Advice (see Section 5.7).
See Chapter 3 for more information on tuition fees and student financial support.
In the Flemish Community, the reserved quota for mobility grants also applies to those who are beneficiaries of the means-tested grant. In this jurisdiction, there are no grants for students in short-cycle programmes (other than nursing), but certain categories of these students may be exempt from registration fees or only have to pay reduced fees. However, all students in short-cycle programmes will be eligible for a grant once these programmes are integrated in the professional HEIs on 1 September 2019.
In Norway, refugees also receive special grants and loans and students with a long, certified period of illness are able to convert their loans into grants.
Source: Adapted from information provided by the participating jurisdictions. See the reader's guide for further information.

5.3. Lifelong learning

Higher education can support lifelong learning by providing opportunities for adults to continue to develop and gain new knowledge and skills throughout their lives. Supporting lifelong learning entails making higher education accessible for all adults, either to build upon their initial higher education qualifications, or to acquire new skills and competencies. It also supports adults to gain an initial higher education qualification later in life. Lifelong learning can therefore help adults adapt to changes in their working careers (OECD, 2017[39]), join the labour force or improve their skills and knowledge to participate more actively in social life (Jamieson, 2016[40]).

Adult learning takes many forms, including formal and non-formal education, on-the-job training and informal education. This section deals with lifelong learning, i.e. learning that:

- happens in the context of formal higher education – institutionalised, intentional and planned education, which is provided by public organisations or recognised private bodies
- is not part of initial education – initial education refers to the education of individuals who are regarded by their society as children, youth and young adults, and is normally designed as a continuous educational pathway for full-time students before their first entrance to the labour market.

Chapter 6 complements this perspective with a view of the role of higher education in the provision of continuing education, including informal and non-formal education.

The majority of students in most OECD countries enter higher education straight from or soon after upper secondary school, and are therefore less than 25 years old. On average across countries with available data, over one-third of young people (excluding international students) are expected to obtain a higher education qualification before the age of 30 (OECD, 2018[4]). Despite these high participation rates, in all OECD countries there remains a large proportion of the population that could potentially access higher education later in life. This is important as people change careers over their working lives and seek new or higher level qualifications.

Governments have a number of policy options to stimulate participation of adults in higher education at different ages and phases of their lives, such as encouraging institutions to provide education on a modular or part-time basis. Policies directly or potentially affecting lifelong learning in the participating jurisdictions will be discussed in the second part of this section.

Government subsidies for student financial assistance can also have an influence on the uptake of study opportunities in higher education at all stages of life. For example, some countries do not differentiate between full-time and part-time students in terms of the subsidy they provide to institutions (i.e. the subsidy allocated is based on student load), for tuition fees or access to student loans or grants.

5.3.1. Part-time studying across OECD countries

Many adults who are interested in participating in higher education have family and work commitments which make it difficult to follow the traditional, weekday, full-time student schedule. Systems that provide options for flexible and part-time education provision can therefore be more successful in increasing participation in lifelong learning.

On average across the 28 countries participating in the EUROSTUDENT survey, 70% of students pursue paid work. While about 20% of these students only pursue paid work during periods without classes, the remaining 50% do so during the class period. The proportion of students pursuing paid work during the class period is about three times higher among students who are 30 or older than among students younger than 22, reflecting the fact that older students tend to be more likely to work while studying

(Hauschildt, Vögtle and Gwosć, 2018[36]). In addition, 7% of students have interrupted their studies in the past for various reasons and about 35% of students identify themselves primarily as workers and not as students (Hauschildt, Vögtle and Gwosć, 2018[36]), which highlights the need for flexibility in higher education systems.

Part-time students are a very heterogeneous group in terms of their aims, expectations and attitudes, as well as their reasons for studying (Callender, Hopkin and Wilkinson, 2010[41]). The incidence of part-time study varies across OECD countries and there are also substantial differences in part-time enrolment across levels of study. Part-time courses might be delivered during the day, evening or in intensive study sessions of a duration of a few days. Part-time study is also defined differently across countries. In some countries, students' intended study load determines their status (students with an intended study load lower than 75% of a full-time load are considered part-time, by the international definition). Other countries classify students as part-time only if they attend specific programmes for part-time students.

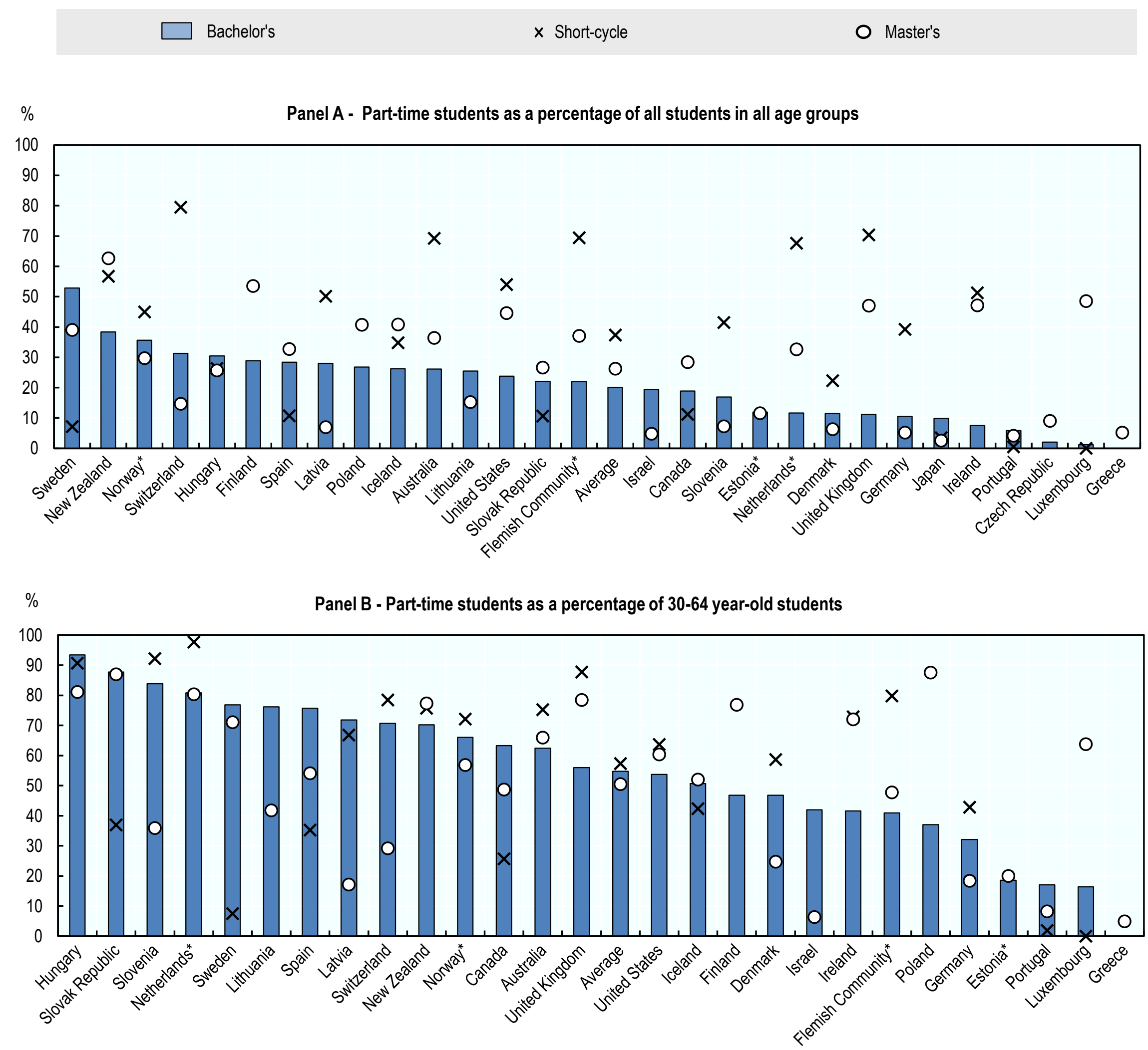
Across all age groups in OECD countries, about 40% of students in short-cycle education programmes are enrolled part-time, compared to around one-fifth of students at the bachelor's level and about one-quarter at the master's level. More than two-thirds of the students in short-cycle education programmes study part-time in Australia, the Flemish Community, the Netherlands, Switzerland and the United Kingdom. Many countries also have a high proportion of part-time students in bachelor's and master's programmes. For example, more than half of the students enrolled in bachelor's programmes study part-time in Sweden, and at the master's level in Finland and New Zealand (Figure 5.7, Panel A). However, in some countries, the share of part-time students is negligible. For example, there are very few students studying part-time at the bachelor's and master's level in Chile and Italy, or at the short-cycle education level in Luxembourg and Portugal (Figure 5.7, Panel A).

On average across OECD countries, about one-half of students between 30 and 64 are enrolled in a part-time programme at the short-cycle, bachelor's and master's level. In all countries with available data, the proportion of part-time students is higher for the age group 30-64 than for all age groups at all levels of education, with the exception of Chile (short-cycle programmes) and Greece (master's programmes). The share of older students enrolled part-time exceeds 80% at all three levels of education in Hungary, the Netherlands, Slovakia and Slovenia, but also at the short-cycle level in the United Kingdom, and at the master's level in Poland.

In Estonia and the Netherlands, the proportion of students studying part-time in bachelor's programmes is between 10% and 15%, below the OECD average. However, the two countries differ substantially in the proportion of 30-64 year-old students in part-time programmes, which is below 25% in Estonia and over 80% in the Netherlands.

The proportion of students studying part-time in bachelor's programmes is around 20% in the Flemish Community, just above the OECD average, and it is around 35% in Norway. For the 30-64 year-old age group, this proportion is 65% in Norway, over 20 percentage points higher than in the Flemish Community.

Figure 5.7. Proportion of part-time students in higher education, by age and ISCED level (2016)



Notes: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
The average for bachelor's and master's programmes is calculated across countries with available data for both series, while the average for short-cycle programmes is calculated separately.
Belgium: Data are not included in the chart because they follow a different statistical definition and therefore they are not comparable with those for the Flemish Community and for other jurisdictions.
Chile: Year of reference 2013.
Italy: Year of reference 2015.
Netherlands: Data refer to public institutions.
Source: Adapted from OECD (2018[3]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en; data provided by the Flemish Ministry of Education and Training.

StatLink https://doi.org/10.1787/888933940892

In the participating jurisdictions with available data, the share of bachelor's part-time students is larger in professional HEIs than in universities. The relative difference is particularly large in the Netherlands, where the share of part-time students is very low (1%) in universities, and it is eight times higher in professional HEIs.

Table 5.8. Proportion of part-time students in bachelor's programmes, by subsector (2016)

	Estonia	The Flemish Community	The Netherlands
Universities	8.9	27.8	1.1
Professional HEIs	11.4	36.9	8.3

Note: Students are considered part-time in the Flemish Community if their intended study load is smaller than 90% of a full-time equivalent. Therefore, the data by subsector for the Flemish Community are not directly comparable with the data by subsector for Estonia and the Netherlands and with the data presented in Figure 5.7 (which are based on the international definition of 75% of a full-time equivalent).
Source: Adapted from information provided by the participating jurisdictions. See the reader's guide for further information.

Lifelong learning is a priority for **Estonia**, which introduced the Estonian Lifelong Learning Strategy 2020 in 2014. The Strategy aims at ensuring everyone has access to learning opportunities that are tailored to their needs and capabilities throughout their lives (Estonian Ministry of Education and Research, 2014[42]). Through implementing the range of measures in the Strategy, Estonia aims to have 20% of adults (25-64 year-olds) participating in lifelong learning at all levels of education by 2020. (Estonian Ministry of Education and Research, 2014[42]). In 2015, only 12% of adults participated in lifelong learning, but by 2017 this had increased to 17% (Estonian Ministry of Education and Research, 2018[12]).

However, the proportion of part-time students in Estonia is relatively low, as shown in Figure 5.7. While higher education is free for full-time students studying in the Estonian language in Estonia, part-time students usually have to pay tuition fees. Full-time students who do not gain at least 75% of the credits corresponding to a full-time workload during the academic year are considered part-time, and can be required to partially reimburse study costs. Part-time students have access to a student loan. Nonetheless, as noted in Chapter 3, the interest rate on loans in Estonia is quite high and the uptake is very low (11% of higher education students benefited from a public loan in 2016).

The **Flemish Community** is the only jurisdiction in the European Union which requires all higher education institutions to offer part-time studies, and all degree programmes must be provided in the form of flexible learning pathways. The Flexible Learning Paths Act (2004) provides the framework to supports flexible pathways, based on a definition of study programmes as an aggregate of modules, each of which is a well-defined unit of learning, teaching and assessment activities. Higher education institutions validate the completion of a module by issuing a credit certificate. Tuition fees are based on the number of credits that students are enrolled in, and there is no distinction between part-time and full-time students in terms of financial support. This, together with other policies on flexible study provision, is likely to contribute to the comparatively high share of students studying part-time.

In the flexible study programme system, students can:

- indicate whether they plan to complete the programme and take on a degree (a "degree contract") or they intend to only enrol in specific modules and credits (a "credit contract")
- enter into an agreement to take exams, under certain conditions imposed by the board of the institution, to obtain a degree or a credit certificate without attending classes ("exam contract").

The short-cycle education programmes, currently delivered by specialised institutions (centres for adult education), also provide a great deal of flexibility for students. These programmes are offered in modules, with subjects sub-divided into a number of modules that can lead to certificates. Several modules together make up the programme, however, students can enrol in single modules. The modules are delivered during the day or evening and on Saturdays. They can be delivered through face-to-face classes or in a combination of face-to-face learning and distance learning. The short-cycle programmes will be offered by professional HEIs from 2019.[2]

In the **Netherlands,** part-time students account for a relatively low proportion of all students (Figure 5.7), and also tend to be older. Part-time students, and students who enter their programme when they are older than 30, are not eligible for student financial assistance in the Netherlands, which can deter participation in lifelong learning, although a special "lifelong learning credit" is available to them since 2017 (see Chapter 3).

Students older than 30 often pay higher tuition fees as a result of the "one bachelor's, one master's" policy. This policy requires students who have already completed a higher education programme to pay higher tuition fees when enrolling in another programme at the same level of education (see Chapter 3).

Following a 2014 review of flexible higher education for the working population to examine the causes behind the relatively low participation in part-time higher education in the Netherlands, a number of initiatives were introduced (see Chapter 3) including:

- A learning outcomes pilot scheme introduced in 21 professional HEIs through 500 part-time and dual study programmes[3] in 2016. This scheme allows higher education institutions to award credits based on learning outcomes, rather than a fixed amount of study hours, which can lead to bachelor's degrees. Institutions can also use the validation of prior learning, workplace learning, and online learning to provide a more customised study experience for students. The programme will be fully evaluated by 2020.
- A pilot voucher system introduced in September 2016 with a small number of ICT programmes, which extended to health programmes in 2017. Students in these programmes can receive vouchers to enrol in modular and part-time education.
- Employees in the private sector can apply for a EUR 1 250 voucher to undertake modules in higher education programmes while working.
- A lifelong learning credit introduced in 2017 to improve the participation of part-time students and those aged 30-55. Beneficiaries of the lifelong learning credit can borrow up to five times the legal tuition fee at similar conditions as other students.

In **Norway**, a country with a relatively high share of part-time students, no distinction is made between part-time and full-time students in terms of tuition fees. Higher education is free, but there are some differences in terms of financial support. Only students with an intended study load of 50% or higher are eligible for grants and loans from the State Educational Loan Fund, and only students studying full-time qualify for the maximum amount of financial support. Most public higher education institutions in Norway offer a number of their programmes and subjects in a flexible mode (online, mixed mode, part-time). In addition, the use of ICT in higher education ensures programmes are increasingly flexible and accessible.

5.4. Digitalisation and online learning

Digitalisation and online learning provide students with more opportunities to access higher education and can provide important opportunities for lifelong learning by allowing students to gain qualifications and improve skills while continuing to meet work and caring commitments. Digital and online learning can also enable full-time students to better balance study and work – an important consideration, as many students work while studying to cover their living costs. Many of the traditional forms of distance education are incorporating forms of online learning, so that face-to-face interaction is not abandoned, but blended with digital and online learning (Brussels Education Services et al., 2014[43]). Online learning ranges from "web supplemented" education, which makes some limited use of online resources (e.g. online availability of lecture notes, email communication), to "fully online" education, where face-to-face interaction with teachers is not required at all (OECD, 2005[44]).

5.4.1. Distance and online education in the participating jurisdictions

Internationally comparable data on the prevalence of online learning activities in higher education across the OECD are not generally available, though recent technological developments are making this type of education more widely available to students. Online learning is available in all participating jurisdictions and, depending on the higher education institution, programmes can be offered through blended learning (a combination of face-to-face and online learning) or, in the Flemish Community, the Netherlands and Norway, entirely online (see Table 5.9).

Table 5.9. Selected policies on digital and online learning (2017)

	Estonia	The Flemish Community	The Netherlands	Norway
Provision of online modules in higher education	Yes	Yes	Yes	Yes
Ability to complete an entire programme through online modules	No	Yes	Yes	Yes
Competitive funding to stimulate innovation in online education	No	No	Yes	Yes
Establishment of a national agency or organisation responsible for digital and online learning in higher education	Yes	No	Yes	Yes

Source: Adapted from information provided by the participating jurisdictions. See the reader's guide for further information.

While the design and delivery of online learning is the responsibility of higher education institutions in most countries, governments support the use of online learning in higher education through a range of policies.

Most Estonian higher education institutions offer some distance education programmes, which include some face-to-face classes through intensive study sessions in higher education institutions (usually Thursday to Sunday, once a month). Estonia is also working to reinforce the use of e-Learning across the higher education sector. Key supporting policies include:

- The BeST e-learning programme, supported by EUR 7 million from the EU Social Fund from 2008 to 2013, aimed to reinforce the use of e-learning; increase the quality of formal education and other forms of training; increase the diversity of studies; contribute to an increase in the mobility of students; and improve access to studies in various regions of Estonia. Over 4 600 e-courses were developed under the programme and it led the creation of education technology and multimedia specialist positions, as well as e-learning support staff in higher education institutions.

- The non-profit Information Technology Foundation for Education (HITSA) was established by the government, the University of Tartu, Tallinn University of Technology, the private company Telia Eesti AS and the Estonian Association of Information Technology and Telecommunications. HITSA is responsible for ensuring the quality of online modules and teaching staff, including the issuance of a “quality e-course” label to certify providers. HITSA also provides analytical insight and promotes knowledge sharing in international networks on education, information systems and infrastructure. In addition, it monitors progress in the utilisation of information technologies in education, and initiates and leads development projects in this area (HITSA, 2018[45]).

Distance education in the **Netherlands** has been provided since 1984 by the Open University of the Netherlands, which has the mission of providing alternative pathways to higher education. It offers distance education, including accredited bachelor’s and master’s degrees. All Open University programmes are provided either completely online or in mixed mode. There are no entry requirements (except a minimum age of 18), and students can enrol for only some specific modules and exams, without having to sign up for a full degree. The Open University of the Netherlands offers distance learning in Flanders as well, with some support from Flemish universities.

Higher education institutions, the Ministry of Education, and the Netherlands Organisation for Scientific Research (NWO) jointly fund the *Samenwerkende Universitaire Reken Faciliteiten* (SURF), which provides access to internet and ICT facilities to higher education students and staff. SURF has an annual budget of around EUR 100 million. Some funds are targeted to specific projects, e.g. funds for innovation that is to contribute to the e-infrastructure (e.g. for high performance computing, supercomputer and grids). SURF supports knowledge exchange among higher education institutions, provides analysis related to experimental projects in the area of online and digital education, and contributes in various ways to the broader use of learning analytics and big data in education.

As part of its 2015 strategic agenda on higher education (The Value of Knowledge, 2015), the Dutch government established the Incentive Fund for Open and Online Education in 2014 to enhance quality, efficiency, access and student success in higher education by using open and online education. The competitive funding programme ran from 2015 to 2018 and provided EUR 1 million annually to institutions. The fund is managed by SURF. In 2015, 45 proposals were submitted and funding was awarded to 11 institutions. In addition, as part of the strategic agenda, the Dutch Government is providing an additional 10% of a special budget (*Studievoorschot*) every year to facilitate digitalisation and improve infrastructure, including digital infrastructure (see

Chapter 3).

Norway has a long history of policies to widen participation through distance learning, due to its sparsely populated areas (OECD, 2018[14]). About 8% of students in higher education in Norway were enrolled in online distance education programmes in 2015. Most public higher education institutions report having students enrolled in online distance courses. The largest proportion of distance learning students is found in relatively small higher education institutions, located in sparsely populated areas. Online distance education courses can be delivered in either a fully online or a mixed mode format (i.e. partly on campus and partly online).

Norway also has a government agency that supports digitalisation in higher education and online learning. The Norwegian Agency for Digital Learning in Higher Education (*Norgesuniversitetet*) was recently merged with two other agencies (the Norwegian Centre for International Co-operation in Education (SIU) and the Norwegian Artistic Research Programme) into a new agency to promote quality in research and higher education more broadly. The new agency is called the Norwegian Agency for International Co-operation and Quality Enhancement in Higher Education (Diku). It provides funding to support a range of initiatives, including the development of new approaches to active learning and digital learning. The agency will continue to conduct a periodic survey on the state of digitalisation and distance learning in higher education. The survey covers various topics such as the diffusion and perceived effectiveness of digital and online learning.

Massive Open Online Courses (MOOCs) have also become an alternative online delivery mode for higher education since they emerged in 2012. MOOCs are online distance education courses that are free of charge and that can be accessed by everyone without entry requirements (OECD, 2016[46]). As they become more common, there is increasing debate on the recognition of credits earned through MOOCs within the higher education sector. Ten Norwegian institutions offered MOOCs in 2017, while in the same year, there were about 150 MOOCs offered by Dutch higher education institutions (source: background information from the Norwegian Ministry of Education and Research).

The Norwegian government established a commission in 2013 to assess the opportunities offered by MOOCs (Norwegian MOOC Commission, 2014[47]). The commission concluded that MOOCs offer the potential to improve distance education, especially when they complement existing types of distance and online provision. By integrating the current offer of online learning, they offer an additional opportunity to promote higher education abroad, reduce the costs of provision and expand access to higher education throughout life.

5.5. Internationalisation

The demand for higher education worldwide and the recognised value of studying abroad have contributed to a diversified flow of international students. International students are those who left their country of origin and moved to another country for the purpose of study. Foreign students are those who study in a country different than their country of citizenship, independently of their purposes (e.g. they might have moved to the country for other reasons and proceeded to study there later).

In 2015, about 4.6 million students were enrolled in higher education institutions outside their country of citizenship (OECD, 2017[6]). In some countries, at some levels of higher education, international students can account for well over one-third of total enrolment (Figure 5.8). But internationalisation can take many forms. Teaching and research staff also move across borders (Chapters 3 and 5). Institutions can deliver programmes abroad through distance education, franchised programmes, foreign campuses (OECD, 2008[48]), or joint and double degree programmes. Both joint and double degree programmes are integrated study programmes. A joint degree programme provides a single degree awarded by two or more institutions, while a double degree programme provides two degrees separately by the institutions involved (Schüle, 2006[49]). In some cases, national regulations may not permit the conferring of joint degree qualifications, leading to issues around the legitimacy of qualifications and their recognition. As a result, double degree programmes are more common than joint degree programmes (Knight, 2011[50]).

Internationalisation policies and international students can also contribute to the learning of all students through internationalisation at home, which is "the purposeful integration of international and intercultural dimensions into the formal and informal curriculum for all students within domestic learning environments", with the aim to develop international and intercultural knowledge, skills and attitudes for all students, regardless of whether they also take part in mobility opportunities (Beelen and Jones, 2015[51]). International students can contribute to internationalisation at home when they interact actively with local students. However, in many countries, the interaction between international and domestic students is relatively limited (ESAA, 2017[52]).

Host countries stand to benefit from international students for a variety of reasons. These include the fees and other living expenses the students pay, and the social and business networks that they help to build with their home countries. In addition, international students, particularly at the master's or doctoral or equivalent level, can contribute to innovation in the host country, initially as students and potentially later on as researchers or highly qualified professionals (OECD, 2016[53]).

A large number of international students in a country can indicate perceived quality of the education provided by the higher education system, and as such can be seen an indication of how attractive the country is as a study destination. However, other factors, including the recognition of foreign degrees and work carried out abroad; the language of instruction; geographical, trade or migration links between countries; and the overall quality of life in the host country can also play a role (OECD, 2017[6]).

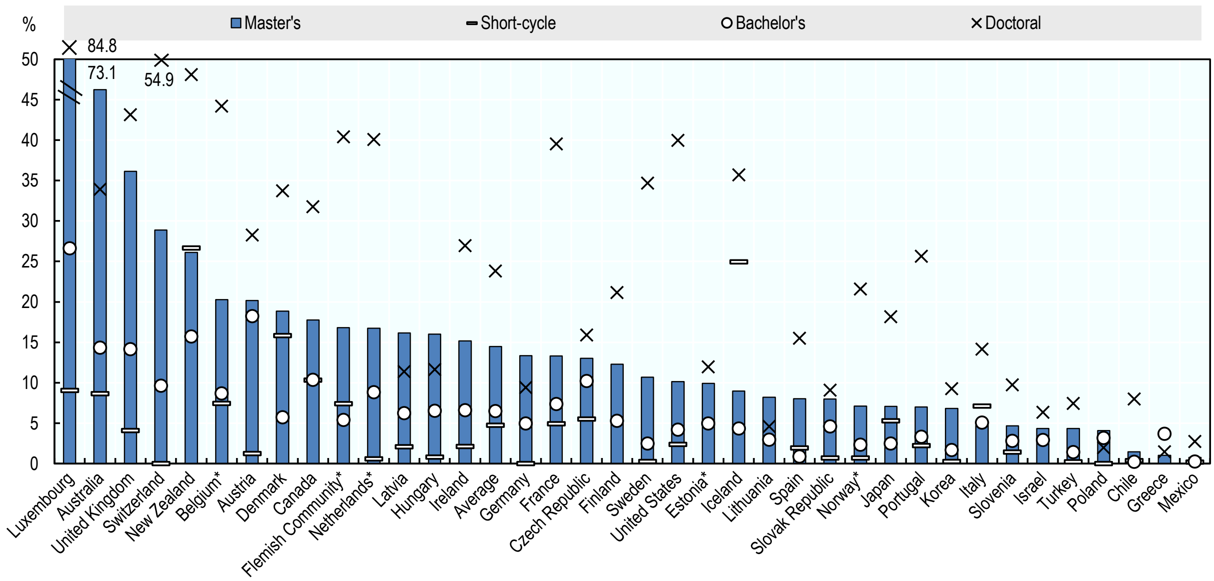
This section examines the prevalence of student mobility across the OECD, as well as initiatives to promote internationalisation in higher education in Estonia, the Flemish Community, the Netherlands and Norway. Policy options to encourage and make the most of internationalisation range from promoting the higher education system abroad and allowing teaching in different languages (which happens in all participating jurisdictions), to charging higher tuition fees to international students to reap a direct economic benefit (the Flemish Community and the Netherlands).

5.5.1. Student mobility

In the OECD area, international students represent 6% of total enrolment in higher education (OECD, 2018[4]). On average across countries, the proportion of international students is much higher at the doctoral (around 25%) and master's (around 15%) than at the bachelor's level (less than 10%) (Figure 5.8). The data refer to degree mobility, i.e. students moving to another country to earn a degree there. The OECD average of this particular indicator is affected by a few countries (Luxembourg and some English-speaking countries) with very large shares of international students, at least partly due to geographic or linguistic reasons (for example, the emergence of English as the *lingua franca* of teaching and research – see below). Therefore, even shares of international students close to the OECD average can be interpreted as a sign that jurisdictions are relatively effective in attracting international students.

Figure 5.8. International students in higher education (2016)

Proportion of international students, by education level



Notes: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
The average for bachelor's, master's and doctoral programmes is calculated across countries with available data for all three series, while the average for short-cycle programmes is calculated separately.
Belgium: Data on short-cycle tertiary programmes are based on nationality and refer to the Flemish Community only.
Belgium, the Flemish Community and the Netherlands: Data exclude the Open University of the Netherlands.
The Czech Republic, Greece, Hungary, Israel, Italy, Korea, Mexico, the Slovak Republic and Turkey (all education levels) and the Flemish Community (short-cycle level): Data reflect the proportion of foreign students instead of international students. Foreign students are those who are not citizens of the country in which the data are collected.
Denmark: Students who have completed a bachelor's degree as international students and subsequently enrol in a second programme (e.g. master's programme) are not counted as international students.
Source: Adapted from OECD (2018[3]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en; data provided by the Flemish Ministry of Education and Training.

StatLink https://doi.org/10.1787/888933940911

Luxembourg has the largest proportion of international students at all three levels (over 70% at the master's and doctoral level, and over 20% at the bachelor's level), which reflects the unique circumstances of this small country in Europe. Other countries with particularly high proportions of international students include many English-speaking countries; Australia and the United Kingdom at the master's level, Austria and New Zealand at the bachelor's level, and New Zealand and Switzerland at the doctoral level. In contrast, the proportion of international students in Mexico is below 3% at all three levels.

In Estonia, the share of international students is below the OECD average at all levels of higher education, but it has been growing rapidly over recent years (by a factor of four in the last 5 years, for all higher education levels combined). The proportion of international students is relatively low in Norway as well, particularly at the bachelor's and master's level. In the Flemish Community, the proportion of international students at the bachelor's level is slightly below the OECD average, but it is in line with the OECD average at the master’s level and higher at the doctoral level. In the Netherlands, the proportion of international students is above the OECD average both at the bachelor’s and master’s level. All participating jurisdictions are actively promoting their higher education systems to international students (Box 5.2).

In the participating jurisdictions with available data, the proportion of international students is considerably higher in universities than in professional HEIs (Table 5.10). Nonetheless, the number of international students can also be substantial in professional HEIs. For instance, the proportion of international students in professional HEIs was around 5% or larger in the Flemish Community and the Netherlands in 2016. In Estonia, the share of international students in professional HEIs is lower, possibly reflecting the fact that there are no programmes taught in English in this subsector (except in a few independent private institutions).

Table 5.10. Proportion of international students in bachelor’s programmes by subsector (2016)

	Estonia	The Flemish Community	The Netherlands
Universities	7.6	6.3	13.1
Professional HEIs	1.2	4.8	7.4

Source: Adapted from information provided by the participating jurisdictions. See the reader's guide for further information.

Students can also study abroad in the form of credit mobility. In this case, they undertake part of their studies at an educational institution abroad (without completing a programme there), and they are credited at their home institution. In 2016, 9% of bachelor’s and master’s graduates had a study period or a work placement abroad of at least three months, on average across the countries of the European Union. Two-thirds of them experienced credit mobility under an EU programme, including Erasmus+. In the Netherlands, 22% of bachelor’s and master’s graduates experienced credit mobility, and in Norway, 11% (calculations based on Eurostat (2018[54])).

Estonia, the Flemish Community and Norway have set targets to encourage outgoing credit mobility. These goals are inspired by the aim of the EHEA (2009[55]) that at least 20% of students graduating in the European Higher Education Area (EHEA) should have had a study or training period abroad by 2020. Based on the current national rates of outgoing mobility, Estonia has set a target of 10% of graduates with experience abroad, and the Flemish Community has set a target of 33%. Norway followed the EHEA in adopting a target of 20% for 2020, but in the longer term it is aiming for 50% of graduates with a study or training period abroad.[4]

English has emerged in the last decades as the *lingua franca* for teaching and research in an academic setting. The use of English makes higher education programmes more attractive for international students, and integrates researchers more effectively in the international research network (Rostan, 2011[56]; Kirkpatrick, 2014[57]). In all participating jurisdictions, higher education institutions are permitted to teach in languages other than the official language (typically, English instead of Dutch, Estonian or Norwegian). According to a survey by the Academic Co-operation Association (Wächter and Maiworm, 2014[58]), about one-third of higher education institutions offered English-taught programmes in short-cycle or bachelor’s education, on average across 27 European countries. This proportion was over 60% in the Netherlands, around 40% in Norway, and around 30% in Estonia.

Another key factor influencing the international mobility of students is the tuition fees they pay, as there are substantial differences in this area across countries. The average annual tuition fee paid by foreign students in public institutions for enrolling in a bachelor programme in 2014 ranged from over USD 14 000 in Australia, Canada, New Zealand and the United States (where foreign students paid on average twice as much as national students) to zero in Finland, Iceland, Norway, the Slovak Republic and Slovenia. The available data show that countries charging higher tuition fees to foreign students can benefit substantially in financial terms. However, the recent tuition fee reforms implemented in Denmark, New Zealand and Sweden also show that tuition fees can have a large impact on the number of incoming international students (OECD, 2017[59]).

Box 5.2. Initiatives in the participating jurisdictions for promoting their higher education system to international students

As many countries and institutions increase their efforts to attract international students, a large number of OECD countries have developed national communication strategies to promote their higher education sector abroad (Sataøen and Wæraas, 2016[60]). A number of OECD countries have national agencies which support and promote international education and academic co-operation, e.g. the British Council in the United Kingdom; the German Academic Exchange Service or *Deutscher Akademischer Austauschdienst* (DAAD) in Germany; and Campus France in France. Similarly, the Netherlands, Norway and Estonia have established agencies to support and promote the internationalisation of education at all levels.

The Archimedes foundation promotes Estonian higher education and research abroad, and coordinates and implements a number of international programmes, including Erasmus+, a European study exchange programme. Estonia provides a number of scholarship programmes for international students coming to Estonia and for Estonian students studying abroad.

The Netherlands has been promoted as a study destination for international students for many years through Nuffic, an independent non-profit organisation, which promotes the Dutch education system online and through its offices around the world. Nuffic also manages scholarship programmes, supports institutional co-operation, and collects and publishes statistics on student mobility.

Norway has had an agency to promote the country as a study destination since 1991. The Centre for International Co-operation in Education (SIU) was established in 1991 and became a public sector agency under the Ministry of Education and Research in 2004. SIU was merged into a new public sector agency that promotes the quality of higher education more broadly in January 2018. The new agency, the Norwegian Agency for International Co-operation and Quality Enhancement in Higher Education (Diku), will continue to deliver the services and activities of SIU and therefore manage international education programmes and initiatives, promote international education in Norway, and provide information and advisory services on the internationalisation in education.

In line with European Union policies to promote mobility across the European Union and associated regions, international students from the European Economic Area (EEA)[5] and Switzerland studying within this area pay the same tuition fees as national students. However, institutions within the EEA can charge higher fees to students from other countries. As a result, students from outside the EEA and Switzerland in the Flemish

Community and the Netherlands pay, on average, substantially higher fees than national students (see Chapter 3). On the other hand, neither EEA nor non-EEA students in Norway pay tuition fees at public and private government-dependent institutions.

Many OECD countries offer scholarships for incoming and outgoing mobile students through bilateral or multilateral international co-operation programmes, and specific agencies that promote the country to international students (Box 5.2). European-wide programmes such as Erasmus+ and Erasmus Mundus play an important role in supporting student mobility in all four jurisdictions. There are also a number of scholarship programmes for students between the European area and other parts of the world. For example, the Flemish Community and a number of other European and Asian countries jointly deliver the Asia-Europe Meeting-Duo (ASEM-DUO) programme to support study abroad opportunities between these jurisdictions. In addition, many governments establish their own study abroad scholarship programmes to support student mobility.

While not aimed at attracting international students to **Estonia**, the tuition fees policy could encourage some international students to study there. As noted in Chapter 3, tuition fees are based on language of instruction rather than citizenship. The government subsidises programmes in the Estonian language and they are free to all students demonstrating sufficient study progress. Higher education institutions are allowed to charge tuition fees for programmes taught in other languages; however, many institutions choose to either not charge tuition fees or offer scholarships that cover tuition fees to international students enrolled in programmes taught in other languages, in order to reach institutional targets for international students. One year of free language classes in Estonian is also available to international students before commencing a programme in Estonian.

The Flemish Community attracts one of the highest levels of doctoral level international students (38%) across OECD countries, but the proportion of international students at the bachelor's level is 5%, below the OECD average, and it is in line with the OECD average at the master's level. An action plan, "Brains on the move", was introduced in 2013 to increase student mobility. The Government aims to increase the number of mobile students, including those from under-represented groups who should account for 33% of all mobile students.

The Flemish Community also aims to increase the number of incoming students through grants and through the "Study in Flanders" project, which was expanded to include a new "Research in Flanders" project. The mobility programmes include:

- The ASEM-DUO Fellowship Programme – a student exchange programme between Flanders and ASEM countries in Asia. Students receive a grant to study abroad and receive recognition for their exchange from the home institution.
- The "Mobility with countries in transition" programme, which supports student mobility between Flanders and Brazil, South Africa, Morocco and Turkey. Both Flemish and international students are eligible for the grants. Students receive recognition for their exchange from the home institution.

In **the Netherlands**, the proportion of international students at the bachelor's level is around 10%, and 15% at the master's level, which is in line with or above the OECD average for both levels. There are no data on international doctoral students in the Netherlands.

Legislation in the Netherlands states that teaching and examinations in higher education must be conducted in Dutch. However, institutions have been able to deliver a large number of English-taught programmes through a clause allowing them to use other languages when necessary due to the content or quality of teaching, or the origin of students or lecturers.

Faced with the increasing offer of English-taught programmes, the Dutch Ministry consulted the Royal Netherlands Academy of Arts and Sciences (KNAW) on the state of language policy in higher education. KNAW found that English offers many potential advantages as a medium of instruction, including facilitating internationalisation and preparing students for an international labour market. However, the Academy suggested that it can also make it difficult for some students (especially those from a disadvantaged background) to succeed in higher education (KNAW, 2017[61]). In addition, KNAW noted that the development of English as the main language of research and academic teaching could create distances between academia and the Dutch-speaking community. This report could feed into future policy discussion on the balance between the benefits and challenges posed by internationalisation.

In addition to providing scholarships to attract international students, the Netherlands encourages Dutch students to study abroad through scholarships for outgoing bachelor’s and master’s students with excellent academic records. Dutch students are also able to take their student financial assistance with them wherever they study. Student financial assistance has been portable in the Netherlands since 2007. Students studying at a recognised programme in any country of the world can benefit from the same grants and loans as they would at home.

Norway has one of the lowest proportions of international students at all levels of higher education among OECD countries, especially at the bachelor’s level. Legislation first granted the right to teach in a foreign language in 2002, and the share of modules taught in languages other than Norwegian (language studies excepted) increased to around 20% in 2016 (Norwegian Ministry of Education and Research, 2017[62]). However, most of the programmes taught in English are offered predominantly at the master’s and doctorate level (Norwegian Ministry of Education and Research, 2017[62]). It is rare for bachelor’s programmes to be taught in a language other than Norwegian (OECD, 2018[14]), although practically all higher education institutions provide some courses in English at the bachelor's level for incoming international exchange students.

Table 5.11. Selected policies on internationalisation in the participating jurisdictions (2017)

	Estonia	The Flemish Community	The Netherlands	Norway
Difference in the tuition fees paid by national and foreign students	No	Yes	Yes	No
Possibility to teach modules and programmes in English	Yes	Yes	Yes	Yes
National target for the proportion of graduates with education or training experience abroad in 2020	10%	33%	Nil	20%
Financial support for outgoing mobility	Yes	Yes	Yes	Yes
Existence of a national agency or organisation with some responsibilities on the internationalisation of higher education	Yes	No	Yes	Yes

Notes: In all four jurisdictions, international students from Switzerland or from countries in the European Economic Area pay the same tuition fees as national students.
Source: Adapted from information provided by the participating jurisdictions. See the reader's guide for further information.

5.5.2. Brain drain, brain gain and brain circulation

Increased student and labour market mobility has generated new opportunities for higher education institutions and economic systems, but also raised concerns in some countries about losing highly qualified graduates who go to work abroad. Most OECD countries compete for global talent, but it is also important to ensure a fair share of the gains to their international partners (OECD, 2008[48]).

The concept of brain drain (or brain gain, depending on which perspective is taken) has been used to reflect the permanent emigration of skilled workers and professionals from their countries of origin towards countries with more developed economies. At the global level, the potential benefits of internationalisation could be lost if too few mobile students return to their country of origin. Brain circulation (or brain exchange) is used to denote a situation of free talent flow in which complex mobility patterns, often involving multiple moves across countries, benefit sending and host countries alike (OECD, 2008[48]). Host countries benefit most clearly from the pool of qualified individuals entering their countries to study or work, while the countries of origin can benefit from the increased human capital of returnees, but also through the establishment of social and business networks with the more developed countries where they work.

International student mobility is likely to benefit both host and sending countries, although this depends on the share of students staying in their host country or returning to their home country after their studies (Bergerhoff et al., 2013[63]). Students coming back to their home countries with more experience and human capital are likely to contribute more to the development of their economy and society than students who move abroad permanently. In a similar way, international students staying to work for some years in their host country give a more direct contribution to its economy. In 2009, between one-sixth and one-third of international students with a residence permit changed their residence status to stay on in their host country, across 14 OECD countries including the Netherlands and Norway (OECD, 2011[64]).

In Estonia in 2015, the proportion of international graduates who were still in the country three years after graduating was 17% at the bachelor's level and 23% at the master's level. In Norway, the proportion of international graduates who were still in the country three years after graduating was 79% at the bachelor's level, 57% at the master's level and 60% at the doctoral level. In both countries, the large majority of international graduates who stayed on after graduation were working (Table 5.12). There are no data available for the Netherlands and the Flemish Community.

Estonia seeks to attract top specialists from abroad, including through international students who stay on after graduation, to counteract the potential labour and skill shortages caused by demographic decline and emigration. However, a large share of international graduates leave Estonia, and the government has set a target of 30% of international master's and doctoral graduates finding employment in the country after graduation by 2020. Improving knowledge of the local labour market and information on available opportunities, for example through traineeships and work-based learning, is seen as an important way of retaining international graduates. International graduates from the more occupationally specific programmes offered by professional HEIs are more likely to find employment in Estonia than graduates from universities (Estonian National Audit Office, 2015[65]; Estonian Ministry for Education and Research, 2015[66]).

Table 5.12. Number of international higher education graduates three years after graduation, by activity status and destination (2016)

As a percentage of the total number of international graduates at a given education level

		Estonia		Norway		
		Bachelor's	Master's	Bachelor's	Master's	Doctoral
Resident in the country of graduation	In education, NOT in employment	0	7	5	4	0
	In employment, NOT in education	10	10	47	29	49
	In education AND in employment	5	6	18	13	1
	NOT in education AND NOT in employment	3	1	10	11	10
Resident in another country		83	77	21	43	40
Total		100	100	100	100	100

Note: Estonian data refer to 2016. In Estonia, there are no short-cycle programmes and there were only nine international doctoral graduates in the year of reference.
Source: Adapted from information provided by the participating jurisdictions. See the reader's guide for further information.

Encouraging student mobility, retaining graduates upon completion of studies and fostering brain circulation requires a whole-of-government approach. Policy initiatives include student visa, residence and work permit requirements and procedures; financial incentives (i.e. tax incentives, scholarships); and housing assistance for international students (OECD, 2017[67]).

Across the participating jurisdictions, a number of recent policy initiatives aim at encouraging international students to stay on after graduation. Since 2016, international graduates in the Netherlands can stay on without need of a work permit and can apply for a residence permit within three years of graduation. Estonia currently allows international students to stay and work for six months after the expiration of their residence permit (OECD, 2017[67]). In Belgium, international graduates will be allowed to stay in the country for a certain period after graduating, even if they do not have an employment contract, pending legislative amendments.

Countries benefit from brain circulation by attracting students and graduates from other countries, and by sending national students abroad to benefit from their immersion in a foreign culture and professional or academic environment. Some initiatives supporting outgoing mobility have been reviewed in Section 5.5.1, including targets on outgoing credit mobility.

The requirement to return to the home country after a period of study abroad is sometimes included in the conditions to become beneficiaries of a mobility scholarship. For example, Estonia makes scholarships for complete degrees abroad conditional on the students returning to Estonia upon completion or carrying out work that is of national interest. The Flemish Community offers scholarships to students from developing countries within the VLIR-UOS programme for collaborative research with developing countries. It requires beneficiaries of scholarships to commit to returning to their home countries after completing their research in Flanders. The aim of the additional requirements is to ensure students reap the benefits of student mobility, while reducing the risk that too many of them leave their home country permanently.

5.6. Student experience in higher education

Student success and learning in higher education depend crucially on the competences and standards within higher education institutions, and on how prepared institutions and staff are to respond to student needs. A number of policy initiatives have been put in place across OECD countries to increase the quality of the institutional environment and of teaching staff, and improve the student experience in higher education. Policies on teaching assessment and appraisal are discussed in Box 5.3, while a more general discussion is given the remainder of this section.

Box 5.3. Teaching appraisal and evaluation

While the evaluation of research has become more standardised in the last decade, due in part to the development and refinement of bibliometric indicators (see Chapter 6), evaluating learning and teaching performance remains a difficult task. In some countries, there have been moves to strengthen teaching appraisal and evaluation to give teaching a stronger role in funding, promotion and hiring decisions.

Teaching appraisal and evaluation is high on the policy agenda of the participating jurisdictions:

Ensuring sufficient provision of expert, motivated teaching staff and workplace learning is a key policy goal in the Flemish Community.

In the Netherlands, the *Talentbrief* (a strategic human resources policy document), calls higher education institutions to broaden their assessments for staff promotion (by not only considering research performance, but also teaching and engagement activities) (Dutch Ministry of Education, 2017[68]).

A key focus of the Norwegian White Paper on Quality Culture in Higher Education is the quality of teaching, with the goal of rewarding teaching excellence and increasing the value of teaching as a career. Increasing the variety of teaching and assessment methods is among the proposed initiatives to reach this goal (Norwegian Ministry of Education and Research, 2017[69]).

Various forms of teaching appraisal exist in the participating jurisdictions. In Estonia, institutions evaluate academic staff every five years of employment as a mechanism for internal quality assurance. A negative evaluation can lead to dismissal of the evaluated employee, as per the Employment Contract Act 2008 (*Töölepingu seadus* 2008).

In the Netherlands, the Comenius programme (see Chapters 3 and 4) is a competitive funding scheme intended to support academic staff in developing and conducting innovative teaching projects, and to strengthen the role of teaching assessment as a tool for career advancement. Proposals for funding should aim to realise concrete improvements in teaching quality with direct benefits for students. The peer review assessment of proposals is the responsibility of the National Funding Council for Education Research (NWO/NRO), and is based on innovativeness, theoretical significance, potential impact and the teaching record of the project leader. The programme also aims at creating a community of fellows facilitating the exchange and dissemination of best practices.

In Norway, measures related to teaching appraisal include:

- Peer review and mentoring for academic staff with teaching duties – the government encourages a greater use of peer review to evaluate teaching across institutions.
- Competitive funding schemes – the government will fund a portfolio of initiatives on competencies and innovation in teaching, as well as networking opportunities.

In the United Kingdom, the Teaching Excellence and Student Outcomes Framework (TEF) was introduced in 2016 to recognise excellence in relation to teaching and ensuring good student outcomes. Higher education institutions receive a gold, silver or bronze award to indicate their level of undergraduate teaching, learning environment and student outcomes. As an incentive for participation, institutions that implement the framework will be allowed to increase their tuition fees in line with inflation (despite the fee cap). The initiative is overseen by the TEF Project Board, which includes, among others, representatives from academia, the student body, funding councils and the government's department of education (HEFCE, 2017[70]).

In Australia, the Australian University Teaching Criteria and Standards framework (a Learning and Teaching Fund Programme) provides a transparent set of criteria and standards to help universities and staff understand what constitutes quality teaching. This framework can be used to set indicative standards for performance review and promotion. The criteria included in the framework include, for instance, design and planning of learning activities; assessment and giving feedback to students; and integration of scholarship, research and professional activities with teaching. For each criteria, sources of indicative evidence which could be used for assessment are provided, including student feedback and peer review (Chalmers et al., 2014[71]).

5.6.1. Student satisfaction as a measure of quality

Student engagement is "the extent to which students are engaging in a range of educational activities that research has shown as likely to lead to high quality learning. Such activities might include active learning, involvement in enriching educational experiences, seeking guidance from staff or working collaboratively with other students" (Coates, 2005[72]). Giving students a voice and listening to their experiences of studying in higher education is recognised as a way to improve learning and teaching in higher education. Evaluations of the student experience can shed new light on what is important to students and provide evidence on how the design of programmes and the information provided to them shape their experiences.

Student experience and engagement surveys provide data on what students are actually doing and how they spend their time in higher education. A number of OECD countries use student surveys at the national level or have introduced policies to mandate institutional-level surveys (Box 5.4).

There are limitations to this data as these types of surveys seek the views of students; they may have difficulty recalling certain types of information; and they may consciously or unconsciously alter their answers depending on the social desirability associated with them (Klemenčič and Chirikov, 2015[73]). In addition, student responses may be influenced by their own perception of the higher education system or the social context in which they are embedded (Porter, 2011[74]). The latter issue is a particularly serious problem with student surveys, as it could bias their results in directions consistent with general social beliefs. For example, students may report larger learning gains in programmes with high reputations just because they infer that in such reputed programmes they must learn a lot (Porter, 2011[74]). One study concluded that student evaluations of teaching performance carry gender biases that can potentially reinforce existing biases in academic staff promotions and hiring (Mengel, Sauermann and Zölitz, 2018[75]).

Box 5.4. Student experience and engagement surveys

Two examples of comprehensive and long-stranding student engagement surveys are the Student Experience Survey in Australia and the National Survey of Student Engagement (NSSE) in the United States.

The Australian Student Experience Survey asks students about six areas of their higher education experience: overall quality of educational experience; teaching quality; learner engagement; learning resources; student support; and skills development.

The results of the survey are published on the Quality Indicators for Learning and Teaching (QILT) website (www.qilt.edu.au) which is supported by the Australian Department of Education and Training. The QILT website also publishes data on the labour market outcomes of graduates and employers' satisfaction with graduate's generic and technical skills, and overall work readiness (Australian Government Department of Education and Training, 2018[76]).

In the United States, the National Survey of Student Engagement (NSSE) collects detailed information from both first-year and senior students in four thematic areas:

- academic challenge, e.g. higher-order learning, reflective and integrative learning, learning strategies, quantitative reasoning
- learning with peers, e.g. collaborative learning and discussions with diverse others
- experiences with faculty, e.g. student-faculty interaction and effective teaching practices
- campus environment, e.g. quality of interactions and supportive environment.

Responses to these thematic areas provide stakeholders with detailed information about students and higher education institutions. This information is published on the NSSE website (nsse.indiana.edu) and has been particularly useful to higher education institutions as they seek to improve learning, teaching and overall quality. Several universities have publicly documented their actions to improve quality in the wake of their NSSE results, and many of these actions are provided to NSSE so that they may be disseminated to other higher education institutions (NSSE, 2018[77]).

In 2018, around 500 American higher education institutions participated in NSSE, and it has been administered in higher education institutions in other OECD countries, such as Canada, Mexico and the United Kingdom.

Ireland, seeking to gain a better understanding of its students and higher education system, launched the Irish Survey of Student Engagement (ISSE) in 2013 based on the NSSE.

Despite these limitations, student surveys provide prospective students with important information to help them make informed choices about where to study. Student-centred metrics can also help guide higher education institutions by providing them with information to review and innovate in their learning and teaching practices (Universities UK, 2016[78]). Student experience evaluations can also help assure students, households, government and the broader community that higher education is delivering value, including value for money. The latter is particularly important as cost-sharing policies and market-oriented approaches become an increasingly central part of the higher education landscape (Teixeira, Jongbloed and Dill, 2014[79]).

Within the participating jurisdictions, Estonia, the Netherlands and Norway also use different types of student surveys to assess their experience in higher education.

Student surveys in Estonia are conducted at the institutional level. A national graduate survey, which includes some questions about the satisfaction with the learning experience, is commissioned by the ministry every few years. In 2012, 91% of graduates were satisfied with their higher education institution, and 87% were satisfied with their ability to carry out the tasks they were assigned on their jobs. About half of graduates were satisfied with the opportunities for traineeships (a form of work-based learning), and this proportion was substantially higher (around three-quarters) for professional HEIs.

The Dutch government commissions an annual survey (*Studentenmonitor*) that monitors the socio-economic background, income and attitudes of students, as well as their study progress, education choices and utilisation of student financial support. The Dutch government also commissions an annual survey of all students that focuses on student satisfaction (*Nationale Studenten Enquête*). The results for each higher education programme are made available to students through a web-based tool, *Studiekeuze* 123 (Section 5.7). In 2018, 77% of Dutch students were satisfied with their programme, with a higher level of satisfaction in universities (85%) than in professional HEIs (72%). Students also expressed their satisfaction on 17 themes related to the quality of higher education. Out of these themes, both university and professional HEI students were most satisfied with their internship experience and the size of their classes, which received satisfaction ratings of 3.8 or above on average (on a 1-5 scale). However, while university students were least satisfied with the preparation for their professional career (3.2), for professional HEI students internationalisation was the least satisfactory theme (3.2) (Studiekeuze123, 2018[80]; Studiekeuze123, 2018[81]).

The Norwegian Agency for Quality Assurance in Education (NOKUT) conducts an annual survey on student perceptions of the quality of their study programmes, known as the *Studiebarometer*. The survey is sent to all bachelor's and master's students in their second year of studies (and also in the fifth year of studies for students in long first degrees). A student survey of students in short-cycle programmes has been recently established as part of a plan to improve the student learning experience at this level of education. The survey examines student choice of field of study, quality of teaching, students' experiences in higher education, their workload and the career relevance of their study programmes. Overall, around 70% of students are satisfied or very satisfied with their study and learning environment, but students would like to receive more feedback from academic staff, have more input into the design and development of their education, and see more creative forms of assessment (Damen et al., 2016[82])(NOKUT, 2016). A recent OECD report (OECD, 2018[14]) suggested that the survey could be expanded to include more questions about student engagement and effective teaching practices, both at an institutional and field of study level, in order to better inform institutional decision-making.

A number of countries in the EHEA participate in the EUROSTUDENT network, which administers a survey to higher education students every three years. The EUROSTUDENT survey focuses on the socio-economic background and living conditions of students. In addition, it provides some information on the levels of student satisfaction with the quality of teaching, the organisation of studies and timetables, and study facilities. It also surveys students on how well prepared they feel for the labour market. The latest survey found that 55% of students are satisfied with the organisation of their studies and 65% with the teaching quality (Hauschildt, Vögtle and Gwosć, 2018[36]).[6]

5.6.2. Student support and talent development

Students, especially those at risk of not completing, can greatly benefit from social, psychological and academic support. Examples of these forms of support include the establishment of learning communities to facilitate social interaction among students (Brouwer et al., 2017[83]); student coaching (Bettinger and Baker, 2014[84]); remedial classes and other forms of formal academic support to students with weaker academic records (Mcnaught, 2013[85]).

Student support can be an effective way to support individuals from groups that are under-represented in higher education, and who could be particularly in need of support, as they may have fewer alternative channels from which to draw it. The presence of effective support systems could make these individuals more likely to complete once enrolled. Despite this, no comparable international data are collected on the resourcing, prevalence and effectiveness of student support in higher education.

The Flemish government provides targeted funding to support student tutoring projects aimed at students from under-represented groups or at risk of non-completion. In addition, it provides funding for the Support Centre for Inclusive Higher Education (*Steunpunt Inclusief Hoger Onderwijs*, SIHO) to support the development of institutional strategies to help disabled and special-needs students.

In the Netherlands, institutions organise a variety of remedial support activities, e.g. on language, mathematics or research methodology. The orientation activities and tests undertaken by applicants in the Flemish Community and the Netherlands (Section 5.7) can be useful tools to identify the needs of students in this respect.

Remedial work is required for some students in a number of state higher education systems in the United States. For instance, the Tennessee Board of Regents requires institutions to place students with poor performance on the Scholastic Aptitude Test or the American College Test in learning support courses or similar interventions for reading, writing or mathematics (OECD, 2017[86]).

In addition to supporting successful completion of higher education for all students, institutions have a role in helping develop the potential of highly motivated and high-achieving students. A number of countries support talented students through special honours programmes or excellence tracks within bachelor’s and master’s programmes, and an increasing number of students are enrolled in these programmes (Kool et al., 2017[87]), though no comparable data are available on these policies or their outcomes. These programmes or tracks are aimed at providing students with more enriching and deeper learning experiences through a range of practices, including smaller classes, wider study material, and a deeper and more challenging exploration of subjects.

Of the participating jurisdictions, **the Netherlands** has the most explicit and extensive policies and practices to support excellence in higher education. After a number of pilot projects dating back to 2004 (Wolfensberger, 2015[88]), the Dutch government ran a competitive funding scheme (the "Sirius Programme") from 2008 to 2014 to finance the development of excellence tracks (talent or honours programmes) within bachelor's and master's programmes. Applications for funding were assessed by a panel of experts and around EUR 60 million were distributed to 23 universities and professional HEIs through this funding scheme between 2008 and 2014.

The excellence tracks are directed at students with high academic performance and strong motivation who are capable of doing more than is provided through the mainstream curricula. The talent or honours programmes include activities aimed at broadening or deepening student learning, including additional subjects and more demanding coursework, interdisciplinary programmes, work- and project-based learning, and research projects (Wolfensberger, 2015[88]). Many institutions maintained the excellence tracks following the termination of Sirius Programme. Some 8% of bachelor's students in universities are in excellence tracks, as well as 6% of students in bachelor's and master's programmes in professional HEIs.

A number of universities in **the Flemish Community** have delivered honours programmes since 2010. In 2015, there were six programmes in place, three of which were delivered by Ghent University. Honours programmes include interactive, work field-related classes; project-related laboratory work and research papers; interdisciplinary subjects; and individual honours research projects conducted during an internship and presented in the final semester (written or orally). However, there is no special support for these programmes by the Government (Wolfensberger, 2015[88]).

In general, there are no honours programmes or excellence tracks for individual students in Norway's higher education system. Instead, the drive for excellence is directed at the system as a whole. This can be seen in the various quality initiatives outlined in the White Papers on quality reform (Norwegian Ministry of Education and Research, 2001[89]), structural reform of the sector (Norwegian Ministry of Education and Research, 2015[90]) and a quality culture in higher education (Norwegian Ministry of Education and Research, 2017[69]). However, some higher education institutions and programmes can be highly selective in Norway; successful applicants need to be academically talented and highly motivated to gain entry. In addition, a research track in higher education programmes in medicine and veterinary studies exists since the 2000s, and pilots are currently starting in other fields of study. The University of Oslo plans to start an honour's programme from 2019.

5.7. Completion and non-completion

In the context of the massive expansion of higher education systems and wider participation, there are persistent challenges related to students' preparation for higher education and their ability to succeed and gain a qualification (CHEPS and NIFU, 2015[91]). Of particular concern to policymakers is the magnitude of non-completion and delayed completion, often perceived as a waste of financial and human resources. Completion rates can be regarded as a measure of operational performance, i.e. the efficiency in transforming input resources into outputs.

It should be noted that recent literature questions the traditional assumption that not completing higher education is a negative outcome in the life of an individual. Many students who leave their studies without graduating go back to higher education later on in life. In addition, in a number of countries, even those who do not graduate fare better in the labour market later on in life than individuals with similar profiles who did not enrol in higher education (Schnepf, 2014[92]).

Nonetheless, there are concerns about non-completion and delayed completion of higher education and implications for labour market outcomes among many OECD countries. High levels of non-completion or severely delayed graduation could reflect failures in the guidance process from compulsory to higher education, inadequate student support mechanisms, low admission standards, as well as poor programme quality (OECD, 2008[48]). Countries have subsequently focused policies on addressing the issue in a number of ways over the last two decades. In the participating jurisdictions, some of the efforts have focused on improving the match between students and programmes through orientation activities and study advice, on the assumption that students are dropping out of higher education because they did not choose a programme that suits their capabilities and interests. The Estonian government has tried to attract non-completers back to higher education through financial incentives. These and other policy initiatives, discussed within this section, have had some positive consequences, but have not eradicated the problem.

Low completion rates may be regarded as a sign of inefficiency in higher education; however, completion depends on other factors as well. For example, the profile of students entering higher education is a factor in determining their path to completion. In addition, completion rates can influence graduate outcomes at the system level. For example, if a higher education system were to lower the standards required for graduation, this could translate into a higher completion rate and lower overall graduate skill proficiency.

As completion rates can be a useful measure of higher education system performance, it is useful to break them down by as many dimensions as possible, including programme level and field of study, student age, study intensity and socio-economic background. Unfortunately, the internationally comparable data that are available on completion rates are relatively limited. To compensate for this lack of data, this chapter also explores what can be learned by comparing the number of first-time graduates with the number of new entrants.

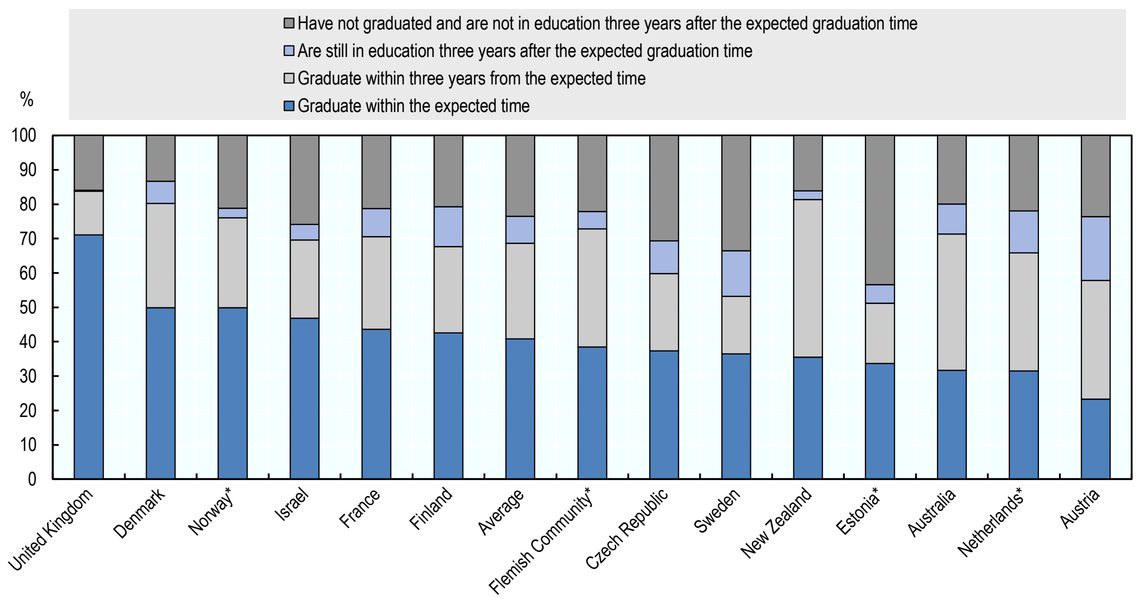
5.7.1. Completion of higher education

In 2014, on average across higher education systems with available data, around 40% of new entrants to a bachelor's programme graduated within the expected duration of the programme (Figure 5.9). This proportion ranged from around one-third, or less, in Australia, Austria, Estonia and the Netherlands to around one-half, or more, in Denmark, Norway and the United Kingdom. In the Flemish Community, 38% of new entrants completed a programme within the expected graduation timeframe. The completed programme could be either the same programme in which the new entrants initially enrolled, or a different higher education programme. The expected duration of the programme is based on relevant legislation or regulation (except for the United Kingdom, where it is reported by the institutions, and the United States, where it is based on common practice).

On average, around 70% of bachelor's new entrants completed a higher education programme three years after their expected graduation year. The proportion of new entrants who graduated within this timeframe was lowest in Estonia (just over 50%), and it above 75% in Denmark, New Zealand, Norway and the United Kingdom. In the Flemish Community, around 73% of students completed within this timeframe and 66% in the Netherlands.

Figure 5.9. Completion and non-completion of bachelor's new entrants (2014)

Proportion of full-time new entrants who:



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
The year of reference is the expected graduation date plus three years. Countries are ranked in descending order of the proportion of new entrants graduating within the expected time.
Czech Republic: Data refer to two years instead of three years after the expected graduation time.
Estonia: Data include all entrants instead of only new entrants.
Flemish Community: Data for "Had not graduated and were not in education" refer to students who were not enrolled in either bachelor's or master's degrees or equivalent programmes. They could still be enrolled at other levels.
France: Data exclude international students.
Source: Adapted from OECD (2016[26]), *Education at a Glance 2016: OECD Indicators*, http://dx.doi.org/10.1787/eag-2016-en.

StatLink https://doi.org/10.1787/888933940930

The share of new entrants who were still in education three years after the expected graduation time is also considerably different across countries, ranging from a negligible fraction in the United Kingdom to around 20% in Austria.

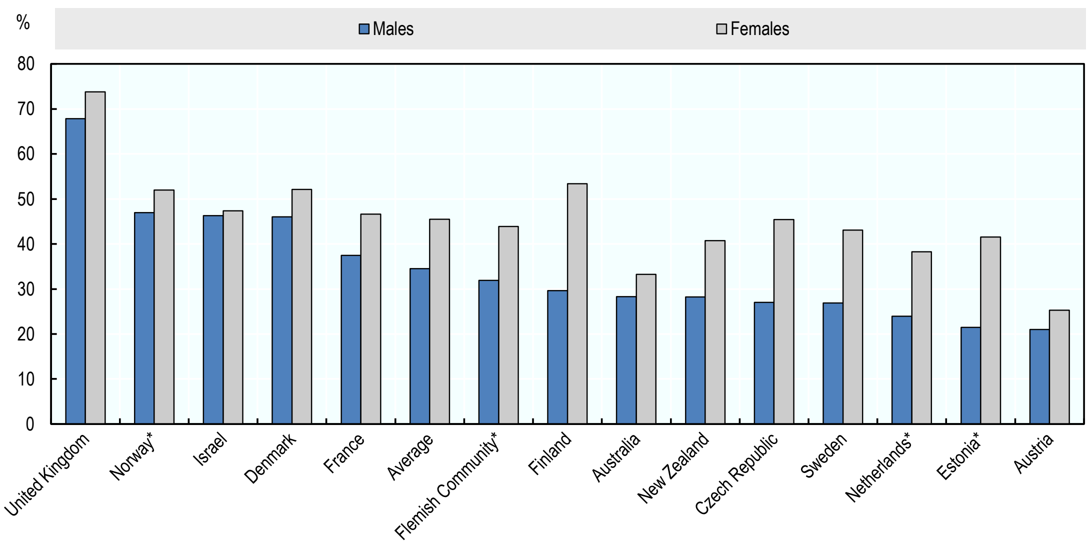
The share of new entrants who leave the higher education system without a degree within three years of the expected graduation year is highest in the Czech Republic, Estonia and Sweden (over 30%), and lowest in Denmark (less than 15%). This proportion is around 20% in the Flemish Community, the Netherlands and Norway, and around 40% in Estonia.

5.7.2. Factors related to completion

The completion rates are remarkably different across genders (Figure 5.10). In 2014, on average across countries with available data, women were about one-third more likely to graduate within the expected time than men. The difference in the probability of graduating by the expected time was largest in Estonia and Finland (over 20 percentage points), and smallest in Israel (1 percentage point).

Figure 5.10. Completion rates in bachelor's programmes, by gender (2014)

Proportion of full-time new entrants graduating within the expected time



Notes: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
The year of reference is the expected graduation date plus three years.
Estonia: Data include all entrants instead of only new entrants.
France: Data exclude international students.
Source: Adapted from OECD (2016[26]), *Education at a Glance 2016: OECD Indicators*, http://dx.doi.org/10.1787/eag-2016-en.

StatLink https://doi.org/10.1787/888933940949

The difference in the completion rate between female and male new entrants was relatively small in Norway (5 percentage points), while it was more substantial (between 10 and 15 percentage points) in the Flemish Community and the Netherlands.

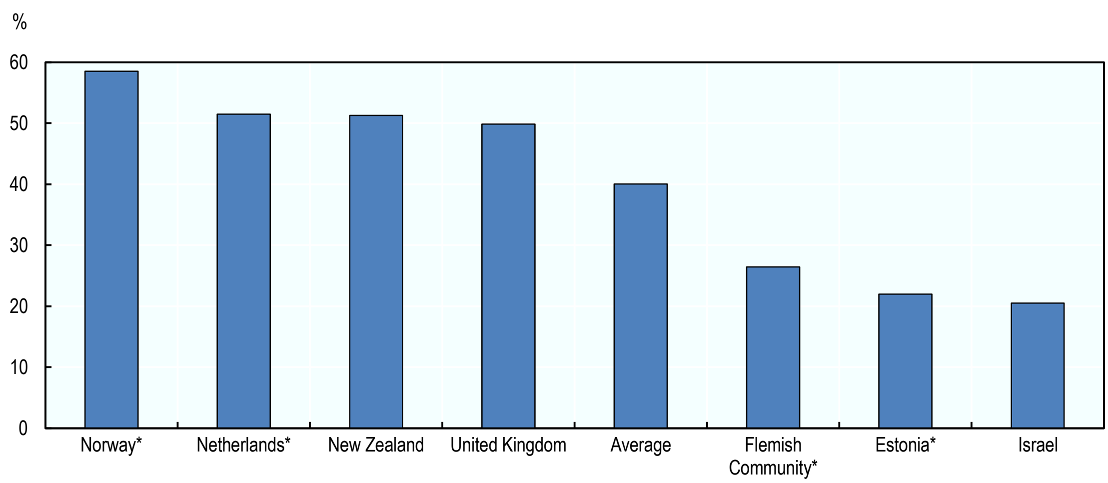
Women tend to be more likely to complete than men, independently of their programmes or field of study (Severiens and ten Dam, 2012[93]; Conger and Long, 2010[94]). Differences in completion rates by gender are probably related to gender differences in attitudes (female students tend to be more organised, disciplined and motivated). However, other factors such as different labour market expectations may play a role as well (with women possibly perceiving higher returns from their degrees) (Severiens and ten Dam, 2012[93]).

Completion by full-time or part-time status

About one-half, or more, of new entrants who enrolled part-time at the bachelor's level completed a higher education programme within the expected time in the Netherlands, New Zealand, Norway and the United Kingdom in 2014 (Figure 5.11). For Estonia, the Flemish Community and Israel, the completion rate of part-time new entrants was between 20% and 30%. In three countries (New Zealand, the Netherlands and Norway), the completion rate of part-time new entrants was higher than for those who enrol full-time, while it was lower in the other four countries with available data.

Figure 5.11. Completion rates of part-time new entrants in bachelor's programmes (2014)

Proportion of new entrants in part-time programmes graduating within the expected time



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
The year of reference is the expected graduation date plus three years.
Estonia: Data include all entrants instead of only new entrants.
Source: Adapted from OECD (2016[26]), *Education at a Glance 2016: OECD Indicators*, http://dx.doi.org/10.1787/eag-2016-en.

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Completion by subsector

There can be large differences between universities and professional HEIs in the share of new entrants to bachelor's programmes who complete or do not complete a programme at the same level of education.

In the Flemish Community and the Netherlands, both male and female new entrants to professional HEI programmes are two to four times more likely to leave higher education without a degree than new entrants to university programmes. In the Netherlands, new entrants to professional HEI programmes are both more likely to leave higher education without a degree and to graduate within the expected graduation time (Table 5.13).

In Estonia, the proportion of new entrants who have not graduated and are not in education three years after the expected graduation time is similar across subsectors, with similar gaps in completion between men and women. The share of new entrants who complete a higher education programme within the expected graduation time is also similar across subsectors for men (20% in both subsectors), but not for women. Over half of female new entrants to bachelor's programmes at professional HEIs in Estonia graduate within the expected graduation time, a far larger proportion than at universities.

Table 5.13. Completion and non-completion of new entrants to bachelor's programmes, by gender and subsector (2014)

Proportion of full-time new entrants who:

		Estonia		The Flemish Community		The Netherlands	
		Universities	PHEIs	Universities	PHEIs	Universities	PHEIs
Graduate within the expected time	Males	20.3	20.4	30.9	26.6	17.9	26.6
	Females	34.2	52.6	39.8	39.8	31.6	41.0
Graduate within 3 years from the expected time	Males	39.3	31.8	76.2	61.2	74.6	50.7
	Females	56.8	61.6	86.7	73.2	87.0	66.8
Have not graduated and are not in education 3 years after the expected graduation time	Males	55.2	58.6	15.9	34.6	9.4	32.8
	Females	36.9	32.9	9.0	23.5	5.9	24.0
Have not graduated and are still in education 3 years after the expected graduation time	Males	5.5	9.6	7.8	4.3	16.0	16.5
	Females	6.3	5.5	4.3	3.4	7.1	9.2

Notes: The year of reference is the expected graduation date plus three years. The share of new entrants who completed a bachelor's programme within 3 years from the expected graduation time includes those who completed a bachelor's programme within the expected graduation time. The sum of the second, third and fourth rows is equal to 100 for each country/gender/subsector combination. PHEIs refer to professional HEIs. For the Flemish Community, new entrants to bachelor's programmes graduating from a short-cycle programme are included among completers. For Estonia, data include all entrants instead of only new entrants.
Source: Adapted from information provided by the participating jurisdictions. See the reader's guide for further information.

Graduates-to-entrants ratios by field of study and socio-economic background

In absence of more comprehensive data on completion rates, the comparison between the number of entrants and graduates in different programmes or conditions offers some indication on the relative propensity to complete, provided that caution is used in the interpretation (Box 5.5). As shown in Figure 5.12, on average across OECD countries, the graduates-to-entrants ratio in engineering, manufacturing and construction is about 10% lower than the ratio for all fields of study combined (bachelor's programmes); in ICT, it is about 30% lower. In contrast, the graduates-to-entrants ratio in social sciences, journalism and information is about the same as the ratio for all fields, and in the field of study of education, it is about 35% higher. This pattern in the proportion of students completing their studies, or leaving without a qualification, is broadly consistent across a number of OECD countries, such as Estonia, Ireland, Germany and the United States (Frowley et al. (2017[95]), Heublein (2014[96]), Chen and Soldner (2013[97]), Järve, Kallaste and Räis (2015[98])).[7]

Box 5.5. What can be learned from differences in the graduates-to-entrants ratio?

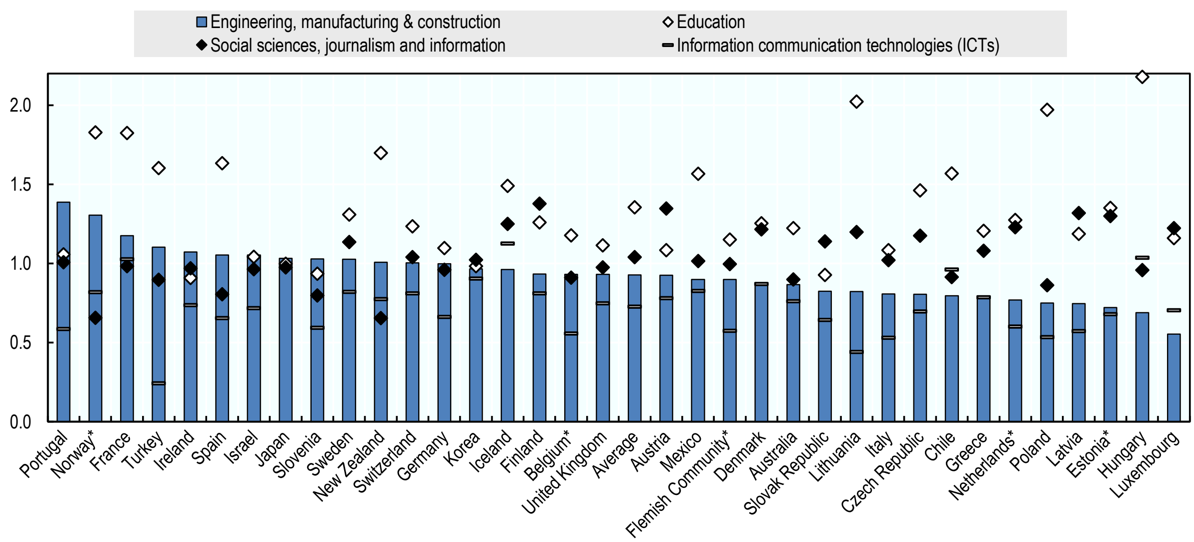
The ratio of first-time graduates to new entrants (graduates-to-entrants ratio) varies by field of study and (to a lesser extent) between individuals from different demographic groups. Completion rates are an important source of this variation: higher completion translates in more graduates, increasing the graduates-to-entrants ratio. Therefore, in certain circumstances, the graduates-to-entrants ratio can be used as a proxy for completion rates.

However, the size of the cohorts entering higher education can also play a role. For example, an exceptionally large cohort of new entrants in the reference year in a certain field of study decreases the graduates-to-entrants ratio for that field of study. Changes in completion patterns matter as well. If a policy to stimulate completion brings about a larger number of graduates than expected in the reference year, then the graduates-to-entrants ratio increases. In addition, switching between fields of study (i.e. students entering higher education in a certain field, and later changing programmes and graduating in a different field) also impacts the graduates-to-entrants ratio.

With these caveats, graduates-to-entrants ratio can provide some indication on the relative propensity to complete, if complemented by contextual information on the higher education systems or other available evidence. In addition, aggregate cross-country measures of the graduates-to-entrants ratio reduce the effect of sudden changes in cohort size or completion rates in one or a few countries.

Figure 5.12. Ratio of graduates to new entrants in bachelor's programmes, selected fields of study (2016)

Relative to the ratio for all fields of study



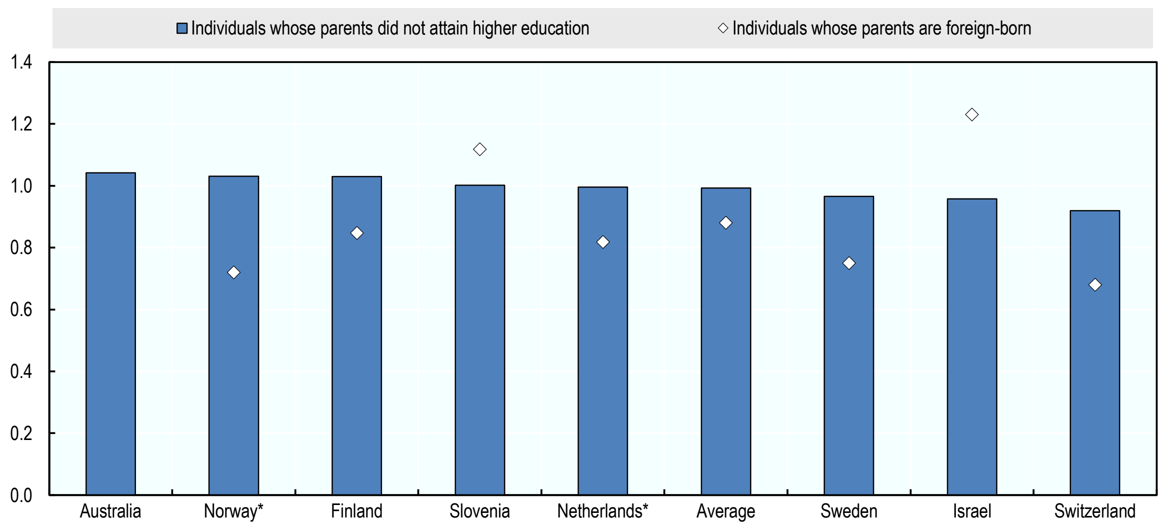
Notes: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
See Figure 5.3 for notes on new entrants by field of study.
Belgium and the Flemish Community: Data exclude first-time graduates from independent private institutions.
Estonia: Data include all entrants instead of only new entrants, and all graduates instead of only first-time graduates.
Source: Adapted from OECD (2018[3]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en; data provided by the Flemish Ministry of Education and Training.

StatLink https://doi.org/10.1787/888933940987

In all countries with available data, the graduates-to-entrants ratio at the bachelor's and long first-degree level among individuals whose parents did not attain higher education is close to the ratio for the whole population (Figure 5.13). The graduates-to-entrants ratio among individuals with foreign-born parents is lower than for the whole population in five countries with available data, but it is higher in Israel and Slovenia. These results suggests that completion rates are not systematically lower among new entrants from critical demographic groups, consistent with previous evidence for a few OECD countries (OECD, 2016[26]). The completion rates of individuals whose parents did not attain higher education or with foreign-born parents can be higher or lower than for other individuals, depending on the selection at entrance (Figure 5.6) and on other contextual factors.

Figure 5.13. Ratio of first-time graduates to new entrants in selected critical demographic groups at the bachelor's and long first-degree level (2015)

Relative to the ratio for all demographic groups



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
See Figure 5.6 for notes on new entrants by socio-economic background. The average is calculated separately for the two series "individuals whose parents did not attain higher education" and "individuals whose parents are foreign-born".
Estonia: Data include all graduates instead of only first-time graduates.
Source: Indicators of Education Systems (INES) Survey on Equity in Tertiary Education.

StatLink https://doi.org/10.1787/888933941006

As shown above, there are low levels of completion within the expected timeframes in all participating jurisdictions. Governments use a variety of policy levers to help improve completion rates. Some of these are directed at students to help them choose the right study programme and ensure they progress through their studies and gain a qualification within the expected timeframe. Others are directed at institutions; for instance, institutions may receive financial incentives to help students succeed and improve completion rates. In all participating jurisdictions, the funding formula for part of the funding allocated to higher education institutions (Chapter 3) includes the number of degrees awarded.

In **Estonia**, the government has set a national target to reduce the share of students who drop out during their first year by six percentage points to 15% by 2020. Completion rates are included in the funding formula, and the performance agreements with higher education institutions include a reduction in the share of students who leave higher education institutions without a degree among the institutional goals. Estonia also limits the time period during which students can receive means-tested grants.

Estonia is also taking a similar approach to the Flemish "exam contract" (Section 5.3) to address non-completion. Students who have completed a large part of their curricular activities but are no longer enrolled in higher education are allowed to take exams and participate in other education activities (e.g. a final thesis) with a view to obtaining a degree as "external students", i.e. without attending classes at the institution. External students do not receive any student financial support.

In addition, Estonia introduced the "TULE" programme in 2010 to encourage former students who had left higher education without completing during the economic boom of 2000-2007 (Chapter 2). The programme was co-funded by the European Union and enabled students to study free of charge. It succeeded in attracting around 800 former students back to higher education by 2013 (this is equal to around 5% of all Estonian entrants in 2013). However, only one-third of them eventually earned a degree. The programme ended in 2015.

In the context of the open admissions policy in **the Netherlands**, the Dutch government is using a combination of measures to try to help students choose the right programme and complete within an expected timeframe:

- The government funds a web-based tool launched in 2006, Study Choice 123 (*Studiekeuze 123*), to help prospective students make a better choice of enrolment in programmes. Study Choice 123 provides information on bachelor's and master's programmes available across the Netherlands, including access requirements, the content of programmes, labour market prospects, and results from the national student satisfaction survey for each programme.
- Under the Higher Education and Research Act (1992) (WHW), higher education institutions are required to offer students a non-binding "study check" to assess their suitability for a programme. The study check can include online or face-to-face information sessions; self-assessment tests; evaluation of motivation letters, entrance tests or intake interviews; and participation in the programme for a day.
- Prospective students are required to take at least an online self-assessment test, which is not binding.
- Under the Higher Education and Research Act (1992), institutions can provide students with binding study advice at the end of the first year that results in their expulsion from a programme if they have not made sufficient progress. The measure provides an incentive to students to progress at a sufficient pace and helps them reflect on their study choices, and has proven effective in increasing completion rates (Sneyers and De Witte, 2017[99]).[8] In 2013, the government piloted the use of binding study advice in the second and later years in a small number of institutions, but it was heavily criticised by students and academic staff and will not be continued past the end of the pilot in 2018.
- Students only receive financial support for a limited period of time. For example, students enrolled in a four-year degree programme are entitled to seven years of student financial aid. In addition, students who qualify for means-tested grants can receive them only for the expected duration of the programme.

The Netherlands is also using a number of funding policy levers to encourage higher education institutions to help students finish their programmes. For instance, the funding formula excludes students who have been enrolled longer than the expected study duration. In addition, the performance agreements with higher education institutions include similar provisions to the Estonian example above to reduce non-completions. Between 2008 and 2013, the Dutch government provided targeted funding to five professional HEIs located in large urban areas to improve the academic performance of students with an immigrant background (for example, in terms of completion rates).

The Flemish Community is developing two types of tests to provide non-binding advice to applicants on their suitability for higher education. One non-mandatory test is more general in nature and will assess the overall motivation, interests and skills of the prospective students. They are also piloting a set of tests for specific fields of study, which will provide applicants with more detailed information about their position relative to the competences and knowledge necessary to undertake a particular higher education programme. These tests will be mandatory starting in 2019 for teacher education and civil engineering (including a civil engineering architecture programme).

In addition, as part of the Flemish legislation to create a more flexible higher education system (the Flexible Learning Paths Act 2004), higher education institutions can impose binding conditions on students to monitor progress and take peremptory action if students do not meet the requirements. Students may be required to leave the institution or change higher education programmes if they do not make sufficient progress.

The Flemish Community has also introduced policies to improve the completion rates of students from disadvantaged backgrounds. The formula to allocate funding to higher education institutions (Chapter 3) is designed to provide incentives to higher education institutions to enrol and support students from disadvantaged backgrounds. More specifically, an additional weight is assigned in the formula to credits completed by students who are beneficiaries of a means-tested grant, who classify as disabled or special-needs students, who work a certain number of hours during the day (night jobs are excluded), or are registered with the government employment agency.

Funding was also provided to Flemish higher education institutions from 2008 to 2014 to support initiatives that increased the entry, progression and completion rate of students from under-represented groups. However, the funding programme was terminated after an evaluation that found it imposed a high administrative burden on institutions. The budget of the programme has been thereafter included in the general budget of higher education institutions.

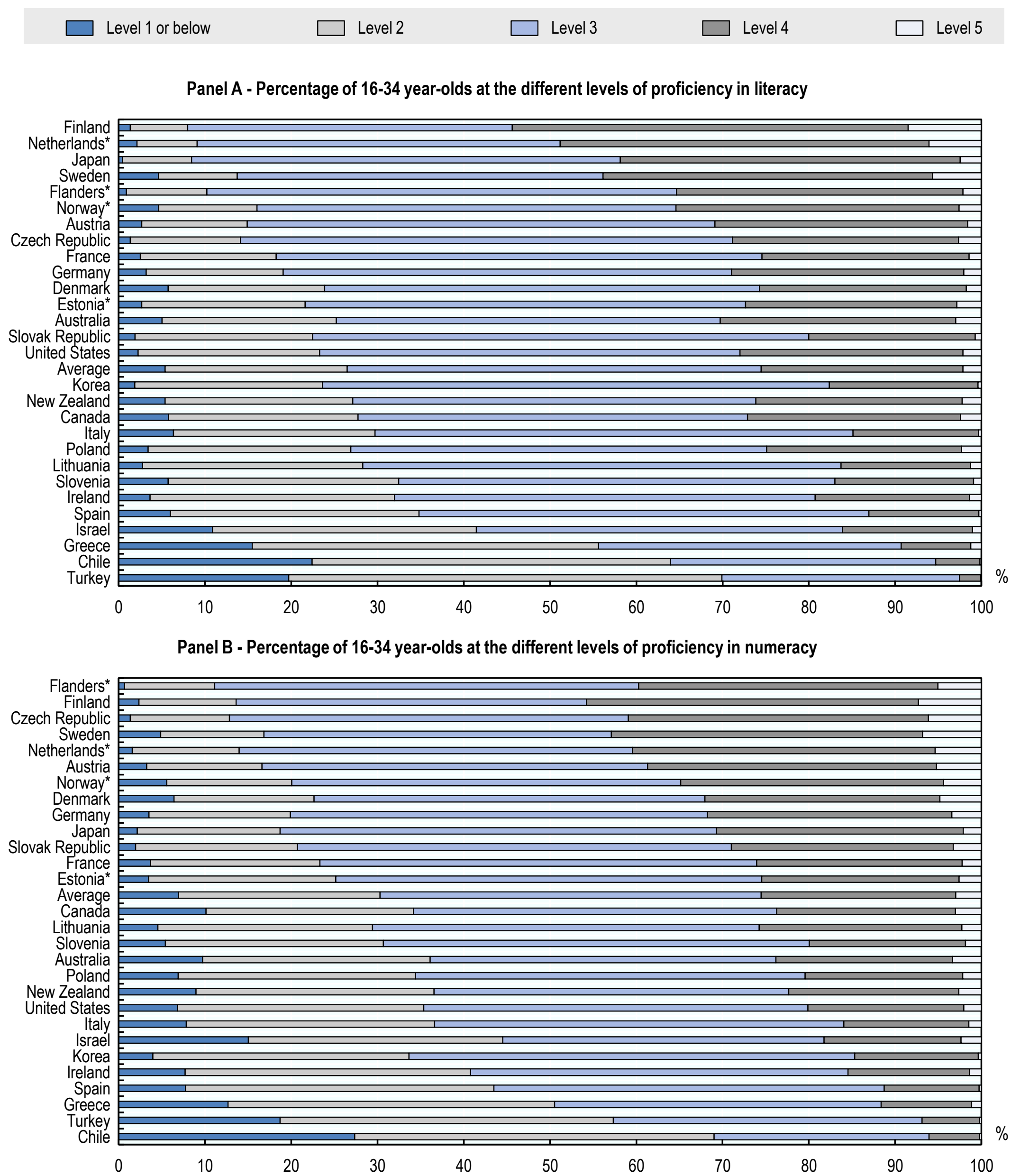
5.8. Skills outcomes

It is difficult to assess the effectiveness of the education function of a higher education system without considering measures of what students learn, or of the skills and competencies that they develop. Internationally comparative measures of higher education learning outcomes are not generally available (Section 5.8.2), so the analysis in this chapter relies on proxy measures. The Survey of Adult Skills, though not designed to measure higher education learning outcomes, can provide some insight into the cognitive and workplace skills of young graduates.

5.8.1. The literacy and numeracy proficiency of young graduates

Figure 5.14 shows the percentage of higher education graduates younger than 35 who, in the Survey of Adults Skills, scored at each of five levels of proficiency on the literacy (Panel A) or numeracy (Panel B) scale for each country. A high share of graduates scoring at low levels of proficiency indicates that a higher education degree is not a good signal of the literacy or numeracy proficiency of graduates. In other words, this result indicates that higher education qualifications are not able to signal a certain threshold skills level or guarantee employers a minimum skills set (Van Damme, 2015[100]). High proportions of low-skilled graduates can have worrying implications, given that skill signalling is an important function of degrees.

Figure 5.14. Proficiency distribution among graduates younger than 35 (2012 or 2015)



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Countries are ranked in ascending order of the proportion of 16-34 year-olds with higher education who perform below level 2 in literacy or numeracy proficiency.
Source: Adapted from OECD (2016[101]), *OECD Survey of Adult Skills*, www.oecd.org/skills/piaac/data/.

StatLink https://doi.org/10.1787/888933941025

As measures of learning gain are not available, it is not possible to reach firm conclusions on how much students learn in the higher education system. For example, a high proportion of graduates with good skills could be due to learning in higher education, but it could also depend on their proficiency before entering, as well as on other factors.

Higher education skills outcomes depend crucially on policies aimed at increasing the quality of teaching and learning. These include many of the policies discussed in this chapter, for example on digitalisation, internationalisation, and student support. In addition, policies on higher education staff (Chapter 4) and on quality assurance in higher education (Chapter 2) can have a direct or less direct effect on teaching, learning and skills outcomes.

On average across OECD countries participating in the Survey of Adults Skills, over 25% of adults with a higher education degree who are younger than 35 do not reach level 3 in literacy, and over 30% in numeracy (see Box 5.6 for an explanation of the levels). The proportion reaching level 3 (or higher levels) exceeds 85% in both proficiency domains in the Czech Republic, Finland, the Flemish Community and the Netherlands. At the other extreme, there are countries such as Chile, Greece and Turkey, where in both proficiency domains over one-half of graduates younger than 35 do not reach level 3.

Box 5.6. Literacy and numeracy proficiency levels according to the OECD Survey of Adult Skills (PIAAC)

Adults performing at **level 3 in the literacy proficiency scale** can understand and respond appropriately to dense or lengthy texts. They understand text structures and rhetorical devices and can identify, interpret, or evaluate one or more pieces of information and make appropriate inferences. They can also perform multistep operations and select relevant data from competing information in order to identify and formulate responses.

Adults at **level 3 of the numeracy scale** can successfully complete tasks that require an understanding of mathematical information that may not be explicit and may be embedded in contexts that are not familiar. They can perform tasks requiring several steps and that may involve a choice of problem-solving strategies and relevant processes. They can interpret and perform basic analyses of data and statistics in texts, tables and graphs.

Level 5 is the highest proficiency level in the scale of the Survey of Adult Skills. At **level 5 of literacy proficiency**, adults can solve tasks which require them to construct syntheses of similar and contrasting ideas or points of view, often while evaluating the reliability of evidentiary sources or being aware of subtle rhetorical cues.

Adults at **level 5 of the numeracy scale** can understand complex representations and abstract and formal mathematical and statistical ideas, possibly embedded in complex texts. They can also develop or work with mathematical arguments or models and justify solutions or choices.

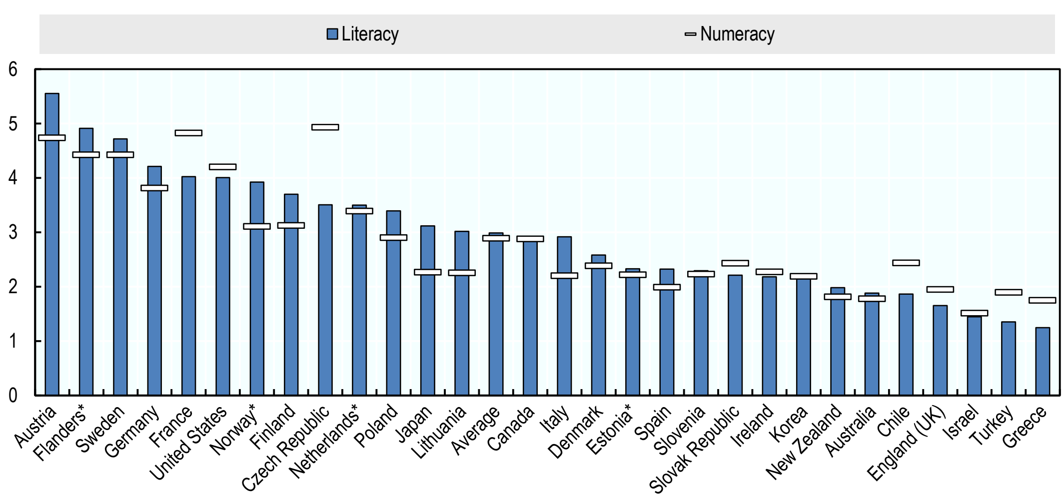
On average across OECD countries participating in the Survey of Adults Skills, 2% of adults with a higher education degree who are younger than 35 reach level 5 in literacy, and 3% in numeracy. This proportion is similar to or above average for all four participating jurisdictions; and is significantly higher than the average for the Netherlands in literacy.

Overall, the adult population in all four participating jurisdictions scores above the average among countries participating in the Survey of Adult Skills in terms of literacy and numeracy proficiency. However, a more refined analysis of the national samples reveals segments of the population with a lower skill level. For example, foreign-language immigrants tend to perform at a considerably lower level than other adults in Flanders, the Netherlands and Norway (OECD, 2013[102]; OECD, 2013[103]; OECD, 2013[104]). In addition, the relative performance of Norway's young adults in literacy and numeracy is not as good as that of older adults. The Survey of Adult Skills also revealed that the Estonian labour market is not short of information-processing skills, although these skills are not equally distributed across the adult population. Older adults, those with a home language other than Estonian and those living in certain regions tend to be less proficient than the national average (Estonian Ministry of Education and Research, 2015[105]).

Figure 5.15 shows the odds of reaching level 3 in the literacy and numeracy proficiency scores for adults younger than 35 with a higher education degree, compared to people of the same age with only an upper secondary education qualification. The odds ratios presented are calculated controlling for age, gender, immigrant and language background, and parents' educational attainment. Odds ratios reflect the relative likelihood of an event occurring for a group of interest relative to a comparison group. An odds ratio greater than 1 represents greater chances of an event (reaching proficiency level 3) occurring for the group of interest (individuals with higher education) vis-à-vis the comparison group (individuals with upper secondary education).

Figure 5.15. Adjusted odds ratio of reaching proficiency level 3, higher education graduates compared to upper secondary education graduates, 16-34 year-olds (2012 or 2015)

16-34 year-olds, by proficiency domain



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
The adjusted odds ratios are computed through a logistic regression model and take account of differences associated with other factors: age, gender, immigrant and language background, and parents' educational attainment. The score differences are significantly different from 1 for all countries in both proficiency domains, except for literacy proficiency in Greece and Turkey.
Countries are ranked in descending order of the literacy proficiency difference.
Source: Adapted from OECD (2016[101]), *OECD Survey of Adult Skills*, www.oecd.org/skills/piaac/data/.

StatLink https://doi.org/10.1787/888933941044

On average across OECD countries and economies, adults younger than 35 with higher education have about three times the odds of reaching proficiency level 3 compared to people of the same age with only an upper secondary education degree, both in numeracy and literacy. The odds ratio for literacy proficiency is about 5, or larger, in Austria and Flanders. This means that, in these two countries, there is a large difference in the probability to reach level 3 between young adults with higher education and with upper secondary education attainment, even when accounting for basic socio-economic factors. In contrast, the odds ratio for literacy proficiency is lower than 1.5 in Greece, Israel and Turkey.

A large odds ratio of reaching proficiency level 3 for higher education graduates in a country may be an indication of the ability of the higher education system to increase the skills of its students, or at least of those who graduate. However, this result may also be driven by other factors, including selection into higher education. This arises if individuals with a higher proficiency level are more likely to enrol in higher education, and to graduate once they enrol. In this case, higher education graduates can perform at relatively high levels of proficiency independently of their higher education learning experience. Another factor driving the difference in proficiency may be the accumulation of skills outside education. In particular, since individuals are not surveyed immediately upon graduation, different work and life trajectories between higher education graduates and other individuals may be responsible for at least part of the observed proficiency differences.

5.8.2. Assessment of learning outcomes

Comparative measures of graduate learning outcomes could greatly enhance the ability to assess the effectiveness of higher education systems and help governments benchmark the quality of their higher education graduates against international standards (Schleicher, 2015[106]).

Since 2000, the OECD Programme for International Student Assessment (PISA) has evaluated the performance of secondary education systems worldwide by testing the skills and knowledge of 15 year-old students; international assessments also exist at the primary level of education. By contrast, there is not a similar programme to directly and systematically measure higher education student learning outcomes. This is a particularly important gap, given the amount invested per student in higher education by the government and the private sector (see Chapter 3).

The OECD's Assessment of Higher Education Learning Outcomes (AHELO) feasibility study demonstrated that a large-scale comparative assessment of higher education learning outcomes is conceptually valid and for the most part technically feasible (OECD, 2012[107]; OECD, 2013[108]; OECD, 2013[109]). There are, however, additional measurement and operational challenges that must be overcome before internationally comparable data on learning outcomes in higher education could be produced and used systemically. Despite the added complexity, there is growing interest across countries in measuring the learning outcomes of higher education (Box 5.7).

Box 5.7. Assessing higher education learning outcomes in OECD countries

Several countries and organisations are developing models to assess the learning outcomes and learning gain of higher education programmes and institutions, either as permanent or experimental initiatives (Van Damme, 2015[100]; Goff et al., 2015[110]; OECD, 2017[2]; Goff et al., 2015[110]; OECD, 2017[2]; Zlatkin-Troitschanskaia et al., 2017[111]):

- In the US, the Council for Aid to Education (CAE) developed the Collegiate Learning Assessment (CLA) and its more recent variant, CLA+, for colleges to measure critical thinking skills. More recently, CAE has partnered with the OECD on CLA+ International to assess learning outcomes in higher education globally. CLA+ will provide participating countries with data at the national, international, institutional and student levels. Countries can also choose to participate in international benchmarking.
- The Higher Education Quality Council of Ontario (HEQCO) is conducting a pilot project to test incoming students on their literacy, numeracy and problem-solving skills, and test them again when they leave as graduates. The test will be based on the OECD's Education and Skills Online assessment tool.
- The UK is funding a learning gain programme through the Office for Students to look at how to measure improvements in knowledge, skills, and personal development acquired during higher education. This will allow higher education institutions to better understand the effect of different learning and teaching practices, and thereby improve their support for students. The programme includes 13 pilot collaborative projects in over 70 higher education institutions to test and evaluate a range of approaches for measuring learning gain. Other activities include the National Mixed Methodology Learning Gain (NMMLG) project that uses various pre-trialled tools and survey instruments to track the learning gain of a group of more than 31 000 undergraduate students in ten higher education institutions. The project was launched in 2016, however, it is to be finished in the academic year 2019-2020 due to issues with the data collection process and a low response rate for the longitudinal sample. The Higher Education Learning Gain Analysis (HELGA) is another programme using existing data on the student experience to evaluate what the data indicate about learning gain. The data include continuation rates, student attainment, the National Student Survey (NSS) and the Destinations of Leavers from Higher Education Survey (DLHE) (HEFCE, 2018[112]; Cook and Hewitt, 2017[113]).
- The European Union has funded the Measuring and Comparing Achievements of Learning Outcomes in Higher Education in Europe (CALOHEE) study, which defined the programme learning outcomes of bachelor’s and master’s programmes in five subject areas: engineering (civil engineering), health care (nursing), humanities (history), natural sciences (physics) and social sciences (education). The methodology to be developed should also be applicable to other fields of study. The study builds on the Tuning Project, which developed threshold-level learning outcomes and competences for a range of disciplines.
- In Japan, as a spin-off project of the OECD AHELO Feasibility Study, the National Institute of Education Research developed a test item bank in order to

measure the learning outcomes of engineering students. The test was conducted in 2016 with 348 first semester master's students in nine Japanese institutions. In addition, the same test item bank was used in Indonesia, measuring learning outcomes of 37 fourth-year undergraduate students at the Bandung Institute of Technology (Cross et al., 2017[114]).

A number of countries have also funded research into measuring graduate learning outcomes. The Australian Government funded the Assessing and Assuring Graduate Learning Outcomes (AAGLO) project in 2010 to examine what types of assessment tasks could be used to measure learning outcomes and the quality assurance processes needed. The project also developed a set of principles for those interested in designing new assessments or making strategic decisions about which assessments are important for measuring graduate learning outcomes (Barrie et al., 2012[115]). The Federal Government in Germany is funding a research project over 2015 to 2019 to gather evidence on appropriate models and assessment tasks for measuring higher education learning outcomes (the Modelling and Measuring Competencies in Higher Education, KoKoHs) (Zlatkin-Troitschanskaia et al., 2017[111]).

5.9. Labour market outcomes

One of the main expectations of students is that higher education will provide them with the skills needed to succeed in the labour market (OECD, 2017[86]). Accordingly, a crucial dimension of the effectiveness of higher education is how well graduates fare in the labour market. The labour market outcomes of graduates are related to the quality of their higher education and their learning outcomes. However, the indicators that measure labour market outcomes may also reflect differences between graduates and other individuals that are independent from the higher education system. For example, they may reflect differences in personal characteristics, employment experience and skill levels that are independent of higher education. In addition, labour market outcomes are also a function of the labour market conditions of an economy, a variable higher education systems cannot control.

This chapter will explore labour market outcomes through measures of labour force status, earnings and, to some extent, the types of tasks performed by graduates. The age group has been restricted to focus on young individuals, who must have graduated relatively recently. Ideally, it would be more accurate to compute the indicators for recent graduates (i.e. those that graduated a certain number of years before the reference year) than for young graduates. However, this data are not available in sufficient quality or for a sufficient number of countries. [9]

Various factors influence the labour market outcomes of higher education graduates. Some of these are outside the higher education system, for instance, economic factors and the characteristics of the students themselves. However, there are a number of things governments, higher education institutions, social partners and students can do to help enhance the labour market outcomes of graduates (OECD, 2017[86]). The participating jurisdictions use a range of information and regulatory policy levers to help enhance the labour market relevance of higher education and improve graduate labour market outcomes, which will be also explored in this chapter.

All jurisdictions have in place mechanisms to systematically collect information on the labour market needs and the employability of graduates (for example, graduate surveys or forecasting models). In addition, in each jurisdiction, there are measures to encourage or mandate the establishment of structured relationships between higher education institutions (or at least, a part of them) and the world of work. Examples can be the inclusion of representatives of the world of work in executive or consulting boards, or the requirement for higher education institutions to demonstrate the labour market relevance of their programmes within the accreditation process. These structured relationships make it easier for employers or labour representatives to give feedback to higher education institutions and to participate in curriculum design, and could be among the reasons underlying the relatively good employment outcomes in the participating jurisdictions.

In addition, professional HEIs in Estonia, the Flemish Community and the Netherlands are required to include a work-based learning component in their programmes. Work-based learning can take many forms (e.g. apprenticeships, work placements and internships), and consists of an attempt to integrate the workplace in the learning environment. Work-based learning makes it easier to acquire practical and labour-market relevant skills for students, while also offering an effective recruitment tool to employers. To be effective, work-based learning must be systematic and integrated within the study programme (OECD, 2014[116]), which requires the types of structured relationships between employers and institutions mentioned above. The systematic embedding of work-based learning in the curriculum could also be related to the relatively good employment outcomes of professional HEI graduates in Estonia, the Flemish Community and the Netherlands.

5.9.1. Employment, unemployment and inactivity

Graduate employment and unemployment rates are important measures of success in the labour market. The employment rate refers to the number of persons in employment as a percentage of the population in a given age group. The unemployment rate refers to the number of persons who are without work and actively seeking employment, as a percentage of the sum of persons who are employed or actively looking for employment (OECD, 2017[6]). The inactivity rate measures the percentage of persons who are not employed and not actively looking for work within a given age group. Higher education attainment is associated with a higher employment rate and a lower unemployment and inactivity rate, on average across OECD countries (Box 5.8 and Figure 5.16).

In terms of the employment and inactivity rate, the largest difference between 25-34 year-old higher education graduates and individuals of the same age with upper secondary or post-secondary, non-tertiary education (about 15 percentage points in absolute value) is observed in Chile and Israel. In terms of the unemployment rate, in France (7 percentage points).

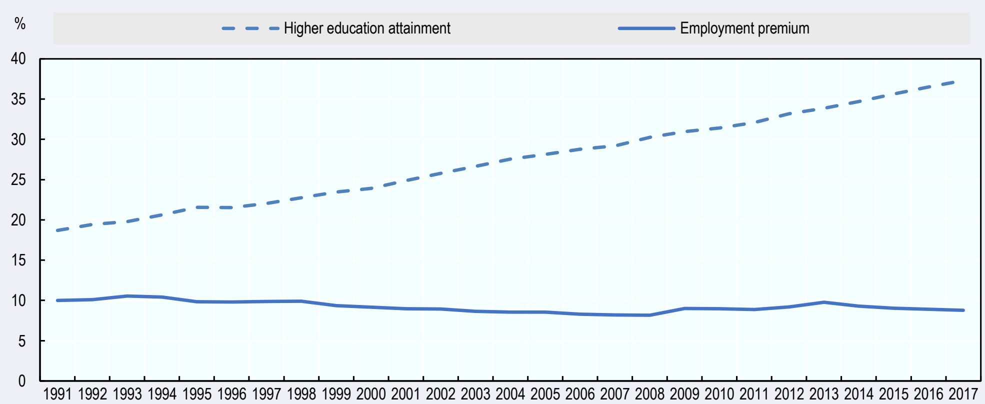
In the Netherlands and Norway, the inactivity rate of young individuals with higher education is 6 to 7 percentage points lower than for those with post-secondary, non-tertiary education, while in Estonia and Flanders, the inactivity rate is similar for these two groups. In terms of the unemployment rate, the gap is larger (over 3 percentage points) in Estonia and Flanders, and less large in the Netherlands and Norway.

Box 5.8. Trends in the employment premium of higher education graduates

The difference in the employment rates of 25-64 year-olds with higher education and with only upper secondary or post-secondary education – the higher education employment premium – remained remarkably stable between 1990 and 2016 (Figure 5.a). It passed from 10 to 9 percentage points between 1991 and 2017, on average across 13 countries with available data, and was not substantially affected by major economic events happening during this time period, such as the economic crisis hitting these countries in 2008.

Figure 5.a. Higher education attainment and the employment premium (1991 to 2017)

Trend in the 13-country average proportion of adults with higher education and average difference between the employment rates of young adults with higher education and with upper secondary or post-secondary non-tertiary education (age group: 25-64 year-olds)



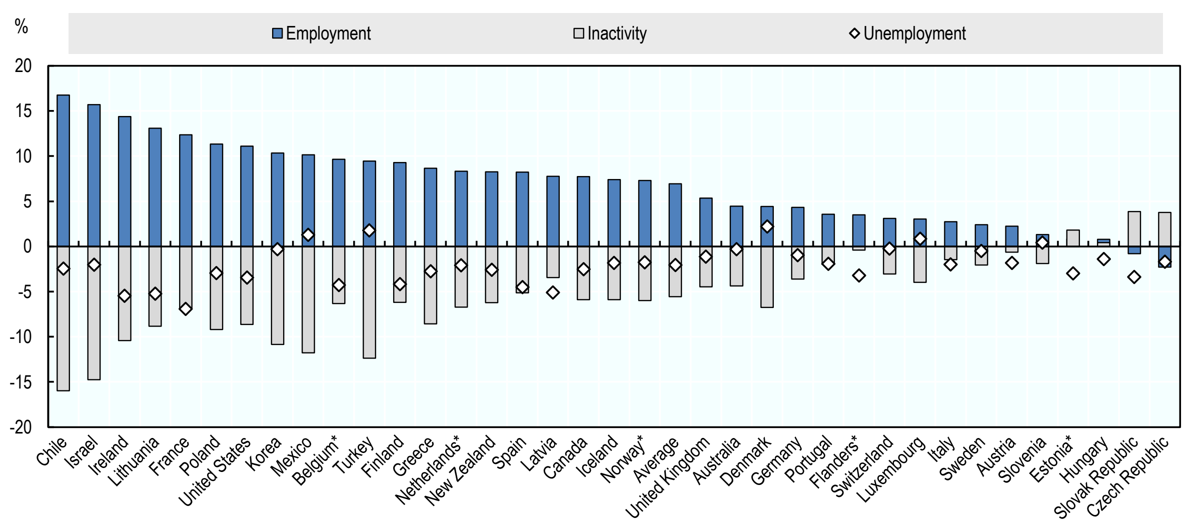
Note: The average has been computed for the 13 countries with no missing data for more than two consecutive years. These are Australia, Canada, Denmark, France, Germany, Greece, Italy, the Netherlands, Spain, Sweden, Switzerland, Turkey, and the United States. Around 7% of the data points have been imputed by a linear interpolation based on the two closest available data points.
Source: Adapted from OECD (2018[3]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en.

StatLink https://doi.org/10.1787/888933941158

The stability of the trend in the higher education employment premium is striking when compared with the growth in higher education attainment, which doubled in the same time period among 25-64 year-olds. This evidence suggests that a sharp increase in higher education attainment does not necessarily result in a fall of the employment advantage conferred by higher education. The stability over time of the labour market premium enjoyed by higher education graduates is confirmed by the available evidence on graduate earnings (OECD, 2018[117]).

Figure 5.16. Difference in the employment, unemployment and inactivity rates between 25-34 year-olds with higher education and with upper secondary or post-secondary non-tertiary education (2017)

Percentage points



Notes: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Japan: Data for higher education include upper secondary or post-secondary non-tertiary programmes (less than 5% of adults are in this group). United Kingdom: Data for upper secondary or post-secondary non-tertiary programmes are included in higher education (less than 5% of adults are in this group).
Source: Adapted from OECD (2018[3]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en; data provided by the Flemish Ministry of Education and Training.

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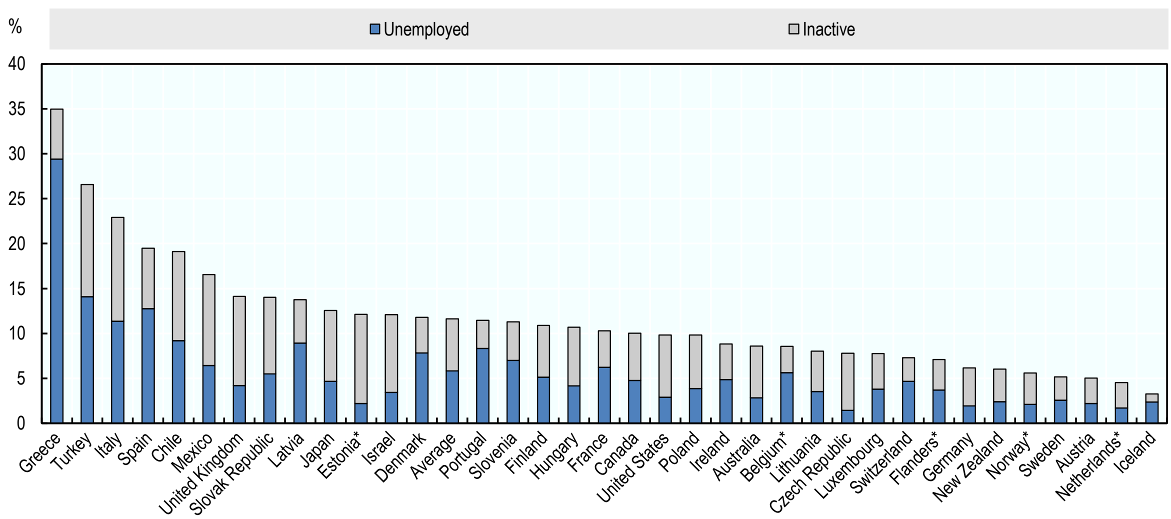
The share of young higher education graduates who are neither employed nor in education[10] is a concern in many countries because it suggests that the skills of many young graduates are not being properly deployed in further education or the labour market. This measure captures not only those who have not managed to find a job (unemployed), but also those who are not actively seeking employment (inactive). The number of graduates who end up in this category is relatively high throughout OECD countries and, on average across OECD countries, about half of 15-29 year-olds are in education, one-third are not in education but employed, and the others are neither employed nor in education.

There may be a range of reasons why a graduate is not in employment or education. For example, they could be discouraged at their job prospects and be no longer looking for work; they may be parents of young children who have withdrawn from the labour force to devote more time to parenting activities; or they may be taking a break after graduation, before starting to look for a job or enrol in another education programme. On average across OECD countries, 12% of 15-29 year-old graduates are not in employment and not in education, half of whom are inactive. Inactive individuals account for a large proportion of graduates not in employment and not in education in some countries. For example, in Estonia 10% of graduates younger than 30 are inactive and not in education, and only 2% are unemployed and not in education (Figure 5.17). In contrast, in Greece almost 30% of young graduates are unemployed and not in education, and only 6% are inactive and not in education.

Figure 5.17. Graduates not in education and not in employment by labour force status, 15-29 year-olds (2016)

Percentage of unemployed and inactive individuals among 15-29 year-old higher education graduates



Notes: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Chile: Year of reference 2015. Japan: Year of reference 2014.
Source: Adapted from OECD (2018[3]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en; data provided by the Flemish Ministry of Education and Training.

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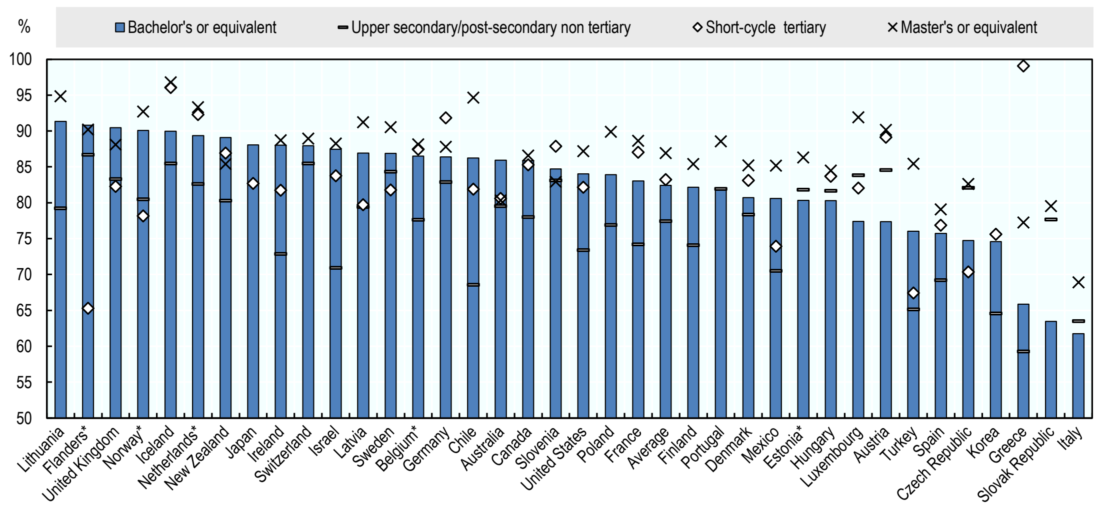
Higher education graduates enjoy higher employment rates than individuals with lower levels of education, but there are large differences between graduates as well. For example, the employment rate varies by higher education level, field of study and subsector.

On average across OECD countries, the employment rate of 25-34 year-olds with a master's degree is over 85%, a few percentage points higher than for those with a short-cycle or a bachelor's degree as their highest level of education (Figure 5.18). This compares with an employment rate of about 75% for upper secondary and post-secondary non-tertiary education graduates.

As is the case with most OECD countries, graduates from bachelor's programmes in Flanders, the Netherlands and Norway all have better employment outcomes than those who have only completed upper secondary education or post-secondary, non-tertiary education. In contrast, in Estonia, the employment rate of bachelor's graduates is slightly lower than among individuals with upper secondary education.

Figure 5.18. Employment rates of 25-34 year-old graduates, by education level (2017)



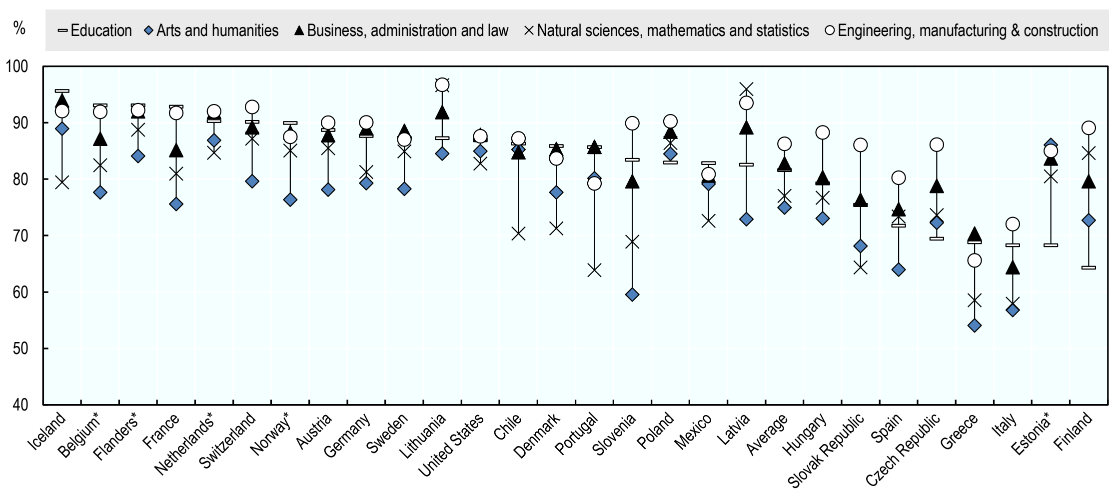
Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
The average for bachelor's, master's and upper secondary or post-secondary non-tertiary graduates is calculated across countries with available data for all three series, while the average for short-cycle graduates is calculated separately.
Chile: Year of reference 2015.
Japan: Data for higher education include upper secondary or post-secondary non-tertiary programmes (less than 5% of the adults are under this group).
United Kingdom: Data for upper secondary attainment include completion of a sufficient volume and standard of programmes that would be classified individually as completion of intermediate upper secondary programmes (16% of the adults aged 25-64 are in this group).
Source: Adapted from OECD (2018[3]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en; data provided by the Flemish Ministry of Education and Training.

StatLink https://doi.org/10.1787/888933941101

There can be large differences in the employment rate of higher education graduates across education levels in some countries or jurisdictions. For example, in Flanders and Norway, the employment rate of 25-34 year-olds with a short-cycle degree is lower than for those with only an upper secondary degree, and it is over 15 percentage points lower than for those with a master's degree. In Austria, Luxembourg and the Slovak Republic, the employment rates of young bachelor's graduates is over 10 percentage points lower than for 25-34 year-olds with a master's degree. In these same countries, 25-34 year-old bachelor's graduates are also less likely to be employed than people of the same age with only an upper secondary or post-secondary non-tertiary degree. There is not much of an advantage in completing a master's programme in Flanders and Norway in terms of the probability to find a job, with employment rates around the same as those for graduates from bachelor's programmes.

The employment rate varies substantially by field of study. On average across OECD countries, 87% of 25-34 year-olds with a degree in engineering, manufacturing and construction are employed, compared to 76% of those with a degree in arts and humanities and 78% of those with a degree in natural sciences, mathematics and statistics (Figure 5.19). The Flemish Community, the Netherlands, Poland and the United States have the smallest spread in the employment rate (less than 10 percentage points) among the five selected fields of study presented in Figure 5.19. In contrast, the spread is 25 percentage points, or more, in Finland and Slovenia.

Figure 5.19. Employment rates of 25-34 year-old higher education graduates, selected fields of study (2017)



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Countries are ranked in descending order of the employment rate of 25-34 year-olds who graduated from a programme in the field of study of education.
Chile, United States: Year of reference 2015.
USA: Data refer to bachelor's degree field, even for those with additional higher education degrees.
Source: Adapted from OECD (2018[3]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en.

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The employment rate for Estonian young graduates in the field of study of education is considerably lower than the employment rate of young graduates in other fields of study, but the government is nevertheless incentivising enrolment in this field (Section 5.2.1). This could be partly due to the fact that, while an overall oversupply of teachers characterises the Estonian education system, shortages are experienced for some particular positions (e.g. Estonian language teachers in regions where Russian as a mother tongue is prevalent; teachers for students with special needs) (OECD, 2016[20]).

In Flanders and the Netherlands, the employment rate is relatively high across all fields of study. The Netherlands has in place some policy initiatives to encourage enrolment in the fields of study of education and health and welfare, and in fields related to science and technology, where a potential shortage of workforce and skills has been identified 5.2.2.

Differences in the employment rate by field of study are not very large in Norway, but they are apparent at the transition to the labour market and may persist throughout graduates' professional lives, with those from arts and the humanities less likely to find jobs. The recent economic slowdown in Norway has slightly hindered the transition to the labour market of recent graduates, particularly from the engineering and natural sciences fields of study. Usually, every tenth graduate from these fields works in the resource extracting industries, which were the most affected following the sudden decline in oil prices in 2013 (OECD, 2018[14]).

Employment rates also vary by type of higher education institution. In the Netherlands, the average employment rate of 25-34 year-old bachelor's graduates masks large differences between graduates of universities and professional HEIs. Some 70% of Dutch university graduates are employed, whereas the employment rate for professional HEI graduates is over 90%. This is the same rate for professional HEI graduates in Flanders (Table 5.14). The difference is largely due to the fact that professional HEI programmes are generally designed to provide direct access to the labour market, whereas university graduates usually continue their education with a master's programme after graduating. The difference in the employment rate in Estonia in 2015 was less pronounced for bachelor's graduates of professional HEIs (83%) and universities (79%).

Table 5.14. Employment rates of 25-34 year-old bachelor graduates, by subsector (2016)

	Estonia	Flemish Community	Netherlands
Universities	79.3	m	73.3
Professional HEIs	82.5	93.2	92.9

Note: The year of reference is 2013 for the Flemish Community, and 2015 for the Estonia. In the Flemish Community, only a small percentage of university bachelor's graduates enter the labour market before earning a master's degree.
Source: Adapted from information provided by the participating jurisdictions. See the reader's guide for further information.

Employment, unemployment and inactivity rates are not the only measures of labour market outcomes. Some graduates may be employed, but they may not find the opportunities to deploy their skills effectively and maintain the level of skills and competences acquired in higher education (Box 5.9). The skills earned with higher education are important in the transition of graduates to the labour market, but even more important is the extent to which these are utilised and enriched on the job (Tomlinson, 2012[118]).

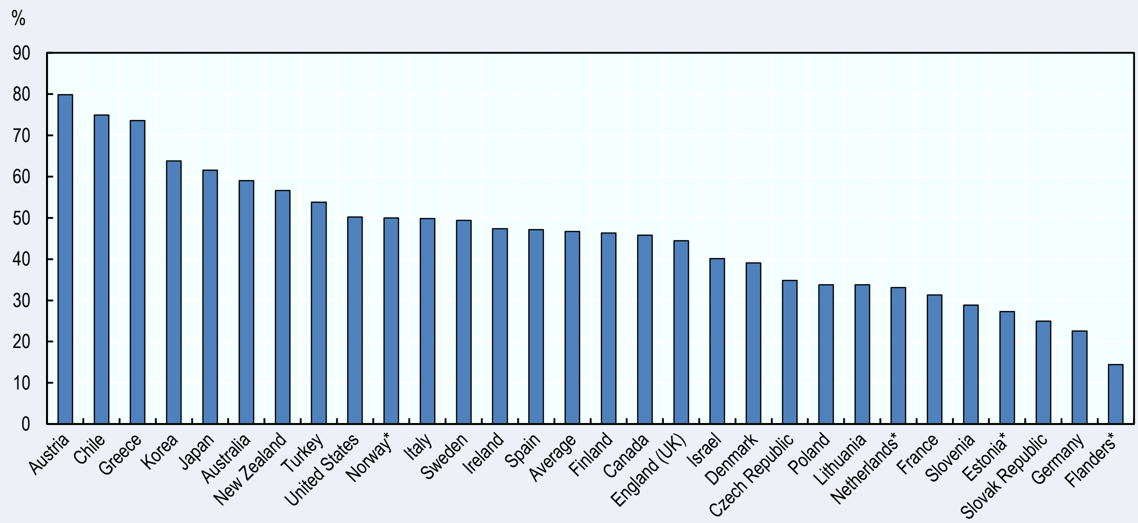
Box 5.9. Higher education graduates with routine jobs

The OECD Survey of Adult Skills identifies jobs in which workers are unable to "change the sequence of tasks" and "how to do the work", which can be considered as a type of routine job (OECD, 2015[119]). In absolute terms, the share of workers with higher education who are younger than 35 and are in jobs with routine tasks is just below 10%, compared to about 20% for workers with upper secondary education, on average across OECD countries and economies. In all participating jurisdictions, less than 5% of young higher education graduates are in routine jobs (OECD calculation based on data from the Survey of Adults Skills).

Figure 5.b shows the relative probability for young workers with higher education qualifications to end up working routine jobs compared to workers with upper secondary education attainment. On average across OECD countries, employed individuals younger than 35 with higher education are less than half as likely to be employed in jobs with routine tasks. In Estonia, Flanders, France, Germany, the Netherlands, the Slovak Republic and Slovenia, they are less than one-third as likely. At the other extreme, in Austria, Chile, Greece and Northern Ireland they are over 70% as likely as workers with upper secondary education.

Figure 5.b. Relative share of workers in jobs with routine tasks, higher education (2012 or 2015)

Proportion of employed individuals younger than 35 with higher education reporting to be unable to choose or change "the sequence of tasks" and "how to do the work" (upper secondary education = 1)



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Source: Adapted from OECD (2016[101]), *OECD Survey of Adult Skills*, www.oecd.org/skills/piaac/data/.

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Alternative sources of labour market information

New sources of data, including social and professional network data provide new possibilities to follow graduates over their transition in the labour market, and to analyse their profiles and skills. Insights from new sources of data therefore have the potential to feed into policy discussion and decisions. While not generally representative of the whole population, these data benefit from high coverage, being based on the informatics records from very large numbers of people. It also offers a better picture of transitional dynamics, as it follows individuals as long as they keep updating their records.

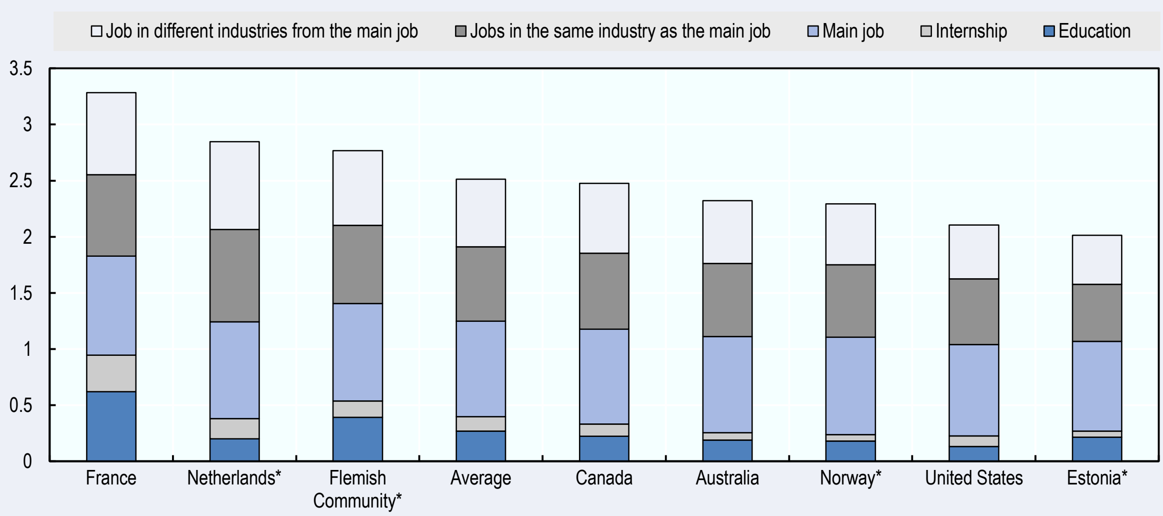
Data from LinkedIn, a platform for professional networking with over 590 million members worldwide, offer the potential to follow the pathways of graduates as they transition from education to employment and explore the relationships between their skills and qualifications and how they navigate the labour market. The OECD and LinkedIn jointly carried out an exploratory analysis of the transitions of first-time master's graduates in the five years after graduation. In total, the transitions of around 5 million LinkedIn members graduating between 2010 and 2013 from eight higher education systems (Australia, Canada, Estonia, the Flemish Community, France, the Netherlands, Norway and the United States) were analysed (Box 5.10). The analysis focuses on individual professional and educational trajectories, and on their relationship with interpersonal skills. This is particularly relevant to modern economies, as they are in continuous evolution, often requiring individuals to adapt to change and disruption by re-training and switching jobs (OECD, 2016[120]).

Box 5.10. Using LinkedIn data to explore dynamic labour market transitions early in the career of higher education graduates

Master's graduates go through a variety of training and professional experiences in the five years after graduation (Figure 5.c). While many graduates opt for further education, the data show that graduates also tend to go through a range of professional transitions early in their careers. On average across countries with data, there are 2.5 education and labour market experiences per graduate in the five years after graduation, but with large differences across countries. For example, the number of additional education experiences per graduate ranges from 0.2 in Estonia to 0.6 in France, while the number of professional experiences per graduate ranges from 1.8 in Estonia to 2.7 in France.

Figure 5.c. The education and labour market experiences of master's graduates (2010-2013)

Average number of experiences in the 5 years after graduation for LinkedIn members reporting to have earned their first master's degree between 2010 and 2013, by type of experience



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
The level of education has been derived from the participants own recording, and may not coincide exactly with the master's level as defined in the ISCED classification.
Source: LinkedIn aggregate data provided at OECD's request.

StatLink https://doi.org/10.1787/888933941196

Figure 5.c makes a distinction between the job which graduates held for the longest time after graduation ("main job") and other jobs either in the same industry as the main job, or in another industry. On average, in the first five years after graduation, there were 0.7 job changes per graduate within the same industry. The number of job changes per graduate into a different industry was even larger (0.8 on average). Further work could examine the question of whether graduates tend to work in a different industry before starting their main job (e.g. to gain work experience before moving to their preferred industry) or afterwards.

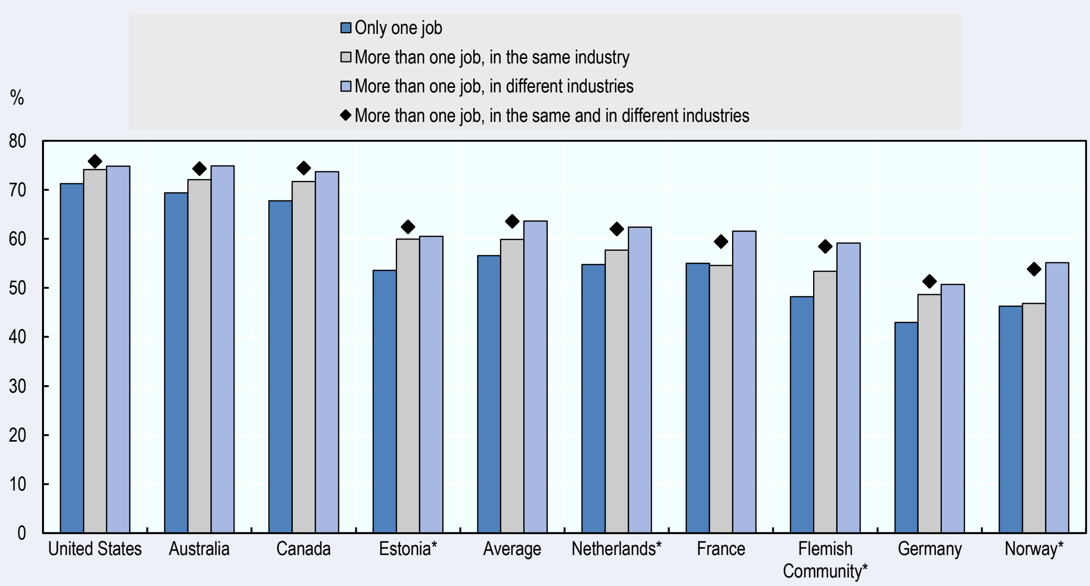
These results suggest varying degrees of job stability across countries, consistent with the different labour markets and institutional settings of different countries (e.g. the dual labour market in France with low stability for young workers, or the relatively stable Norwegian labour market (OECD, 2018[14]; OECD, 2017[121]). However, it is not possible to know whether the level of job stability experienced by graduates depends on their own choices or on the labour market in which they find themselves.

Interpersonal skills

Navigating the labour market successfully requires a diverse set of skills, including technical skills, but also creative thinking, and social and behavioural skills. Many higher education institutions have introduced teaching methods (e.g. problem-based learning) aimed at better developing such a diverse set of skills (Hoidn and Kärkkäinen, 2014[122]).

Figure 5.d. Percentage of master's graduates reporting at least one interpersonal skill on their LinkedIn profile, by labour market trajectory (2010-2013)

LinkedIn members reporting to have earned their first master's degree between 2010 and 2013, who during the five years following their graduation had:



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Graduates without work experience are excluded from the chart. The level of education has been derived from the participants' own recording, and may not coincide exactly with the master's level as defined in the ISCED classification.
Source: LinkedIn aggregate data provided at OECD's request.

StatLink https://doi.org/10.1787/888933941215

Interpersonal skills are one of a number of categories of skills (together with industry knowledge, tools and technologies, languages and other skills) that LinkedIn members can add on their profile. They include communication, time management, contract negotiation, and many others. Figure 5.d shows, for master's graduates with different labour market trajectories, the proportion reporting at least one interpersonal skill on their LinkedIn profile. While overall there are high levels of reporting of interpersonal skills in the graduate cohorts, there are differences in the levels of interpersonal skills reported across countries, suggesting that there may be differences in perceived values of interpersonal skills by graduates from different higher education systems.

In all countries, interpersonal skills appear more often on the profiles of graduates with more dynamic career trajectories. The proportion listing at least one interpersonal skill is slightly lower for graduates who had only one job in the 5 years after graduation (57% on average across countries), it is highest for graduates who moved across industries for work (64% on average), and it is in between these two values for graduates who changed jobs but not industry (60% on average).

This association suggests that graduates, especially those moving for work across industries, find interpersonal skills valuable to their professional profile. This result supports the efforts of many higher education institutions to foster the development of students' interpersonal skills.

5.9.2. Earnings

Employment and unemployment rates are important measures of success in the labour market, but they only show whether higher education graduates have succeeded in obtaining a job. Earnings show, in part, whether graduates are getting jobs that require, value and reward their advanced level of skills.

On average across OECD countries, 25-34 year-old full-time workers with a master's degree earn about 60% more than full-time workers of the same age with only an upper secondary degree. Young full-time workers with a bachelor's degree earn about 30% more, and those with a short-cycle degree about 10% more than full-time workers with only an upper secondary qualification (Figure 5.20).

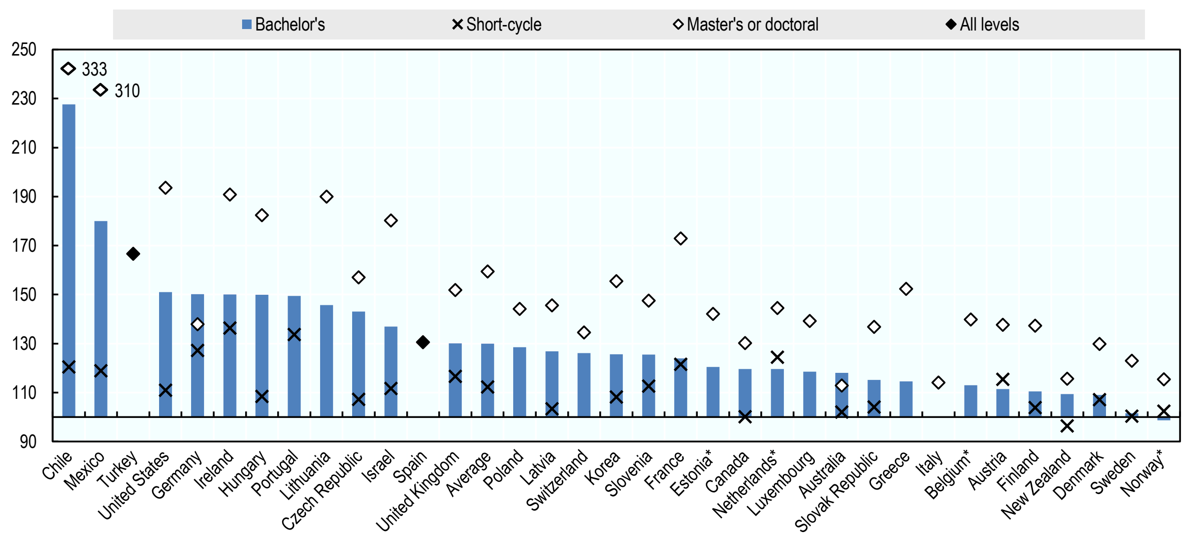
Chile, Mexico and the United States are the countries with the highest earnings premiums, both at the bachelor's and the master's level. In these countries, 25-34 year-old full-time workers with a master's degree earn about twice, or more, as much as full-time workers of the education and same age with only an upper secondary qualification; and those with a bachelor's degree, one-and-half times as much, or more. Workers with a master's degree earn over 10% more than those with an upper secondary qualification in all countries. Workers with a bachelor's degree earn more than those with an upper secondary or post-secondary non-tertiary qualification in all countries except Norway.

The earnings premium is substantial in Belgium, Estonia and the Netherlands, with young master's graduates earning over one-third more than workers of the same age with upper secondary education or post-secondary non-tertiary education in all three countries, and bachelor's graduates earning over 10% more. In Norway, bachelor's graduates in the age group 25-34 earn a similar amount as young people with a lower level of education, but master's graduates earn about 15% more.

The difference in earnings between higher education graduates and people with upper secondary education could depend on the ability of higher education to provide graduates with competences relevant to the labour market, but also on the match between supply and demand of graduates in the labour market, and on the general level of income inequality in a particular country. The countries with the highest earnings premiums for young bachelor's graduates (Chile, Mexico and Turkey) are characterised both by a relatively low share of adults with higher education (low supply of higher educated workers, which could push up their salary) and by a high level of inequality in the income distribution (so that differences in earnings across any socio-economic group tend to be accentuated). The three countries with the lowest bachelor's earnings premium (Denmark, Norway and Sweden) are characterised by both a relatively high higher education attainment level and by low levels of income inequality (OECD, 2018[4]) (OECD, 2015[29]).

Figure 5.20. Relative earnings of 25-34 year-olds, selected education levels (2016)

Average earnings of full-time, full-year 25-34 year-old workers with a bachelor's degree compared to those with a short-cycle, master's or doctoral qualification (upper secondary or post-secondary non-tertiary education = 100)



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
The average for bachelor's and master's or doctoral graduates is calculated across countries with available data for both series, while the average for short-cycle graduates is calculated separately.
Belgium, Canada, Chile, Czech Republic, Finland, Spain: Year of reference 2015.
Czech Republic, Slovak Republic, Switzerland, and the United States: Index 100 refers to upper secondary and post-secondary non-tertiary levels of education.
Denmark, Italy, Lithuania, the Netherlands: Year of reference 2014.
Ireland, Latvia, Luxembourg, Mexico, and Turkey: Earnings net of income tax.
Source: Adapted from OECD (2018[3]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en.

StatLink https://doi.org/10.1787/888933941139

The earnings of workers with a short-cycle degree tend to be lower than for other levels of higher education, and they can be substantially lower than for upper secondary or post-secondary non-tertiary educated workers as well. For example, in Estonia (where programmes at the short-cycle tertiary level are no longer offered), workers with a short-cycle degree earn about 15% less than workers with an upper secondary qualification. In contrast, in Norway and the Netherlands (where individuals with short-cycle attainment represent only a small fraction of the workforce) their relative earnings are about 5% higher than those of workers with a bachelor's degree.

5.9.3. Labour market data sources

Graduate surveys

Information on the labour market is a particularly important tool to help students choose a higher education programme and ensure they are well prepared for the labour market (OECD, 2016[120]). It can also help governments steer the system to meet labour market needs and assist institutions in planning their programme offerings.

Graduate surveys are commonly used to provide insights into the success of graduates in the labour market, as well as to provide information about how well graduates are meeting the needs of employers. As a result, many countries have national graduate surveys. In the participating jurisdictions, national graduate surveys are conducted in Estonia, the Netherlands and Norway. They typically seek information from graduates about their background, education, employment and earnings situation. In addition, these surveys solicit views on the graduates' satisfaction with their completed higher education programmes and its relevance to the labour market.

Institutions can design and carry out their own graduate surveys. In some cases, graduate surveys are linked to student surveys, and even made available to the scientific community to study questions of general interest on teaching effectiveness (see, for example, Feld, Salamanca and Zölitz (2017[123])).

In Norway the graduate survey (*Kandidatundersøkelsen*) is conducted by the Nordic Institute for Studies in Innovation, Research and Education (NIFU). The graduate survey provides information on employment outcomes following graduation, and describes the quality of jobs, the length of the job search, graduates' job satisfaction, and the alignment between graduates' skills and job requirements. The graduate survey also collects some information about the content of programmes, including the learning and teaching process, and the graduates' assessment of the knowledge and skills they gained in higher education. As in the Netherlands, some institutions, notably the University of Oslo, the University of Bergen and the Norwegian University of Science and Technology (NTNU), survey employers on how well their graduates perform in the labour market, the skills employers need, and their views on how well developed these skills are among their graduates. These one-off surveys of employer satisfaction often focus on specific programmes and are not conducted systematically across the system.

After assessing the feasibility of a graduate survey across Europe (Mühleck, 2015[124]), the European Union is developing a graduate tracking mechanism. This instrument will provide qualitative and quantitative information on what higher education graduates do after they complete their education and training. The graduate tracking system will help new students make informed choices about what to study and help government authorities steer their higher education systems. However, one of the key aims of the new tracking system is to motivate higher education institutions to deal with graduate employability at the institutional level and improve programmes and co-operation with employers.

Other sources

Graduate surveys are a useful tool to gather information on what happens after higher education and on the match between skill supply and demand from the point of view of graduates. To ensure a more comprehensive understanding of the needs of the labour market, many OECD countries collect and disseminate information through a variety of other measures (OECD, 2016[120]).

In 2016, the Estonian government launched OSKA, a forecasting tool developed with the support of the EU Structural Funds. The tool is used to anticipate labour market and skills needs and provides information and recommendations based on expert panels comprised of representatives from social partners, education institutions and the public sector. Economic activity is divided into 24 economic sectors, and each of them is analysed in-depth once every five or six years, with monitoring in the following years. A general report on changes in labour requirements, labour market developments and trends over the next 10 years is prepared annually (see http://oska.kutsekoda.ee/en/) (European Commission, 2017[125]). This tool is expected to help achieve the national targets for graduate employment (e.g. an employment rate of 88% for 20-34 year-old graduates by 2020). Estonia has been using administrative data to track higher education and VET graduates since 2013.

The public employment service of Flanders, in collaboration with the Ministry of Education, annually publishes information on the employment rates of recent graduates by programme rather than institution. In the Netherlands, Study Choice 123, a web-based student advice tool (Sections 5.6 and 5.7), provides information on labour market prospects by higher education programme.

Norway develops a wide range of labour market relevant information that can be used in higher education, including the government website (www.utdanning.no). This website provides potential higher education students with information on entry requirements, the types of jobs in which graduates from a certain field of study typically work, the number of people working in those occupations, the anticipated number of jobs in the future (based on projections of Statistics Norway), and the median earnings for a given occupation. The website also provides students with short videos of workers from different professions in order to give them an indication of the type of work that they do. A 2013 evaluation of the career guidance services in Norway found that while three-quarters of surveyed students were aware of this website, only one-half have actually used it (IPSOS MMI, 2013).

Table 5.15. Labour market data sources available in the participating jurisdictions (2016)

	Employer surveys	Surveys of workers or graduates	Quantitative forecasting models	Sector studies	Qualitative methods	Labour market information system	Other
The Flemish Community		X	X	X	X	X	
Estonia	X	X	X	X	X		
The Netherlands	X		X	X	X	X	
Norway	X	X	X	X	X	X	X

Source: OECD (2016[120]), *Getting Skills Right: Assessing and Anticipating Changing Skill Needs*, http://dx.doi.org/10.1787/9789264252073-en; information provided by the participating jurisdictions. See the reader's guide for further information.

Policies to improve labour market relevance

Changing skill needs are challenging labour market and education and training policies, and contributing to skills mismatch and shortages across OECD countries. While employers often complain that they cannot find workers with the required skills, large numbers of higher education graduates face difficulties in finding job opportunities matching their qualifications (OECD, 2016[120]).

Quality assurance processes, including institutional and programme accreditation, can play a role in ensuring the relevance of higher education programmes to the labour market. Quality assurance can require or encourage the involvement of social partners (employers and trade unions) in the design and development of curriculum that is relevant to the labour market, and in the decision-making process around programme offerings. Social partners can also help through the provision of reliable information on skill needs. Social partners and external stakeholders are required to participate in external quality assurance processes in all four participating jurisdictions.

Including labour market relevance in accreditation and programme design

Consultation with social partners is a way for higher education institutions to gain up-to-date insight into labour market competence, knowledge and skill needs. For example, higher education institutions are required to consult with employers in the Czech Republic, Denmark, Latvia and Poland (OECD, 2017[86]).

In Estonia, higher education institutions are required to take account of the needs of the labour market when designing new study programmes under the Standard of Higher Education (Estonia, 2009[126]). They also must ensure that the objectives and learning outcomes of new programmes align with their respective professional standards, and take into account graduate and employer satisfaction surveys (EKKA, 2011[127]).

The graduate employment rate is also included among the criteria for the quality assessment of study programme groups (Chapter 2) in Estonia. Institutional accreditation reviews evaluate the extent to which higher education programmes (and the number of student places) are in line with the expected labour market and social needs. Estonia also uses surveys to monitor graduate and employment satisfaction.

In the Netherlands and the Flemish Community, an important rationale for the introduction of short-cycle tertiary programmes has been to respond to a perceived labour market need for short, occupationally-specific higher education programmes. In the Flemish Community, short-cycle tertiary programmes will be delivered by professional HEIs from 2019, but they are currently offered by other institutions (Section 5.2.2). The learning outcomes of short-cycle tertiary programmes need to be based on professional qualification standards developed by representatives of the labour market and recognised by the Flemish government. In addition, one-third of the work load in short-cycle tertiary programmes must consist of work-based learning.

Professional HEIs in the Flemish Community and the Netherlands emphasise the connection between study programmes and the professional field. Common practices across institutions include the establishment of a professional field advisory board at the institution, and of domain-specific learning outcomes, in collaboration with representatives of the professional field (Kolster and Westerheijden, 2014[128]). Professional HEIs in these jurisdictions also recruit teachers with professional experience in the field, and in some cases involve professionals in the assessment of project work and final theses.

In the Netherlands, all programmes applying for accreditation have to demonstrate the alignment between the intended learning outcomes and the current needs of the labour market or the academic community. The alignment with the labour market is particularly important for programmes offered at professional HEIs. The accreditation panel ascertains the existence of this alignment based on labour market indicators and meetings with representatives of study programmes, social partners and other stakeholders (e.g.

alumni). In addition, new programmes proposed by higher education institutions must receive a positive assessment on their overall fit within the higher education and economic system if they want to receive public funding (a similar assessment is required in the Flemish Community). A committee set up by the government carries out this assessment by looking at existing programmes offered by other higher education institutions; evaluating the statistical projections of labour demand in sectors relevant to the programme; and interviewing representatives of the social partners on the match between the expected learning outcomes and current trends in the world of work. The goal is to ensure that the programme is a valuable addition to the existing offer of higher education programmes, and that it fills a regional or national labour market need. The Dutch government and other higher education stakeholders are drawing plans to expand the scope of this assessment to all existing higher education programmes in public institutions.

In Norway, four out of eleven members of the executive board of higher education institutions must come from outside the higher education sector, for example from employers, cultural organisations or public institutions. In addition, all higher education institutions must have Councils for Co-operation with Working Life, which work with academic staff to help ensure the relevance of education to the needs of the labour market.

The Norwegian White Paper on Quality Culture in Higher Education, released in January 2017, emphasises the need for higher education institutions to develop study programmes relevant to the labour market while also accounting for student needs goal (Norwegian Ministry of Education and Research, 2017[69]). The main venue to encourage collaboration between individual higher education institutions and social partners in Norway are the Councils for Co-operation with Working Life (RSA). The RSAs were created by the Norwegian government in 2011 to facilitate a more structured and binding collaboration between higher education and the world of work and ensure programmes and subjects delivered through continuing education have greater labour market relevance. All public higher education institutions are required to have an RSA. RSAs have played a generally positive role in bringing social partners and higher education institutions together to share information, promote strategies for collaboration, and inform programme content and development at a strategic level (OECD, 2018[14]).

While the formation of RSAs is an important first step, proper implementation is required to ensure effectiveness. A survey found that a majority RSA committee members from outside the higher education institution felt that their work on the committee did not result in concrete actions to improve the interaction between institutions and employers, nor did their work influence institutions' strategies, enhance the labour market relevance of existing programmes, or lead to the creation of new programmes (Tellmann et al., 2017[129]). In order to have a more meaningful impact, a recent OECD report recommended that higher education institutions establish RSA sub-committees at the operational level and suggested that Norway develop a mechanism for sharing best practices between RSAs (OECD, 2018[14]).

Work-based learning in higher education

One of the most widely-recognised practices to enhance labour market relevance and outcomes is the use of work-based learning. Work-based learning integrates learning in a workplace or practice setting with a student's academic programme. There are various types of work-based learning in higher education. These include field experience, mandatory professional practice, co-operative education placements, internships, applied research, project learning and service learning.

Evidence suggests that work-based learning can help students obtain better labour market outcomes. For example in the United States, one out of five higher education graduates participating in an internship ends up being hired by the same organisation (Cappelli, 2015[130]). In Canada, students who take part in work-based learning are more likely to be employed in their field of study (Peters, Sattler and Kelland, 2014[131]). In the EU, students who participate in work-based learning during their studies are more likely to find jobs than their counterparts who did not have relevant work experience; and work-based learning can be particularly important for non-traditional learners (EC/EACEA/Eurydice, 2016[132]).

Graduate apprenticeships are a form of work-based learning involving graduates. Within this apprenticeship scheme, students can combine studies with work while earning a salary (OECD, 2017[86]). For example, Skills Development Scotland began offering Graduate Level Apprenticeships in 2016 in the ICT/digital, engineering and civil engineering fields of study. These apprenticeships will be expanded to other sectors in the future (Skills Development Scotland, 2016[133]).

In Estonia, requirements to include work-based learning apply to all higher education programmes (EC/EACEA/Eurydice, 2016[132]). For the less academically-oriented programmes ("professional programmes"), a minimum of 15% of the study load should consist of work-based learning. This requirement in higher education has been supported by a programme aimed at developing work-based learning in higher and vocational education since 2016, PRÕM (OECD, 2017[86]). PRÕM aims to build better linkages between education and the labour market and greater co-operation between institutions and enterprises. The programme is funded from EU structural funds.

In the Flemish Community and the Netherlands, the professional HEIs must provide a period of work-based learning in bachelor's programmes. In the Netherlands, this period of work-based learning has a minimum duration of 9 months, out of a total duration of four years for the bachelor's programme. Universities may, but are not obliged to, offer work-based learning as part of their education programmes

The OECD's in-depth analysis of the labour market outcomes and relevance of Norway's higher education system found that the provision of work-based learning in Norway is quite low and not evenly distributed across fields of study. In 2015, only 43% of master's graduates reported to have had practice periods (voluntary or mandatory) during their studies (Støren et al., 2016[134]). Some programmes, such as health, education, and engineering, have a long tradition of collaboration with employers by integrating practice periods into the curriculum. In contrast, work-based learning is particularly low in the humanities fields of study (Thune and Støren, 2015[135]).

Evidence shows that participation in work-based learning helps students transition effectively to the labour market and obtain good labour market outcomes. In Norway, work-based learning is especially effective in supporting good labour market outcomes in those fields of study where it is less common, such as the arts and humanities, and the social sciences (Thune and Støren, 2015[135]). Despite being shown to be an effective higher education technique, currently, there are no explicit policy initiatives to encourage work-based learning in the Norwegian higher education system. The Government of Norway, however, plans to present a White Paper on higher education and labour market co-operation and relevance in late 2020 or early 2021. It has been suggested that policymakers in Norway may encourage the proliferation of work-based learning by including it as an objective in performance agreements between higher education institutions and the Ministry of Education and Research. The government may also lead by example by expanding the number of work-based learning opportunities through its role as an employer and by facilitating participation among small and medium-sized enterprises (OECD, 2018[14]).

5.10. Concluding remarks

This chapter reviewed the performance of higher education systems in carrying out their education function, discussed relevant higher education policies with a particular focus on the four participating jurisdictions, and highlighted gaps in the existing information base.

This concluding section focuses on summarising some of the key messages of the chapter, along with limitations of current information and gaps in the data which prevent a deeper analysis. Below is a summary of key performance areas discussed in the chapter, including some indications of where an improvement of the information base would be particularly useful.

- Good learning outcomes are crucial to establish the effectiveness of higher education systems. A strong interest in this topic has resulted in a number of initiatives being carried out at the national level, but internationally comparable data are not generally available at this moment. The Survey of Adult Skills is not designed to measure graduate learning outcomes, but it can be used to study the generic literacy and numeracy skills of young higher education graduates. Across countries and economies participating in this survey, a worrying proportion (around 30%, on average) of graduates from OECD higher education systems do not reach literacy proficiency level 3.
- There is a lack of comparable evidence on the pedagogical practices used in higher education (for example the prevalence in different programmes and modules of small tutorials, group assignments, research or practical projects, etc.). Coupled with data on learning outcomes, this evidence could be used to identify effective or promising teaching and learning practices. Given the absence of such evidence, this topic has not been systematically investigated in this chapter.
- Retention and completion play a central role in the assessment of higher education performance, and they are widely regarded as measures of the efficiency of a higher education system. Completion rates tend to be low, on average across higher education systems with available data (around 40% of bachelor's new entrants complete their programmes on time). More insight could be drawn from an extension of the coverage of completion indicators, both in terms of countries and of available breakdowns (e.g. by higher education level and by field of study). Furthermore, data on first-year retention rates (students who are still in higher education one year after entering it) are not yet available.
- This chapter discussed the role of different subsectors (universities and professional HEIs) within the higher education system. Different subsectors are one way of ensuring diversity in higher education, thus making the system more sustainable. In the participating jurisdictions with available data, professional HEIs tend to enrol more part-time and older students than universities, and the employment rate of their graduates is relatively high. The analysis by subsector relied on data specifically provided by Estonia, the Flemish Community and the

Netherlands. If data by subsector were collected more systematically across OECD countries, this discussion could reach more specific and generalizable conclusions.

- Along with quality, equity is a fundamental attribute of effective higher education systems. The equity dimension cuts across indicators at all stages of higher education system performance, from input to outcome. In addition, a multiplicity of social conditions and background characteristics can concur in determining an individual's lack of educational, economic or social opportunities. A limited set of indicators have been presented for a few relevant demographic groups in this chapter, but more detailed data would be needed to fully account for equity in higher education. The available data already show substantial gaps in access to higher education. Young people whose parents do not have a higher education qualification are between 40% and 60% less likely than other individuals to enter a bachelor's programme, across higher systems for which data are available.
- Internationally comparable data on other dimensions of socio-economic background (e.g. parental income and occupation) could be useful to enhance the understanding of education inequality, but are not available. In addition, data are not available for the most advanced levels of education (master's and doctoral), which limits the analysis of this chapter to short-cycle, bachelor's and long first-degree programmes.
- Internationally comparable data on the flows of students between types of programmes and institutions would help to study the effectiveness of different admission systems in guaranteeing the accessibility of all higher education programmes. The number of students admitted through the recognition of prior learning could also fit this purpose.
- Digitalisation and online learning provide an opportunity to develop new pedagogies, and to offer new ways for students to participate in higher education. Digitalisation offers potential to improve the efficiency of the higher education system (by doing more with the same inputs) and to economise resources across the system. In all the participating jurisdictions, some institutions already offer certain modules entirely online. In Estonia, the national agency responsible for digital and online learning in higher education can certify these modules. However, the internationally comparable data on digitalisation and online learning are limited.
- Young higher education graduates are more likely to be employed than people with upper secondary or post-secondary non-tertiary education, with an average employment premium of 7 percentage points across OECD countries. They also earn more, and are less likely to hold routine jobs with few opportunities to learn. Indicators on graduate outcomes focus on young graduates (e.g. 25-34 year-olds) because they are assumed to have graduated relatively recently. However, indicators on recent graduates (e.g. individuals who graduated five years before the reference year) would be more accurate as a measure of the effectiveness of higher education system in connecting with the labour market. In addition, more information on graduate outcomes by type of institution (universities or professional higher education institutions; public, government-dependent or independent private) would improve our understanding of this connection.

- Several other indicators have been identified that would be relevant to cross-country policy analysis, if data were available. Some examples are the proportion of international students staying on in a country after completing their studies, or the proportion of students involved in different forms of student support or excellence tracks. As with the previous information gaps listed in this section, better data in these areas would help to formulate a more complete assessment of the effectiveness of the higher education system.

As well as metric data, the benchmarking of higher education systems relies on the availability of qualitative information on national policies and on higher education practices. A summary of some of the initiatives presented in this chapter are presented in Table 3.14. These initiatives, one per participating jurisdiction, have been selected to illustrate responses to a variety of policy challenges faced by countries; and to represent, when possible, the distinctive approach of the jurisdiction to the selected policy challenge.

Table 5.16. Selected higher education policies from the participating jurisdictions (2017)

	Motivation	Policies
Estonia	Encouraging students to enrol in fields of study leading to professions in high demand	▪ Scholarships to enrol in natural sciences, mathematics and statistics, ICT, engineering, manufacturing and construction, and teacher education ▪ Free tuition for higher education programmes in nursing ▪ A special programme involving paid work and study for prospective teachers ▪ The proportion of students enrolled in fields of study identified as part of the university's mission or area of responsibility is included in funding mechanisms (Chapter 3)
The Flemish Community	Making participation in higher education more flexible	▪ All higher education institutions must offer part-time studies and all degree programmes must be provided in the form of flexible learning pathways ▪ Tuition fees are based on the number of credits that students are enrolled in ▪ No distinction between part-time and full-time students in terms of financial support ▪ Students can enrol for a full programme, for a module or even just to take an exam
The Netherlands	Better matching students with higher education programmes	▪ Government-funded web-based tool provides information on all bachelor's and master's programmes available across the country, including access requirements and results from the national student satisfaction survey ▪ Institutions are required to offer students a non-binding "study check," which can include online or face-to-face information sessions, self-assessment tests, etc. ▪ Mandatory, non-binding online self-assessment test for prospective students ▪ Institutions can provide students with binding study advice at the end of the first year that results in their expulsion from a programme if they have not made sufficient progress
Norway	Encouraging enrolment in higher education across demographic groups	▪ "Mainstreaming" approach to equity in higher education where financial support in the form of grants and loans is provided to all students, rather than targeted at special groups, and tuition is free ▪ Special grants and academic leave for students with children ▪ Special grants and loans for students with disabilities

Source: Adapted from information provided by the participating jurisdictions. See the reader's guide for further information.

The information in Table 3.14, as well as the other qualitative data on higher education policies in the participating jurisdictions presented in this chapter, have been collected through an ad-hoc questionnaire. As mentioned in Chapter 3, a systematic data collection on higher education policies would greatly facilitate the benchmarking of higher education systems by making the evidence base more consistent across countries and time.

Notes

[1] Entry rates measure inflow to higher education during a specific period and represent the percentage of an age cohort that is expected to enter a higher education programme over a lifetime. The estimates are based on the number of new entrants in 2016 and the age distribution of this group. Therefore, the entry rates are based on a "synthetic cohort" assumption, according to which, the current pattern of entry constitutes the best estimate of the behaviour of today's young adults over their lifetime.

Entry rates are sensitive to changes in the education system, such as the introduction of new programmes. The rates can be very high, even greater than 100% (thus clearly indicating that the synthetic cohort assumption is implausible), during a period when there is an unexpectedly high number of entrants. In some countries, high entry rates may reflect a temporary phenomenon, such as the effects of economic cycles and crises, higher education reforms driven by the Bologna Process or a surge in the number of international students. Government efforts to encourage older students to re-enter higher education through second-chance programmes can also boost entry rates (OECD, 2018[4]).

[2] Short-cycle nursing and midwifery programmes are an exception, as they are offered by secondary schools, and they will not be transferred to professional higher education institutions.

[3] Dual programmes are programmes in which the work-based component has similar importance as the education-based component.

[4] The graduate mobility goals of participating jurisdictions and the EHEA differ because the EHEA goal includes degree mobility within the EHEA itself, i.e. students moving from one country to another to earn a full degree (and possibly not undertaking study mobility during their programme abroad).

[5] The EEA comprises the European Union, Iceland, Liechtenstein and Norway.

[6] Response rates to the EUROSTUDENT survey vary from 1% to 66% across participating countries.

[7] In the US, the rate of students leaving without a qualification in the field of education is comparatively high based on the cited references. In Estonia, the relatively low graduates-to-entrants ratio in ICT is consistent with the low completion rate registered at the national level in this field of study. About half of Estonian ICT students already work full-time during their studies, mostly in the IT sector. The availability of good job opportunities before graduation could be contributing to the low completion rate in this field, although the choice not to complete a programme is likely to depend on a wider range of factors (Järve, Kallaste and Räis, 2015[98]).

[8] The authors of the study estimate a 3% increase in the rate of students graduating within one year from the expected time, and a 7% increase in the rate of students leaving the programme during their first year. The authors also find that, following the implementation of the study binding advice, students perceive it as more feasible to complete the programme within the expected time, but that their general level of satisfaction with the programme decreases.

[9] The accuracy of labour force status indicators as measures of higher education performance may be further limited if a large number of graduates move across countries. For example, information is missing for over 10% of Estonian graduates, who are most likely living abroad (Jaggo, Reinhold and Valk, 2016[136]). This could potentially affect the employment, unemployment and inactivity rates of Estonian graduates.

[10] This indicator is similar to the rate of NEETs (individuals Not in Education, Employment or Training), with the exception that it may include some individuals who are undergoing some training different from formal education.

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Chapter 6. Research

This chapter looks at the performance of higher education research and development. It covers the financial and human resources that are allocated uniquely to research, the distribution of research expenditure, the profile of research personnel, access to research careers, the profile of doctorate holders, research activity, internationalisation, research productivity and impact.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

6.1. Introduction

Research and development (R&D) is one of the three key missions of higher education institutions. As defined in the Frascati Manual (OECD, 2015[1]), R&D comprises basic research, which is aimed at creating new knowledge with no specific application in view; applied research, which is aimed at creating new knowledge towards a specific practical aim; and experimental development, which has the goal of developing new products or processes.

Higher education institutions carry out all three forms of R&D. As discussed in Chapter 1, there has been a substantial expansion in research and experimental development activity across the OECD in recent years. The volumes of R&D investment and output are on strong growth trajectories in many countries, notwithstanding a reduction in expenditure in many cases following the economic crisis.

However, measuring the return on investment in research and development can be problematic, regardless of whether the return relates to economic or social gain. Indeed, the level of capacity within individual higher education systems to assess and compare the quality and volume of their research output is far from clear.

This chapter looks at how successful higher education systems are in terms of ensuring a strong foundation for investment in R&D expenditure, providing equitable opportunities and attractive working conditions for researchers, and producing high quality research.

6.1.1. Research systems and strategies

A strong framework for systematically creating and diffusing knowledge is a key pillar of any innovation strategy (OECD, 2015[2]). Public research plays a vital role in delivering innovations that have social and economic benefits. Research activities carried out in the public higher education sector, along with the activity of public research institutes (PRIs) compose the public research system. Public research systems are organised differently in the participating jurisdictions (Box 6.1). Overall, three-quarters of total basic research is carried out in the public research system, even though public R&D only accounts for 30% of the overall volume of R&D in the OECD (OECD, 2016[3]).

No consensus has yet emerged on how the quality of research can be measured, how efficient higher education R&D is at driving innovation, and how research infrastructure can be designed and funded most effectively to meet the needs of economies and societies. The traditional role of public research has been to ensure research and development in areas that have long term possibilities for societal value although they may not provide an immediate economic gain. Currently, there are increasing expectations on public research systems to transfer knowledge and increase the impact of research (OECD, 2016[3]).

As research and development activity has expanded, OECD governments are increasingly developing specific strategies covering public research and innovation. Each of the participating jurisdictions also has specific plans with measures aiming to improve the performance of research and innovation.

Box 6.1. Public research systems in the participating jurisdictions

As of 2017, the main actors in the research system of Estonia are the six public universities. Of these institutions, Tartu University and Tallinn University of Technology receive the largest share of public funding and have the highest number of students and staff (Kattel and Stamenov, 2017[4]). In addition, there are seven public research organisations and seven private R&D institutions (including one private university) that play an important role in the research system.

In Norway, the public research system includes universities and university colleges, research institutes and hospitals (health trusts). The Research Council of Norway (RCN) funds research over the whole range of R&D activities, and assumes an advisory role to the government in research policy matters. The council also funds the establishment and operation of specially designated research centres which carry out specific functions, such as Centres of Excellence (SFF) in specific fields of science, Centres for Research-based Innovation (SFI), and Centres for Environment-friendly Energy Research (FME).

In the Netherlands**,** universities carry out the majority of public research, though in recent years there has been some increase in practice-oriented research at professional HEIs. Public research institutes consist of scientific research institutes that are under the Netherlands Organisation for Scientific Research (NWO) and the Royal Netherlands Academy of Arts and Sciences (KNAW); government laboratories; and applied research (TO2) institutes, the latter of which are the most significant of the public research institutes in terms of expenditure (OECD, 2014[5]).

Research in the public system of the Flemish Community is carried out by higher education institutions and four Strategic Research Centres (SRC). There are also a number of additional scientific institutes, knowledge institutes and policy research centres. Each Strategic Research Centre focuses on one key specific area of research (nanotechnology, biotechnology, automotive and machine production, and multidisciplinary research); centres are also active in the commercialisation of their research. Belgium also has ten federal scientific establishments, which often conduct research in partnership with universities in the Flemish and French Community (Flemish Department of Economy, Science and Innovation, 2017[6]).

In **Norway**, the *Long-term Plan for Research and Higher Education 2019–2028* sets the priorities for Norwegian higher education over the period. The government aims to further increase investment in higher education over the period and also work to facilitate the greater use of knowledge. Key measures of the plan related to R&D are an investment package to improve technology (including increasing basic research in ICT and building an e-infrastructure for open research), boosting the role of R&D for renewal and restructuring of the business sector (including expanding researcher education in new business creation), and increasing commercialisation, research-based innovation and business-oriented research (Norwegian Ministry of Education and Research, 2018[7]).

The Netherlands has set out a *2025 Vision for Science: Choices for the Future* (Dutch Ministry of Education, Culture and Science, 2014[8]), which aims to consolidate the Dutch position as a world leader in research and ensure that the system can evolve to maintain its position amid emerging challenges. Specific commitments include considerable investment in research projects which attract Horizon 2020 funding, and the development of a National Research Agenda (NWA) to set priorities. The policy note *Curious and* *committed: the value of science* further elaborated on the 2025 vision, particularly in terms of policy initiatives (Dutch Ministry of Education, Culture and Science, 2019[9]). The *Strategic Agenda for Higher Education, Research and Science 2015-2025* (Dutch Ministry of Education, Culture and Science, 2015[10]), also includes objectives to enhance research into higher education practices in order to improve education quality and build strong, permanent links between education, research and practice (for example, through Centres of Expertise to tackle the greatest societal challenges).

In **the Flemish Community**, the policy note *Work, Economy, Science and Innovation 2014-2019* outlines the Flemish commitment to reach the EU 2020 target investment of 3% of its gross domestic product (GDP) in research and development, comprising 1% from government funding and 2% by the business sector. There is also increased focus on the participation of higher education institutions in European programmes such as European Research Council and Marie Curie, and aligning the Flemish research strategy with the European instruments (Flemish Government, 2014[11]).

The ***Estonian*** *Research and Development and Innovation Strategy 2014-2020* sets goals for the system, including achieving the 3% EU 2020 GDP target, moving to 10th place on the EU Innovation Scoreboard, increasing the number of doctoral graduates and the impact of scientific publications. Estonia is also aiming to increase its share of EU research funding and become more active and visible in international research, development and innovation co-operation initiatives (Estonian Ministry of Education and Research, 2014[12]). Estonia also has particular goals in relation to the levels of investment in R&D by source, by targeting a level of investment of 2% of GDP from the private sector, with 1% of GDP coming from the state and local budget.

6.2. Investment in research and development

The combined expenditure of OECD countries on public R&D currently represents 65% of the global public R&D investment, though the growth of public science systems in emerging economies is likely to change the balance of expenditure in the years to come (OECD, 2016[3]). The higher education sector performs a substantial share of public research activity across OECD countries, and also plays a key role both in performing basic research and training researchers through doctoral education. Expenditure on R&D within higher education has been on a pattern of sustained growth, more than doubling since 1995, though growth has begun to slow in recent years (OECD, 2017[13]).

The policy arguments for investing in R&D are complex. The timelines as well as the economic and social payoffs of research projects are not always clear in advance at the level of individual investments, particularly when it comes to investment in basic research. However, investment in research creates value by improving the body of knowledge and new ideas from which the economy can draw to innovate, create new products and services and improve existing ones. This increased stock of knowledge can provide wider economic or social benefits through knowledge, market or network spill-overs (Georghiou, 2015[14]).

With the goal of promoting innovation high on the policy agenda in many OECD countries, investment in knowledge creation to feed into innovation is increasingly considered crucial. Indicators on the source, destination and distribution of expenditure can provide insight into how much governments are prioritising the R&D sector and which subsectors and types of research are attracting the majority of funding. The comparative data presented in this section focus on the key questions of how higher education expenditure relates to the broader R&D investment in countries, where investment comes from and how it is spent.

6.2.1. Higher education investment within the broader R&D sector

Gross domestic expenditure on research and experimental development (GERD) measures all intramural expenditure on research and development within a jurisdiction. It includes expenditure on R&D from outside the jurisdiction, but not domestic expenditure which is spent in another jurisdiction, and so provides a clear measure of the volume of expenditure on R&D within any one economy.

GERD is distributed among the four R&D-performing sectors: business enterprise, government, higher education and private non-profit, as defined by the Frascati manual (OECD, 2015[1]). Therefore, GERD encompasses expenditure on Higher Education R&D (HERD), expenditure on research in the government sector (GOVERD), business research and development expenditure (BERD) and expenditure in the private non-profit sector. Government policy and targets in R&D tend to focus on either the R&D sector as a whole, or the public research sector, rather than specifically focusing on higher education R&D.

Many countries across the OECD have set targets to increase GERD. For example, in line with the EU 2020 strategy for smart, sustainable and inclusive growth, European countries including Denmark, Germany and France envisage increasing GERD to 3% of GDP by 2020; while Finland, Sweden and Japan have set more ambitious spending targets of 4% of GDP by 2020 (OECD, 2014[15]). However, as can be seen from Figure 6.1, some OECD countries invest considerably more in R&D than others. For example, in Israel and Korea, GERD amounts to more than 4% of GDP; while Turkey, Latvia, Mexico and Chile spend less than 1% of GDP on R&D.

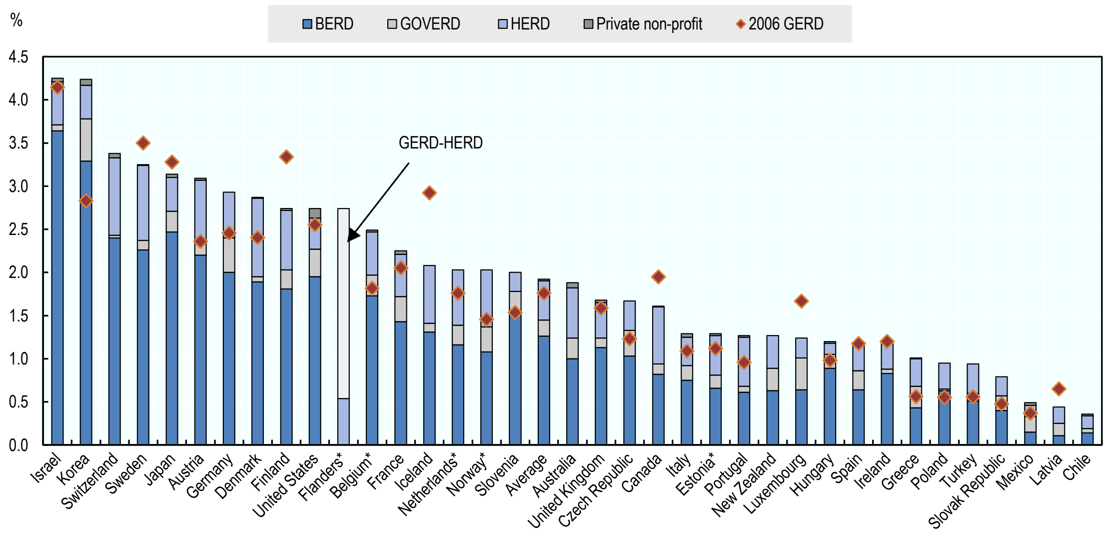
Overall, GERD in the OECD area amounted to 1.9% of GDP in 2016, compared to 1.8% of GDP in 2006. At the level of individual countries, expenditure as a proportion of GDP increased in 23 of the 31 countries with available data for 2006 and 2016; with the most significant increases occurring in Austria (0.7% of GDP) and Korea (1.4% of GDP). Countries with decreasing investment over the period 2006-2016 include Canada, Finland and Luxembourg (Figure 6.1).

In Flanders, GERD is higher than the OECD average, with investment equivalent to 2.7% of GDP in 2016, while in the Netherlands and Norway, GERD was at approximately 2% of GDP. The Netherlands and Norway have moved steadily from below or at the average level of investment in 2006 to above average levels by 2016, and while comparable data for 2006 for Flanders are not available, Belgium was already slightly above the OECD average in 2006, with GERD as a proportion of GDP of 1.8%.

GERD patterns have been more volatile in Estonia in recent years, though it must be noted that in relatively small research systems, the ratio between GERD and GDP can be affected by single investments involving relatively large financial amounts. For example, R&D investments related to an Estonian oil shale refinery contributed to GERD reaching 2.3% of GDP in 2011 (from a 2005 level of 1.1%) and progressively decreasing since, reaching a level of 1.3% of GDP in 2016.

Figure 6.1. Gross domestic expenditure on R&D (2016)

As a percentage of GDP, overall and by performing sector



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Source: Adapted from OECD (2018[16]), *OECD Science, Technology and R&D Statistics*, https://doi.org/10.1787/strd-data-en.

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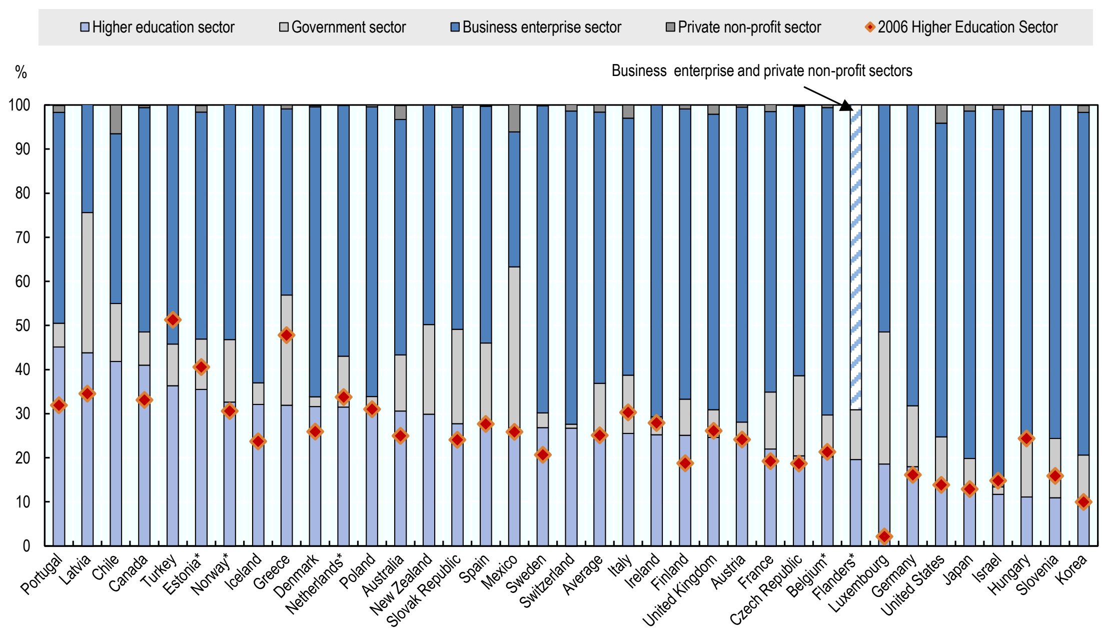
Business enterprise expenditure on research and development represents the largest portion of GERD, accounting for over 60% of R&D on average across the OECD (Figure 6.2). HERD is the next largest expenditure category, while GOVERD in OECD countries is lower on average than HERD. Overall, around 26% of GERD in 2016 was allocated to research undertaken by the higher education sector alone.

Figure 6.2 shows that in all OECD countries except Hungary, Korea, Luxembourg, Mexico and Slovenia, the higher education sector was responsible for a larger proportion of R&D expenditure than the government sector in 2016.[1] The proportion of expenditure on R&D performed by government was slightly above the OECD average in Flanders (11%), Estonia (11%) and the Netherlands (12%). In Norway, approximately 14% of R&D was undertaken by the government. However, although the government sector is a relatively minor performer in research and experimental development, it represents a major source of funding of R&D undertaken by the higher education and business sectors (OECD, 2015[17]).

In Flanders the business enterprise sector and the private non-profit sector represented almost 70% of GERD in 2016. The business enterprise sector provided around 50% of GERD in Estonia, the Netherlands and Norway, implying that HERD and GOVERD are more important in these jurisdictions. The higher education sector is particularly important in Estonia; in 2016 it was responsible for around 40% of expenditure.

As Figure 6.2 shows, the higher education sector has been attracting an increasing proportion of GERD in recent years in many countries, even as GERD itself also expands. For example, Portugal increased the proportion of GERD allocated to the higher education sector by more than 10 percentage points between 2006 and 2016. In other countries, however, such as Greece, Hungary and Turkey, the proportion of GERD allocated to higher education has been falling. In the Netherlands and Norway, the proportion of GERD spent in the higher education sector in 2016 was similar to 2006 levels.

Figure 6.2. Gross domestic expenditure on R&D by performing sector (2016)



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018. Data refer to 2016 or most recently available year.

Source: Adapted from OECD (2018[16]), *OECD Science, Technology and R&D Statistics*, https://doi.org/10.1787/strd-data-en.

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6.2.2. Sources of funding for higher education research and development

Higher education draws on various domestic and international funding sources for R&D activities (OECD, 2015[17]). While R&D activities in higher education may be to some extent funded by internal funds (e.g. income from endowments or student fees), the majority of funding comes from outside the higher education sector. Given the pressures of financing higher education faced by the public sector (see Chapter 1), higher education institutions are increasingly seeking to diversify sources of R&D funding, as well as other higher education activities. This section assesses how well-diversified the funding sources are for R&D across OECD higher education systems.

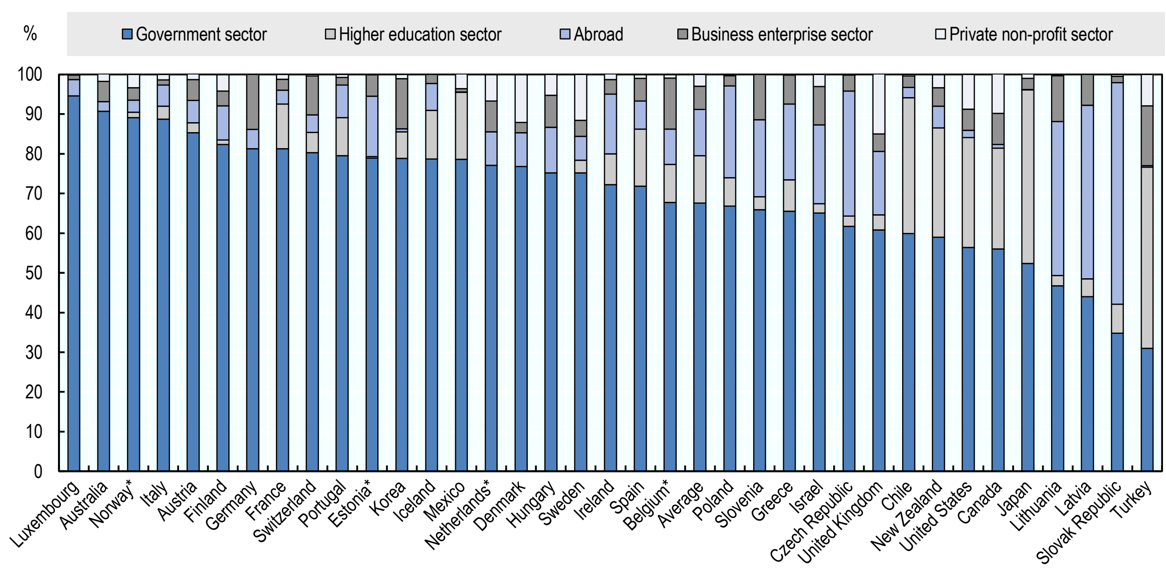
On average, across OECD countries with available data, R&D undertaken by higher education in 2016 was, for the most part, heavily financed by the government sector (68%), followed by funding from within the higher education sector itself (12%), funding from abroad (12%), business enterprises (6%), and the private non-profit sector (3%). However, some systems are also able to raise funding from the business enterprise sector, such as Germany (14% of overall funding) or Korea (13% of overall funding) (Figure 6.3).

Government funding accounted for more than two-thirds of HERD in Belgium, Estonia and the Netherlands, and close to 90% of HERD in Norway. Funding from abroad is the second largest source of funding of HERD in Estonia (15%), while the business enterprise sector is the second largest source of funding in Belgium (13%). In the Netherlands, 8% of HERD in 2016 was financed from abroad and another 8% came from the business enterprise sector. With 3% of HERD originating from the business sector, Norway had the lowest contribution from business among jurisdictions participating in the benchmarking exercise in 2016.

Compared to other sources of funding for HERD, the contribution of the business sector is relatively small (5% of HERD on average across the OECD in 2016). However, these figures may understate the full extent of businesses' overall contribution to HERD, which can also involve payments for the use of facilities or outcomes of R&D such as licensing income or investment in spin-offs.

Figure 6.3. Expenditure on research undertaken by the higher education sector, by source of funding (2016)

As a percentage of total funds



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Data refer to 2016 or most recently available year.
Source: Adapted from OECD (2018[16]), *OECD Science, Technology and R&D Statistics*, https://doi.org/10.1787/strd-data-en.

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In addition to contributions from businesses, funding from private non-profit organisations is an important indicator of engagement in R&D performed by the higher education sector. In some countries, such as Denmark, Sweden and the United Kingdom, the contribution of private non-profit organisations to HERD far exceeds that of the business sector. However, in the four participating jurisdictions, private non-profit funding in higher education is not a substantial source of funding; while it was the source of more than 6% of funding in the Netherlands in 2016, it made up less than 4% of funding in Norway and less than 1% in Belgium and Estonia.

When compared to the OECD average, the higher education sectors in Belgium, Estonia, the Netherlands and Norway contribute less funding to support R&D undertaken by higher education. This may be related to relatively low availability of internal funds (e.g. income from endowments or student fees) within the higher education sectors of the participating jurisdictions, compared to some other OECD countries.

Disparities of funding from different sources can be related to the funding mechanisms in place for research in particular country contexts; while some systems may fund R&D from general institutional funds, in other cases institutions may receive a specific allocation of R&D funding from government. Differences are also related to the relative availability of funding from different sources. For example, European countries are eligible to apply for targeted R&D funding from the European Union, so they may have more capacity to attract funding from abroad. In other countries, notably Canada, Sweden, the United Kingdom and the United States, the private non-profit sector is an important source of funds.

Table 6.1 summarises the key funding mechanisms for each of the four participating jurisdictions. As can be seen from the table, performance-based formula funding and competitive funding mechanisms for R&D, as well as block grant funding, are in place in all jurisdictions. For example, in the Flemish Community, in addition to the block grant funding for research provided by the Department of Education and Training, higher education institutions can receive special research funding from the Department of Economy, Science and Innovation, which is provided based on performance (Jonkers and Zacharewicz, 2016[18]). These "Special Research Funds" (BOF), are awarded based on the number of master's and doctoral degrees awarded, gender diversity, and research productivity and impact. Institutions can also benefit from "Industrial Research Funds" (IOF) if they engage in technology transfer activities such as licensing, patenting and spin-offs.

The Netherlands directs a special stream of funding towards practice-oriented research as part of the funding allocated to the professional HEI sector. This stream of funding can be used to appoint associate professors (lectors) who specialise in developing research projects in conjunction with stakeholders, which serves their mutual interest. In addition, competitive funding is available for professional HEIs to establish Centres of Expertise, public-private partnerships set up to encourage partnership between higher education institutions, industry and government. Most of the Centres of Expertise are affiliated with one of the "top sectors", key sectors of importance to the Dutch economy (Section 6.7).

Funding from international sources

A number of countries rely heavily on funding from abroad to finance higher education R&D, including from international organisations and supranational entities. In five of the countries for which data was available for 2016, funding from international sources represented over one-fifth of total funding, ranging from 23% of funding in Poland to over 56% of funding in the Slovak Republic (Figure 6.3). However, for EU countries, some of the differences between countries can also be related to how funding from European Structural Funds is accounted for in budgets. In some countries, it may be classified directly as funding from abroad, while in others it may be incorporated into national funds before being allocated, meaning it is then classified as government funds.

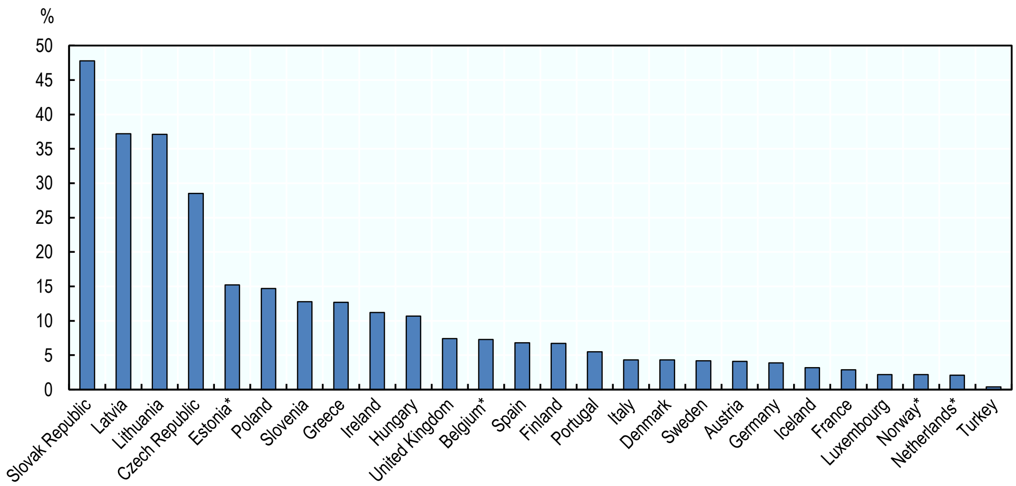
Table 6.1. Types of funding for R&D in the participating jurisdictions

	Estonia	The Flemish Community	The Netherlands		Norway
			Universities	Professional HEIs	
Base funding	Yes (provided by the Ministry of Education and Research to R&D institutions that received a positive evaluation)	Yes (provided by the Department of Education and Training)	Yes (part of the block grant where fixed allocations constitute 58%, another 5% is allocated for doctoral training)	Yes (to support practice-oriented research, provided as part of the lump sum funding for professional HEIs)	Yes (constitutes 70% of the block grant without detailed specifications of its use)
Performance-based funding	Yes (base funding is performance-based)	Yes (provided by the Department of Economy, Science and Innovation through Special Research Funds and Industrial Research Funds)	Yes (part of the block grant is formula-based with performance elements, constitutes 37% of the block grant) Research-related indicators are also included in the performance agreements		Yes (constitutes 6% of the block grant for HEIs provided based on performance)
Project- and/or programme-based competitive funding/research grants	Research grants for research groups, institutions or individuals	Yes (project-based funding provided by the Research Foundation)	Yes (competitive project- and programme-based funding provided by the Research Council and the Royal Academy of Sciences)	Yes (NWO competitive funds for practice-oriented research; supports knowledge exchange between SMEs and professional HEIs and the creation of Centres for Expertise)	Yes (competitive project-based funding, primarily provided by Research Council of Norway)
Funding to support research infrastructure	Yes	Yes (through the programme infrastructure of the Research Foundation)	Yes (in support of the "top sectors" activities)		Yes (it aims to increase appropriations to research infrastructure by NOK 400 million by 2018)
Indicators or other considerations attached to funding mechanisms	To be eligible for baseline funding, R&D institutions must have a positive evaluation in the regular government research evaluation process. In total, 95% of funding is awarded based on performance criteria (high level research publications, patents and patent applications, co-financing of R&D and doctoral graduates); and 5% is allocated to humanitarian research of national significance.	Special Research Funds are awarded based on number of master degrees, defended doctorates, gender diversity, publications and citations. Industrial Research Funds are awarded based on defended doctorates, publications and citations, revenues from licences, revenues from EU contracts, patents and spin-off companies.	Formula-based funding (37% of the core R&D funding of universities) considers degrees and defended doctoral degrees. Indicators in performance agreements include research contracts funded by research councils and the EU, scientific impact, scores in research assessment exercises, doctorate degrees awarded.	Competitive funding to support co-operation between professional HEIs and business.	Performance-based funding is awarded based on several indicators: including scientific production, student credits, degrees, exchange students, competitive funding from the research council and regional research funds, funding from the EU and other third-parties.

Source: Adapted from Jonkers and Zacharewics (2016[18]), *Research Performance Based Funding Systems: a Comparative Assessment*, https://doi.org/10.2760/70120; information provided by the participating jurisdictions. See the reader's guide for further information.

Figure 6.4. European Commission funding of government and higher education R&D in selected European countries (2015)

Share of government and higher education R&D funded by EC as a percentage



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
For Austria, Belgium, Denmark, and Sweden, data refer to 2013. For Germany, France, Italy, Lithuania, Luxembourg, the Netherlands, Poland, Portugal and Slovenia, data refer to 2014.
Source: Adapted from OECD (2017[13]), *OECD Science, Technology and Industry Scoreboard 2017: The digital transformation*, http://dx.doi.org/10.1787/9789264268821-en.

StatLink https://doi.org/10.1787/888933941291

As can be seen in Figure 6.4, funding from international sources represents a small proportion of funding overall across OECD countries, although it tends to be more substantial for countries that are eligible to receive funding from the European Union (EU). Funds provided by the EU are especially important for R&D undertaken in a small group of European countries, reaching almost half the funding in the Slovak Republic in 2015. EC funding is also important for Estonia (15% in 2017), while it accounts for 7% of Belgian funding. On the other hand, Norway and the Netherlands have some of the lowest shares of their overall higher education R&D funding coming from the European Commission, at around 2% (Figure 6.4).

In recent years, countries have had varying rates of success in attracting R&D funding from EC sources (Table 6.2). Over the period 2014-2016, Belgium was the most successful of all European Union countries in successfully attracting funds from the Horizon 2020 framework programme for R&D, with an 18% success rate from almost 15 000 applications. The Netherlands and Norway also had relatively high success rates for their applications, at 17% and 16% of applications respectively. In Estonia, where approximately 2000 applications were submitted for funding over the period, there was a success rate of 13%.

Table 6.2. Success rates in attracting Horizon 2020 funding (2014-2016)

	Number of applications	% of overall applications 2014-2016	Application success rate %
Belgium	14 840	3.7	18
Austria	9 705	2.4	17
France	30 660	7.7	17
Luxembourg	1 095	0.3	17
The Netherlands	22 226	5.6	17
Germany	44 811	11.2	16
Sweden	11 464	2.9	16
Norway	5 847	1.5	16
Denmark	8 981	2.2	15
Ireland	6 394	1.6	15
United Kingdom	49 412	12.4	15
The Czech Republic	4 385	1.1	14
Spain	42 403	10.6	14
Finland	8 671	2.2	14
Estonia	2 020	0.5	13
Greece	12 839	3.2	13
Portugal	9 521	2.4	13
The Slovak Republic	1 901	0.5	13
Italy	44 820	11.2	12
Lithuania	1 095	0.3	12
Latvia	1 419	0.4	12
Poland	7 901	2	12
Hungary	4 874	1.2	11
Slovenia	4 512	1.1	11

Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Source: Adapted from European Commission (2018[19]), *Horizon 2020 in full swing - Three Years On - Key facts and figures 2014-2016*, https://doi.org/10.2777/778848.

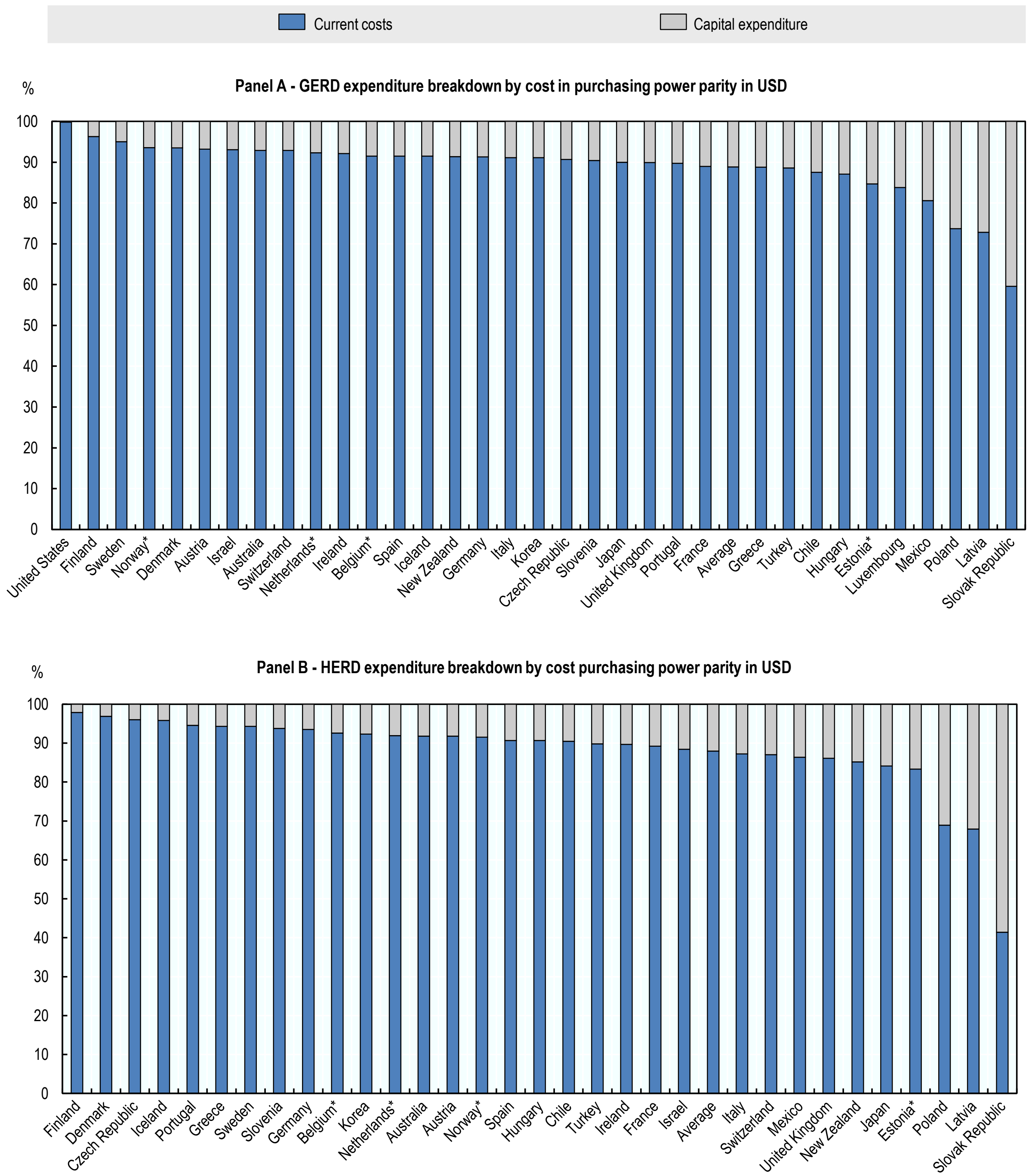
6.2.3. How research and development funding is spent

Current and capital costs

Current expenditures in R&D are composed of labour costs of R&D personnel; other current costs used in R&D, such as services and items (including equipment) used and consumed within one year; and annual fees for the use of fixed assets. Capital costs cover the purchase of fixed assets such as land and buildings, machinery and equipment, capitalised computer software and other intellectual property products that are used in R&D for more than a year (OECD, 2015[1]). This increasingly includes electronic infrastructure such as data, computing and communications networks that are used within R&D systems or, in some fields of research, shared between systems (European Strategy Forum on Research Infrastructures Long-Term Sustainability Working Group, 2017[20]).

On average across the OECD in 2015, current costs represent 89% of GERD, and capital costs just 11%; though in many countries, the proportion of expenditure dedicated to current costs is above 90%. Research is intensive on human resources, and therefore labour costs are generally the largest component of current costs (OECD, 2015[1]).

Figure 6.5. Expenditure on R&D by type of cost (2015)



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Data refer to 2015 or most recently available year.
Source: Adapted from OECD (2018[16]), *OECD Science, Technology and R&D Statistics*, https://doi.org/10.1787/strd-data-en.

StatLink https://doi.org/10.1787/888933941310

On average, the breakdown of HERD by type of cost does not differ greatly to the breakdown of GERD; overall around 12% of costs relate to capital expenditure (Figure 6.5). But capital costs can vary over time in countries according to national plans for building or improving physical structures. For example, in Latvia and Poland, capital expenditure represented more than 30% of HERD in 2015, which may indicate that these countries were investing in expanding their research infrastructure.

In the participating jurisdictions, varying levels of capital expenditure were evident in 2015. Estonia spent 15% of GERD and 17% of HERD on capital costs, significantly higher than the OECD average, which could reflect additional investments under the Estonian Research Infrastructures Roadmap (see below). Belgium, the Netherlands and Norway spent below the OECD average proportion on capital expenditure in 2015, amounting to approximately 8% in each of these jurisdictions. However, in general, capital expenditure in higher education tends to show some volatility over time, depending on the levels of investment in infrastructure required and priorities for expenditure.

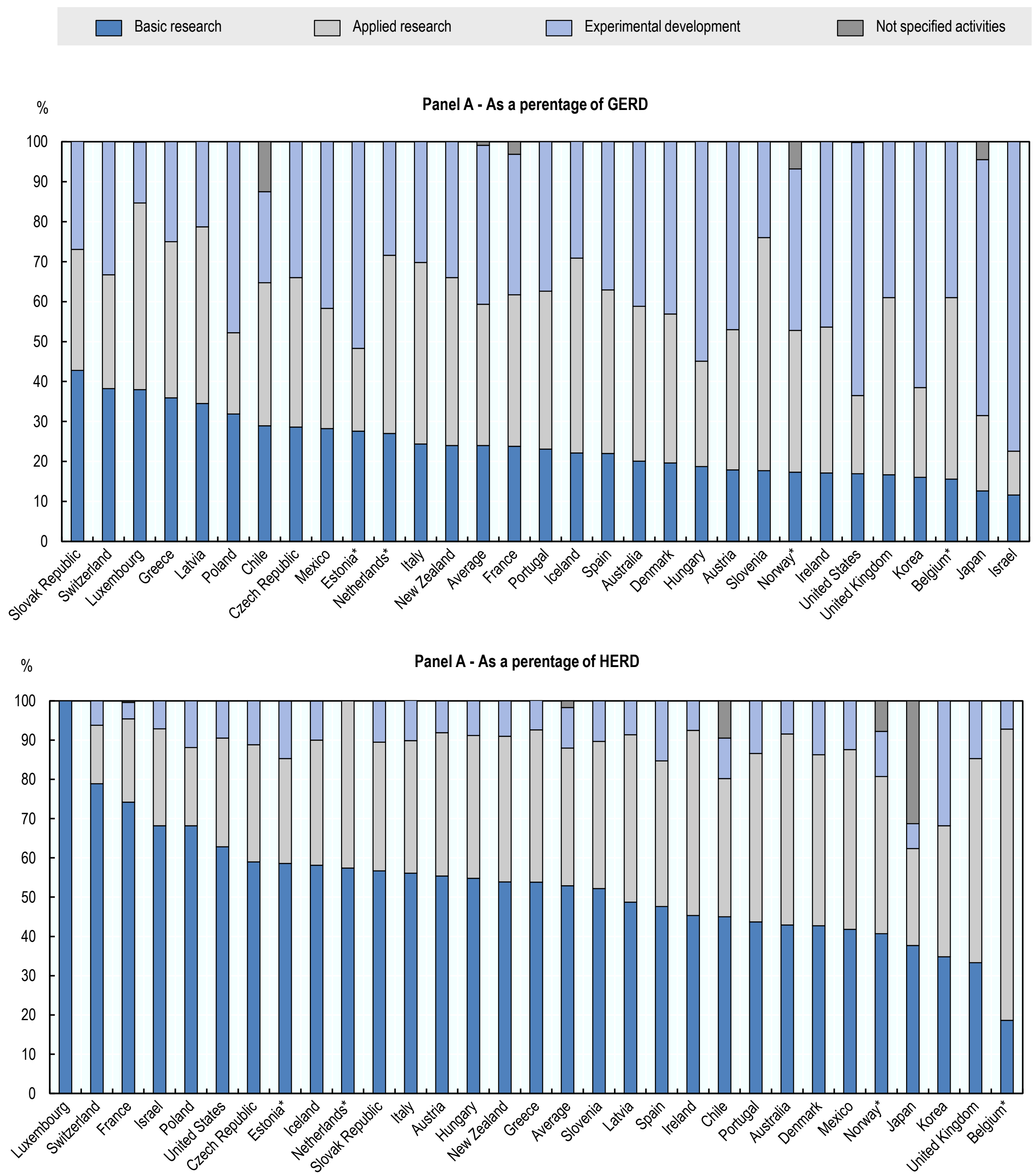
Improving physical research infrastructure is a top priority for science technology and innovation policymakers in most OECD countries (OECD, 2017[13]). For example, in 2019, Estonia updated its Research Infrastructure Roadmap to improve existing infrastructure and create new facilities and equipment. The roadmap earmarks 17 research infrastructure projects of national importance for investment in the coming decade. Estonia is also involved in the development of 14 international research infrastructures. Norway also committed to increasing appropriations to research infrastructure by NOK 400 million over the period 2015-2018, and has a national roadmap for research infrastructure, which is updated biannually (Norwegian Ministry of Education and Research, 2018[7]).

Expenditure by type of R&D

Overall, applied research and experimental development account for approximately 75% of gross domestic expenditure on R&D on average in the OECD area, and for more than 80% in eleven countries, including Israel, Japan or Korea (Figure 6.6). On the other hand, on average across OECD countries with available data for 2015, approximately 53% of GERD in the higher education sector was allocated to basic research, followed by applied research (35%) and experimental development (10%), with marked differences across countries (Figure 6.6). This highlights the key role that higher education plays in conducting basic research across OECD countries.

The proportion of GERD allocated to basic research in 2015 was relatively low in Belgium (16%), while it is just above average in the Netherlands and Estonia, at around 27% for both jurisdictions. In Norway, the breakdown for GERD was 17% on basic research, 36% on applied research, and 40% on experimental development. In France, Luxembourg and Switzerland, basic research accounts for more than 70% of HERD. Other countries, such as the United Kingdom or Korea, tend to invest a lot more in applied research and experimental development in the higher education sector. While the Netherlands and Estonia also spend a slightly higher than average proportion of HERD on basic research (approximately 57%), the proportion of HERD in Belgium devoted to basic research was the lowest in OECD countries in 2015, making up less than 20% of spending (Figure 6.6).

Figure 6.6. Expenditure on R&D by type of R&D activity (2015)



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Data refer to 2015 or the latest available year.
Source: Adapted from OECD (2018[16]), *OECD Science, Technology and R&D Statistics*, https://doi.org/10.1787/strd-data-en.

StatLink https://doi.org/10.1787/888933941329

Many countries have set targets to increase expenditure on applied research in recent years, including in the participating jurisdictions. In line with the target to increase investment in R&D to 3% of GDP by 2020, the Flemish Community aims to increase funding for fundamental, basic and applied research at higher education institutions. For 2019, the Flemish Government has a budget increase of EUR 128 million for R&D. In 2015, Estonia established a new instrument to support the development of applied research in areas of smart specialisation. Approximately EUR 27 million will be allocated to support the development of business R&D and co-operation between higher education institutions and business (Kattel and Stamenov, 2017[4]).

However, it is important to ensure that the growth in applied research does not come at the expense of basic research, and that an appropriate balance of basic and applied research is maintained (OECD, 2008[21]). With the shift in emphasis in public research away from public research institutes and towards universities (OECD, 2016[3]), the higher education sector will continue to play the core role in ensuring that fields of knowledge that may hold social and cultural value, though not necessarily immediate economic value, are protected. At the same time, research universities face an increasing pressure to commercialise knowledge and earn income from sources other than public funds, which creates conflict with the traditional view that knowledge production and dissemination is a public good, and threatens to erode the position of basic research (Altbach, Reisberg and Rumbley, 2009[22]).

6.3. Profile of research and development personnel

Research and experimental development activities rely on the availability and high quality of R&D personnel, covering everyone employed directly in R&D activities, including researchers, technicians and other support staff (OECD, 2015[17]). Different ways of calculating the numbers of full-time equivalent research staff exist across countries, as countries do not always have the availability of information to make distinctions between research and other functions, according to the Frascati manual, or coverage may differ (for example, some, but not all countries include doctoral students as researchers) (OECD, 2017[13]).

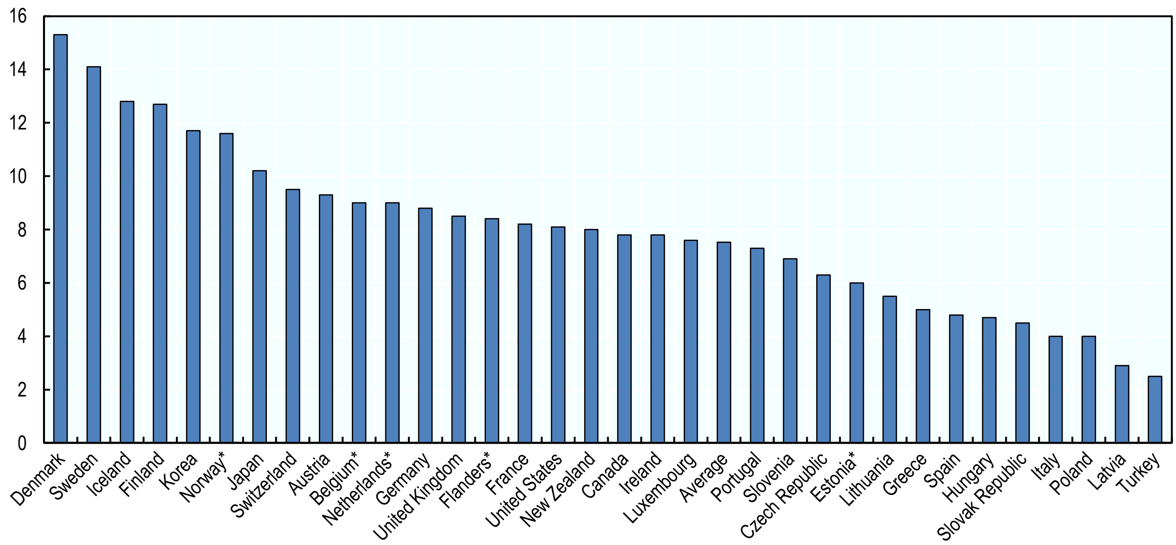
6.3.1. Researcher numbers relative to the labour force

Researchers are “professionals engaged in the conception or creation of new knowledge. They conduct research and improve or develop concepts, theories, models, techniques instrumentation, software or operational methods” (OECD, 2015[1]). One way of comparing the supply of researchers to R&D systems is through measuring the numbers of researchers relevant to the size of the labour force. Across all research sectors, the highest numbers of full-time equivalent (FTE) researchers per one thousand people in the labour force in 2016 were found in the Nordic countries, Japan and Korea (Figure 6.7).

For the participating jurisdictions, the share of FTE researchers per one thousand of the working age population was slightly above the OECD average in Flanders (8) and the Netherlands (9) in 2016. Norway had one of the higher concentrations of FTE researchers in the same year, with 12 per one thousand people in the labour force. On the other hand, Estonia had 6 researchers per one thousand people in the labour force, lower than the OECD average.

Figure 6.7. Researchers in the labour force (2016)

Full-time equivalent researchers per 1 000 people in the labour force



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018. Data refer to 2016 or most recently available year.
Source: Adapted from OECD (2018[16]), *OECD Science, Technology and R&D Statistics*, https://doi.org/10.1787/strd-data-en.

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The low share of researchers in the Estonian workforce may be partly explained by an ageing population and outward migration, but also by a lack of funding and incentives to pursue a research career. A previous study also found that salaries for researchers were lower than the EU average (Kattel and Stamenov, 2017[4]). Moreover, the reliance on short-term, project-based funding may lead to precarious conditions for researchers. To address these challenges, Estonia is making use of European structural funds to develop research capacity (Kattel and Stamenov, 2017[4]). In addition, the government has been working to make funding for R&D more sustainable by increasing the share of recurrent funding to institutions so that the proportion of such funding to competitive research grants would be 50:50 (Jonkers and Zacharewicz, 2016[18]).

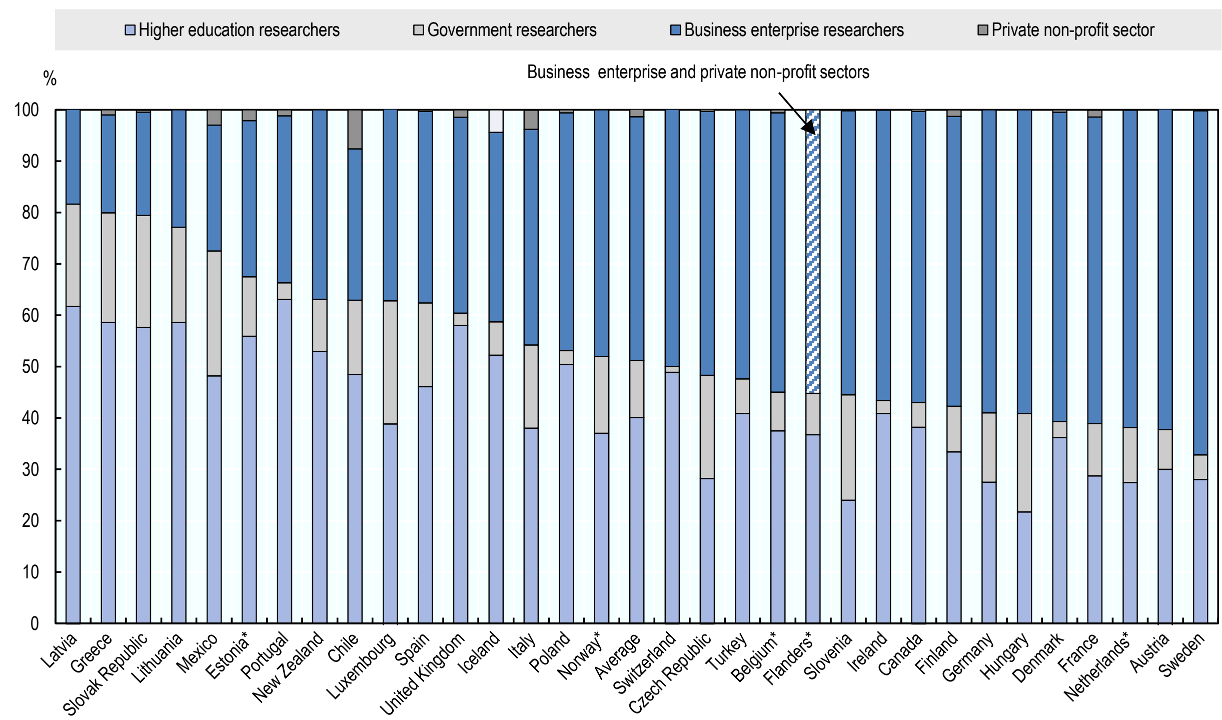
Well-designed human resources policies can play an important role in attracting talented human capital to the research profession. Adopting internationally agreed human resource principles into local policies can also act as an important signal to potential talent. For example, in the Flemish Community, almost all universities and other R&D institutions have obtained a 'Human Resources Excellence in Research' designation, or are close to obtaining this recognition. This designation indicates that the human resources policy for researchers in this jurisdiction is in line with the human resources strategy and principles of the European Charter and Code for Researchers (see Chapter 4).

6.3.2. Researchers by sector of employment

On average, around one-half of FTE researchers in OECD countries work in the higher education and government sectors, with 40% of all researchers working in higher education in 2016, and 11% in the government sector, though there are marked differences between countries (Figure 6.8). Higher education and government researchers combined account for less than 20% of total FTE researchers in Korea; while in Greece, Latvia and the Slovak Republic, higher education and government researchers combined represent at least 80% of the overall numbers.

Figure 6.8. Researchers by sector of employment (2016)

Full-time equivalent researchers as a percentage of national totals



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018. Data refer to 2016 or most recently available year.
Source: Adapted from OECD (2018[16]), *OECD Science, Technology and R&D Statistics*, https://doi.org/10.1787/strd-data-en.

StatLink https://doi.org/10.1787/888933941367

Higher education researchers make up over half of all FTE researchers in Estonia, while the proportions are lower in the other participating jurisdictions; around 37% in Flanders and Norway and 28% in the Netherlands. The proportion of government researchers is also lower than average in Flanders at around 8%, while they are closer to the average (around 12%) in Estonia and the Netherlands, and make up 15% of researchers working in Norway.

Between 2005 and 2015, the share of researchers in higher education increased in Belgium and Estonia and remained unchanged in Norway. The Netherlands experienced a decrease in the proportion of higher education researchers by around 8 percentage points over the same time period. The smaller share of higher education researchers in the Netherlands may partly be explained by the presence of public research institutes, including applied research (TO2) institutes (Box 6.1).

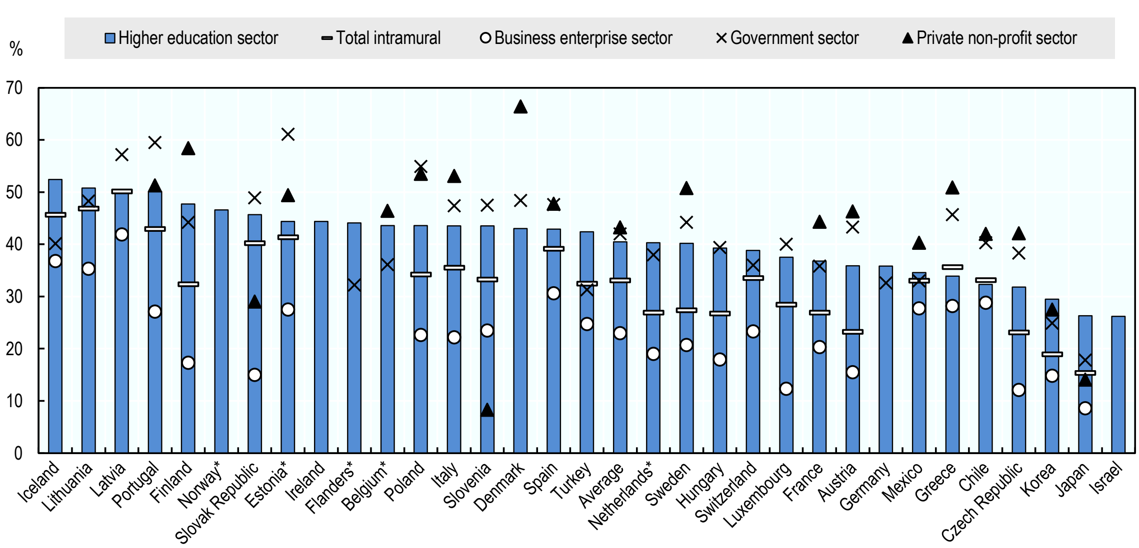
6.3.3. Gender equality in the research and development workforce

Women now outnumber men in terms of enrolment at the bachelor's and master's levels, on average across the OECD, and gender parity in enrolment in doctoral education has almost been achieved, as overall women now make up 48% of new entrants to doctoral education (Section 6.4). However, some countries are lagging behind on gender equity in the research and development workforce, and women remain less represented in doctoral education in some fields of research, including engineering and science (OECD, 2015[17]). Other forms of gender inequality persist that are specific to the research and development sector; for example in higher education, women are also less likely to hold a senior academic position, be corresponding authors in research publications or manage a higher education institution (OECD, 2015[17]).

On average in OECD countries with available data, women account for around 40% of the total of full-time equivalent researchers in the government, higher education and private non-profit sectors. While this shows that gender parity has not yet been achieved in higher education, progress is more advanced than in the business enterprise sector, where overall in 2016 only around 23% of researchers were women. In Iceland, Latvia, Lithuania and Portugal, parity of male and female researchers in higher education has been achieved, while in the government sectors in Estonia, Poland, Portugal and Latvia there is now a larger proportion of female than male researchers. In Japan and Korea, while higher education has a larger female representation than other R&D sectors, still in 2016 less than 30% of higher education researchers were female (Figure 6.9).

Figure 6.9. Women researchers, overall and by sector of employment (2016)

As a percentage of total full-time equivalent researchers



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Data refer to 2016 or most recently available year.
Source: Adapted from OECD (2018[16]), *OECD Science, Technology and R&D Statistics*, https://doi.org/10.1787/strd-data-en.

StatLink https://doi.org/10.1787/888933941386

Norway's proportion of researchers in higher education was approaching parity in 2016, with 47% of women researchers. Estonia and Flanders were also above the OECD average on this measure, with 44% of higher education female researchers. The Netherlands was slightly below the OECD average, with 40% of female researchers in higher education (Figure 6.9).

As discussed in Chapter 4, many countries have introduced policies aimed at increasing the participation of women in research careers. While there have undoubtedly been some advances in terms of increased participation, persistent challenges remain to be overcome before gender equity in research and development can become a reality (Box 6.2).

Box 6.2. Persistent barriers to gender equity related to research and development

A recent OECD and G20 review of the evidence base covering the position of women in the modern digital economy and society found that large inequalities still exist between men and women across many areas relevant to research and innovation. Findings include:

- There is a systematic underrepresentation of women in ICT jobs, and top management positions in business and academia. For example, only 17% of scientists making a salary of more than USD 105 000 are women.
- Women still account for only one-fifth of graduates in STEM subjects, and only make up 20% of corresponding authors on STEM publications.
- Around 90% of innovative start-ups seeking venture capital funding are run by men. When women-owned start-ups do seek funding, they receive on average 23% less funding. Evidence indicates that this ratio can be improved when women are included in the management structure of venture capital firms.
- While progress has been made in the number of patents filed by teams with at least one woman, overall 80% of patents filed at key intellectual property offices worldwide are filed by all-male teams.

Source: Borgonovi et al. (2018[23]), *Empowering Women in the Digital Age; Where Do We Stand?*, https://www.oecd.org/social/empowering-women-in-the-digital-age-brochure.pdf.

6.3.4. Researchers in higher education by field of science

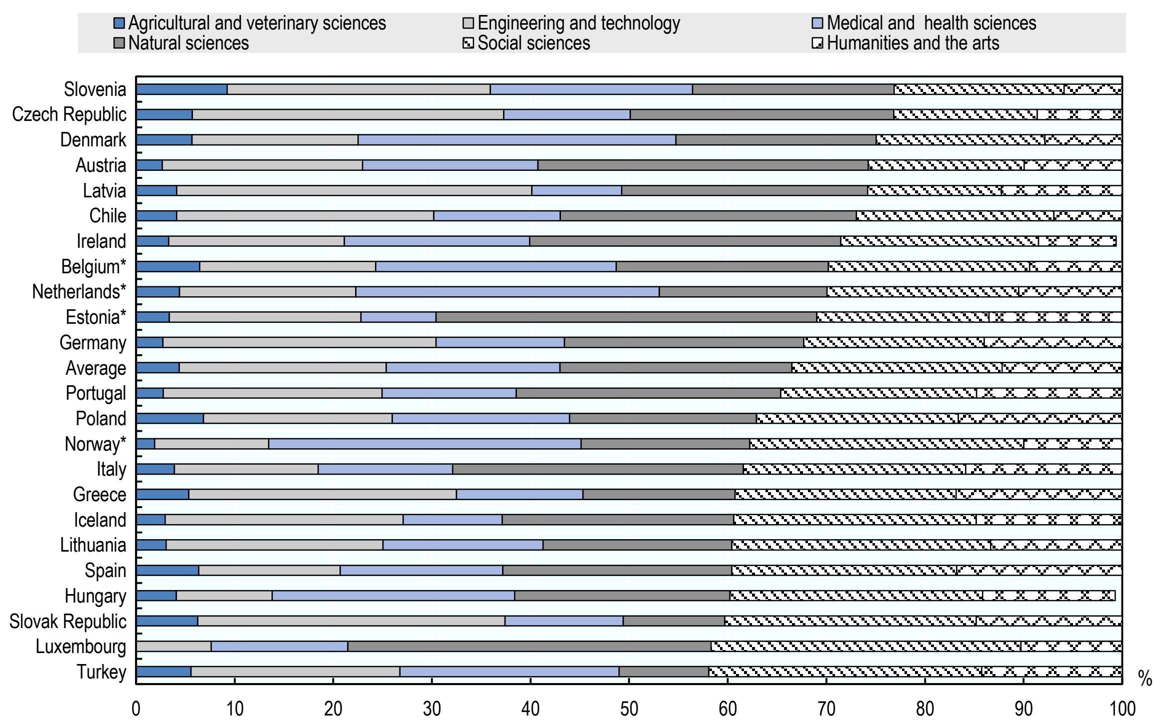
Researchers in OECD countries work across a broad range of fields of science, though many countries tend to specialise more heavily in particular fields. Broad fields of science in this section are defined according to the ISCED 2011 classification (OECD/Eurostat/UNESCO Institute for Statistics, 2015[24]), though at a more granular level, new fields are constantly emerging as communities of researchers grow, new technologies develop and science becomes more specialised.

According to 2016 data, around one-quarter of higher education researchers across OECD countries with available data work in natural sciences (24%), while just over 20% of researchers work in engineering and technology and another 20% on social sciences. The medical and health sciences sector has 18% of researchers, while 12% are working in humanities and the arts, and just over 4% of researchers across the OECD area are in agricultural and veterinary sciences (Figure 6.10).

While a variety of patterns can be observed across countries, at least 50% of researchers in each country are working in STEM-related fields of natural sciences, engineering and technology, medical and health sciences, and agricultural and veterinary sciences. Estonia has the largest share of higher education researchers in natural sciences among OECD countries with available data, making up 39% of researchers, while on the other end of the scale, less than 10% of researchers in Turkey are working in areas related to natural sciences.

In Belgium, the distribution of higher education researchers across fields of science is similar to that of the OECD average. In the Netherlands and Norway, there is a particularly high proportion (more than 30%) of higher education researchers working in medical and health sciences.

Figure 6.10. Researchers in higher education by field of science (2016)



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Data refer to 2016 or most recently available year.
Source: Adapted from OECD (2018[16]), *OECD Science, Technology and R&D Statistics*, https://doi.org/10.1787/strd-data-en.

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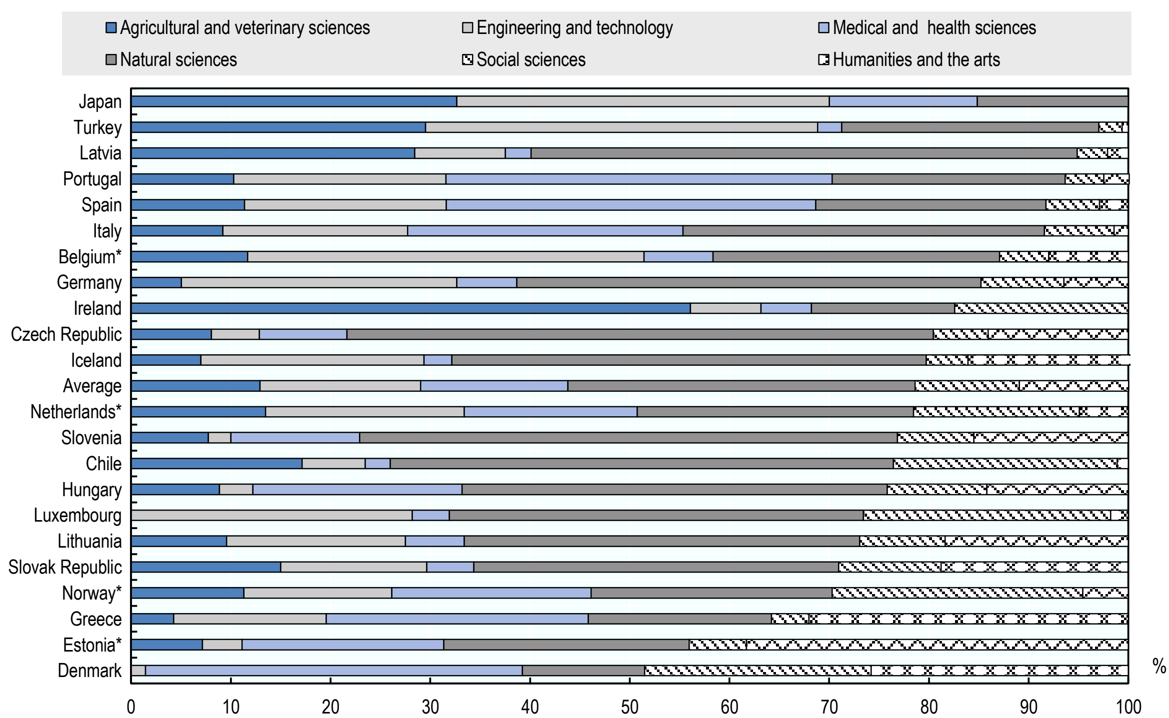
Differences between concentrations of researchers in different fields of science can relate to government policy goals or country specialisation in different sectors. In many countries, including the participating jurisdictions, governments have identified “key sectors” in which to focus R&D activity (Section 6.7).

Differences can also relate to the ways in which public research is distributed between the higher education sector and the government sector. As with higher education researchers, engineering and technology; medical and health sciences; and natural sciences are also the three most represented fields among government researchers in OECD countries with available data, the majority of which are in the natural sciences. But compared to the higher education sector, a smaller proportion of government researchers across the OECD are in the social sciences (11%); while a higher proportion (13%) are in agricultural and veterinary sciences, although differences between countries are substantial. In Ireland, for example, more than half of government researchers are in agricultural and veterinary sciences, while in Norway, one-quarter of government researchers are in the social sciences. (Figure 6.11).

Figure 6.11. Researchers in the government sector by field of science (2016)



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Data refer to 2016 or most recently available year.
Source: Adapted from OECD (2018[16]), *OECD Science, Technology and R&D Statistics*, https://doi.org/10.1787/strd-data-en.

StatLink https://doi.org/10.1787/888933941424

Estonia has one of the largest shares of government researchers in the humanities and the arts (38%). While engineering and technology is the second most represented field of science among higher education researchers in Estonia, it is the least represented field among government researchers. This reflects a historical division of roles between different sectors; following Estonian independence, many government research institutions merged with universities, whereas those institutions that carry out other functions in addition to research and development activities (e.g. the Estonian Literary Museum and the Institute of the Estonian Language) have tended to remain in the government sector.

In Belgium, on the other hand, the largest share of government researchers (40%) is in engineering and technology, a difference of almost 25 percentage points from the OECD average. And while social sciences is one of the fields that is least represented among government researchers in general across the OECD, it attracts the largest share of government researchers in Norway (25%).

6.3.5. Technicians and support staff

In addition to staff with research and field-specific expertise, other categories of skilled personnel are also required to support research activity, including personnel with ICT skills, administrative skills and those that can operate and maintain physical machinery related to research activities.

In the R&D sector, technicians and equivalent staff are defined as "persons whose main tasks require technical knowledge and experience in one or more fields of engineering, the physical and life sciences, or the social sciences, humanities and the arts. They participate in R&D by performing scientific and technical tasks involving the application of concepts, operational methods and the use of research equipment, normally under the supervision of researchers" (OECD, 2015, p. 163[1]).

The evidence presented in this section indicates the variety of human resource patterns in R&D across the OECD. The relative proportions of technicians and other support staff can depend on different methods of apportioning research-related tasks in different countries, or differences in the amount of applied research and experimental development carried out, which may require greater numbers of certain staff categories. Differences in the relative concentration of technicians and other support staff therefore reflect very different ways in which research is organised, as well as the variety of roles and responsibilities undertaken by staff working in research and development in different countries.

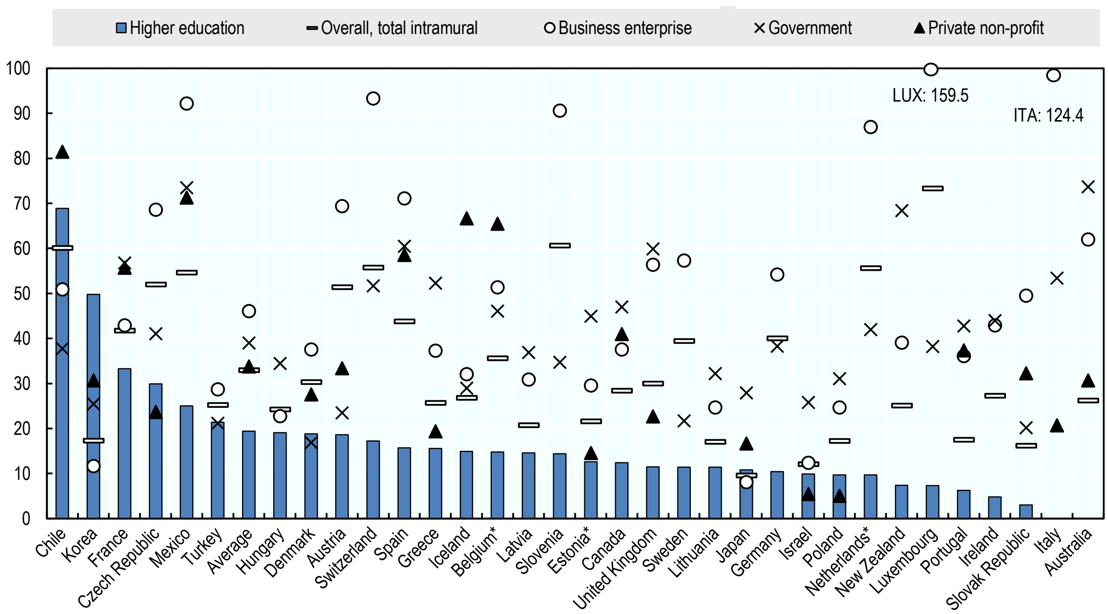
In the OECD countries with available data for 2016, there are on average 33 technicians for every 100 researchers. The ratio of technicians to researchers tends to be higher than average in the government sector (39 technicians per researcher) and lower than average in the higher education sector (19 technicians per researcher). Across countries, the ratio of technicians to researchers in higher education can range from less than 5 in the Slovak Republic and Ireland to as high as 69 in Chile (Figure 6.12).

Lower ratios of technicians working in higher education, compared with other sectors, is not unexpected given the fact that higher education performs a relatively high proportion of basic research in most countries. Applied research and experimental development are likely to require a higher ratio of technicians to researchers to perform the necessary tasks. However, with many higher education systems aiming to expand the volume of applied research, as well as an increasing use of physical infrastructures even for basic research (Section 6.2.3), the demand for research technicians and other associated staff in higher education is likely to increase in the future.

In Estonia, there was an overall ratio of 22 technicians to 100 researchers in 2016, though the ratio is higher in the government sector (45 per 100 researchers) and much lower in the higher education sector (13 per 100 researchers). The difference between the government and higher education sector was even higher in the Netherlands, with 42 technicians per 100 researchers in the government sector, and around 10 in the higher education sector, partly due to the presence of public research institutes (Box 6.1). Belgium also has a similar pattern to the Netherlands, with 46 technicians per 100 researchers in the government sector, and 15 in higher education, though their most recently available data refer to 2011.

Figure 6.12. Technicians to researchers (2016)

FTE technicians per 100 researchers, overall and by sector of employment



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Data refer to 2016 or most recently available year.
Source: Adapted from OECD (2018[16]), *OECD Science, Technology and R&D Statistics*, https://doi.org/10.1787/strd-data-en.

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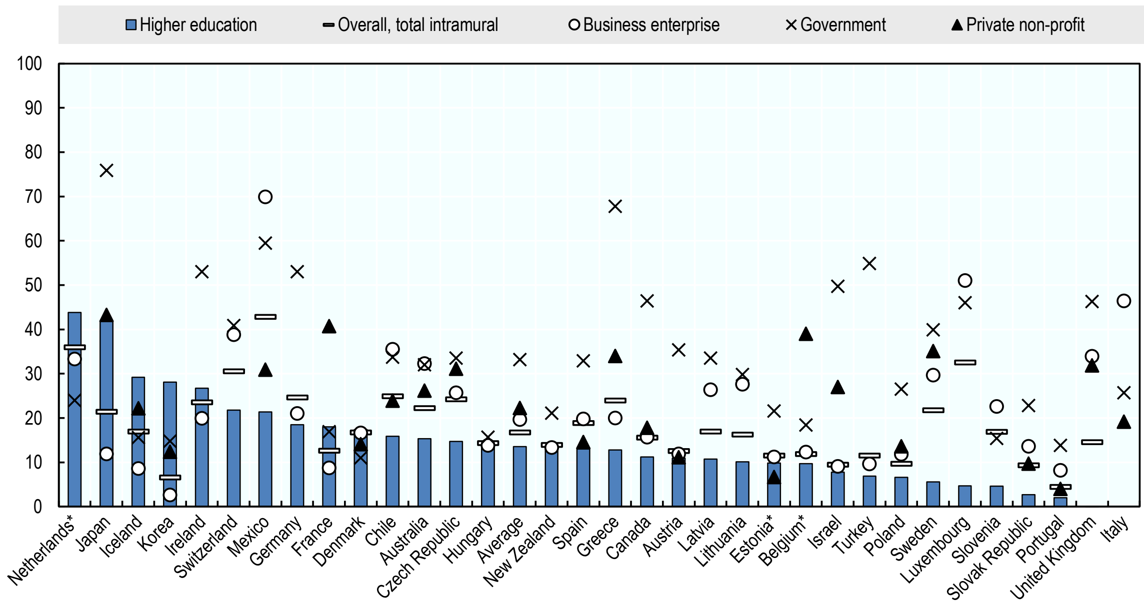
Other support staff include "skilled and unskilled craftsmen, and administrative, secretarial and clerical staff participating in R&D projects or directly associated with such projects" (OECD, 2015, p. 164[1]). According to 2016 data, the average ratio of other support staff in OECD countries with available data was 17 support staff to 100 researchers. As is the case with research technicians, this ratio is higher in the government sector (33 per 100 researchers), and slightly lower in the higher education sector (14 per 100 researchers), with marked differences between countries (Figure 6.13).

The ratio of other support staff to 100 researchers in higher education is more than 40 in Japan and the Netherlands, while the category appears to be almost non-existent in the United Kingdom, although the category does exist in other R&D sectors. The ratio of other support staff to 100 researchers in the government sector is over 50 in Germany, Greece, Ireland, Japan, Mexico and Turkey, with Mexico in particular having a very large proportion of both other support staff and technicians in the government sector (60 other support staff and 74 technicians per 100 researchers).

Figure 6.13. Other support staff to researchers (2016)

FTE other support staff per 100 researchers, overall and by sector of employment



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Data refer to 2016 or most recently available year.
Source: Adapted from OECD (2018[16]), *OECD Science, Technology and R&D Statistics*, https://doi.org/10.1787/strd-data-en.

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Estonia and Belgium both have just under 10 higher education support staff to 100 researchers, below the OECD average for the higher education sector. Proportions of support staff are also well below the average for the government sector, at around 20 researchers per 100 technicians in each of the two jurisdictions. The Netherlands is one of only a few countries with greater proportions of support staff working in the higher education sector (44 per 100 researchers) than in the government sector (24 per 100 researchers). This could partly be explained by the national emphasis on maximising the "valorisation" of research and the additional resources devoted to this priority in the Netherlands (see Chapter 7).

While Norway does not have separate data for technicians and supporting staff, aggregate data for the two categories are available. In Norway, there are around 40 technicians and other supporting staff per 100 researchers. This number is somewhat higher for the government sector, but markedly lower for the higher education sector at only 27. These values are below the OECD average of 51 overall and 69 for the government sector, and relatively in line with the average of 29 for the higher education sector. However, Norway has a very high number of researchers relative to its population. This may indicate that in Norway researchers perform the tasks that are performed by technicians and other supporting staff in other countries, and this may explain the apparent relative under-resourcing in these personnel categories.

6.4. Accessing a career in research

Doctoral education represents the key entry point into a career in academia. Most career paths in higher education research require a doctorate as the minimum standard before researchers can progress to the next career level, for example as a post-doctoral researcher, junior lecturer or associate professor (see Chapter 4).

On a global level, the role of doctoral students and graduates within the broader research system could be considered to be at crossroads. Many countries have been actively encouraging increasing numbers of doctorate holders in the population, and there have been large increases in the numbers of new doctorates worldwide over the last decades (OECD, 2016[3]). However, the increased numbers alone may not be necessarily be meeting the needs of the research and development sector. For example, there have been some indications of a slowdown in STEM doctorate graduates in recent years, particularly in the largest doctoral education systems, which could lead to a future shortage of researchers in these fields. At the same time, in some cases, doctoral graduates are facing uncertain and insecure career paths within public research systems. Many doctoral graduates and increasingly, post-doctoral researchers, are leaving the research profession (OECD, 2016[3]).

Nonetheless, a steady supply of skilled knowledge-based capital will be needed to spur the innovations of the future and maximise the potential for future economic progress (OECD, 2015[2]). Furthermore, to actively participate in international innovation networks, countries will need to not only ensure that they have a pool of capable researchers, but that they have the skills to collaborate effectively across institutions and countries, and that the research they do is relevant to the international market (OECD, 2017[25]).

Therefore, the policy focus is beginning to broaden in many countries from increasing the volume of doctoral graduates to also ensuring rewarding careers in R&D, addressing systemic and individual challenges that can arise throughout a career in research, and helping doctoral graduates to develop the types of transferable skills that are in demand across the economy. This section looks into how doctoral education is organised (with a particular focus on the participating jurisdictions) and the flows of students in and out of doctoral studies. The data presented can give an indication of how successful systemic policies and practices are in attracting doctoral students, and providing rewarding conditions which encourage them to complete their studies and progress.

6.4.1. Entering doctoral studies

Across OECD countries, doctoral education is organised in diverse ways, and there are substantial differences in the number and profiles of those who are pursuing doctoral studies. The entry requirements for a doctorate also vary across OECD countries.

Since the introduction of the three-cycle system as part of the Bologna Process in Europe, a master's qualification is generally the basis for admission to doctoral studies throughout the European Higher Education Area (EHEA). The duration of doctoral studies within the EHEA is typically three to four years. The Canadian doctoral programme is also similar to European approaches, with most students entering on the basis of a master's degree, though the average time for completion of the doctorate is around six years.

By contrast, in the United States, the majority of students can enter doctoral programmes following the completion of a bachelor's degree. However, during the first two years of doctoral programmes, students participate in graduate-level coursework and doctoral seminars and colloquia. Students may then be required to pass a qualifying examination in the second or third year of study to be admitted to the research part of the doctoral programme. Students take between six and nine years to complete a doctorate in the United States depending on the subject and the institution.

In Australia, the usual prerequisite for prospective students is the completion of a bachelor's programme with an honours component (class I or IIA). Alternatively, students may be accepted on the basis of completion of a master's through research or course work. Doctoral programmes typically take three to four years to complete.

The most common type of qualification obtained from research doctoral studies is the Doctor of Philosophy (PhD), though professional doctoral education has seen significant growth in many countries. Professional or discipline-specific doctorates are most often obtained by undertaking a combined period of study based at a higher education institution (which can comprise taught programmes, research or both) and professional practice, and are oriented more towards applying the skills obtained in professional practice than a career as a researcher. While some OECD countries, such as the UK and the USA, offer increasing numbers of professional doctoral programs, other countries, such as Canada, have instead opted to add more professionally focused elements to the traditional PhD program (Chiteng Kot and Hendel, 2012[26]).

Accessing and funding doctoral education in the participating jurisdictions

In all of the participating jurisdictions, admission to doctoral studies is generally on the basis of a master's degree or an equivalent qualification, with a minimum duration of around three years FTE, though typically completion takes at least four years (Table 6.3). Higher education institutions may have additional requirements for admission, such as interviews, the submission of a research plan, additional examinations, etc. In the Flemish Community and the Netherlands, candidates without a master's degree may be admitted to a doctoral programme, but only in exceptional cases, and applicants may need to undergo a competence assessment to show their ability to conduct research and write a doctoral thesis.

In Estonia, the Flemish Community and the Netherlands, doctoral studies are carried out only in universities. In Norway, the majority of state institutions and some private institutions also provide doctoral education. In the Netherlands, all doctoral candidates are either part of a graduate school or a research school. Research schools are partnerships between multiple research universities and research institutes, while graduate schools are organised within universities.

The level and type of financial supports for doctoral students are important predictor variables for the completion of doctoral education, with assistantship-type support (where a student receives a stipend in return for the performance of specific research or teaching-related duties) strongly associated with increased completion (Ampaw et al., 2012[27]). All four participating jurisdictions have a range of mechanisms in place to provide financial stability for doctoral students.

Table 6.3. Characteristics of doctoral education in the participating jurisdictions

	Estonia	The Flemish Community	The Netherlands	Norway
Providers of doctoral education	Universities	Universities	Universities	Universities and some university colleges
Admissions requirements	Master's degree or equivalent (required); other admission requirements set by institutions may apply	Master's degree (exceptions apply); other admission requirements set by institutions may apply	Master's degree (exceptions apply); other admission requirements set by institutions may apply	Master's degree (at ISCED-7); other admission requirements set by institutions may apply
Duration of doctoral studies	3-4 years FTE (typical duration 4 years)	4 years (intended duration, but on average candidates take about 5 years to complete)	3 years FTE (minimum duration) but most doctoral candidates working at universities are appointed for 4 years	3 years FTE (minimum duration). Doctoral candidates are normally hired based on a 4-year contract (1/4 of the time dedicated to teaching and other duties at the HEI). Candidates financed through other sources are on 3-year contracts
Status of doctoral candidates	Students	Students but in addition they can be considered employees of the university where they study, or of a foundation that provides scholarships for doctoral education	Most doctoral candidates are employees of the university where they study; there are also external doctoral candidates	Employees of the higher education institution where they study, of a company, or a public employer; there are also external doctoral candidates

Source: Adapted from Eurydice (2018[28]), *National Education Systems*, https://eacea.ec.europa.eu/national-policies/eurydice/home_en; information provided by the participating jurisdictions. See the reader's guide for further information.

In most European countries, including Estonia and the Flemish Community, the primary status of a doctoral candidate is a student status (Eurydice, 2017[29]). In the Flemish Community, students may also be considered employees of the university where they study or of a foundation that provides scholarships for doctoral studies. Around 13% of doctoral candidates in the Flemish Community have both student and employee status (Eurydice, 2017[29]).

In contrast, in the Netherlands and Norway, the primary status of a doctoral candidate is an employee of the educational institution, usually for a period of four years (Eurydice, 2017[29]). This applies to most doctoral candidates in Norway and around half of candidates in the Netherlands. In these jurisdictions, some doctoral candidates are also hired as employees of another public or private employer. In the Netherlands, around 45% of doctoral candidates are considered 'external candidates'. These individuals generally work outside the academic sector (Eurydice, 2017[29]). A small number of doctorate students can also study on the basis of a scholarship, through a scheme introduced in 2015 to attract more talented students to doctoral education. Many of the students benefiting from this scholarship are international students.

In Estonia, doctoral candidates are classed as students and are entitled to social benefits on the same grounds as bachelor's and master's students. However, they are also entitled to some employee benefits such as parental leave and pension credits. In 2012, the position of junior researcher was created to encourage doctoral candidates to continue working in the research field after obtaining a doctoral degree. This means that doctoral students can work in parallel as junior researchers and receive a salary in addition to their study allowance.

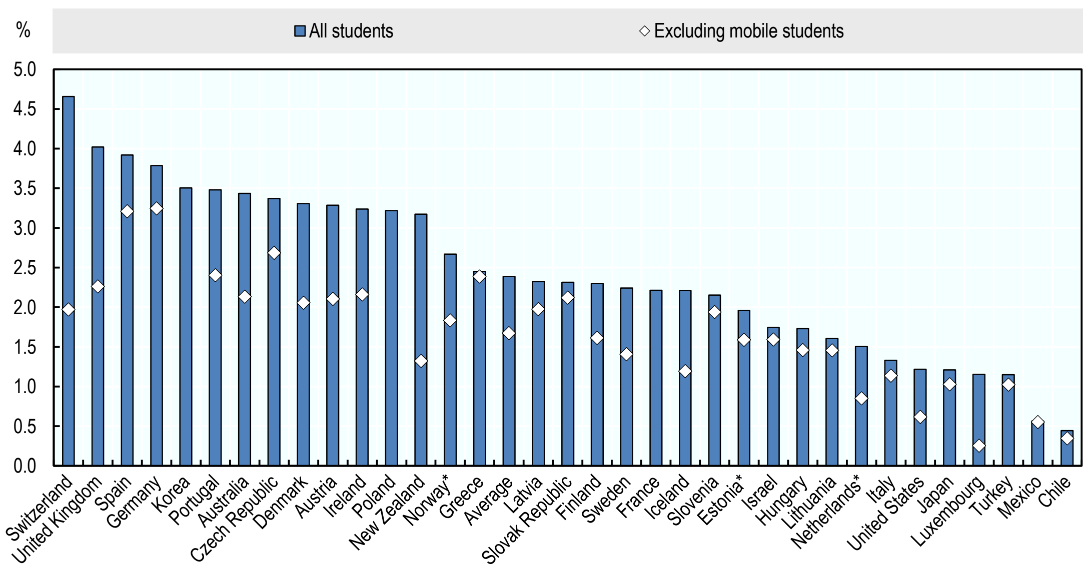
There are also funding schemes in the participating jurisdictions that support prospective students employed in other sectors outside of academia. For example, in Norway, public sector organisations and businesses that allow their employees to complete a doctorate in their area of work are entitled to financial support from the Research Council of Norway (Research Council of Norway, 2019[30]).

Entering doctoral studies

Numbers of doctoral students have been increasing in recent years across the OECD, and based on patterns of entry for 2016, 2.4% of young people are expected to enter a doctoral programme or equivalent in their lifetime on average across the OECD. By comparison, lower levels of higher education first-time entry rates equal 58% for bachelor's programmes and 24% for master's programmes (OECD, 2018[31]). This overall rate masks substantial inter-country differences, however. Entry rates surpass 4% in Switzerland and the United Kingdom but are less than 0.5% in Chile (Figure 6.14)

Figure 6.14. Entry rates at doctoral level (2016)

Including and excluding international students



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Data on doctoral students exclude those who are employed outside of higher education.
Source: Adapted from OECD (2018[32]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en.

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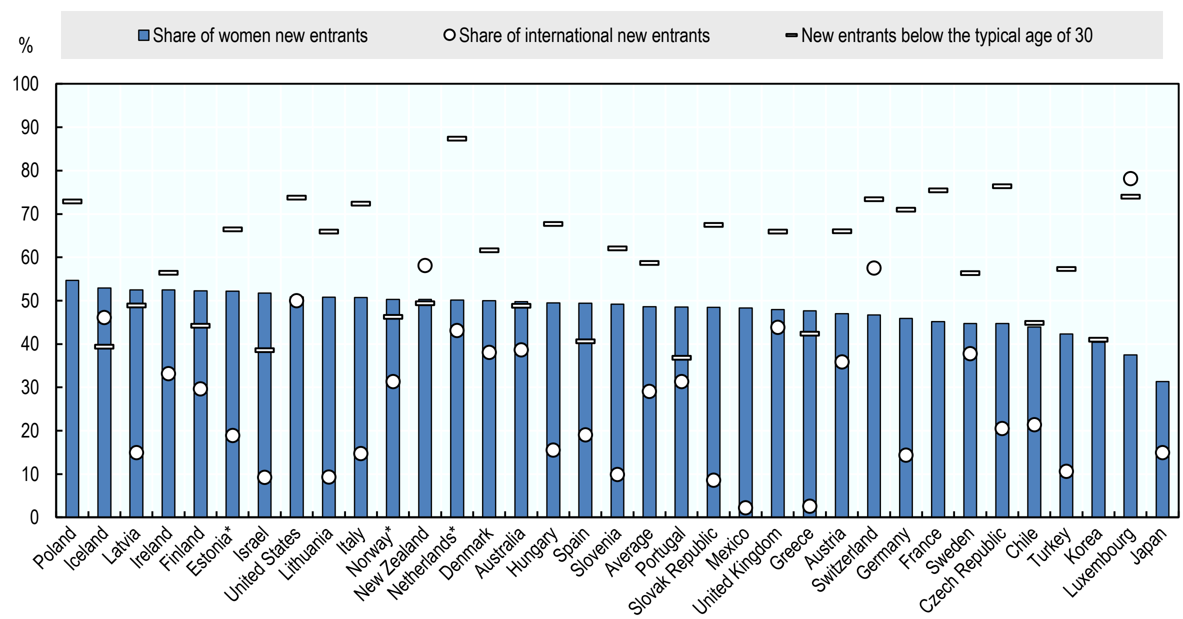
Doctoral education is characterised by a relatively high level of internationalisation reflecting policy efforts to increase international mobility in the scientific community and among highly skilled individuals (OECD, 2017[13]). On average across the OECD, more than one out of four new entrants to doctoral education is an international student, compared to one out of five at the master's level and one out of ten at the bachelor's level (OECD, 2016[33]). Luxembourg had the highest proportion (78%) of international new entrants at the doctoral level among OECD countries in 2016; and around one in two new entrants in New Zealand, Switzerland and the United States were international students in the same year. In some countries, such as Greece and Mexico, international students accounted for less than 5% of all new entrants at the doctoral level (Figure 6.14**).**

When excluding international students, first-time entry rates at the doctoral level in 2016 decreased from 2.4% to 1.7% on average in OECD countries and by more than half in Switzerland (from 4.7% to 2.0%) and New Zealand (from 3.2% to 1.3%) (Figure 6.14).

Within the participating jurisdictions with available data, Estonia and the Netherlands had entry rates at the doctoral level below the OECD average in 2016 with first-time entry rates of 2% and 1.5% respectively, while Norway was marginally above the OECD average with a first-time entry rate of 2.7%. International entrants represented 43% of new entrants to doctoral education in the Netherlands, which was 14 percentage points above the OECD average. In Norway and Estonia, international entrants accounted for 31% and 19% of new entrants respectively (Figure 6.15).

Figure 6.15. Profile of first-time new entrants to doctoral studies (2016)

Percentage of total



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Source: Adapted from OECD (2018[32]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en.

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The profile of doctoral candidates

Based on 2016 evidence for OECD countries, students are on average 31 years-old when they first enter a doctoral programme. But the age at which students first start doctoral studies varies across countries. For example, in the Netherlands, students are 26 years old on average when they first start a doctoral programme, whereas in Portugal the average age of entry is 35 years old (OECD, 2018[31]). This could be a function of the age at which students graduate from lower levels of higher education, the flexibility of the higher education system, or cultural expectations (such as a preference for having work experience before entering a doctorate programme).

Overall, approximately 59% of new entrants to doctoral education across the OECD are below the age of 30. While in some countries, such as the Czech Republic and France, more than 75% of new entrants to doctoral programmes are below the age of 30; in others, such as Israel and Portugal, less than 40% of new entrants are below this age (Figure 6.15).

The Netherlands is the country with the largest proportion of younger entrants to doctoral education among OECD countries, with 87% of new entrants to a doctoral programme below the age of 30 in 2016. In Estonia, 67% of new entrants were under 30 in 2016 while less than half (46%) of entrants were under this age in Norway.

While starting ages are different, it is clear that in most OECD countries, doctoral students are most likely to be going through their studies while in their 30s. Insecurity about career prospects and limited financial resources often associated with early-stage careers in research (and in some countries, the accumulation of debt over this period) can be at odds with other sectors which may offer greater job security and benefits for similar levels of skills and experience within the age cohort. This also means that doctoral graduates tend to enter the labour market at a later stage compared to peers choosing other career paths. Furthermore, the employment prospects for doctoral graduates can vary; while overall unemployment rates for doctoral graduates are very low, the higher education sector appears to only absorb about one-third of doctoral graduates, which may mean that many young researchers are not able to follow their preference for an academic career (Section 6.5).

Figure 6.15 also shows the share of female new entrants to research careers, based on 2016 data. On average, close to 49% of new entrants to doctoral education in OECD countries were women in 2016, reflecting the progress that has been made in this area in recent years in closing the gender gap in higher education enrolments at all levels. The lowest proportions of women entering doctoral programmes were in Japan (about 30%), Chile, Korea, Luxembourg and Turkey (around 40%), while the proportion was more than 50% in a group of countries including Finland, Iceland and Poland. However, other sorts of gender gaps remain in research (see Box 6.2).

Women accounted for around 50% of the population of new entrants to doctoral education in the Netherlands, and Norway in 2016, which is just above the OECD average. In Estonia, over 52% of new entrants to doctoral education were women.

6.4.2. Completion of doctoral programmes

Doctorates are awarded following the achievement of a set of requirements which aim to show the standard has been met to achieve the award. Doctoral degrees can be awarded based on the public defence of a thesis, by publishing a minimum amount of material, or by other means, such as completing a combined programme of teaching and research, or other practice-related milestones in the case of professional doctorates. Though differences in assessment exist across countries, most processes in European countries, including the participating jurisdictions, entail the preparation of a substantive body of research work and a subsequent defence of the work before an academic committee (Box 6.3).

Box 6.3 Assessment practices for awarding a doctoral degree

In **Estonia**, doctoral studies are carried out on the basis of an individual work plan, the progress of which is periodically assessed by an attestation committee. Participation in international scientific conferences, international doctoral courses, study activities organised by doctoral schools, and training in laboratories abroad may count towards the fulfilment of such work plan (Eurydice, 2016[34]). Independent research in the form of a thesis, a series of publications accompanied by a summary article or a published monograph can be recognised as a doctoral thesis. The degree of 'doctor' is awarded after the completion and public defence of the thesis.

In the **Flemish Community**, the degree of 'doctor' is awarded after a period of scientific research and the public defence of a doctoral thesis involving a university panel of academics. At most universities, the doctoral fellows have followed training organised by doctoral schools before defending the doctoral thesis (Eurydice, 2014[35]).

In the **Netherlands**, the progress of a doctoral candidate is evaluated on an individual basis, usually through an arrangement made between the candidate and the supervisor. The status of the supervisor remains provisional until their official appointment shortly before the doctoral defence. The doctoral dissertation of the candidate is first approved by the supervisor and then provided to a panel of at least three academics to decide whether the dissertation satisfies the standard required for a doctorate (Eurydice, 2014[35]).

In **Norway**, at least three senior academics sit on the committee that evaluates a candidate's doctoral thesis, and at least one of them must come from another institution in Norway or from abroad (Eurydice, 2011[36]). The doctoral degree is awarded after a public thesis defence. The traditional doctorate leads to a degree of 'doctor of philosophy', which must be based on high level research.

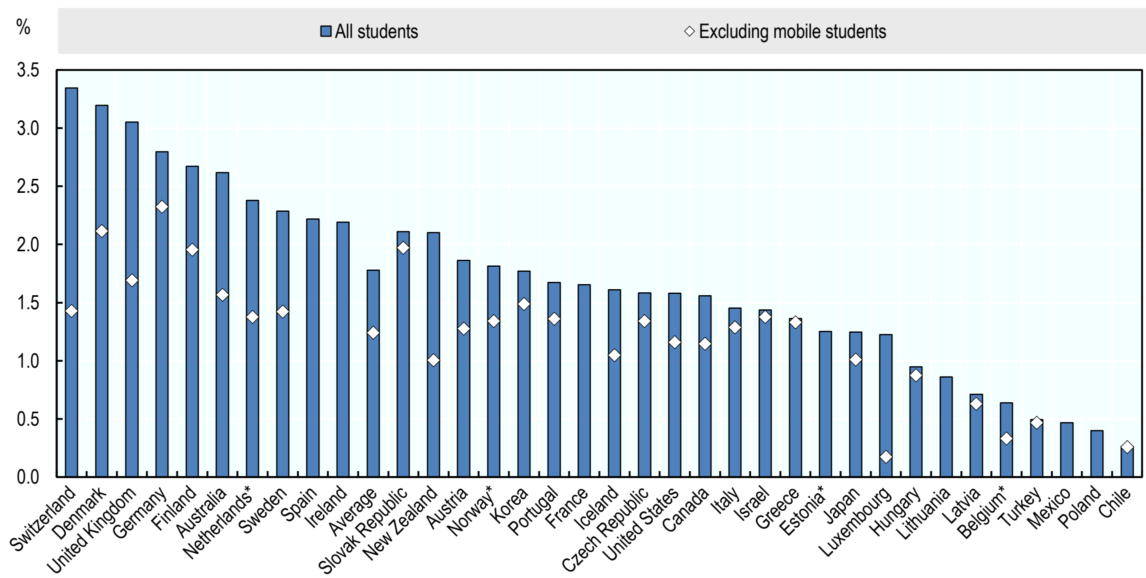
Another major model of doctoral assessment is in place in the United States, where it is common for doctoral candidates to receive more formative assessment throughout the process and first defend their progress in front of a committee, then only prepare the dissertation after this successful examination (Barnett et al., 2017[37]).

Expected graduation rates from doctoral education can give an indication of the relative success of OECD countries in producing young research talent. Based on patterns of graduation for 2016, approximately 1.8% of young people across the OECD are expected to graduate from a doctoral programme in their lifetime, compared to 18% who are expected to graduate with a master's degree and 38% with a bachelor's degree (OECD, 2018[31]).

In 2016, first-time graduation rates at the doctoral level exceeded 3% in only three countries: Denmark, Switzerland, and the United Kingdom (Figure 6.16). These countries also have some of the highest first-time entry rates and the largest share of international students in doctoral education in the OECD. When excluding international students, the first-time graduation rate for OECD countries dropped to 1.2%. Across the OECD, around 30% of students who graduated from a doctoral programme in 2016 were international students, compared to 19% who received a master's degree, or 7% who were awarded a bachelor's degree for the first time (OECD, 2017[38]).

Figure 6.16. Graduation rates at doctoral level (2016)

Including and excluding mobile students



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Source: Adapted from OECD (2018[32]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en.

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Among the participating jurisdictions, first-time graduation rates exceed the OECD average in the Netherlands, where 2.4% of young people are expected to graduate at the doctoral level. Norway is just below the average and Estonia and Belgium fall below the average with 1.3% and 0.6% first-time graduation rates at the doctoral level, respectively. When excluding international students, first-time graduation rates drop by as much as 50% in Belgium (from 0.6% to 0.3%) and by 40% in the Netherlands (from 2.4% to 1.4%).

In the Netherlands, graduation rates are considerably higher than entry rates for all students, excluding mobile students. This may reflect the fact that doctoral researchers do not register initially as doctoral students and are thus excluded from the entry rates statistics. It would also explain why entry rates in the Netherlands are well below the OECD average, whereas graduation rates are well above the OECD average for all students and in line with the average when excluding mobile students.

Comparing the rates in Figure 6.14 and Figure 6.16 may suggest that entry rates are growing, but also could indicate that many candidates do not complete doctoral education. Internationally comparable data on completion rates in doctoral programs is not currently available, but evidence from individual country studies indicates that they are relatively low across the OECD. Non-completion rates have been estimated to be as high as 50% in many countries (Van Der Haert et al., 2013[39]). This represents a cost for both individuals and higher education systems as a whole. Non-completers may experience lower employment prospects and a decrease in self-esteem, while systemically there is a loss in terms of financial resources, human resources and the loss of potential from research that will not be completed (Litalien and Guay, 2015[40]).

While there are limited studies on those who drop out of doctoral education, emerging evidence indicates that a number of personal and institutional factors can play a role in the decision to leave doctoral education. In a recent study, for example, more than one-third of doctoral students reported their intention to drop out, based on a range of factors including the difficulty of balancing doctoral studies and personal life, and problems with isolation and a lack of integration into their local academic community (Castelló et al., 2017[41]).

Evidence also suggests that doctoral completion rates can be improved through specific institutional practices, for example through ensuring academic staff are well prepared to supervise doctoral students (Box 6.4). Encouraging these practices can help to reduce costs related to non-completion.

Box 6.4. Social support and doctoral completion

Many factors play a part in doctoral non-completion. While adequate financial support is important, social support also plays a key role in improving the experience of doctoral candidates and improving completion rates. The role and approach of the doctoral supervisor is particularly vital in this regard. Professional and emotional support from an engaged doctoral advisor can help the doctoral candidate perceive stressful parts of doctoral education as less stressful (for example, writing the doctoral dissertation). Doctoral candidates are also more likely to progress in their professional development if they have a supervisor that is well connected to the relevant professional networks and wider group of scholars in the field of expertise, and when the supervisor and other faculty allocate time towards organising opportunities to discuss research questions and improve their scholarship (Jairam and Kahl, 2012[42]).

Some OECD countries are using funding mechanisms to encourage higher education institutions to increase the number of students graduating with doctoral degrees. For example, Estonia, the Flemish Community, the Netherlands and Norway take into consideration the number of defended doctoral degrees when allocating R&D funding to institutions. Estonia has also set a target to increase the number of new doctoral graduates in an academic year to 300 by 2020 (Estonian Ministry of Education and Research, 2014[12]). This figure amounted to 190 in 2012, and had increased to 253 by 2017.

6.5. Profile of doctorate holders in the population

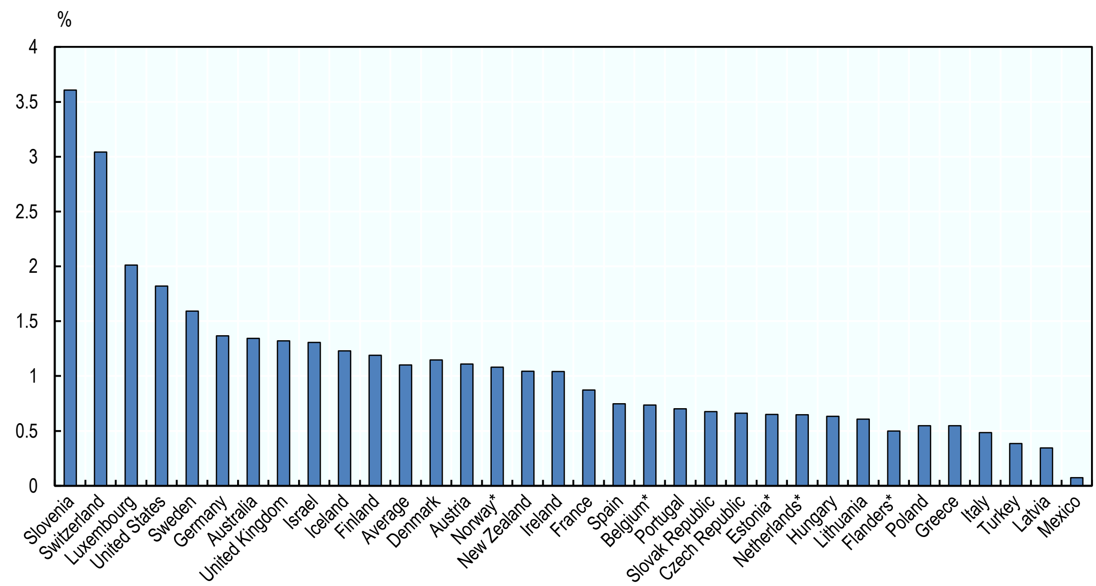
As the numbers of individuals with advanced research qualifications expands, it is becoming increasingly possible to identify them as a separate group and provide more detailed information on their profiles and labour market outcomes. The outcomes of doctorate holders is of particular policy interest, given the substantial government investment in doctoral education by many national research systems.

On average across OECD countries, 1.1% of the population aged 25-64 had completed a doctoral level programme in 2017 (Figure 6.17). However, the share of doctoral holders in the population varied substantially among OECD countries, from less than 0.5% in

Latvia, Mexico and Turkey to 2% or more in Luxembourg, Slovenia and Switzerland. In the participating jurisdictions, doctorate holders accounted for 1.1% of the population in Norway, similar to the OECD average, while they represented less than 0.6% of the population in Estonia, Flanders and the Netherlands.

Figure 6.17. Share of doctoral holders in the population (2017)

25-64 year-olds



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Source: Adapted from OECD (2018[32]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en.

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6.5.1. Careers of doctorate holders

The UNESCO/OECD/Eurostat data collection on the Careers of Doctorate Holders (CDH) was initiated in 2011 in order to improve the information available about the profile and career patterns of doctorate holders in the population, given their importance in national research systems. Data are collected every two years at the aggregate level from OECD member countries, which provide the aggregates based on a range of national data sources, including labour force surveys and population registers (OECD, 2013[43]).

The 2016 version of the data collection covered 16 OECD countries, and Flanders. The CDH data shows that doctorate holders are more likely to move across borders than many other categories of the population. On average across OECD countries with available data, doctorate holders who are foreign-born accounted for nearly one-quarter of doctorate holders in 2016 (Figure 6.18, Panel A). In addition, 14% of doctorate holders were foreign citizens in 2016, on average across OECD countries.

In Norway, foreign-born doctorate holders made up 45% of the total doctorate holders in the population, the third largest share among OECD countries with available data. Norway also had the second highest share of foreign citizen doctorate holders among

OECD countries with available data (37%), indicating that Norway is an attractive destination for talent with advanced qualifications.

In Flanders, the share of foreign-born doctorate holders was slightly above the average across OECD countries, with 25% of doctorate holders being foreign-born. On the other hand in Estonia and the Netherlands, the share of foreign-born doctorate holders was below the average, at 16% and 14% respectively. Similarly, the share of foreign citizen doctorate holders was above the average in Flanders (16%), while it was below the average in Estonia (9%) and the Netherlands (6%).

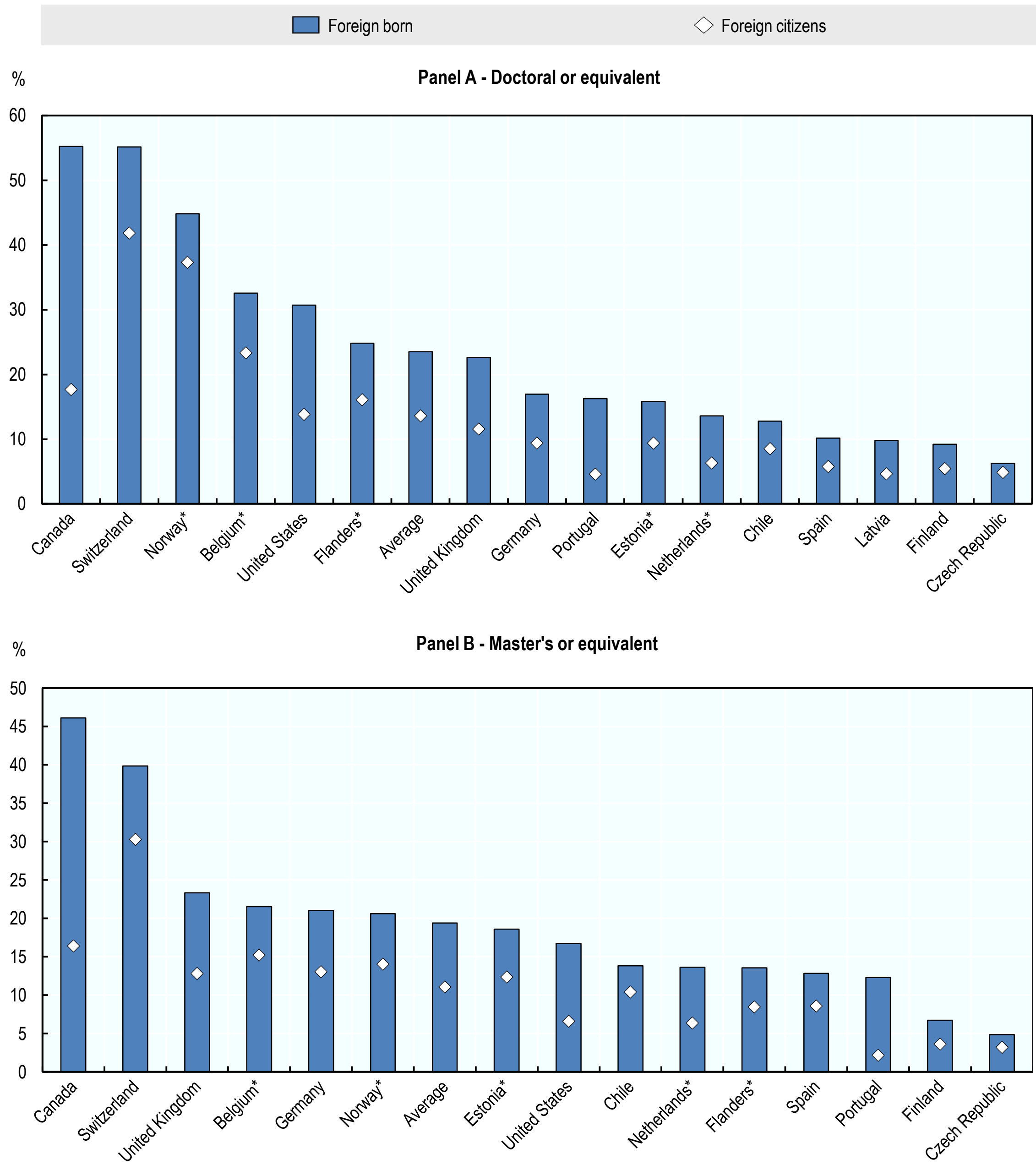
Doctorate holders are more likely to be foreign-born or a foreign citizen than master's holders (Figure 6.18, Panel B). The shares of foreign-born individuals and foreign citizens were 4 percentage points higher among doctorate holders than master's holders, on average across OECD countries in 2016. However, this pattern does not hold equally across countries. For example, while in Flanders and Norway, the shares of foreign-born individuals and foreign citizens among doctorate holders were around double the share of master's holders, the shares of foreign citizens among doctorate holders were lower in Estonia and the same for both masters and doctorate holders the Netherlands.

In comparison with the general trends for fields of study among the population with higher education as a whole, doctorate holders are less likely to specialise in education; arts and humanities; social sciences; and business administration and law. On average across OECD countries with available data, over half of master's holders studied these subjects, compared to one-third of doctorate holders. Less than 20% of doctorate holders completed their doctoral study in the field of health and welfare; while around 11% studied in the fields of arts and humanities, engineering and social sciences respectively (Figure 6.19).

On the other hand, more than one-quarter of doctorate holders in OECD countries with available data studied natural sciences. This is a much higher proportion than the overall proportion of graduates from natural sciences programmes, where on average across the OECD, less than 7% of graduates earned a qualification in natural sciences in 2015 (OECD, 2018[32]). This highlights the prominent role that doctoral education plays within economies to provide the advanced STEM qualifications required in many areas of the labour market.

Differences in emphasis on various fields of study are also evident across the four participating jurisdictions. In the Flanders, a relatively large share of doctorate holders specialised in engineering (18% compared to the OECD average of 11%). In the Netherlands, doctorate holders who studied social sciences accounted for 17% of the total cohort, higher than the OECD average of 11%, while in Norway, 16% of doctorate holders studied arts and humanities, which is above the OECD average (also 11%).

Figure 6.18. Advanced degree holders by country of birth and citizenship (2016)



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Chile, Latvia and the United States: Data refer to 2015. Finland: Data refer to 2014. The Netherlands: Data refer to 2013.
Source: OECD Careers of Doctorate Holders survey.

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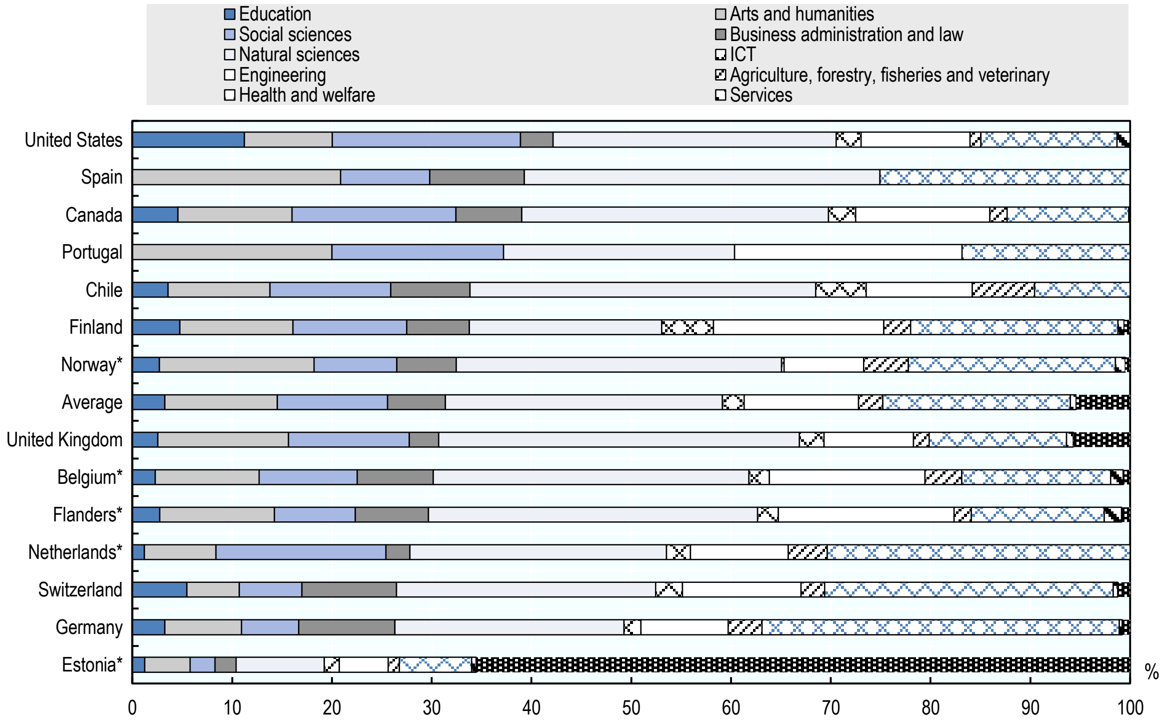
Figure 6.19. Doctorate holders by field of study (2016)



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Countries and economies are ranked in descending order of the share of new entrants enrolled in: education; arts and humanities; social sciences; and business administration and law. Chile, Latvia and the United States: Data refer to 2015. Finland: Data refer to 2014. The Netherlands: Data refer to 2013.
Source: OECD Careers of Doctorate Holders survey.

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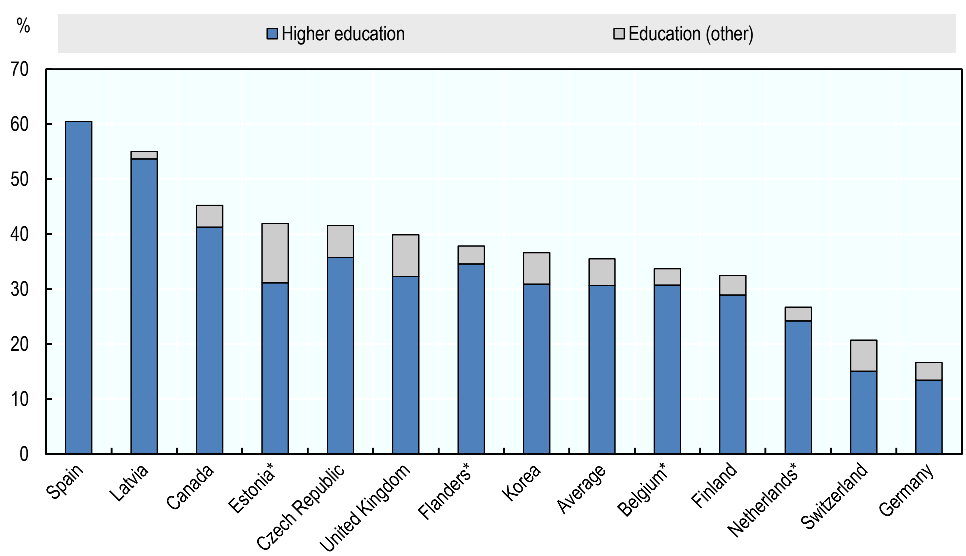
Around 35% of doctorate holders were employed in the education sector in 2016, on average across OECD countries with available data (Figure 6.20). In Estonia and Flanders, the shares of doctorate holders working in the education sector were above the average level, while the share was below the average in the Netherlands. The substantial share of doctorate holders working outside of the education sector may suggest that there is a strong demand for the skills and knowledge provided by doctoral education in the wider labour market, especially given the tendency for doctorate holders to qualify in higher numbers in fields that are in high demand in the labour market. However, the relatively low rate of absorption into the education sector may also be indicative of a shortage of jobs, particularly in academia.

Figure 6.20. Doctorate holders by industry of employment (2016)



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018. Latvia: Data refer to 2015. Finland: Data refer to 2014. The Netherlands: Data refer to 2013.
Source: OECD Careers of Doctorate Holders survey.

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6.6. Internationalisation of research

6.6.1. International mobility

International mobility in R&D is important because it facilitates the circulation of knowledge and affects the quality of research. International mobility is also crucial to the innovation process; increasingly it is recognised that international collaboration, including the mobility of students and researchers, is likely to yield better results for innovation processes than continuously intensifying a "race for talent and investment" (OECD, 2017[25]).

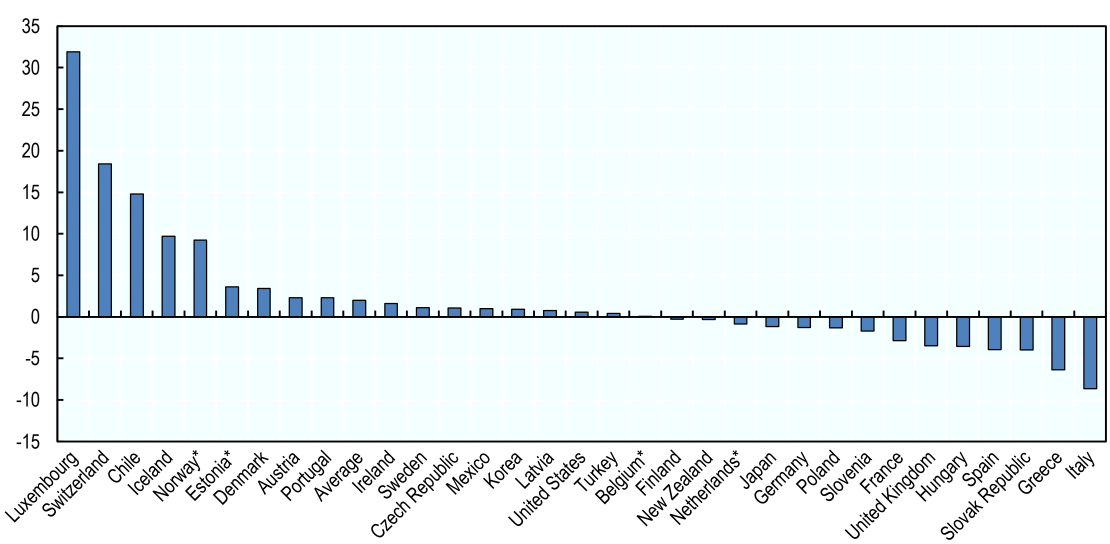
International mobility is characterised in some OECD countries as a "brain circulation" where countries experience both inflows and outflows of talent. One measure of brain circulation is to examine the net flows of scientific authors, using bibliometric data available from the Scopus database, which provides data on the location of the affiliations of scientific authors over the time of their publications. These data therefore give an indication of those who move to another country or economy, those who stay in the same location, and those who return to the economy in which they first published (Figure 6.21 and Figure 6.22).[2] According to the Scopus data, researchers who conduct research abroad and return to the economy in which they first published contribute to raising the overall impact[3] of domestic research by 20% on average (OECD, 2017[13]).

Net flows of research authors for the OECD as whole since 2002 appear to be negative according to the Scopus data; over the period 2002-2016 in total there was a net outflow of almost 14 000 researchers (OECD, 2017[13]). Relative to the size of the population of 25-64 year-olds, Luxembourg, Switzerland, Chile, Iceland, and Norway have the largest positive net flows of researchers, while Italy and Greece, have the largest negative relative flows (Figure 6.21). In the participating jurisdictions, both Norway and Estonia experienced a net brain gain over the period, though the gain for Norway was over double the gain for Estonia. At the same time, between 2002 and 2016 Belgium and the Netherlands experienced close to even flows overall relative to the population.

In general, individual researchers who move to other countries are more likely to be associated with higher impact publications than researchers who have stayed in their original countries or returned. This appears to be mostly the case when moving from lower to higher performing research systems. For example, in the United States, researchers who leave the country tend to have lower journal scores, while those who move to the United States have higher scores than those who have stayed there, providing an indication that this country is very attractive for talented researchers (OECD, 2017[13]).

Figure 6.21. International net flows of scientific authors, selected economies (2002-2016)

Difference between annual fractional inflows and outflows per 100 FTE researchers



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
OECD calculations based on Scopus Custom Data, Elsevier, Version 4.2017, July 2017.
Source: Adapted from OECD (2017[13]), *OECD Science, Technology and Industry Scoreboard 2017: The digital transformation*, http://dx.doi.org/10.1787/9789264268821-en.

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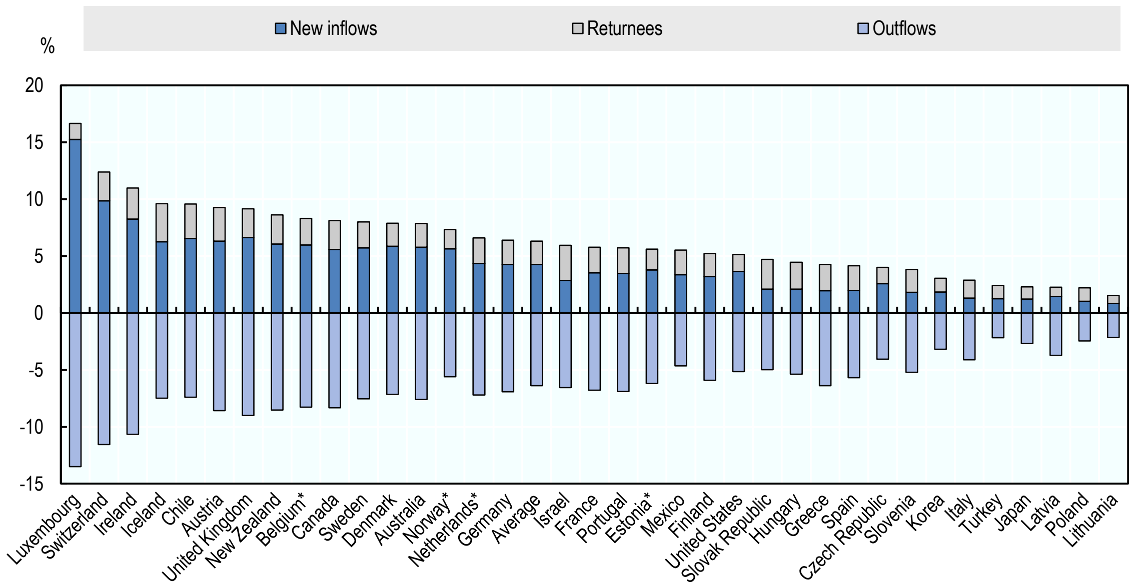
In recent years, OECD countries have made substantial efforts to attract international doctoral students and more established researchers to help enhance their research performance. Most recently in the participating jurisdictions:

- **Estonia** established the Dora Plus and Mobilitas Plus programmes with support from European regional development funds to attract students and researchers from abroad, improve Estonia's reputation as a destination for research and expand transnational collaboration opportunities. Among other supports, the Dora programmes provides scholarships for international students for study visits to Estonia and supports to higher education institutions in Estonia to organise short-term courses for international study groups. Initiatives under the Mobilitas Plus include post-doctoral research grants for researchers coming from abroad, and retuning researcher grants for researchers returning to Estonia after completing some research abroad. The programme will continue until 2023.
- **The Flemish Community** has established several programmes to attract talented researchers from abroad and to promote outgoing mobility. For example, the Odysseus programme supports researchers from abroad who are already considered to be leading in their field, including promising post-docs, to start a research group in a Flemish university. These individuals are offered a permanent position at a Flemish university and project funding to establish a research team.
- Similarly, higher education institutions in **the Netherlands** encourage incoming and outgoing mobility of researchers and have designated funds to support such initiatives. Some research universities set aside annual funds for the recruitment of talented foreign research fellows and visiting professors. The Academy of Sciences and the Research Council also provide funding to stimulate international mobility among researchers.

Despite the increasing policy focus and an expansion of initiatives of recent years, it appears from bibliometric analysis that, in any one year, the vast majority of researchers are not internationally mobile (Figure 6.22). In 2016, on average across the OECD, 94% of scientific authors were classed as "stayers" meaning that their 2016 affiliations and pre-2016 affiliations were based in the same country (OECD, 2017[13]). However, mobility patterns and the extent of brain circulation tend to vary across economies. For example, in Greece, Hungary, Spain and the Slovak Republic, among others, the majority of inflows are returnees originally affiliated with an institution in the country. However, in most countries, the majority of researchers with an international mobility record represented new inflows (Figure 6.22).

Figure 6.22. International mobility of scientific authors (2016)

As a percentage of scientific authors, by last main recorded affiliation in 2016



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
OECD calculations based on Scopus Custom Data, Elsevier, Version 4.2017, July 2017.
Source: Adapted from OECD (2017[13]), *OECD Science, Technology and Industry Scoreboard 2017: The digital transformation*, http://dx.doi.org/10.1787/9789264268821-en.

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Differences in flow patterns can also be observed across the participating jurisdictions. Belgium has one of the largest rates of brain circulation among OECD countries, with new inflows and returnees combined accounting for 8% of all scientific authors in 2016, while outflows were also of the order of 8%. Norway had a slightly positive overall inflow (+1.7%), though overall flow rates were lower than in Belgium. In Estonia and the Netherlands, there was less than one percentage point difference between inflow and outflow rates in 2016.

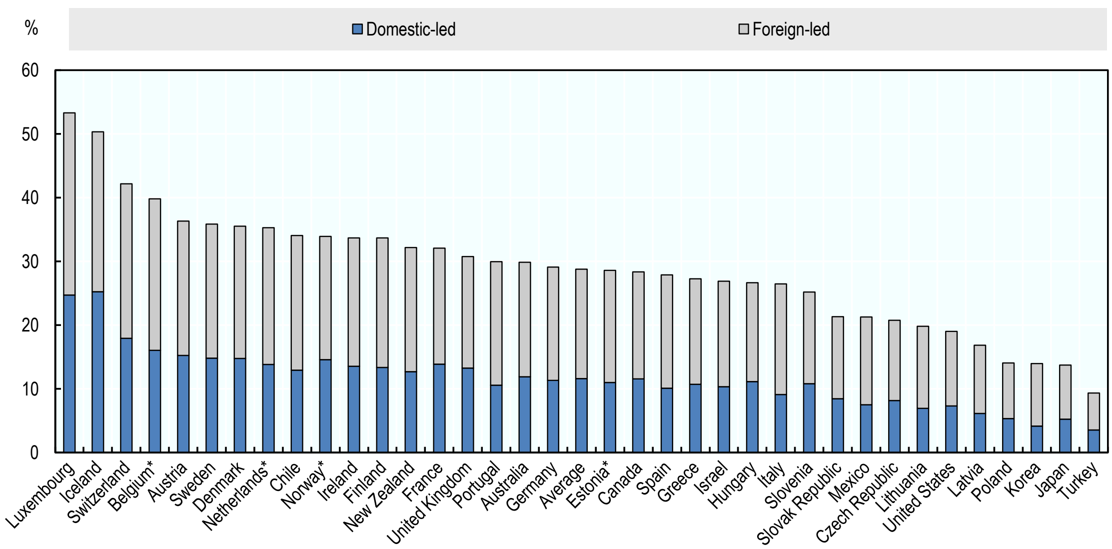
6.6.2. International collaboration

Along with mobility of talent, levels of international collaboration indicate the ability of research systems to participate in global research and innovation networks. On average across OECD countries, just under 30% of domestically authored documents involved some collaboration with researchers in other countries in 2015 (Figure 6.23). The share of publications with international collaboration was more than 50% in Iceland, Luxembourg, both relatively small countries where the need to collaborate internationally in research might be stronger given the lower likelihood of national networks of specialists within particular fields.

At the other end of the scale, less than 15% of publications in Japan, Korea, Poland and Turkey involve international collaboration, and international collaboration is also below 20% in the United States. The lower rate in the United States may be explained by the relatively advanced scientific network, which provides enhanced possibilities for national collaboration.

Figure 6.23. International scientific collaboration (2015)

As a percentage of domestically authored documents, fractional counts



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018. OECD calculations based on Scopus Custom Data, Elsevier, Version 4.2017, July 2017.
Source: Adapted from OECD (2017[13]), *OECD Science, Technology and Industry Scoreboard 2017: The digital transformation*, http://dx.doi.org/10.1787/9789264268821-en.

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Language may also create barriers to international collaboration. While English has been adopted as the common international language for scientific publications, the majority of scientists globally are not native English speakers, and there are differences between countries in the proportions of scientific publications that are published in English. This can cause problems both in terms of transferring knowledge and discovering potential collaborators in the field (Meneghini and Packer, 2007[44]).

In the participating jurisdictions, Belgium, the Netherlands and Norway all had higher shares of international collaboration in publications than the average in 2015, while the share in Estonia was just below the average. The share of publications involving international collaboration was particularly high in Belgium, where almost 40% of all scientific publications in 2015 involved some form of international collaboration.

The above-average level of international collaboration in the Netherlands may be explained by an active involvement of higher education institutions in international alliances and consortia, such as the League of European Research Universities, the European Consortium of Innovative Universities and the IDEA League. Many universities are also active members of research consortia funded by the European Commission. Moreover, under the SEO (*Stimulering Europees Onderzoek*) scheme, the Netherlands Organisation for Scientific Research (NWO) provides additional funding to universities based on the number of international research projects funded through the Horizon 2020 programme.

In Norway, institutions can also benefit from additional government funding if they receive grants from European interregional co-operation initiatives. Norway's long-term strategy outlines objectives and priorities for research co-operation in the European Research Area and the Horizon 2020 programme (OECD, 2016[45]). To achieve this goal, the Research Council of Norway increased the budget to support the participation of public research organisations in the EU Framework Programme to NOK 140 million in 2015 (OECD, 2016[45]). Norway additionally has a number of policies to develop international relationships, which can benefit the higher education R&D sector, such as

- international co-supervision of doctoral candidates with a co-operating institution abroad (*cotutelle*)
- the INTPART and UTFORSK initiatives, managed by the Research Council of Norway and the Norwegian Agency for International Co-operation and Quality Enhancement in Higher Education, funds research partnerships and project co-operation with institutions in a number of countries (including Brazil, China, India, Russia, South Africa and the United States).

Estonia has set targets to strengthen international co-operation in research. It aims to increase the share of national public funding for internationally co-ordinated research to 3% of government budget appropriations or outlays for R&D (GBAORD) by 2020 (Estonian Ministry of Education and Research, 2014[12]), from a level that was at 1.3% in 2010. Estonia is also a member of or participant in various international research infrastructures and organisations specialising in health, technology, life sciences and related fields, such as the European Space Agency, European Molecular Biology Conference (EMBC) and the European Organization for Nuclear Research (CERN).

6.7. Measuring and improving research performance

As research activity and investment increases, so does the imperative to measure its impact and evaluate its performance. This is necessary particularly in the case of public research, where there is a renewed focus on accountability for public spending and an increasing requirement for knowledge and evidence on which to base future funding decisions.

Recent OECD work has highlighted the general challenges faced across OECD countries to evaluate the outputs of research and development. The available metrics and approaches for measuring the social and economic impact of R&D suffer from a number of limitations, even as international rankings grow in importance. In addition, the links between the evaluation of research and policymaking are not always clear, including the setting of priorities for the system (OECD, 2016[46]). Developing new and robust ways to measure research performance and set systemic priorities are therefore likely to be areas of continued policy focus into the future. National initiatives are in place in many countries that aim to evaluate and improve the quality and relevance of research, including in the four participating jurisdictions.

Estonia has had a policy monitoring programme for research, development and innovation in place since 2011, coordinated by the University of Tartu. The programme was revised in 2015 to strengthen co-operation between government, higher education institutions and the private sector; and to enhance the role of science and research in the economy (OECD, 2016[47]). The new programme, RITA, examines the implementation of research, development and innovation strategies in co-operation with Tallinn University, the University of Tartu, Tallinn University of Technology, Estonian Academy of Sciences and Estonian Research Council.

In order to monitor progress in the policy objective of alignment of R&D activities with the interests of the Estonian society and economy (Estonian Ministry of Education and Research, 2014[12]), the government introduced two indicators for 2020, one measuring government budget appropriations by socio-economic objectives and the other for the share of public sector R&D expenditure financed by the private sector.

In addition, in 2014, the government allocated EUR 123 million to support institutional development plans and structural reforms, including mergers of higher education and R&D organisations, and to improve the quality of research (OECD, 2016[47]). New measures to strengthen public sector innovation and to improve the capacity of higher education institutions and public research organisations to undertake socially relevant research have also been implemented (Kattel and Stamenov, 2017[4]).

The Flemish Community has also adopted measures to increase efficiency in R&D. A number of research and innovation agencies have been merged, and funding for R&D has been reformed to streamline different research activities and simplify the application process for research funding. Strengthening of policy evaluation capacity has also been a priority, both at the federal level and within individual communities. The Flemish Community, for example, has recently performed an evaluation of the application procedures for projects and grants of the Research Foundation (OECD, 2016[48]).

In **the Netherlands**, measurement and improvement of research performance takes place within large research programmes, while measurement as such is also part of national monitors of R&D activities. The National Research Agenda (NWA) was developed in a bottom up process with researchers, the private sector, NGOs, citizens and other stakeholders. Research questions were grouped into 25 ‘routes’ that combine scientific and societal challenges (Dutch Ministry of Education, Culture and Science, 2019[9]). The measurement framework of the NWA includes parameters about collaboration between different types of actors (universities, applied research (TO2) institutes, the private sector, NGOs, government agencies, etc.). In terms of output and impact, established indicators such as publications and IPR are used alongside qualitative indicators for knowledge sharing and addressing societal challenges.

Measuring and improving research performance is also addressed in the “top sectors” initiative (see Chapter 7) and its evolution to a mission-driven innovation policy. This initiative seeks to tailor public resources to priority sectors of the economy and to strengthen coordination of activities in these sectors by government, business and knowledge institutions (OECD, 2016[49]). Every two years, the Dutch Statistical Office evaluates the progress of the “top sectors” initiative in the areas of macro-economy, enterprise development, employment characteristics, innovation performance and education output (OECD, 2017[50]). In addition, Statistics Netherlands, the Rathenau Institute and the Association of Universities in the Netherlands (VSNU) monitor investments, activities and results in R&D and innovation.

Norway has adopted a number of reforms to increase the effectiveness and efficiency of public research. This has been reflected through structural reforms involving several mergers of higher education institutions; and funding reforms, including revisions to the indicators considered in the block grant for higher education institutions, and an experiment involving performance contracts (OECD, 2016[45]). The *Long-term Plan for Research and Higher Education 2019–2028* serves as the key guiding policy framework for higher education and R&D in Norway. It outlines five priority areas which reflect a mixture of social and economic goals: oceans; climate, environment and clean energy; public sector innovation for better and more efficient services; enabling and industrial technologies; civic protection and social cohesion in a globalised world research (Norwegian Ministry of Education and Research, 2018[7]). In 2016, Norway also introduced stricter requirements for institutional accreditation in order to improve the quality of research and education in higher education institutions (OECD, 2016[45]). Among other factors, these requirements consider the relevance of research to the regional business community and the nature and size of doctoral provision (OECD, 2016[45]).

6.7.1. Monitoring research productivity and quality

In tandem with the increase in the volume of research activity and growing investment in research, there has been an expansion of measures which aim to provide an indication of research and development performance and impact. Pressure at the political level to demonstrate the effectiveness of public spending, the growth of bibliometric analysis and increasing volumes of both quantitative and qualitative information about research output has led to a research-related “metric tide” (Wilsdon et al., 2015[51]). These metrics can relate to the output of individual researchers, or can be aggregated to provide measures of quality and performance for journals, institutions and national systems (Box 6.5).

Box 6.5 Key terms related to research productivity and quality

Most measures of research quality and productivity are based on bibliometrics, such as the number of scientific publications and number of citations (the number of times an individual published paper is referenced in the work of other scientific authors). Key relevant bibliometrics which have grown in popularity and use in recent years include:

Citation count: The number of times a paper has been cited in other publications.

H Index: Designed to measure both productivity and quality at the individual level, the H index is defined as the highest number of publications an author has that have been cited at least an equal number of times (Hirsch, 2005[52]). For example, an H Index of 10 implies that the author has 10 papers that have been cited at least 10 times.

Impact factor: The impact factor measures how often on average each article in a journal is cited in a given year (Glänzel and Moed, 2002[53]). High-impact journals can be defined as those that have the highest levels of citations within their particular journal category or specialty (Garfield, 2003[54]).

Scientific production (of a country): The total amount of publications by authors affiliated with institutions in that country in a given year (OECD and SCImago Research Group, 2016[55]).

Altmetrics: Alternative measures of impact, such as the number of times a publication is mentioned on social media, discussed in blogs or mentioned in news sites.

Quantitative measures of research productivity and quality are still recognised as being experimental in nature and questions remain about how well such measures are able to fully cover research activity, given that there is no one central repository of all scientific publications, and there are variations in methodologies between different repositories of indexed scientific publications on how such metrics are calculated (OECD, 2017[13]). However, because of the volume of information available, they have become widely adopted as the best available measures of research performance.

Despite the increasing access to metric performance data, qualitative evaluation through peer review remains the backbone of quality assurance in scientific production, both for reviewing individual research outputs and determining which research project proposals should be funded. Peer review of research proposals can help to increase the probability of the highest quality research being supported financially. However, the peer review process for journal publications has also attracted criticism due to the delays it introduces in communicating scientific results; and as evidence emerges demonstrating various types of bias, a lack of reliability and predictability in review processes (Bornmann, 2013[56]). While no alternative has arisen to challenge peer review, it is likely that future measures of research performance will increasingly attempt to combine both qualitative and quantitative elements, to provide a more multidimensional view of performance and increase confidence in the process (OECD, 2016[46]).

However, while peer review and bibliometric data can give some information on aspects of quality, there are other quality issues related to research publications for which solutions must be found in the research community. A major quality challenge relates to reproducibility of research; an increasing number of studies across various fields show that a large proportion of research claims and results cannot be replicated either by the original researchers or another team (Ioannidis, 2017[57]). Various obstacles to reproducibility present themselves at all stages of the research process, including not controlling for bias at the design stage, p-hacking (generating hypotheses and making analytical decisions which fit the structure of the observed data), failing to properly outline the experimental conditions under which the results were obtained and results which meet the standard of being statistically significant but with small effect sizes (Munafò et al., 2017[58]).

A number of initiatives aim to improve the ability to replicate important research results and strengthen the knowledge base which is used to underpin many decision processes and inform further research. For example, in some fields such as medicine, pre-registration of studies and specification of their protocols in advance of conducting the research have become standardised (Munafò et al., 2017[58]) and many high-impact journals have introduced more stringent requirements for authors to describe the conditions under which experiments were carried out (McNutt, 2014[59]).

Other policy actions which can improve the reliability of research include open science movements such as the European Commission’s European Open Science Cloud, which has a goal of ensuring that all scientific publications are FAIR (Free, Accessible, Interoperable and Reusable). One of the key drivers of the requirement for FAIRness is the recognised need for research to be more reproducible, and evidence suggesting that implementing FAIR principles systemically is likely to bring considerable return on investment in terms of research quality, transparency and discoverability (European Commission, 2018[60]). Governments can also play a role in improving research quality, for example by funding research which aims to replicate existing results and requiring pre-registration of study hypotheses as a condition for awarding funding (KNAW, 2018[61]).

6.7.2. Volume and impact of research output

Metrics used for assessing the performance of research in higher education at the systemic level include the volume of output, measured quantity of scholarly output per FTE researcher; and the impact of output, often measured by citation counts per FTE researcher. These values are often normalised by fields of study, due to the differences in the levels of citations between different fields. Another measure used to assess quality of research is the number of scholarly output per FTE in high-impact journals, i.e. those journals whose publications traditionally attract more citations from the scientific community (Box 6.5).

Figure 6.24 presents some information on the overall quantity and impact of scientific production in different economies, by measuring the volume of scientific publications and the relative numbers of citations they attract.

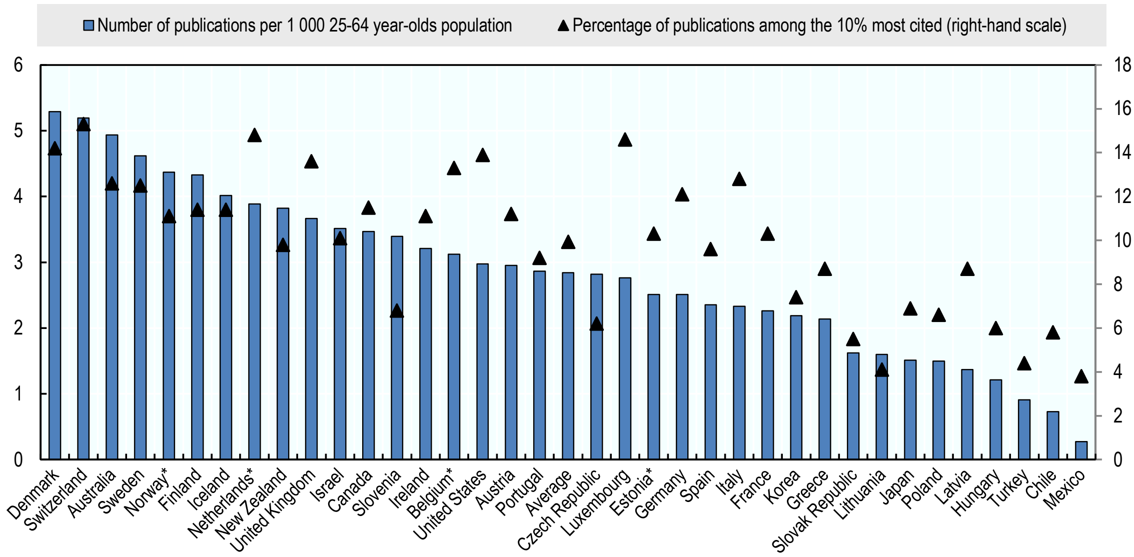
In terms of volume of publications, the most productive countries in 2015 with around 5 publications per 1 000 25-64 year-olds in the population were Australia, Denmark and Switzerland. On the other hand, Chile, Mexico and Turkey had the lowest volume of publications, at less than one publication per 1 000 of population.

Norway and the Netherlands produced publications at a level higher than the OECD average in 2015, with around 4 publications per 1 000 of 25-64 year-olds, compared to the OECD average level of 3 publications. In the same year, Belgium produced 3 publications and Estonia 2.5 publications respectively for every 1 000 25-64 year-olds.

The percentage of documents from each country in the global 10% most-cited publications allows a comparison of the scientific impact of publications at the system level, as a proxy for the quality of output of research systems. In 2015 Switzerland had the largest share of domestic scientific documents within the top 10% most-cited publication (15%), closely followed by the Netherlands and Luxembourg. On the other hand, only about 4% of publications in Lithuania, Mexico and Turkey appeared among the world's most-cited publications (Figure 6.24).

Figure 6.24. Quantity and impact of scientific production (2015)

Number of documents and percentage among the world's 10% most cited publications, fractional counts



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
OECD calculations based on Scopus Custom Data, Elsevier, Version 4.2017; and 2015 SCImago Journal Rank from the Scopus journal title list (accessed June 2017), July 2017.
Source: Adapted from OECD (2017[13]), *OECD Science, Technology and Industry Scoreboard 2017: The digital transformation*, http://dx.doi.org/10.1787/9789264268821-en.

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Belgium also performs highly according to this measure, with around 13% of publications among the most cited globally, higher than the OECD average level of just under 10%. There are no disaggregated statistics for the regions of Belgium, but the normalised score for most-cited publications from the European Regional Innovation Scoreboard shows the highest performance for Flanders (0.77), followed by the Brussels Region (0.72) and Wallonia (0.69) (European Commission, 2017[62]). Norway (11%) and Estonia (10%) both have levels of top cited publications slightly higher than the OECD average, and Estonia in particular has shown a considerable improvement in this indicator from 2005 to 2015 (OECD, 2017[13]).

The number of top-cited publications has been used widely as a proxy measure of the quality of research output, though it may be more accurately considered as a measure of its impact, as certain papers such as broad reviews of literature tend to attract more citations regardless of quality, certain fields of study tend to have higher citation counts, and authors may also cite a paper when criticising it (Tahamtan, Safipour Afshar and Ahamdzadeh, 2016[63]). Despite some shortcomings in the measurement process, the use and acceptance of bibliometric data to measure performance is growing across the OECD. In many countries, such the participating jurisdictions, they are now part of the decision-making process for R&D funding (Box 6.6).

Box 6.6 Connecting R&D funding to bibliometric data

To improve the quantity and quality of their scientific output, participating jurisdictions have incorporated bibliometric information into R&D funding decisions.

In **Estonia**, around one-third of base funding is based on the number of publications in internationally recognised journals, the number of high level research monographs and the number of registered patents and patent applications (Jonkers and Zacharewicz, 2016[18]). The remainder of the funding in based on qualitative evaluations.

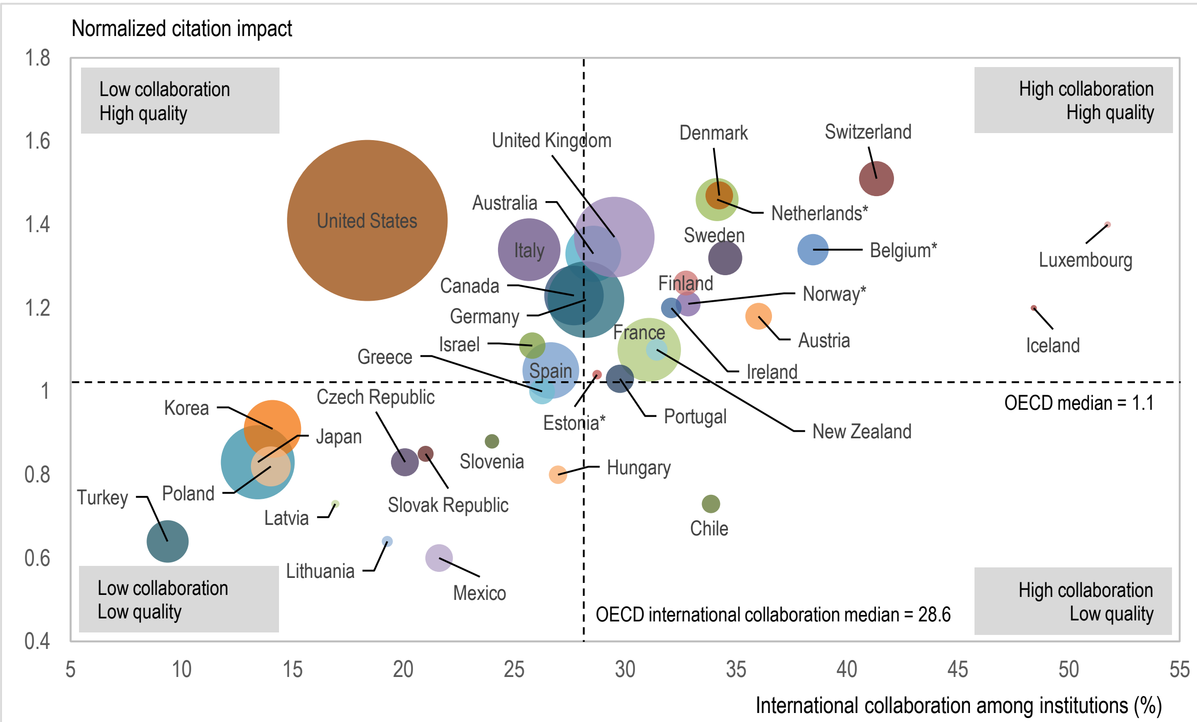
In **the Flemish Community**, around 40% of the ‘Special Research Funds’ provided to Flemish universities are based on research output and scientific impact (Jonkers and Zacharewicz, 2016[18]). Among the bibliometric information considered when allocating funding are publications in the Web of Science (WoS), a repository of academic articles, and citations and publications in the Flemish Academic Database for the Social Sciences and Humanities (VVAB). The latter was created in response to the low representation of social sciences and humanities journals in the WoS (Jonkers and Zacharewicz, 2016[18]). Inspired by the Norwegian funding model for research, the Flemish Government modified the bibliometric part of the funding model in 2008 to give prominence to all areas of research and make field-specific publications comparable across fields. Publications in the VVAB were included in the funding model in 2010, and their relative weight has increased since 2012.

Norway introduced incentives for publications in the higher education funding model in 2004. The funding model for research was designed in a way that offers a complete representation of verifiable bibliographical records in all areas of research and makes field-specific output comparable across research fields (Sivertsen, 2016[64]). Comprehensive bibliometric information is verified or provided by research organisations, through an integrated national research information system (CRISTIN), covering all public research organisations in Norway, including universities, university colleges, university hospitals and independent research institutes. Higher weight is given to publications in the most selective international journals and book publishers. Evidence suggests that this has not led to higher citation impact at the country level, but it did increase the absolute number of publications in high-level publication channels (Sivertsen, 2016[64]).

The Netherlands uses a Standard Evaluation Protocol (SEP) to monitor the quality of research. The SEP is periodically evaluated by the association of universities, the Research Council and the Royal Academy of Arts and Sciences. The SEP planned for 2015-2021 has moved from a high emphasis on research output to research quality. All research universities and research institutes are subject to assessment according to the guidelines outlined in the SEP. In 2014, the Netherlands released a White Paper announcing its vision for science and research for 2025. It envisages conducting world-class research, maximising research impact through stronger links to industry and society, and developing talent (OECD, 2016[49]).

Figure 6.25. The citation impact of scientific production and the extent of international collaboration (2012-2016)

As an index and percentage of all citable documents, based on fractional counts



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
The size of the bubble indicates the relative volume of publications (using fractional counts). The normalised citation impact measure is derived as the ratio between the average number of citations received by documents published by authors affiliated with an institution in a given economy and the world average of citations, over the same time period, by document type and subject area.
OECD calculations based on Scopus Custom Data, Elsevier, Version 4.2017, July 2017.
Source: Adapted from OECD (2017[13]), *OECD Science, Technology and Industry Scoreboard 2017: The digital transformation*, http://dx.doi.org/10.1787/9789264268821-en.

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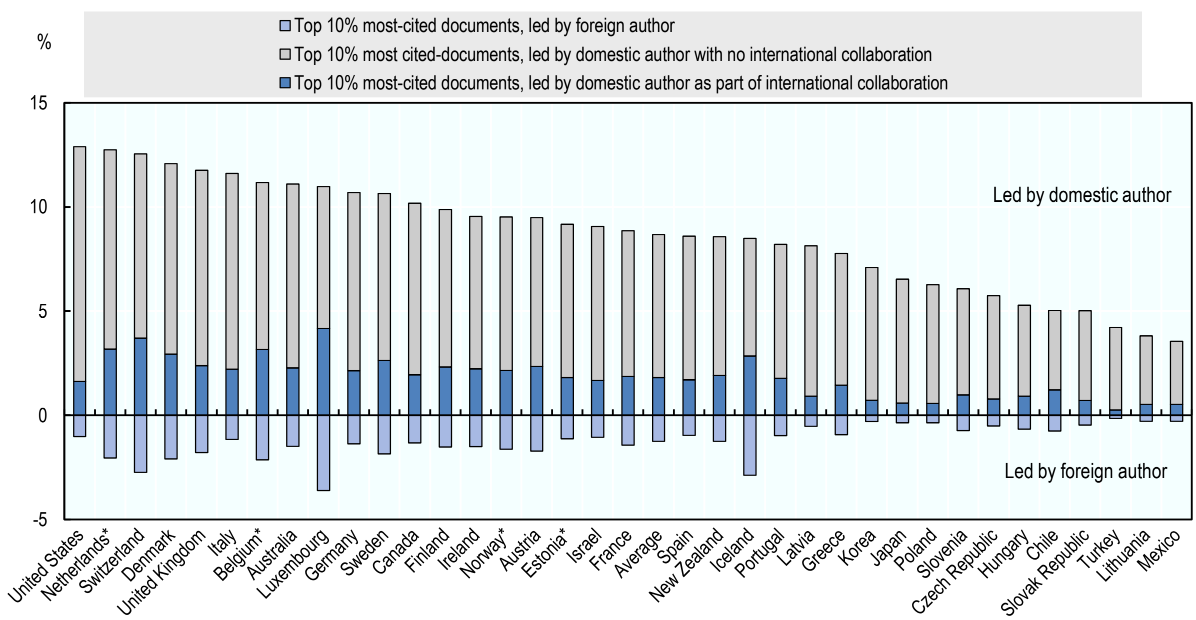
When comparing the data in Figure 6.22 and Figure 6.23 on international mobility and collaboration of researchers and Figure 6.24, a link between internationalisation and research performance could be inferred. The countries that perform the best in terms of the scientific quality of their research, as measured by field-normalised citation impact, tend to be those with higher levels of international collaboration.

Figure 6.25 also reinforces this point. Denmark, the Netherlands and Switzerland are among the top performers in OECD countries in terms of citation impact, with a normalised impact at least 30% higher than the OECD median for all indexed publications between 2012 and 2016. These countries were also among the OECD countries with relatively high levels of international collaboration between 2012 and 2016 (between 34% and 41% of all publications involved international collaboration). Belgium and Norway are also in the top right quadrant of Figure 6.25, indicating above average performance in both citation impact and international collaboration, while Estonia is near the median values for both measures.

Figure 6.26. Top 10% most-cited documents and patterns of international collaboration (2015)

Domestic and foreign-led top cited, as a percentage of all documents, fractional counts



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018. OECD calculations based on Scopus Custom Data, Elsevier, Version 4.2017; and 2015 SCImago Journal Rank from the Scopus journal title list (accessed June 2017), July 2017.
Source: Adapted from OECD (2017[13]), *OECD Science, Technology and Industry Scoreboard 2017: The digital transformation*, http://dx.doi.org/10.1787/9789264268821-en.

StatLink https://doi.org/10.1787/888933941709

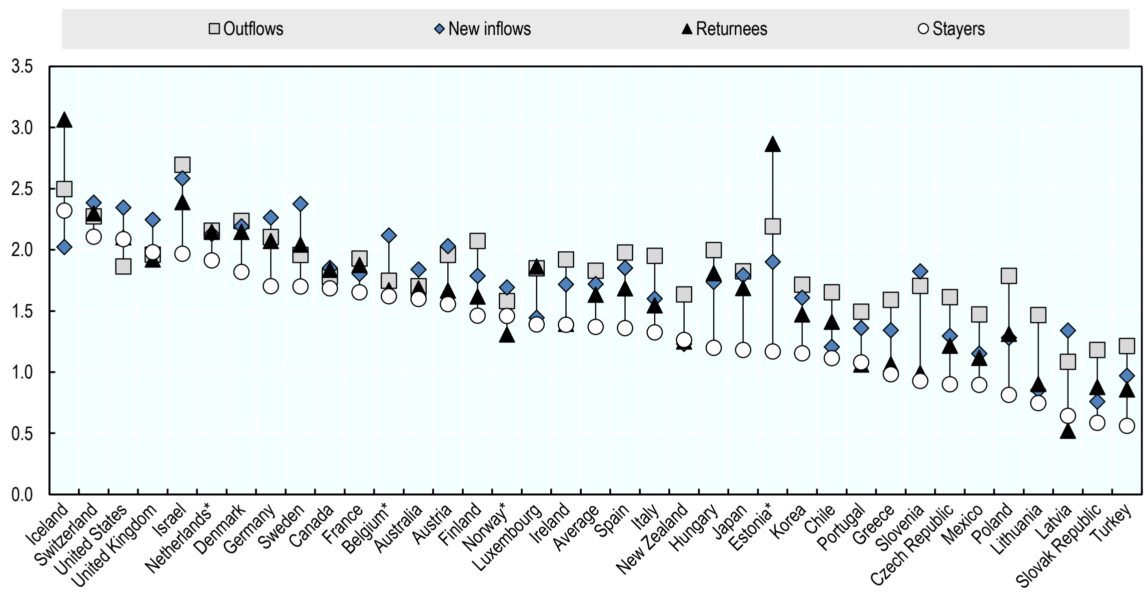
The strength of the research performance of the Netherlands is further confirmed by the fact that it is only second to the United States in the percentage of top 10% most-cited documents led by a domestic author in 2015, either with or without international collaboration (Figure 6.26). Belgium had a similar percentage of top 10% most-cited documents led by a domestic author with international collaboration to the Netherlands (just over 3% in both countries), but had a smaller share of top cited publications with no international collaboration (8% compared to almost 10% in the Netherlands). Norway and Estonia had similar shares of most-cited documents led by a domestic author with and without international collaboration, both just above the OECD average levels.

Bilateral flows of researchers can help to further increase the impact of research. As discussed in Section 6.6, evidence suggests that authors who undertake research abroad and return to the economy ("returnees" in Figure 6.27) in which they first published contribute to raising the overall impact of domestic research. Authors who move abroad ("outflows") tend to be associated with higher rated publications than their counterparts who remain in the country or return later. Authors who do not move abroad ("stayers") are generally more likely to publish in lower ranked journals (OECD, 2017[13]).

The United States in somewhat exceptional in this regard; researchers who moved into the country ("new inflows") had higher journal scores in 2016 than those who have stayed in the country throughout their career. However, United States-based authors who left the country and moved abroad had lower journal scores, as measured by the SCImago journal rank (Figure 6.27).

Figure 6.27. Expected citation impact of scientific authors, by mobility profile (2016)

Average 2015 SCImago Journal Rank (SJR) scores



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
OECD calculations based on Scopus Custom Data, Elsevier, Version 4.2017; and 2015 SCImago Journal Rank from the Scopus journal title list (accessed June 2017), July 2017.
Source: Adapted from OECD (2017[13]), *OECD Science, Technology and Industry Scoreboard 2017: The digital transformation*, http://dx.doi.org/10.1787/9789264268821-en.

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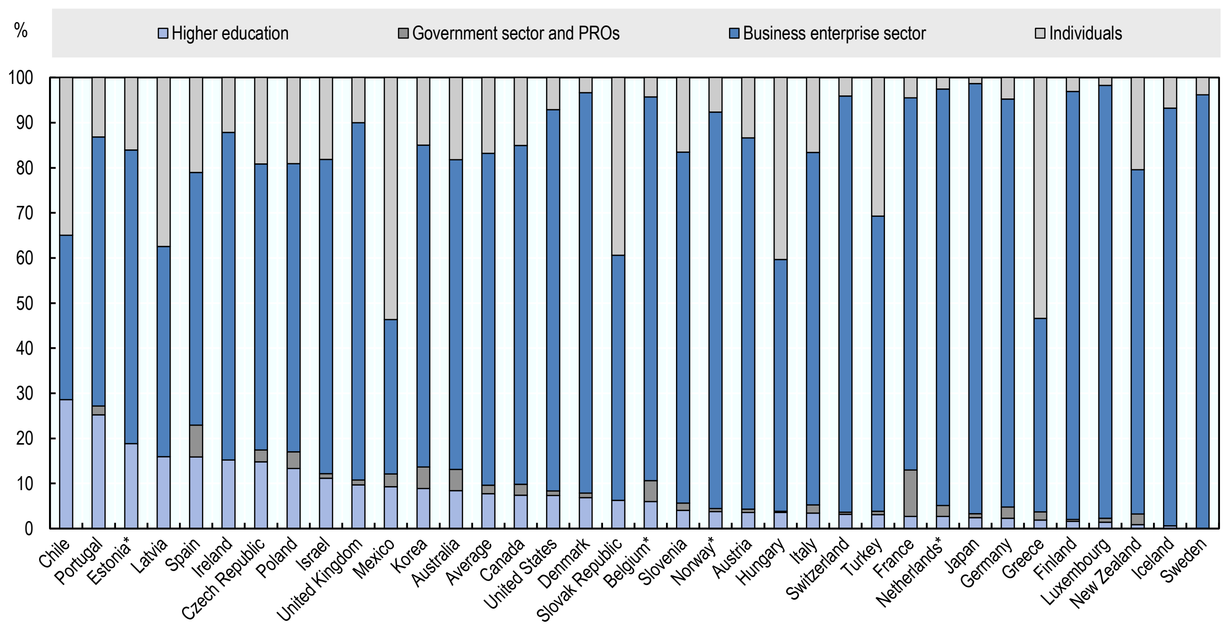
In the Netherlands, there was almost no difference between returnee, outflow or new inflow authors in 2016 in terms of the ranking of the journals where they publish (as measured by the SCImago journal rank score), although stayers had a lower journal score. On the other hand, in Norway returnees tended to publish in lower-ranked journals than the other groups of authors. In Belgium new inflows were the group who were able to publish most frequently in higher-ranked journals in 2016. Estonia had the widest range of scores between groups, and the largest difference between the expected citation impact of returnees and stayers (although these effects may also be due to the statistical variability produced by the smaller size of the research community in the country).

6.7.3. Turning research into innovation

Innovations can come about in a number of different ways, including as a result of research and development activities. The results of research projects can lead to knowledge that generates new ideas or inventions, which when implemented or diffused across society can be converted into impactful innovations (OECD/Eurostat, 2018[65]). In experimental development, the primary intention is to develop innovative processes or products, though other research and development activities can also strengthen individual or organisational capacities for innovation, even where innovation is not the primary objective of the research (OECD/Eurostat, 2018[65]).

Figure 6.28. PCT published applications by sector (2010-2016)

Percentage by sector and individuals



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Data include all Patent Co-operation Treaty applications which were published between 2010 and 2016. WIPO uses published applications for confidentiality reasons. Government and PROs are not calculated separately, they are aggregated into the same group.
Source: World Intellectual Property Organization (2010-2016[66]), *PCT Yearly Review: The International Patent System*, http://www.wipo.int/pct/en/activity/index.html.

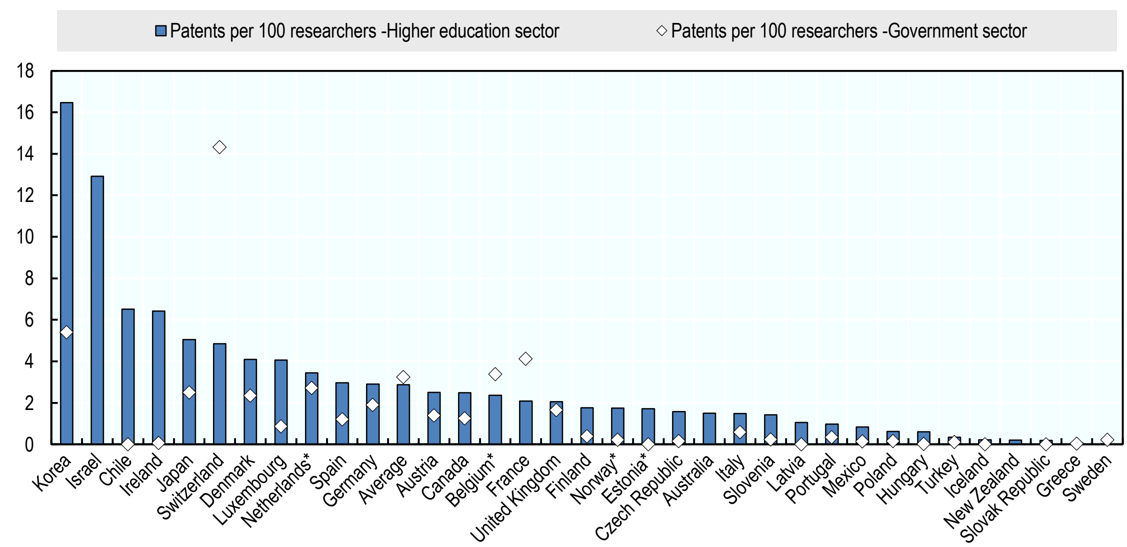
StatLink https://doi.org/10.1787/888933941747

When an organisation or research team develops an innovative idea, it is possible to legally protect their resulting intellectual property rights in various ways, including through patents and trademarks. Therefore, data on patent applications are often used as a proxy means of analysing innovative output. Data in Figure 6.28 cover all Patent Co-operation Treaty (PCT) patent applications which were published between 2010 and 2016 by sector and individuals. The vast majority of published applications originate in the business enterprise sector, followed by individuals; higher education, government and public research organisations generate smaller proportions of patents.

Patents can give an indication of how well expenditure on higher education research and development can be turned into innovative output. On average for OECD countries, fewer than 8% of patents are filed by the higher education sector, but the figures vary. For example, higher education accounts for more than one-quarter of published applications in Chile and Portugal, where the share of researchers in higher education in these countries is relatively high. On the other hand, the proportion of patents filed by the higher education sector is close to zero in Iceland and Sweden.

Figure 6.29. PCT published applications by higher education and government researchers (2010-2016)

Number per 100 researchers



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Data include all Patent Co-operation Treaty applications which were published between 2010 and 2016. WIPO uses published applications for confidentiality reasons. Government and PROs are not calculated separately, they are aggregated into the same group.
Source: World Intellectual Property Organization (2010-2016[66]), *PCT Yearly Review: The International Patent System*, http://www.wipo.int/pct/en/activity/index.html.

StatLink https://doi.org/10.1787/888933941766

In addition to the variability across countries, there are significant differences between the government and higher education sectors. In general, the average number of published patent applications by government researchers in OECD countries is larger than the number of published patent applications by higher education researchers. A notable example is Switzerland, with over 14 published applications per 100 government researchers between 2010 and 2016, compared to 5 per 100 higher education researchers (Figure 6.29). This may be explained by the fact that almost all R&D undertaken by the government sector in Switzerland is dedicated to applied research (OECD, 2017[13]).

Korea and Israel have the highest numbers of patents per 100 researchers from the higher education sector. The high productivity of researchers in Korea may be related to the fact that the majority of expenditure on R&D in higher education goes into applied research and experimental development. However, other factors may also be related to productivity, as for example while Israel also has a relatively high number of patents per 100 researchers, only about one-third of R&D funding in higher education is spent on applied research and experimental development (Figure 6.6).

In the Netherlands, there were 3.5 published applications for patents per 100 higher education researchers between 2010 and 2016, above the OECD average. In Belgium, there were 2.4 published applications per 100 researchers, slightly below the average; while Norway and Estonia were further below the average at close to 1.7 patents per 100 researchers each. The number of published patent applications for the government sector is also relatively high in Belgium and the Netherlands (around 3 per 100 researchers). On the other hand, the government sector in Estonia and Norway publishes relatively few patents, which could be related to the missions of public research institutes in these jurisdictions. For example, in Estonia, government research institutes that have remained outside the higher education sector tend to have other functions in addition to conducting research.

Despite the fact that Figure 6.29 indicates that the rate of patent applications from the higher education sector is relatively low overall, higher education research and development outputs may indirectly have a larger impact than it appears. For example, due to the legal situation in some countries, patents may be assigned to actors outside the higher education sector. Thus, the quantity of patent applications with higher education institutions as the origin but not the applicant remains largely unknown. In other cases, the higher education sector might create the knowledge which spurs patent applications. This influence is difficult to capture with existing metrics, although efforts have been made to identify relevant indicators, such as the number of patent applications filed by other sectors that cite academic papers. (The EUMIDA Consortium, 2010[67]).

Research and development in higher education also impacts more broadly on innovative processes through a number of other pathways as well as through patents. Through increased engagement-related activity, higher education institutions and systems are aiming to further enhance the social impact of research carried out in the higher education system. Chapter 7 explores some of the ways that higher education systems have been seeking to improve collaboration and create a more favourable environment for innovative processes.

6.7.4. Fostering research excellence in higher education

As discussed in previous sections, the quality of research can be assessed by considering the impact of research output on the work of other researchers, or by examining how well research can be turned into innovative products, services and technologies. While the discussion in the previous sections focuses on systemic performance, in reality, the highest impact research is concentrated not only within certain countries, but in a subset of institutions within those countries. In terms of vertical differentiation, high impact research is often most associated with the more elite research universities, and high research performance is essential for universities to achieve the “world-class” status of being ranked among the top universities globally.

The initial publication of the Academic Ranking of World Universities (ARWU) in 2003 by Shanghai Jiao Tong, followed closely by the Times QS World University Ranking in 2004 led to an almost immediate general acceptance of these metrics throughout the global higher education sector and sparked waves of policy initiatives at institutional, national and supranational level aimed at increasing standing in the rankings (Hazelkorn, 2009[68]).

Concern has been expressed about the narrow range of metrics used in the international institutional ranking, and the methodology used to compute them. For example, reputation surveys are a key input (see Chapter 2), which can be subject to manipulation and various biases (Bowman and Bastedo, 2011[69]). Rankings of individual institutions are sensitive to changes in indicators or weightings used, which limits their utility for students and policymakers and may result in sub-optimal choices if used as a basis for making decisions (Saisana and Saltelli, 2010[70]).

Despite concerns about the reliability of the rankings, the high weight attached to research impacts in these rankings, either through bibliometric indicators, the numbers of staff that have been awarded international prizes (Nobel Prize and Fields medal) for breakthrough research, or even indirectly through research reputation, helps to explain the increasing investment in higher education research in recent years by institutions, and a growing policy focus on research excellence.

In this competitive environment, research excellence initiatives have become commonplace across OECD countries and other countries that are heavily investing in producing research output and quality, such as China and the Russian Federation. A 2013 OECD survey of government ministries, to which 20 countries responded, identified 28 funding initiatives from 18 of the countries that met the criteria to be considered a Research Excellence Initiative (OECD, 2014[71]) .

Research excellence initiatives have been defined by the OECD as instruments that are designed to encourage outstanding research by providing large-scale, long-term funding to designated research units (often termed centres of excellence or CoEs). Many benefits of research excellence initiatives have been identified, including the enhanced ability of CoEs to attract and concentrate highly talented researchers in well-equipped environments, and providing security for carrying out broad and complex research agendas, especially for projects involving transdisciplinary research (OECD, 2014[71]) .

In the participating jurisdictions, many research excellence initiatives have been implemented:

- The development of excellent academic communities is one of three core pillars in the **Norwegian** Long-term Plan for Research and Higher Education. The Research Council of Norway’s Centres for Excellence and Centres for Research-based Innovation are key mechanisms through which Norway supports higher education research excellence. Through these programmes, large tranches of funding are awarded to research clusters on a competitive basis, based on selection criteria which focuses on scientific quality and high international standards (OECD, 2017[72]).
- **The Flemish Community’s** “VIS-scheme” (Flemish Cooperative Innovation Networks) has been responsible since 2001 for the creation of centres of excellence in the Flemish Community. Since 2009, many of these centres have been streamlined, consolidated or scaled up to become strategic research centres. More recently, the VIS-scheme has supported the development of Innovation Platforms, which provide a platform for the co-operation of various actors engaged in research in a particular industry. Many of the innovation initiatives are in the process of being updated following a new policy which focuses on strategic clustering of research actors (Flemish Department of Economy, Science and Innovation, 2017[6]).
- **The Netherlands** promotes excellent research through the Gravitation Programme, which supports the formation of consortia of universities that have the potential to conduct ground-breaking scientific research of international importance, preferably leading to some breakthrough of global significance. The

selection procedure is conducted by Netherlands Organisation for Scientific Research (NWO) (Dutch Ministry of Education, Culture and Science, 2014[8]).

- In **Estonia**, the programme of the Centres of Excellence in Research (CoE) was introduced in 2001. A Centre of Excellence in Estonia consists of one or more internationally high-level research teams that have a clear set of common research objectives and work under the same management, with the aim of strengthening the international competitiveness and the quality of research, improving performance, ensuring future generations of researchers, intensifying national and international research co-operation between institutions and increasing the international impact of Estonian research (Estonian Ministry of Education and Research, 2017[73]).

6.8. Concluding remarks

This chapter provided a discussion of the available metric data related to the inputs, processes, outputs and outcomes of higher education research and development, as well as a more in-depth analysis of relevant policies and practices in the four participating jurisdictions. In this section, key messages of this chapter are outlined, along with an overview of areas where additional data would provide benefits for assessing the performance of the research function in higher education.

- The key justification for investment in research and development is that it underpins the creation of new knowledge that is needed to develop future innovations. With that in mind, OECD governments are aiming to increase the level of investment in research as a proportion of GDP, as well as broaden the range of sources for R&D investment. As discussed in Chapters 3 and 4, a clearer delineation between the resources (human and financial) invested in education and research would allow for a more robust analysis of the efficiency and cost-effectiveness of the research and development activities of higher education systems.
- Ensuring access to a rewarding career in research is a core requirement for building and sustaining a high-performing research and development system. More comprehensive and reliable data on the different types of researchers within the higher education system and in the private sector, their socio-demographic characteristics and the different stages of their careers would provide a greater understanding of how government policy could support the needs of R&D systems for high-quality human resources, through, for example, identifying mismatches between field of studies and sector of employment, understanding employment conditions in research oriented occupations within and outside academia, and monitoring transition paths in and out of academia.
- Bibliometric data is currently the only means by which to conduct comparative metric analysis across countries of the quality and impact of research. It is also the best available data source for inferring information about the flow of researchers between jurisdictions, and the effect that this has on research quality. However, there are a number of conceptual and methodological challenges associated with using bibliometric data. While there is no obvious alternative at present, it is likely, given the growth in research activity in recent years across the OECD, that there will be increasing interest in developing a broader and more reliable range of indicators to measure research impact.

- In addition to the metric data presented in this chapter, a number of national policies and practices in the participating jurisdictions are motivated by improving various aspects of the research function in higher education. A summary of some of the initiatives presented in this chapter is given in Table 6.4.

Table 6.4. Selected higher education policies from the participating jurisdictions (2017)

	Motivation	Policies
Estonia	Increasing the internationalisation of research	• The Dora Plus and Mobilitas Plus programmes have been established to attract students and researchers from abroad, improve Estonia's reputation as a destination for research and expand transnational collaboration opportunities. Among other supports, the Dora programmes provide scholarships for international students for study visits to Estonia and supports to higher education institutions in Estonia to organise short-term courses for international study groups. Initiatives under Mobilitas Plus include post-doctoral research grants for researchers coming from abroad, and retuning researcher grants for researchers returning to Estonia after completing some research abroad. • Estonia also participates actively in many international research projects and initiatives, including the European Molecular Biology Conference (EMBC), European Space Agency (ESA), European Spallation Source (ESS) and the European Organization for Nuclear Research (CERN). • Estonia has relatively high Horizon 2020 funding as a percentage of GDP among the jurisdictions.
The Flemish Community	Improving and streamlining investment in R&D	• The Flemish Community has brought investment in R&D to a level of 2.5% of GDP, with the target of reaching 3% by 2020. • Funding mechanisms include 'Special Research Funds' (BOF), which are awarded based on the number of master's and doctoral degrees awarded, gender diversity, and research productivity and impact. Institutions can also benefit from 'Industrial Research Funds' (IOF) if they engage in technology transfer activities, such as licensing, patenting and spin-offs. • The Flemish Community is among the jurisdictions most successful at attracting funding from Horizon 2020.
The Netherlands	Creating world-class, high-impact research	• The Gravitation Programme supports the formation of consortia of universities that have the potential to conduct ground-breaking scientific research of international importance, preferably leading to some breakthrough of global significance. • Standard evaluation protocols (SEP) are used to monitor the quality of research.
Norway	Developing flexible ways to access a career in research	• State institutions and private institutions carry out doctoral research. • Researchers are treated as employees and receive social benefits. • Public sector organisations and businesses that allow their employees to complete a doctorate in their area of work are entitled to financial support from the Research Council of Norway. • Norway participates in international joint doctoral supervision projects (*cotutelle*).

Source: Adapted from information provided by the participating jurisdictions. See the reader's guide for further information.

Notes

[1] In some countries, there is no material difference between the policies or funding systems in the higher education and government sectors. For example, in Estonia, the same rules of funding apply for government, higher education and private non-profit sectors, independent of their legal status.

[2] It should be noted that these data cover all sectors of R&D and are not specifically tailored to higher education. However, as researchers in higher education have the most incentive to publish their work in indexed publications, it could be expected that the measures are at least of this magnitude in higher education.

[3] As indicated by the SCImago Journal Rank, a measure of scientific influence of scholarly journals that accounts for both the number of citations received by a journal and the importance or prestige of the journals where the citations are made (OECD, 2017[13]).

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Chapter 7. Engagement with the wider world

This chapter focuses on one of the three main functions of higher education – engagement with society. Engagement in higher education encompasses various roles and functions and involves a wide range of stakeholders, including business and industry, the public sector, the social economy and civil society. This chapter discusses how higher education engagement activities can work to build human capital, contribute to innovation and support wider social, economic, cultural and environmental development.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

7.1. Introduction

Engagement with the wider world is recognised as one of the three main functions of higher education, but it typically takes a backseat to education and research. The term "engagement" denotes the interaction between higher education and wider society, reflecting the responsibility of higher education to provide social benefits beyond the academic realm (Benneworth, 2017[1]; E3M, 2012[2]; Goddard et al., 2016[3]). It is often referred to as the "third mission" of higher education, though in reality all three functions tend to be broadly intertwined and mutually sustaining.

Engagement is "by definition a two-way process, involving interaction and listening, with the goal of generating mutual benefit" (National Co-ordinating Center for Public Engagement, 2017[4]). This implies a reciprocal relationship between higher education and society. Active engagement between higher education institutions and communities, industry and others ensures higher education is more responsive to the needs of society, and enhances the relevance of both education and research activities.

The transfer and exchange of knowledge and resources lie at the core of all engagement activity. However, higher education institutions take different approaches to engagement depending on their missions, locations and other factors. As a result, there is no 'one-size-fits-all' approach to engagement in higher education. It includes interactions with social partners to improve the relevance of higher education and to drive innovation. It also involves participation in a wide range of activities at local, regional and national levels to contribute to the social, economic, cultural and environmental development of communities and regions (OECD, 2007[5]).

Table 7.1 illustrates the diversity of engagement activities across higher education systems with a list of some of the key concepts and definitions that are used to characterise engagement. Different concepts have originated in different contexts and have often become more comprehensive with time; for instance, the concept of the "triple helix" has developed into the "quadruple helix", reflecting an increased importance of the role of civil society in higher education.

Participating jurisdictions in the 2017-18 round of the benchmarking project requested a deeper analysis of the engagement function of higher education, focusing on continuing education and broader civic and social engagement. This chapter will therefore explore the ways that engagement builds human capital for greater social impact; contributes to innovation; and supports wider social, economic, cultural and environmental development.

Comparable metric data on different forms of engagement are not yet widely available. Much of the internationally comparable data are based on engagement between higher education and business. The chapter presents an overview of the available indicators of engagement, including measures of collaboration between higher education and enterprises, and business contribution to higher education expenditure on research and development (R&D). To support peer learning, it also outlines some policies and practices for developing effective engagement activities that have been recently initiated across the OECD.

Table 7.1. Engagement in education: Key concepts and definitions

Title	Definition
	Types of engagement
Public engagement	Public engagement entails the many approaches adopted by higher education institutions, their staff and students while connecting with the public. Such connections are a two-way process and lead to the sharing of knowledge, expertise and skills. Public engagement is mutually beneficial, building trust, understanding and further collaboration, and increasing the relevance and impact of higher education on civil society (National Co-ordinating Center for Public Engagement, 2017[4]).
Community engagement	Community engagement encompasses interactions and collaborations between higher education institutions and their communities at different levels (local, regional, national, global) to promote inclusivity, mutuality, partnership and reciprocity in their exchange of resources and knowledge (Driscoll, 2008[6]).
Third mission	The term third mission refers to higher education institutions' expanded efforts to engage with industry and society in recent decades. The activities which form the third mission (often comprised of technology transfer and innovation, continuing education and social engagement) are often defined as supplementary to teaching and research, and therefore become known as such in higher education (E3M, 2010[7]).
Responsible research and innovation	Responsible research and innovation (RRI) is an approach where researchers, citizens, policy makers, business, third sector organisations, etc. work together throughout the research and innovation process to better align the process and its outcomes with the values, needs and expectations of society, with the aim of fostering inclusive and sustainable research and innovation (European Commission, 2017[8]).
Valorisation	Valorisation is a term used to address efforts related to maximising access to and impact of academic research, expanding its value beyond academia. It often entails concepts such as increased accessibility (i.e. open access), and the development of research and science with non-traditional groups (Benneworth and Jongbloed, 2010[9]).
	Models of collaboration for innovation
Triple helix	The triple helix is a model that describes the interaction between government, industry and higher education institutions in a knowledge-based economy to foster innovation. This model highlights the interdependence and importance of policy interaction in innovation systems (Etzkowitz and Leydesdorff, 1995[10]).
Quadruple helix	Building on the triple helix, this model adds civil society as the fourth helix to encourage a more citizen- or user-centred approach to innovation, including co-creation of knowledge and entrepreneurial discovery processes (Cavallini et al., 2016[11]).
Knowledge triangle	The knowledge triangle is a conceptual tool for understanding knowledge building as a multifactorial and systemic process, depending on the interaction between education, research and innovation. The knowledge triangle framework highlights the need for an integrated approach to research, innovation and education policy. The term originated as part of the European Union's Lisbon Strategy (Cervantes, 2017[12]; Soriano and Mulatero, 2010[13]).
Technology transfer	Technology transfer involves the transfer of ideas, practices, knowledge, intellectual property, discoveries and inventions that results from research conducted in higher education institutions (in co-operation with external partners or not) into a non-academic environment where they can lead to social and commercial benefits at local, regional, national or global levels (E3M, 2012[2]).
Smart specialisation	Smart specialisation is a policy approach to knowledge-based investment that aligns industrial, education and innovation policies with a focus on those areas of comparative advantage in a city, region or country. The approach is based on entrepreneurship; multi-governance mechanisms of interaction; mapping and benchmarking of cluster and key players; evidence-based monitoring; and evaluation systems (OECD, 2013[14]). In EU countries, it has been implemented as a strategic place-based approach to economic development through targeted support for research and innovation (European Commission, 2017[15]).
	Concepts related to higher education institutions
Entrepreneurial university	The entrepreneurial university describes higher education institutions that are organised and managed like enterprises. The entrepreneurial model is both a process and an outcome; it is associated with the commercialisation of knowledge and research outputs, the development of entrepreneurship and entrepreneurial skills, and a more enterprising approach to institutional management in higher education (Clark, 1998[16]; Etzkowitz, 1983[17]; Foss and Gibson, 2015[18]).
Civic university	A civic university has a clear sense of purpose and place; it takes a holistic approach to engagement by developing institution-wide collaborations with impact that goes beyond academia; it uses innovative methodologies to be actively engaged with the world and the community where it is based; and it is transparent and accountable to both stakeholders and the public (Goddard et al., 2016[3]).
HEInnovate	A framework, developed by the European Commission and the OECD, for higher education institutions to self-assess how they manage resources, build organisational capacity, collaborate with external stakeholders, create and nurture synergies between their core functions, embed digital technology, promote entrepreneurship and support knowledge exchange with the wider world (HEInnovate, 2017[19]).

7.2. Engagement to build human capital

Effective development and use of human capital is essential for economic and social progress (OECD, 2012[20]). Higher education, through its education, research and engagement functions, facilitates the development of critical skills needed for employment, innovation, active citizenship and social cohesion. As well as basic cognitive skills, students in higher education can also develop a range of technical, professional and discipline-specific skills through their study programmes, which support their successful integration into the labour market.

However, a much broader set of skills is required to ensure that individuals and societies are resilient to challenges created by economic and social upheaval, and to support the innovations necessary for continued social progress. Higher education study can help to strengthen transversal skills, such as cognitive and information processing skills, and can also provide the opportunity to develop further skills (such as innovation, leadership and risk management), which have a strong potential to enhance the benefits of education and research to the wider society.

This section describes two distinct ways in which higher education institutions and systems can work to build human capital through engagement activities. First, higher education systems can develop and implement policies to support entrepreneurship– through direct educational programmes and by creating an entrepreneurial mind-set and enterprising environment for students and academics. Second, higher education systems also provide opportunities to develop skills and competencies in a more informal way through continuing education.

7.2.1. Building capacity for entrepreneurship

Entrepreneurship, including social entrepreneurship, is one key channel through which the benefits of higher education can be transformed into products and services that provide societal value. Higher education institutions are in a great position to mobilise students to enhance their entrepreneurial skills, to provide support for their business start-ups and to develop their career as entrepreneurs in all fields of study. For example, it is accepted that higher education has a role to play in social entrepreneurship by identifying, training and supporting individuals who have the potential to create profound social change (Nicholls, 2006[21]). Student entrepreneurship can also support business creation, as well as urban and regional economic development (OECD, 2010[22]).

Embedding education for entrepreneurship across higher education

As noted in the OECD Skills Strategy, entrepreneurs are made, not born (OECD, 2012[20]). Capabilities and competences to support entrepreneurship are increasingly being targeted for development through the higher education system. Higher education institutions can help their students to develop the knowledge, skills and attitudes necessary to become entrepreneurs. This includes generic workplace skills such as communication, teamwork, planning and organisational skills.

Additionally, to become successful entrepreneurs, students need to know how to identify opportunities, turn them into successful ventures, and recognise and respond to difficulties and obstacles they may encounter. They therefore also need to develop a range of business, technical, social and personal skills, the ability to manage risk, think strategically, exploit personal networks, and motivate others. There is no single set of entrepreneurship skills and capacities, but examples of important skills could include those listed in Table 7.2.

Table 7.2. Skills and abilities which support entrepreneurship

Business and technical skills	Social and personal skills
Planning and goal setting	Self-discipline
Decision-making	Written and oral communication
Human resource management	Innovation
Marketing	Persistence
Financial management	Leadership
Technology implementation/use	Change management
Environment monitoring	Network building
Quality control	Strategic thinking
Risk management	Negotiation
Problem solving	Interpersonal
Growth management	Ability to organise
Compliance with regulations	Creative thinking

Source: OECD (2014[23]), "Building entrepreneurship skills", in *Job Creation and Local Economic Development*, http://dx.doi.org/10.1787/9789264215009-10-en.

Programmes that help develop supportive skills for entrepreneurship usually include the following:

- Learning to understand entrepreneurship: education *about* enterprise involves creating awareness and increasing a theoretical understanding of entrepreneurship.
- Learning to become entrepreneurial: education *in* enterprises deals mainly with management training for established entrepreneurs and employees.
- Learning to become an entrepreneur: education *for* enterprise involves education that aims to cultivate the skills necessary for setting up and running a business (OECD, 2014[23]).

Governments can play a critical role in developing entrepreneurship in higher education in all fields of study, not just in business or related fields, by driving the development and diffusion of entrepreneurship education across a wide range of educational programmes and institutions. Alongside international initiatives such as HEInnovate (HEInnovate, 2017[19]), various national policies to support entrepreneurship have been put in place across the OECD in the context of the growth of the entrepreneurial university model (Clark, 1998[16]), including in the participating jurisdictions.

In **Estonia**, entrepreneurship is recognised as a key competence for lifelong learning. One of the key goals of *Estonian Lifelong Learning Strategy 2020* is to implement a new approach to learning that supports personal development and the acquisition of creativity and entrepreneurial skills at all levels and in all types of education (Estonian Ministry of Education and Research, 2014[24]). The Entrepreneurship Education Programme which was launched in 2015 aims to embed the development of entrepreneurial skills in general, vocational and higher education. The programme supports the development of an entrepreneurship competencies framework and pedagogical materials, as well as the delivery of training for teachers at all education levels, business mentors and entrepreneurs who participate actively in entrepreneurship education. The methodological framework is based on the entrepreneurship competence model as a progression model for all education levels, an extension of the EntreComp model (an entrepreneurship competence framework created by the European Commission), adjusted to the Estonian education system.

The Entrepreneurship Education Programme also entails the design and development of entrepreneurship courses that are piloted and delivered at all education levels. A network of higher education institutions, together with the Estonian Chamber of Commerce, the Estonian Employers' Confederation, the Estonian Service Industry Association, Foundation Innove, Junior Achievement Estonia, county development centres represented by the Ida-Viru Enterprise Centre, business incubators, and the Ministry of Economic Affairs and Communications, have been established to disseminate the programme activities.

In **the Netherlands** the government has supported entrepreneurship education at all levels of education since 2000, including through the TechnoPartner Programme, which started in 2004 and focused on improving the environment in which technology-based start-ups operate, particularly in higher education institutions. Funded projects are based on public-private partnerships comprised of professional higher education institutions, incubators, innovation intermediaries, and other actors, including banks and companies (OECD, 2010[22]). Subsequent initiatives include the Education and Enterprise Action Programme (*Actieprogrammema Onderwijs en Ondernemen*) from 2007 to 2011. These initiatives have helped drive the integration of entrepreneurship programmes in most Dutch higher education institutions. Institutions have also established collaborative networks such as the six regional Centres for Entrepreneurship (DutchCE), which cover eight universities and eight professional HEIs. The centres support entrepreneurship programmes for students, staff and local entrepreneurs. A 2012 evaluation and a study the same year show that the centres have helped increase student interest in entrepreneurship, build greater collaboration between institutions and firms, and encourage employers to play a greater role in the design and delivery of entrepreneurship education (Wymenga et al., 2012[25]).

In a number of higher education institutions in the Netherlands, entrepreneurship has also become a part of the human resources policy for academic staff. Lecturers, researchers and doctoral candidates can all participate in entrepreneurship training courses to enhance their knowledge of entrepreneurship and entrepreneurial skills. In addition, the government has launched a programme to support academic entrepreneurship called "Take-off," which provides grants and loans that academics can use to translate their research into a product or a service (Netherlands Organisation for Scientific Research, 2014[26]).

In **Norway**, all higher education institutions provide entrepreneurship education, either as designated study programmes or as courses or topics integrated into other programmes (Cervantes, 2017[12]). This has been a long-standing practice in Norwegian higher education. The 2014 Action Plan, *Entrepreneurship in Education and Training – from compulsory school to higher education 2009–2014*, noted that 21 state university colleges and universities in Norway reported that they offered programmes of study in entrepreneurship in 2008. These included individual courses within degree programmes in economics, education, tourism, technology and other fields. Some institutions have also created designated units to strengthen their entrepreneurship and innovation capacity, such as the Centres for Entrepreneurship at the University of Oslo, the University of

Stavanger, the University of Agder and the Norwegian University of Science and Technology (Norwegian Ministry of Education and Research, Norwegian Ministry of Local Government and Regional Development and Norwegian Ministry of Trade and Industry, 2014[27]).

Norway has also established the Centres for Excellence in Education Initiative (SFU) to improve the quality of higher education and foster more innovative learning and teaching. There are currently eight Centres for Excellence in Education based in higher education institutions across Norway, including “Engage – Centre for Engaged Education through Entrepreneurship” (Norwegian Institute of Science and Technology and Nord University) (NOKUT, 2016[28]). ENgage is a consortium consisting of the NTNU School of Entrepreneurship, Nord University Business School, NTNU Experts in Teamwork, TrollLABS and Spark NTNU. It applies a learning model that includes action-based learning, student-to-student learning, collaborative skills, rapid prototyping and student engagement. The programme provides train-the-trainer courses and activities for students in all disciplines aiming to develop entrepreneurial skills.

The 2014 Action Plan urged higher education institutions to expand and diversify their entrepreneurship education provision. As a result, a nationally funded peer-mentoring project to support the development of entrepreneurship was piloted across five Norwegian higher education institutions from 2014 to 2016. The impact of the pilot on participating programmes was positive, with students reporting increased satisfaction in course evaluations, master’s graduates successfully finding employment within three months of graduation, close to 100% completion rates, and very low dropout rates. In addition, one out of three graduates established their own company. At the conclusion of the pilot, the coordinating institution, Norwegian University of Life Sciences (NBMU), was considering how the peer mentoring concept could be intensified institution-wide through its Learning Centre and integrated into other programmes. The peer learning model was also picked up by other institutions across Norway and embedded into programmes (Torp, 2014[29]).

The Research Council of Norway also finances the Student Entrepreneurship (STUD-ENT) programme through its FORNY2020 programme. The programme encourages entrepreneurship among students, promotes a stronger entrepreneurship culture in higher education institutions, and increases the number of knowledge-intensive jobs in Norway (Research Council of Norway, 2019[30]).

The Flemish Community designed an Action Plan on Entrepreneurial Education for 2015-2019, which aims to help develop entrepreneurial attitudes among students and equip them with the necessary skills and knowledge to become successful entrepreneurs. A successful practice resulting from this policy was the introduction of certificate-based business management classes in a number of higher education institutions to help students to start businesses while studying.

The Agency for Innovation and Entrepreneurship provides the *Baekeland* scholarships for doctoral students in the Flemish Community who collaborate on scientific research projects with companies (who provide part of the funding). One goal of this initiative is to encourage entrepreneurship and the commercialisation of research among doctoral students.

Additional initiatives include the Ghent Entrepreneurship Ecosystem, which is an alliance between the City of Ghent, an independent association that supports young entrepreneurs (Unizo), a government-funded institution that supports start-up projects (Imec) and higher education institutions (Ghent University, Artevelde University College Ghent and University College Ghent). The Ghent Entrepreneurship Ecosystem supports students in developing entrepreneurial mind-sets and engaging in entrepreneurial activities. The programme provides a variety of support activities, which are available to all students, including coaching and mentoring; counselling; support for co-operation; soft skills training; workshops; and training in sales, marketing, branding, pitching and funding. In addition, the Ecosystem supports the development of entrepreneurial skills of art students, through the ARTEpreneur project, financed by the Flemish government with the support of several business partners. Every year, up to 1 800 students participate in the project to commercialise their ideas (Melonari, 2017[31]).

Institutional entrepreneurship and the HEInnovate framework

Higher education institutions themselves are also aiming to become more enterprising. Taking a more entrepreneurial approach to institutional management has long been a growing trend in higher education, with the goal of promoting efficiency of resource allocation and maximising commercial outputs (Etzkowitz et al., 2008[32]). It is therefore important that entrepreneurial skills are developed not only in students but by higher education staff within institutions as well. Entrepreneurial education emphasises organised interaction with the outside world and therefore strong partnerships with business, public sector and social economy organisations are a cornerstone of the entrepreneurial model.

In collaboration with the European Commission, the OECD has developed a framework to facilitate the development of an entrepreneurial culture in higher education institutions. HEInnovate broadens the understanding of institutional innovation and entrepreneurship beyond efficiency and maximisation of commercial outputs. The conceptual framework considers how higher education institutions build organisational capacity; how they involve external stakeholders in the leadership and governance of the institution; how they embed digital technology into their activities; how they create and nurture synergies between teaching, research and their societal engagement; and how they promote entrepreneurship through education and business start-up support, as well as knowledge exchange to enhance the innovation capacity of existing firms (HEInnovate, 2017[19]).

Some higher education institutions have a solid foundation of initiatives pioneered by individuals. Scaling these up and sustaining change at institutional and systemic levels requires supportive frameworks for resource allocations, staff incentives, continuous professional development, and the creation of strategic partnerships – locally, nationally and globally. HEInnovate provides a free online self-assessment tool that allows higher education institutions to involve a wide range of stakeholders (e.g. leadership, staff, academic and administrative staff, key partner organisations) to collectively review achievements and identify areas for improvement.

An innovative and entrepreneurial higher education institution is defined as one that is "designed to empower students and staff to demonstrate enterprise, innovation and creativity in teaching, research, and engagement with business and society. Its activities are directed to enhance learning, knowledge production and exchange in a highly complex and changing societal environment; and are dedicated to creating public value via processes of open engagement" (HEInnovate, 2017[19]).

The HEInnovate framework highlights opportunities for development within the following dimensions:

- leadership and governance
- organisational capacity: funding, people and incentives
- entrepreneurial teaching and learning
- preparing and supporting entrepreneurs
- digital transformation and capability
- knowledge exchange and collaboration
- the internationalised institution
- measuring impact.

The OECD has identified a range of policies and practices that can be used to help build innovation and entrepreneurship in higher education. As part of the HEInnovate initiative, a number of country reviews have been conducted in collaboration with governments to advance change at the system level, including in the Netherlands (Box 7.1).

Box 7.1. Entrepreneurship in higher education in the Netherlands

The Netherlands provides an example of good practice in bringing innovation and entrepreneurship to the forefront of higher education. Through its "valorisation" programme (Box 7.5), the Netherlands has strengthened the business environment for start-ups, improved co-operation between higher education institutions and cities, diversified career options for higher education staff, and enabled higher education institutions to monitor and report on their engagement activities. The application of the HEInnovate framework provides insights into why the Netherlands has been successful in entrepreneurship:

1. **Leadership and governance.** Entrepreneurship is a major part of the strategy of higher education institutions, and they have a model for integrating entrepreneurial activities into the education provision. Higher education institutions support their faculties and units to act entrepreneurially.
2. **Organisational capacity.** Higher education institutions are open to engaging and recruiting individuals with entrepreneurial mind-sets; they invest in staff development and provide incentives to staff that actively support entrepreneurship education. Institutions also have access to a range of funding and investment sources to support their entrepreneurial objectives.
3. **Entrepreneurial teaching and learning**. Entrepreneurship is integrated into the education and research functions of higher education institutions. Institutions design and deliver entrepreneurial curricula in collaboration with social partners and provide a range of formal and informal learning opportunities to help students develop entrepreneurial skills.
4. **Entrepreneurship support.** Entrepreneurship support is made available to students, graduates and staff who aim to start a business; they have access to funding, mentoring and training on how to start and develop a business.
5. **Knowledge exchange and collaboration.** Higher education institutions are actively involved in collaboration and knowledge exchange with social partners. They have strong linkages to incubators and science parks; and they provide staff and students with opportunities to take part in innovative activities.
6. **Internationalisation.** Internationalisation is an integral part of the entrepreneurial agenda of higher education institutions. They support the international mobility of students and staff, recruit international staff, and embed an international dimension in teaching and research.
7. **Measuring impact.** Higher education institutions monitor and evaluate how financial and human resources are used to support their entrepreneurial agendas. They evaluate entrepreneurial teaching and learning, support for start-ups and activities to promote knowledge exchange.

Supporting entrepreneurship in higher education in the Netherlands could be further improved by making entrepreneurship education accessible to students early on in their studies as well as to alumni; recognising student engagement in entrepreneurship; enhancing entrepreneurial pedagogy; and strengthening regional entrepreneurial eco-systems and policy co-ordination for entrepreneurship and other forms of engagement.

Source: OECD/EU (2018[33]), *Supporting Entrepreneurship and Innovation in Higher Education in The Netherlands*, https://doi.org/10.1787/9789264292048-en.

Other initiatives are taking place at the international and supranational levels. For instance, Ashoka, a non-profit organisation that supports 3 500 social entrepreneurs in 93 countries, has partnered with 37 universities and colleges in the United States, including Boston College, Arizona State University, and George Mason University, to support social entrepreneurship (Florida International University, 2016[34]).

At the supranational level, the Regional Innovation Impact Assessment Framework (RI^2 system), was developed by the European Commission to assess targeted funding for universities. The RI^2 system aims to complement both the existing performance-based funding systems in EU member states and HEInnovate (Jonkers et al., 2018[35]). The RI^2 system is not meant for university self-assessments, but rather provides incentives for universities to produce convincing case studies, which should be assessed by an international panel of independent experts. The RI^2 system builds on HEInnovate in that higher education institutions that have undertaken it may be better prepared to develop case studies and perform well in the RI^2 framework assessment. The framework allows universities or regional governments to choose indicators to track university progress over time in the context of regional development levels. The RI^2 system proposes four categories that should be covered in the assessment and indicators:

- education and human capital development
- research, technological development, knowledge transfer and commercialisation
- entrepreneurship and support to enterprise development
- regional orientation, strategic development and knowledge infrastructure (Jonkers et al., 2018[35]).

7.2.2. Supporting continuing education

Higher education plays a critical role in developing and updating the skills of society. One pathway to doing this is by providing access to continuing education to individuals at different stages of their lives. Continuing education refers to education delivered by higher education institutions that is not part of a formal (typically accredited) programme; it is also distinct from the concept of informal learning that results from daily routines related to work, family or recreational activities (Box 7.2). Lifelong learning, i.e. formal learning undertaken throughout life, is addressed in Chapter 5.

Continuing education can help individuals develop or acquire new skills to improve work productivity, advance their career or change careers. Continuing education can also help stimulate personal development, provide a sense of achievement, and can improve health and general quality of life (Jamieson, 2016[36]; Souto-Otero, 2011[37]). It usually takes the form of non-credit courses on a wide range of subjects, and could have the objective of gaining new knowledge on a topic of interest or developing specific skills (e.g. information and communication technologies (ICT) or communication skills). Governments use a variety of regulatory and funding tools to promote the delivery of continuing education in higher education institutions.

Box 7.2. Definition of non-formal and informal learning

Non-formal learning is defined as education that is institutionalised, intentional and planned by an education provider. The defining characteristic of non-formal education is that it is an addition, alternative and/or complement to formal education within the lifelong learning process of individuals. It caters to people of all ages but does not necessarily apply a continuous pathway structure; it may be short in duration and/or low-intensity; and it is typically provided in the form of short courses, workshops or seminars. Non-formal education mostly leads to qualifications that are not recognised as formal or equivalent to formal qualifications by the relevant national or sub-national education authorities, or leads to no qualifications at all. Nevertheless, formal, recognised qualifications may be obtained through exclusive participation in specific, non-formal education programmes; this often happens when the non-formal programme completes competences obtained in another context.

Informal **learning** is defined as learning that is intentional or deliberate, but not institutionalised. It is consequently less organised and less structured than either formal or non-formal education. Informal learning may include learning activities that occur in the family, workplace, local community and daily life, on a self-directed, family-directed or socially directed basis.

Source: UNESCO (2012[38]), *International Standard Classification of Education ISCED 2011*, http://uis.unesco.org/en/topic/international-standard-classification-education-isced.

In Estonia, legislation defines the role and mission of universities and professional HEIs, including their responsibility to provide education services to society (Estonian Parliament, 1995[39]; Estonian Parliament, 1998[40]). The provision of continuing education for the general public is among the criteria used in institutional accreditation. Institutions are assessed on whether they define and implement objectives for continuing education training, whether this form of training is tailored to meet the needs of target groups and whether mechanisms to monitor participant satisfaction exist. There are also goals related to the provision of continuing education in performance agreements, which are tied to funding. In Estonia, 20% of funding is allocated based on performance, and one indicator pertains to revenues from study activities (i.e. funding coming from tuition fees and provision of continuing education).

In Norway, continuing education is partly funded by the government and partly by the private sector. The Strategy for Skills Policy 2017-2021 promotes the development of continuing education in vocational colleges and higher education institutions and highlights the need for further development in this area (Norwegian Ministry of Education and Research, 2017[41]). Study associations and other organisations also provide continuing education in Norway (sometimes in partnership with higher education institutions).

Centres for continuing education

Higher education institutions in a number of countries have centres for continuing education offering courses in various fields of study.

Norwegian higher education institutions provide continuing education for adults through *etterutdanning* courses, which do not have any exams or credits, and *videreutdanning* courses, which have the same admissions requirements as regular higher education programmes, involve exams and provide students with credits. Continuing education provided by higher education institutions includes corporate and business training to companies. The flexibility provided by continuing education helps Norwegians develop new skills and update their existing skills to meet changing labour market demands without having to enrol in a complete degree programme. However, continuing education students can use the credits they accumulate through the *videreutdanning* courses towards a degree.

Additional examples of continuing education include the Osher Lifelong Learning Institutes in the United States, which are funded by the Bernard Osher Foundation and are located on the campuses of more than 100 higher education institutions across various states. These institutes provide a wide range of non-credit courses and activities for adults older than 50 who are interested in learning for personal interest. In Denmark, universities provide non-formal education through "university extension courses" (Box 7.3).

Box 7.3. University extension courses in Denmark

Danish universities have a long tradition of delivering non-formal education in the form of extension courses. The university extension courses are a nationwide initiative delivered through four divisions in the cities of Copenhagen, Aarhus, Odense and Aalborg. In addition, there are also more than 100 university extramural committees delivering non-formal education in other regions. The objective of the programme is to disseminate the results of the research produced by higher education institutions to the wider community in the form of lectures, lecture series and university courses. These cover a wide range of subjects, including health and natural sciences, humanities, social sciences and theology. The Danish government provides grants to help cover some of the costs associated with teaching, travel and administration, the amount of which is determined in the annual Appropriations Act. The Council for the University Extramural Department (*Folkeuniversitetet*) is responsible for distributing the grants. Participants in these courses have to pay a fee, which amounts to a minimum of one-fourth or, on some occasions, one-third of the expenditure on teaching (Danish Ministry of Education, 2018[42]).

7.3. Engagement to support innovation

Higher education research and innovation are core elements of a country's knowledge system. Higher education systems across the OECD are the key producers of basic research, which is used in applied research and experimental development, and ultimately in the production of new products and processes in business, government and other sectors of society. By engaging with the private, public and social sectors, higher education can create stronger potential for innovation within its research function. As a result, it can better address society's biggest challenges, including climate change, public health, energy, food and water supply (OECD, 2016[43]).

The Knowledge Triangle

The Knowledge Triangle (Sjoer, Nørgaard and Goossens, 2012[44]) refers to the interaction between education, research and innovation to drive a knowledge-based society. Interactions between these three areas are facilitated by a range of activities, including:

- *Interaction between research and education:* through geographic and sectoral mobility of graduates, postgraduate training programmes, basic and applied research as the basis for research-led teaching.
- *Interaction between research and innovation:* support for knowledge transfer and knowledge exchange via various initiatives, including:

- public-private partnerships
- university-industry research contracts
- commercialisation of publicly funded research
- academic spin-offs and start-ups
- knowledge and technology transfer offices
- incubators
- open science and open innovation platforms.

- *Interaction between education and innovation:* support for the development of an entrepreneurial culture in academic programmes and entrepreneurial skills (Cervantes, 2017[12]).

Higher education institutions integrate the knowledge triangle by providing key inputs for each of the corners of the triangle and by embedding knowledge triangle processes into their internal organisation and missions. Governments use a range of measures to build closer linkages between education, research and innovation through higher education, including:

- grants for collaborative research for higher education institutions and firms
- tax incentives for firms that purchase services from higher education institutions
- financial support for institutional spin-offs
- funding to promote the internationalisation and mobility of students and researchers
- incentives to encourage participation in commercialisation activities by researchers and academics
- funding for entrepreneurship education
- open access to publicly-funded research
- networking events open to various actors involved in science-industry links (Cervantes, 2017[12]).

7.3.1. Collaboration across sectors to drive innovation

Collaboration with other sectors of the economy is important for R&D to ensure that knowledge is generated, shared and applied in a way that maximises its benefits to the economy and society. Many problems, such as those related to the environment or the global sanitation crisis, are becoming increasingly difficult to solve without scientific advice, and governments have shifted to more evidence-informed approaches to tackling the biggest challenges in society. In this context, connecting the knowledge produced by higher education institutions more deeply with different stakeholders, such as non-profit organisations, foundations and civil organisations, strengthens the relevance of higher education (OECD, 2011[45]).

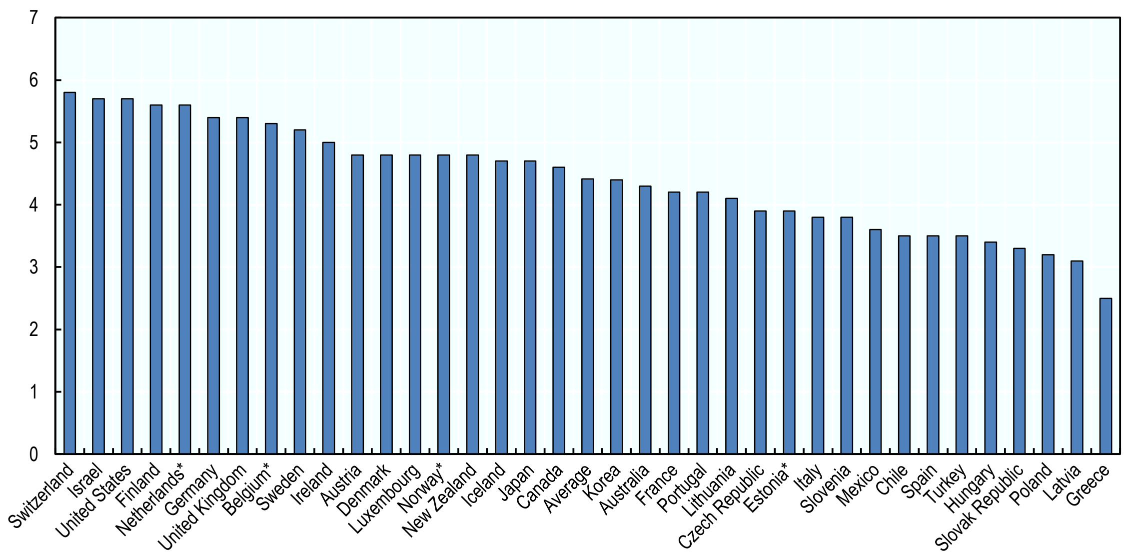
Collaboration between higher education and industry is necessary to make sure the research produced by higher education is in line with industry's needs for innovation. It also helps higher education institutions strengthen their role in national and global knowledge systems, and become more financially sustainable. This collaboration provides benefits for enterprises, which gain easy access to knowledge that is relevant for product development and innovation. Finally, it gives researchers better access to business and social networks and more opportunities to work in various fields.

The Global Competitiveness Index is based on the World Economic Forum's Executive Opinion Survey, which covered 133 economies and over 12 000 executive responses in 2017. Executives were asked to rate the extent to which businesses collaborate with universities in their respective countries, on a scale from 1 (not at all) to 7 (to a great extent) (World Economic Forum, 2017[46]). Figure 7.1 shows the results of the Executive Opinion Survey on this indicator in OECD countries. The top five countries that reported a high level of higher education-business collaboration in the Global Competitiveness Index in 2017 were Switzerland, Israel, the United States, Finland and the Netherlands.

Figure 7.1. Higher education-business collaboration in R&D (2017)

Extent to which businesses collaborate with universities on a scale from 1 to 7

(1= do not collaborate and 7 = collaborate extensively)



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
This chart shows the response to the question: In your country, to what extent do business and universities collaborate on research and development?
Source: Adapted from World Economic Forum (2017[46]), The Global Competitiveness Report 2017-2018, https://www.weforum.org/reports/the-global-competitiveness-report-2017-2018.

StatLink http://dx.doi.org/10.1787/888933941785

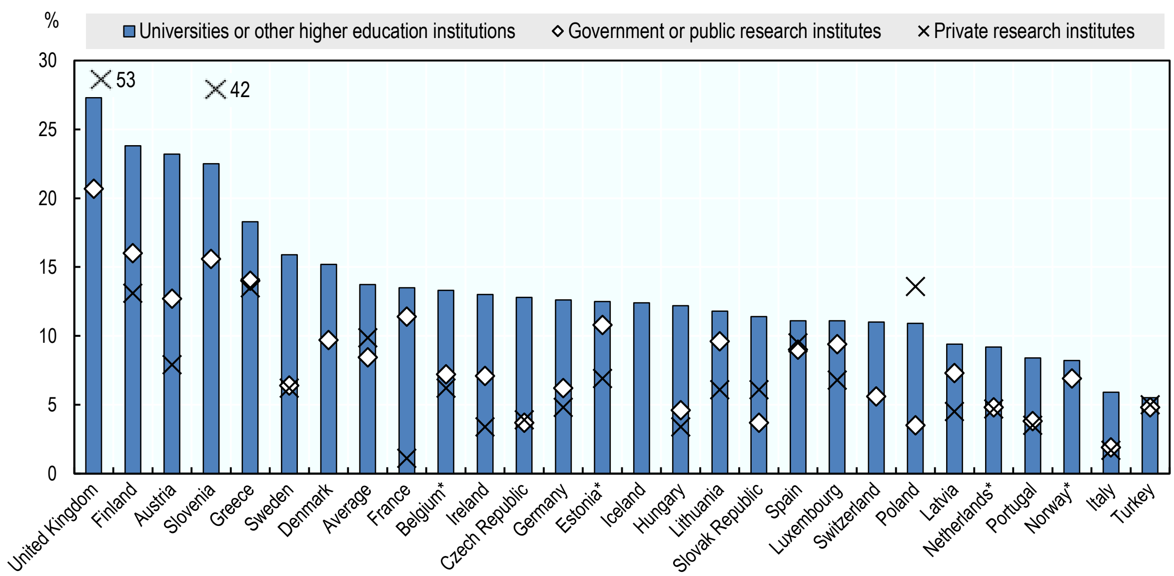
EU Average Data from Eurostat's Community Innovation Survey (CIS) form the basis of the European Innovation Scorecard, which is used to measure national innovation performance in European countries. The CIS differs from the World Economic Forum Executive Opinion Survey in that it asks individual enterprises if they have collaborated with the higher education sector over the period 2012-2014, whereas the Executive Opinion Survey asks the enterprise to make a judgement about the level of university-business collaboration for the country as a whole. This should be taken into account when interpreting the data from the two surveys, as the Executive Opinion Survey measures perceptions of university-business collaboration rather than factual collaboration.

Data at an enterprise level show that, across OECD countries with available data, on average, about 14% of enterprises reported co-operating with the higher education sector in 2016 (Figure 7.2). While more than one-fifth of businesses co-operated with higher education institutions in Austria, Finland, Slovenia and the United Kingdom, less than 6% of enterprises reported co-operation in Italy and Turkey. The level of reported co-operation was around the OECD average in Belgium and Estonia and below 10% in the

Netherlands and Norway. In all four participating jurisdictions, the share of enterprises co-operating with the higher education sector was higher than the share of enterprises co-operating with government or public research institutes, and with private research institutes.

Figure 7.2. Businesses collaborating on innovation with higher education or research institutions (2016)

As a percentage of total enterprises with 10 or more employees



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
The Eurostat Community Innovation Survey asks the following question: "Did your enterprise co-operate on any of your innovation activities with other enterprises or organisations?" It then asks the respondent to identify the type of co-operation partner. The survey defines innovation as "the introduction of a new or significantly improved product, process, organisational method, or marketing method by your enterprise" (Eurostat, 2018[47]). It also specifies that both partners do not need to commercially benefit to be counted as co-operating on innovation activities.
Source: Adapted from Eurostat (2018[47]), *Community Innovation Survey, Science, Technology and Innovation Indicators*, http://ec.europa.eu/eurostat/web/science-technology-innovation/data/database.

StatLink http://dx.doi.org/10.1787/888933941804

Evidence from the OECD STI Scoreboard 2017 shows that in all OECD countries with available data except for Korea, a higher share of large businesses collaborated on innovation with higher education or research institutions compared to small and medium-sized enterprises (SMEs) from 2012-2014 (Figure 7.3). The UK reported the largest share, nearly one-quarter, of SMEs engaging in this form of collaboration, followed by Belgium with about 22%. In Estonia, almost 20% of SMEs collaborated on innovation activities with higher education or research institutions, followed by Norway with about 17% and the Netherlands with about 16%.

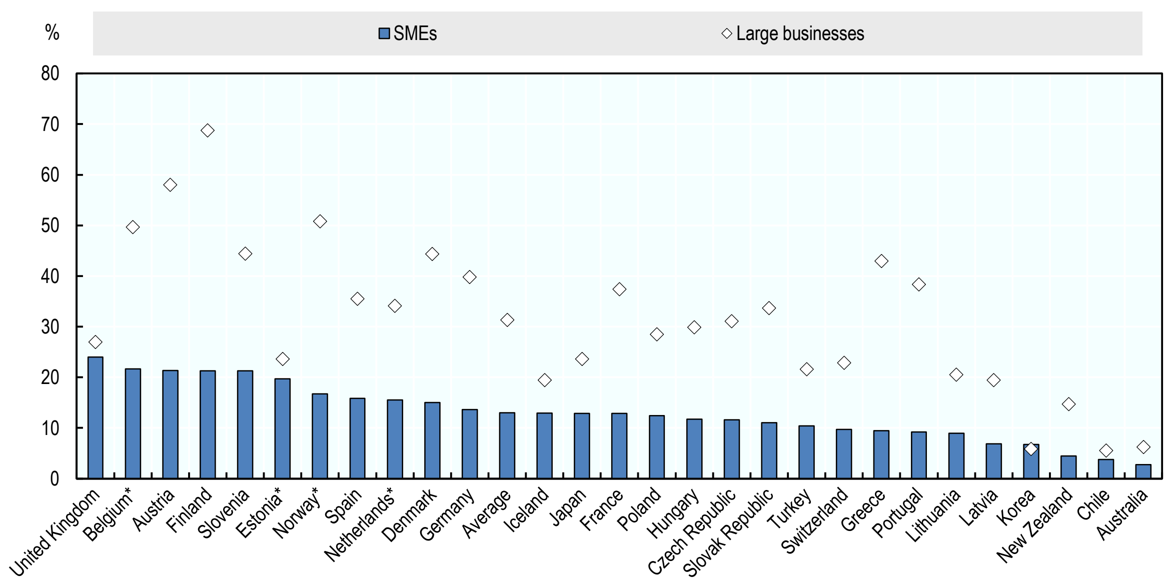
The relatively high level of collaboration between SMEs and higher education institutions in Belgium might be due to a number of systemic initiatives created to stimulate higher education engagement with companies, and in particular with SMEs. In the Flemish

Community, for example, the Flanders Agency for Innovation and Entrepreneurship funds the TETRA programme to improve the transfer of knowledge and technology from higher education to SMEs and the social profit sector.

Belgium and Norway were among the OECD countries with the highest proportion of large businesses collaborating on innovation with higher education or research institutions (around 50%). By contrast, about 34% of large businesses in the Netherlands and about 24% in Estonia collaborated with higher education or research institutions on innovation.

Figure 7.3. Businesses collaborating on innovation with higher education or research institutions, by size (2012-2014)

As a percentage of product and/or process-innovating businesses in each size category



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Source: Adapted from OECD (2017[48]), *OECD Science, Technology and Industry Scoreboard 2017: The digital transformation*, http://dx.doi.org/10.1787/9789264268821-en.

StatLink http://dx.doi.org/10.1787/888933941823

While higher education and business co-operation is improving in Estonia, it needs to be further strengthened (European Commission, 2017[49]). Estonia has introduced a number of initiatives to connect research with business:

- The ADAPTER programme is a network of Estonian universities and R&D organisations (i.e. Estonian Academy of Arts, Estonian Academy of Music and Theatre, National Institute of Chemical Physics and Biophysics, Centre of Food and Fermentation Technologies, Software Technology and Applications Competence Centre and BioCC LLC) established in late 2016. The network coordinates education and R&D services to enterprises and other organisations. Services offered by the network include contract research, data analysis, continuing education and other training services. Support is provided through vouchers (e.g. the development voucher grant and the innovation voucher grant), as well as through access to analytical research facilities across the Baltic Sea Region, and also through various programmes and investments (e.g. enterprise development programme, environmental investments). ADAPTER is funded through the ASTRA programme, which supports institutional development for higher education and research institutions.

- NUTIKAS is a funding programme to support applied research in smart specialisation growth areas. Enterprises can apply for funding to commission research and development projects from the qualified research institutions, including universities. The programme helps build the capabilities of R&D institutions in relevant applied research and collaboration between R&D institutions and enterprises.
- Competence Centres are knowledge-based organisations that help strengthen co-operation between government, R&D institutions and the business sector. The centres provide a space for co-operative activities with qualified specialists and for the provision of research and training. They aim to increase the quality and volume of applied research, increase the number of R&D employees and their movement between entrepreneur and research institutions, and strengthen the long-term strategic planning and management capability in companies and research institutions (Enterprise Estonia, 2000[50]). There are six Competence Centres dealing with health technology, food production, information and communication technologies (ICT) and manufacturing.

The Flemish government funds research activities performed by higher education institutions through the Industrial Research Fund. Part of the funding is allocated to establish interface structures, such as Technology Transfer Offices (TTOs), which facilitate the transfer of knowledge from higher education institutions to industry and the wider society. The TTOs affiliated with the five Flemish universities are responsible for establishing contact with industry, offering legal support related to contracts, promoting education activities for engagement, offering protection of intellectual property and supporting start-ups and spin-offs. The TTOs have formed the TTO Flanders network to provide a unique point of contact to industry. The network also plays a role in improving the collaboration between TTOs, strengthening their performance, and maximising the benefits of the knowledge and technology produced by higher education institutions to the economy and society.

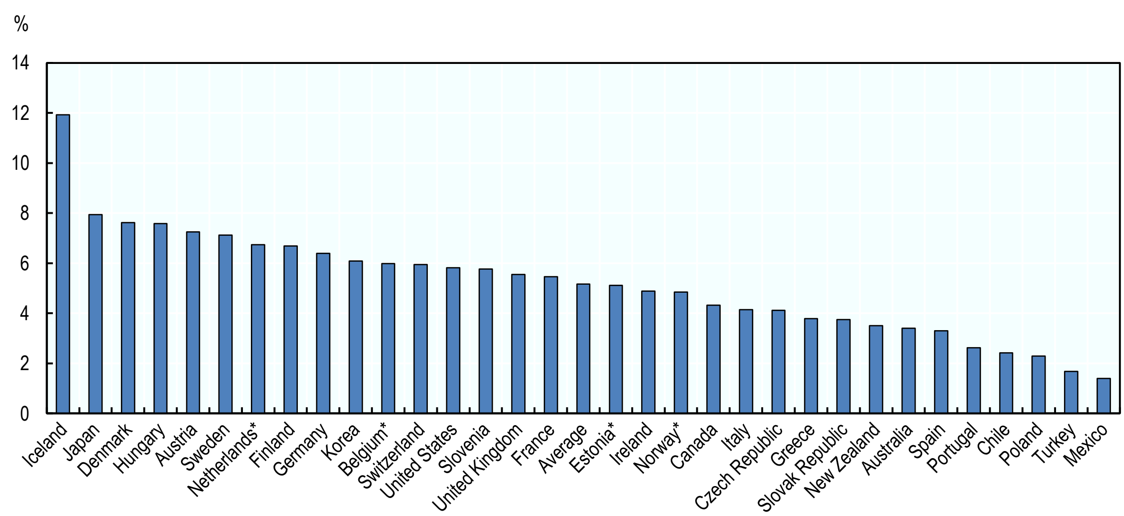
In 2011, the Dutch government launched a 'top sectors' initiative to align public resources for R&D and innovation across nine strategic sectors: horticulture and propagation materials; agro-food; high-tech systems and materials; energy; logistics; creative industry; life sciences; chemicals; and water. Strategies were developed for each sector, and consortia for knowledge and innovation, known as Top Consortia for Knowledge and Innovation (TKI), were formed to implement them. These TKI consortia consist of public-private partnerships, which include higher education institutions. Every two years, the Dutch Statistical Office monitors the success of the top sectors initiative in the areas of macro-economy, enterprise development, employment characteristics, innovation performance and education output.

Outside of the participating jurisdictions, the "Third Stream[1]" fund in the United Kingdom is an example of how governments can support engagement activities that promote R&D collaboration with other sectors of the economy. The fund was created in 1999 and focused on supporting higher education institutions' responsiveness to the needs of business and the wider community through a broad range of knowledge exchange activities. Over time, the need to assess how the funding secured direct and indirect economic benefits grew, and annual evaluations were performed, assessing the nature and scale of the engagement between universities and industry/society through the Higher Education-Business and Community Interaction Survey (HEFCE, 2015[51]). Using econometrics to measure the extent to which a particular policy instrument used affected the pattern and direction of interaction between 2006-2014, expert assessments of attribution of knowledge exchange income to funding suggested that each £1 of the fund supported £6.4 of knowledge exchange income (Ulrichsen, 2015[52]).

University-private co-publication

Science-industry relationships are difficult to measure given the diversity and intangibility of knowledge transfer channels. University-private co-publications are one of the more tangible ways of showing collaboration between higher education and private sectors. Figure 7.4 provides an overview of university-private co-publications as a share of the total co-publication output in OECD countries.

Figure 7.4. University-private co-publications as a share of total co-publication output (2015)



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
Source: Adapted from Web of Science/CWTS (2015[53]), *Share of public-private co-publications*, www.rathenau.nl/en/page/share-public-private-co-publications-international.

StatLink http://dx.doi.org/10.1787/888933941842

In 2015, the share of co-publications ranged between 4.8% and 6.7% for the participating jurisdictions. Belgium and the Netherlands had a higher percentage of university-private co-publications as a share of total co-publications, as well as the total co-publication output, than that of the OECD average. Meanwhile, the total co-publication output of Norway was higher than the OECD average, but the share of university-private co-publications was below average. Estonia on the other hand, had both the university-private co-publication share and the total co-publication output below the OECD average.

Policies to encourage the production of publications are typically included in indicators of performance-based funding schemes (block grant for research) in participating jurisdictions. For example, Estonia has set targets for the share of scientific publications among the top 10% most cited scientific publications worldwide to reach 11% and the number of top-level scientific publications per million population to reach 1600 by 2020 (Estonian Ministry of Education and Research, 2014[54]).

In the case of the Flemish Community, the number of publications and citations is one of the parameters that dictates the allocation of funds derived from the Special Research Fund.

In the Netherlands, higher education institutions are able to include both quantitative and qualitative components in performance-based funding. For the more quantitative approach, indicators such as the number of co-publications with industry are used.

In Norway, result-based funding has been in place since 2002 and accounts for approximately 30% of the block grant. Publication points[2] is a close-end budget indicator of the results-based funding for higher education, which allocates a set amount of funding and requires competition among institutions (as opposed to indicators that have an open-end budget and are not subject to a fixed pool of funds).

Examples of factors that may inhibit the share of multiple-affiliation university-industry co-publications (i.e. with at least one author listing a university address and a company address as a percentage of the total university-industry co-publications output) include: research mobility patterns; institutional policies on academic appointments; and national regulations that either endorse or prohibit multiple appointments (Tijssen, Yegros-Yegros and Winnink, 2016[55]).

As seen in this section, some OECD countries have developed (or are at the early stages of developing) indicators to measure the social impact of engagement activity in research. Such developments have the potential to eventually evolve into comparable indicators across OECD countries.

7.3.2. Higher education as a driver for local and regional innovation

Higher education institutions have an important impact on their local environments. The effects of institutions in urban or regional areas can be political, demographic, economic, infrastructural, cultural, educational and social (Peer and Penker, 2014[56]). They can directly contribute to the economy and help increase productivity (OECD, 2016[57]). They can also have an indirect impacts on human capital, the pool of knowledge and the attractiveness of a local area (OECD, 2007[5]).

The majority of OECD residents live in urban areas; and urbanisation rates are set to rise from low double-digit rates to more than 80% by the end of the century. Projections of population growth indicate that many cities will undergo a heavy urbanisation process in the coming years. By 2050, 70% of the world's population will live in cities (and more than 60% of the cities that will exist in 2050 have yet to be built) (KPMG, 2017[58]). Higher education can play a role in developing solutions to challenges posed by increasing urbanisation. For example, as part of the Urban Agenda, the Dutch government, with the participation of knowledge institutions and the business sector, initiated the "City Deals on Education" to enhance the capacity for growth and innovation, as well as the quality of life in cities (Box 7.4).

Box 7.4. The City Deals on Education in the Netherlands

The City Deals on Education (*Kennis Maken*) was introduced in 2017, with support from the Ministry of Education, Culture and Science, with the aim of finding solutions for social challenges in cities through the large-scale involvement of researchers, lecturers and students. Not only does this strengthen the problem-solving capacity of the city, but it also contributes to the training of students who will contribute to shaping society – and gives them a better understanding of social issues. Using society as a learning environment for students is an important theme in the Strategic Agenda for Higher Education and Research 2015-25.

The idea is that students formulate the relevant research questions together with researchers and partners in the field (businesses, government, social institutions, citizens' initiatives, etc.), carry out further research on urban problems and evaluate whether or not assumed problem-solving approaches are effective. This can take different forms, such as community service, knowledge workshops, field laboratories and student housing in the learning environment itself. Collaboration takes place in multi-disciplinary and multi-level teams, and within the framework of "triple helix" and "quadruple helix" partnerships.

Currently, universities in 11 major Dutch cities (including all professional HEIs) are participating in the initiative. Six additional cities will join the initiative in 2019.

In 2016, the OECD, in partnership with the Ford Foundation, launched the Inclusive Growth in Cities initiative, which invites mayors from around the world, as well as leaders from business, philanthropic organisations, associations of cities, think-tanks and international institutions to identify and promote the role of cities in addressing rising inequalities. Currently, there are 50 mayors working on a common agenda with four policy pillars to promote inclusive growth in cities. These pillars refer to an inclusive education system, labour market, housing market and urban environment, and infrastructure and public services. Activities vary from city to city; however, they have previously included increasing access for disadvantaged groups to education, including higher education (OECD, 2016[59]).

UNESCO has also developed initiatives that encourage higher education engagement in territorial development, such as the Learning City Award and the Global Network of Learning Cities (GNLC). The Learning City Award was launched in 2013 and recognises cities that are playing an active role in the development of education. Key features of the initiative include promoting inclusive learning from basic to higher education and fostering a culture of learning throughout life (UNESCO Institute for Lifelong Learning, 2018[60]). The UNESCO GNLC serves as a platform for sharing best policy practices of lifelong learning. The network is currently composed of more than 200 member cities worldwide.

Non-urban regions, including rural regions close to cities as well as remote rural regions, contribute to national prosperity in many ways (OECD, 2016[57]) and higher education systems in many countries aim to play a role in promoting the prosperity of their local region. In Japan, a Programme for Promoting Regional Revitalisation by Universities as Centres of Community (COC+) has been implemented. The Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT) allocated approximately EUR 36 million in 2015 to fund the COC+ programme. MEXT assigns COC+ coordinators, manages the progress of projects, and facilitates linkages between regions participating in the project. The COC+ programme aims to improve the employability of graduates in the local region and spur local job creation through collaboration between universities, local government and SMEs. For universities, this involves gaining a better understanding of regional issues through the acquisition of specialist knowledge and through problem-based learning using the region for field work (Japanese Ministry of Education, Culture, Sports, Science and Technology, 2016[61]).

The role of higher education in place-based innovation systems

Place matters for innovation; the importance of geography in interactions which promote innovation is well-documented in studies of clusters, agglomeration economies and knowledge spill-overs (Cervantes, 2017[12]; OECD, 2013[62]). Different measures of the benefits of innovation activities find that the strongest interactions take place within a radius of approximately 200 kilometres (OECD, 2013[62]). This cluster of interactions at the local level with "a group of local actors and dynamic processes, which together produce solutions to different challenges" creates place-based innovation eco-systems (Rissola et al., 2017[63]; Senior, Hautamäki and Oksanen, 2014, p. 4[64]). In place-based innovation systems, the policy focus is on local and regional eco-systems that can generate growth by applying a multi-sector, whole-of-government approach and aligning objectives across multiple levels of the government through a networked governance model.

The importance of location within innovation systems is now reflected in initiatives such as the European Commission's Cohesion Policy, which aims to reduce differences between regions and to ensure growth across Europe. The European Structural Investment Funds are among its main tools - the implementation of Research and Innovation Strategy for Smart Specialisation (RIS3) is an ex-ante condition for the application of the funds. Smart specialisation strategies can form part of a national or regional research and innovation strategic policy framework in order to address emerging opportunities and market developments in a coherent manner and avoid the duplication and fragmentation of efforts (European Commission, 2014[65]). This draws on the understanding that local, regional and national interests must be harmonised, and that implementation of the RIS3 should be monitored to ensure inclusive participation and the cohesive use of the funds.

The Netherlands aims to foster a place-based innovation system that reflects its strengths and streamlines efforts to priority areas for growth. The main source of regional funding for research comes from the European Structural Investment Funds. The funds are tied to five smart specialisation priority areas (manufacturing and industry; sustainable innovation; human health and social work activities; services; and energy production and distribution) corresponding to selected geographic areas in the country. The smart specialisation strategies are drawn up and implemented by Programme Monitoring Committees, which represent the provinces in these geographic areas.

To strengthen its regional approach, the Netherlands has also supported the creation of various regional platforms. For example, several regions, including Amsterdam, Rotterdam, Utrecht, Eindhoven, Gronigen and Twente, have established Economic Boards (i.e. platforms including regional stakeholders) to stimulate innovation activities in the region. Board members include education providers, business sector organisations and representatives of the local government.

The Netherlands also recognises the important role of SMEs in building innovative and entrepreneurial eco-systems. The Regional Attention and Action for Knowledge Circulation programme (RAAK) provides project-based financial support for professional HEIs that engage in collaborative research with external partners. The RAAK programme is a competitive support scheme that was created to improve collaboration and knowledge exchange between professional HEIs and SMEs.

In addition, a series of reforms have been implemented in Dutch professional HEIs to strengthen their role in regional research and innovation networks. The position of "lector," which is a form of associate professorship, was introduced in 2001 to bring research expertise into the subsector. Around the same time, so-called Knowledge Circles were created (comprised of lectors, other academics working in professional HEIs and local stakeholders) to work on research activities of common interest, with a regional focus based on the location of the institution. The research involves students and is expected to be incorporated in the curricula of the professional HEIs. More recently, the Netherlands has introduced Centres of Expertise in professional HEIs to further enhance co-operation between institutions, government, industry and other social partners (Box 7.5).

In 2007, **Norway** established a ten-year funding programme for regional R&D and innovation (*Virkemidler for regional FoU og innovasjon*) through the Research Council. The funding programme aimed to promote greater regional collaboration between trade and industry, R&D institutions and government authorities. It also contributed to the establishment of closer ties with other national and global networks and innovation initiatives, such as the Arena programme, Norwegian Centres of Expertise and the Regions of Knowledge initiative.

In addition, Regional Research Funds were established in 2010 in Norway in order to promote R&D for regional innovation and development. Higher education institutions, public research institutes, local industry and other organisations can apply for funding from one of the seven major regional funds, depending on geographic location. The aim is to support the region's competitive strengths in R&D (OECD, 2017[66]).

The Norwegian Innovation Clusters programme was launched in June 2014, building on existing innovation structures (19 Arena Clusters, 14 Centres of Expertise and 3 Global Centres of Expertise), adding new levels, modules and elements to further develop existing and potential new cluster initiatives (Norwegian Innovation Clusters, 2019[67]). In addition, the FORNY2020 funding programme of the Research Council supports the commercialisation of R&D results and helps bring products and services to the market.

The Norwegian Act on higher education was also amended in 2003 to transfer the right to commercial exploitation of research results from individuals to institutions (Government of Norway, 2010[68]). This gave Norwegian higher education institutions institutional ownership, in certain circumstances, to patentable inventions. It also elevated the importance of entrepreneurship and led to the establishment of Technology Transfer Offices (TTOs), which contribute to the commercialisation of research findings (Norwegian Ministry of Education and Research, Norwegian Ministry of Local Government and Regional Development and Norwegian Ministry of Trade and Industry, 2014[27]). Technology Transfer Offices are also located in all regions of Norway, and are supported through a grant programme managed by the Research Council, jointly funded by the Ministry of Education and Research and the Ministry of Trade and Industry.

As part of the performance-based component of funding for Norwegian higher education institutions, additional funding is awarded based on reported income from regional research grants and grants from the Research Council. In 2017, roughly EUR 31.5 million was granted to higher education institutions on this basis. Institutions can also receive additional funding if they receive grants from the European interregional co-operation initiatives. A new performance indicator was introduced in 2017, which is based on third-party public and private funding (separate from Research Council and regional research funding). The newly introduced performance agreements also include indicators for entrepreneurship and innovation for some institutions.

7.4. Engagement for wider development

In previous reviews of the engagement activity of higher education systems, the OECD noted that the softer and longer-term community engagement activities in higher education were relatively under-developed, partly due to problems of measurement and the absence of incentives in policy frameworks (OECD, 2007[5]). This remains a challenge, particularly at national and international levels, even though substantial efforts have been made in many jurisdictions to open up multiple channels of engagement in higher education.

Engagement for wider development, in addition to the role that higher education systems play in developing and serving their surrounding regional area, can include efforts to foster mutually beneficial relationships with wider civil society, activity that contributes to a richer cultural environment and activity that promotes greater environmental awareness and contributes to achieving broader social goals on sustainability.

7.4.1. Increasing the social relevance and impact of research

In addition to the more typical individual economic benefits, such as employment, earnings, and income generated from intellectual property as a result of research, the knowledge produced through higher education is considered to be a public good which provides benefits to wider population (Tilak, 2008[69]). For example, higher education contributes to general innovation capacity, the production of evidence, and the formation and reproduction of knowledge and social relations through which knowledge is shared. Higher education also produces individual goods which have collective benefits, such as social and scientific literacy, effective citizenship and economic competence (Marginson, 2014[70]).

Through the lens of higher education as a public good, the social relevance and impact of research can be defined in different ways, depending on the national priorities of each country and on the context within which R&D systems operate.

- The Research Excellence Framework (REF) in the United Kingdom includes an assessment of both the quality of scientific contribution as well as social contribution and defines impact as: "an effect on, change or benefit to the economy, society, culture, public policy or services, health, the environment or quality of life, beyond academia" (HEFCE, 2016, p. 4[71]).
- The National Science Foundation (NSF) in the United States applies the concept of "broader impact" as a key condition in the impact review of project proposals. The concept is comprised of five core long-term outcomes, including broadening participation of under-represented groups, broadening dissemination of scientific and technological understanding, and providing benefits to society (National Science Foundation, 2018[72]).
- The Valorisation Programme in the Netherlands defines valorisation as "the process of creating value from knowledge by making knowledge suitable and/or available for economic and/or societal use and translating that knowledge into

competitive products, services, processes and entrepreneurial activity" (Nederland Ondernemend Innovatieland, 2009[73]) (Box 7.5).

Box 7.5. Valorisation Programme and Centres of Expertise in the Netherlands

The Ministry of Education, Culture and Science and the Ministry of Economic Affairs in the Netherlands both consider valorisation to be an important issue and have contributed to the development of a broad conceptualization of the term, which serves as a basis for several policy initiatives.

In 2010, the Valorisation Programme was initiated with co-operation from both ministries, with the aim of professionalising the knowledge transfer process. A budget of EUR 63 million was allocated for the period 2010-2018 to finance several regional consortia centred on one or more higher education institutions. The programme provides funding for 13 large-scale regional innovation projects to professionalise knowledge transfer (VSNU, NWO and KNAW, 2014[74]).

The consortia bring together companies, knowledge and research institutes, civil society organisations and local and regional governments. The programme provides 50% co-funding for valorisation plans (maximum EUR 5 million), on the condition that the plans are carried out by a public-private consortium. Funds support entrepreneurial education, the screening and scouting of knowledge transfer opportunities, intellectual property applications, pre-seed funding, proof-of-concept funding, network creation and other activities that contribute to knowledge transfer. The objective is that the consortia continue their activities beyond the period during which they receive government funding.

The Centres of Expertise (CoEs) are a new form of co-operation between professional HEIs, industry and government. CoEs develop and deliver knowledge services based on public-private partnerships and in co-operation with regional partners. The CoEs focus not only on applied research, but also on improving education through involving students in practice-oriented research projects. As part of the performance agreements with professional HEIs, 1% of the core grant was set aside for competitively awarding grants of EUR 1 million per year for the creation of 17 CoEs in 2012 and 2013. So far, 25 CoEs have been established, some without a dedicated government subsidy.

Higher education institutions in the Netherlands have agreed to work on making valorisation more transparent, through reporting on entrepreneurship education and the other activities aimed at valorisation. Over the years, potential indicators for monitoring valorisation activity have been proposed, and some institutions have agreed to use some of these in their performance agreements, along with qualitative statements. So far, there is no universal set of valorisation indicators used for all Dutch higher education institutions.

Additionally, the societal relevance of academic research is assessed in the peer reviews that take place every six years and assess the universities' research quality on the basis of the Standard Evaluation Protocol (SEP). The evaluation looks at the economic, social and cultural contribution of research through indicators such as contract research, advisory reports for policy makers or contributions to public debate.

Social impact is much more difficult to assess than scientific impact, because it manifests in different ways and may take many years to become evident. In addition, it may be difficult to assess a potentially wide-ranging impact on different groups of stakeholders. Nonetheless, there is increased pressure to demonstrate the social relevance and impact of academic research, which has led to efforts to create indicators for social impact and include these in performance assessments of research. As a result, many OECD countries have developed or are developing indicators to measure engagement activity in research and innovation.

In the Netherlands, the government has tested indicators for valorisation in the performance agreements that were in place during the period 2012-2016 (Box 7.5). The government recently invited higher education institutions to develop their own set of valorisation indicators, allowing for more transparency on valorisation activities and results.

The Australian Research Council undertook an Engagement and Impact Assessment Pilot in 2017 (Australian Research Council, 2017[75]). The pilot and methodologies were evaluated to develop a full assessment which incorporates feedback from universities, industry and end-user participants. The full assessment was launched in 2018. Impact will be assessed through qualitative studies that show the direct social, economic, environmental and cultural impact of university research. It will also show what universities are doing to facilitate the delivery of these impacts (Box 7.6).

Box 7.6. Engagement and Impact Assessment in Australia

As part of the National Innovation and Science Agenda, the Australian government is developing a framework for assessing how universities are translating their research into economic, social and other benefits, and incentivising greater collaboration between universities, industry and other end-users of research. A pilot was undertaken in 2017 providing a basis for a national rollout in 2018. The national assessment will be undertaken as a companion to Excellence in Research for Australia.

The objectives of the Engagement and Impact Assessment are to:

- clarify to the government and the Australian public how public expenditure in university research translates to benefits beyond academia
- identify institutional processes and infrastructure that enable research engagement
- identify how institutions currently translate research into impact
- increase support for the translation of research impact within institutions for the benefit of Australia beyond academia.

In the 2018 Engagement and Impact Assessment, universities are assessed in each discipline using qualitative statements, a small number of quantitative indicators for engagement and a narrative-based study for impact. The assessment panels are organised according to broadly cognate disciplines and are comprised of academic researchers and research end-users.

Source: Australian Research Council (2017[75]), *Engagement and Impact Assessment*, www.arc.gov.au/engagement-and-impact-assessment.

The United Kingdom is developing a Knowledge Exchange Framework (KEF) to measure university-business collaboration and knowledge exchange, building on data from the Higher Education Business and Community Interaction Survey and other sources. The two key assessment criteria of the KEF are metrics and good practice (e.g. in the processes of capitalising on university intellectual property through spin out companies or licensing) (HEFCE, 2017[76]).

Supranational initiatives are also promoting a greater focus on improving the societal impact of research. For example, Responsible Research and Innovation (RRI) is a concept in the European Commission’s Horizon 2020 Framework Programme for Research and Innovation (see Table 7.1 for the definition of RRI). In Horizon 2020, RRI focuses on six priority areas: engagement, gender equality, science education, open access, ethics and governance. The European Commission promotes RRI through its Science with and for Society programme, focusing on these priority areas (European Commission, 2019[77]).

Flanders and Norway have recently incorporated the concept of RRI into their research and innovation strategies. Flanders accounts for the major part of total Belgian participation, as well as the largest share of grants secured through Horizon 2020 in the country (and about 3% of the total Horizon 2020 funding across Europe). It performs particularly well in projects relating to governance for the advancement of RRI (Flemish Department of Economy, Science and Innovation, 2017[78]). Estonia's national Research, Development and Innovation strategy also makes commitments to further align R&D with the interests of the Estonian society and economy (Estonian Ministry of Education and Research, 2014[54]).

RRI is a strategic priority in Norway under the *IKT og digital innovasjon* (IKTPLUSS) programme. IKTPLUSS was created by the Research Council of Norway and is a large-scale initiative on information technology and digital innovation. By contributing to ICT solutions through the production of knowledge and technology, the programme aims to enhance productivity and efficiency, and address key societal challenges. Applicants must include RRI perspectives in their applications and demonstrate a commitment to engagement (The Research Council of Norway, 2018[79]).

Engaging citizens in the research process

Engaged research is a term that emphasises the use of collaborative research methods and the scholarship of engagement.[3] It often appears in the form of community-based research, participatory action research and service learning. Participatory action research is a methodology in social sciences that helps build bridges between academics, local communities, and government agencies by developing a public sphere for creating knowledge (McTaggart, 1997[80]). Service learning represents a combination of experiential learning and community involvement used in schools and higher education institutions; it is also referred to as involved learning (Roza, Lonneke; Meijs, 2014[81]) and community service (Haski-Leventhal et al., 2010[82]).

In the Flemish Community, examples of research projects with a direct impact on the environment and on the community include *Curieuzeneuzen*, a collaboration project to engage citizens in scientific research and the Participatory Platform for Sustainable Energy Management (PARENT), which promotes the reduction of household energy consumption in the local community.

The Netherlands has a long history with engaged research that dates back to the 1970s, with the development of "Science Shops." Science Shops are small entities that carry out scientific research in a wide range of disciplines at the request of citizens and local civil society, usually free of charge. By the 1980s, Science Shops had been established at all Dutch universities as bureaus of the institution, serving many scientific disciplines (The International Science Shop Network, 2018[83]). These developments aimed to strengthen community-university research partnerships. The Science Shops model has been the recipient of EU funding (FP7) to scale public engagement in research and has been cited as a good practice (Mulder, Henk; Straver, 2015[84]; Wageningen University, 2014[85]). The Netherlands also defined its National Research Agenda (NWA) through a bottom-up process with researchers, the private sector, NGOs, citizens and other stakeholders (see Chapter 6).

Other jurisdictions also provide examples of recent programmes which aim to improve engagement. CampusEngage in Ireland is a programme that defines engaged research as "a wide range of rigorous research approaches and methodologies that share a common interest in collaborative engagement with the community and aim to improve, understand or investigate an issue of public interest or concern, including societal challenges" (Irish Universities Association; Irish Research Council, 2017[86]). CampusEngage has championed the use of a wide range of indicators to measure community engagement in higher education, which includes collaborative research methods.

The Research Councils UK (RCUK) have also developed incentives for research engagement through activities that foster national coordination and impact. The National Co-ordinating Centre for Public Engagement works with key national partners to draw participation from the public in the knowledge creation process (University of Bristol; University of West England, 2018[87]). Impact is measured as academic, economic and social; for example, as a condition for funding, researchers must use the Pathways to Impact statement as a component of their research projects in grant applications to the government (UK Research and Innovation, 2018[88]). The Pathways to Impact statements require grant applicants to be project-specific and focus on potential outcomes. In addition, the RCUK Catalysts Seed Fund (CSF) functions as a source of flexible funding for higher education institutions, so that they can create and improve models for embedding public engagement in research at the institutional level (UK Research and Innovation, 2018[89]). In the 2015/2016 round of the CSF programme, 10 higher education institutions received GBP 65 000 each for 12 months.

7.4.2. Expanding open access and open science movements

Access to academic research is often only available for a fee, which can be expensive, limiting its availability to practitioners, stakeholders and the general public. Issues of intellectual property rights and ownership are complex, but movements for open access and open science are gaining traction. "Open science" refers to unrestricted access to publicly funded research results, and requires the ability of scientific systems to exchange and make use of research results and data. OECD member and non-member countries are increasingly developing legal and policy frameworks, guidelines and initiatives to encourage greater openness in science, with several countries implementing strategic approaches (OECD, 2015[90]).

Open science also enables the increased engagement of citizens in scientific progress and innovation. It has the potential to provide multiple benefits, including:

- **Improving efficiency in science.** Open science could increase research productivity by: 1) reducing research duplication and the re-creation of data; 2) allowing a more accurate verification of research results; 3) enabling more research to be conducted based on the same data; and 4) multiplying opportunities for domestic and global participation in research.
- **Generating knowledge spill-overs.** Increased access to research results could spur knowledge spill-overs, innovation and efficiencies across the economy and society.
- **Helping to address global challenges.** Addressing global challenges requires access to and sharing of reliable data from many countries. The international Human Genome Project is an example of a large-scale research endeavour in which an openly accessible data repository has been used successfully by researchers all over the world, for different purposes in different contexts. Furthermore, for scientists in developing countries, greater access to international science and data can help meet social and economic goals (OECD, 2015[90]).

Open access is defined by the European Commission as "the practice of providing online access to scientific information that is free of charge to the end-user" (European

Commission, 2017[91]). The EU framework on open access to and preservation of scientific information aims to provide researchers, business, and citizens with free, online access to EU-funded research results, optimising the impact of publicly funded research at the European level. The main objectives are to enhance quality, reduce duplication, speed up scientific progress, help to curtail scientific fraud, and contribute to economic growth and innovation (European Commission, 2018[92]). The European Commission supports two publishing categories: the self-archiving ‘green open access’ and the ‘gold open access’ publishing. ‘Green open access’ means that the published article or peer-reviewed manuscript is archived by the researcher (or representative) in an online repository – with access often being delayed, as publishers may wish to recover their investment by selling subscriptions and charging pay-per-download fees. In the case of ‘gold open access publishing,’ the article is provided in open access immediately by the scientific publisher (with costs borne by the research institute or funding agency supporting the research) (European Commission, 2017[91]).

Horizon 2020 Regulations and Rules of Participation for open access to peer reviewed scientific publications are implemented through provisions in the grant agreement. Beneficiaries must submit a scanned copy of the final version of their peer-reviewed manuscript accepted for publication in a repository for scientific publications and ensure open access either through open access publishing (open access journals or journals that sell subscriptions and offer the option of making certain articles open (hybrid journals)) or through self-archiving in a repository of their choice (‘green open access,’ available within six months of publication). Publication costs incurred during the grant agreement period are eligible for reimbursement, and a mechanism will be piloted to address costs incurred after the end of the grant agreement. Open access also covers bibliographic metadata and underlying data (data underpinning the publication), although without obligation (European Commission, 2017[91]) Sustainable funding for the preservation of scientific research is important, as curation costs for digitised content are still high (European Commission, 2018[92]).

In addition, the framework also includes the Open Research Data Pilot, which is an initiative that aims to maximise access to and re-use of data generated by projects. The foci include future and emerging technologies; research infrastructures; leadership in enabling and industrial technologies; societal challenge (clean energy, climate action and inclusive innovative societies); as well as science with and for society (European Commission, 2017[91]).

Finland has been referred to as a case study for adopting open innovation platforms (OIPs) as a policy tool (Cervantes, 2017[12]). OIPs have been adopted in many cities and are being used as collaboration models by higher education institutions to fulfil their third mission (Raunio, Räsänen and Kautonen, 2016[93]).

Some of the shortcomings involved in adopting open access and open science movements are related to the way incentives are organised, as the tenure structure within higher education institutions and the ownership of scholarly communication systems deter academics from wanting to publish in open access journals (Bernstein-Sierra, 2017[94]). The tenure structure perpetuates the property regime, as there is an expectation of work dissemination through prestigious and traditional journals (Box 7.7). These journals are often owned by large corporate publishers and have a more restricted access channel.

Box 7.7. Who "owns" knowledge?

"Knowledge is a commons because it is non-excludable; with sufficient mental capacity, no person can be excluded from acquiring it, […however], its expression is not. When ideas are expressed in tangible form — as books and musical compositions — those forms can be made excludable and commodified. In order to incentivize authors and musicians to continue to write and compose, governments grant limited monopolies to knowledge creators in the form of intellectual property rights. IP, and specifically copyright, is the legal mechanism that allows creators to exclude others from accessing the book or composition, and ultimately charge a fee for their work. IP transforms common resources into commodities" (Bernstein-Sierra, 2017[94]).

The 2017 OECD Science Technology and Innovation Scoreboard provides an assessment of open access of scientific documents based on an analysis of the levels of access provided by a random sample of 100 000 citable documents published in 2016 (Figure 7.5). The review has four labels: gold open access, gold hybrid, green open access and closed. Gold open access refers to documents associated with publishers who make their content available at no charge to readers. Gold hybrid refers to documents accessible from a publisher that typically require a subscription for general access, but allows open access to specific documents upon payment from the author or sponsors. Lastly, green open access indicates that the document exists in repositories and does not match either of the other gold options (OECD, 2017[48]).

Overall, the main model remains by far one of closed access (Figure 7.5). On average in 2016, around 4% of authors appeared to be paying a fee to make their papers publicly available within traditional subscription journals (gold hybrid). Among the different open access channels, publishing in gold open access journals was the most common option for authors in Estonia, Norway and Belgium. In the Netherlands, the green open access model was the most commonly used among open access journals.

All participating jurisdictions have policies to encourage further open access. In the Flemish Community, as part of the Work, Economy, Science and Innovation 2014-2019 strategy, Flemish universities are encouraged to develop a consistent open access and data policy.

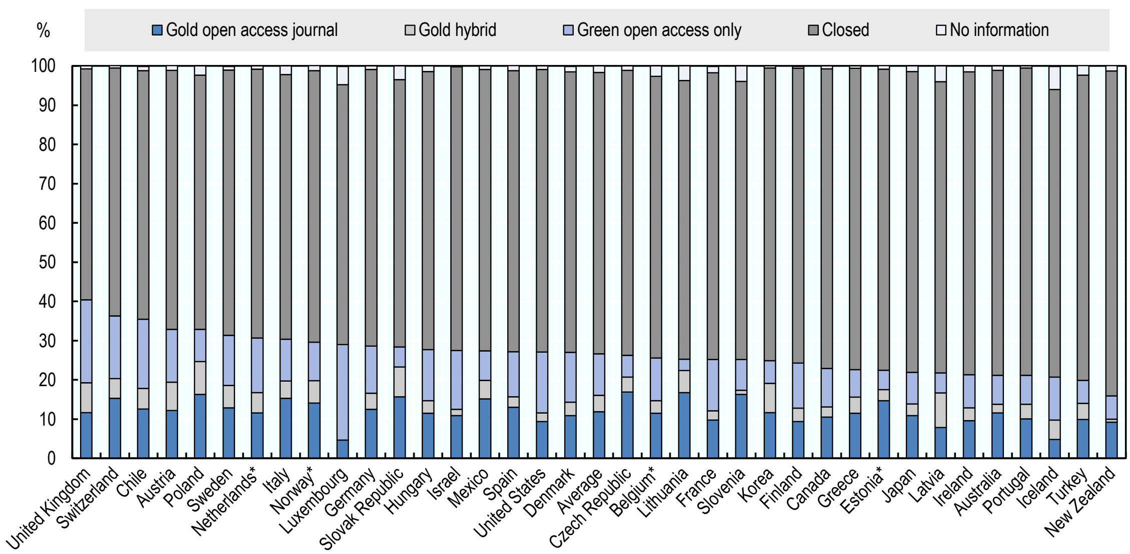
The National Research Council (NWO) in the Netherlands requires immediate open access publishing of publicly funded research and has additional requirements on data management. In 2017, the Netherlands published its National Plan Open Science. A coalition of stakeholders[4] is working together in the National Platform Open Science to realise the ambition of 100% open access to their publications by 2020, the optimal re-use of research data and the inclusion of open science in the evaluation and assessment of researchers. The guiding principle to the National Plan Open Science is open when possible and closed when necessary. The government expects open access and open science to become the norm in scientific research. The Association of Universities in the Netherlands (VSNU) negotiates with scientific publishers on behalf of universities; and new contracts with open access opportunities have been concluded with several scientific publishers (e.g. allowing researchers to choose the open access option for journal publications at no costs).

The Research Council of Norway (RCN) has a policy on open access that requires grant beneficiaries to make their publicly funded scientific publications available in open access repositories. RCN has a dedicated funding scheme to support open access publishing (2015-2019). However, targeted financial support for open access publishing will be cut from RCN by 2019 when publishing costs are to be included in the indirect costs in applications (European Commission; OECD, 2018[95]).

As policies and legal frameworks are developed to encourage greater openness in science, it will be important to also develop internationally comparable indicators to measure progress across the OECD.

Figure 7.5. Open access of scientific documents (2016)

As a percentage of a random sample of 100 000 documents published in 2016



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018.
OECD calculations based on Scopus Custom Data, Elsevier, Version 4.2017; and roadoi "wrapper" routine for the oaDOI API.
Source: Adapted from OECD (2017[48]), OECD Science, Technology and Industry Scoreboard 2017: The digital transformation, http://dx.doi.org/10.1787/9789264268821-en.

StatLink http://dx.doi.org/10.1787/888933941861

7.4.3. Creating a greater role for higher education in civic and cultural engagement

In recent decades, higher education institutions have become increasingly entrepreneurial in many countries, with the development of on-campus business incubators, technology accelerators, science parks, and spin-offs. This has been accompanied by increased policy interest in the economic outputs of commercial activity. However, there has been some criticism that the emphasis on commercialisation and business engagement has overshadowed civic engagement (Benneworth, 2013[96]; Hazelkorn and Gibson, 2017[97]). Similarly, there have been suggestions that the emphasis on "technology transfer" implies a one-way relationship between higher education and society, favouring technological contributions to innovation and neglecting the role of the arts, humanities and social sciences (Kempton et al., 2013[98]). This has been accompanied by growing calls for greater social and public accountability in higher education (Hazelkorn and Gibson, 2017[97]).

As a result, more demand and citizen-driven approaches to innovation, regional engagement and "third mission" activities have arisen in recent years, with the objective of re-orienting higher education towards social challenges and concerns (Benneworth, 2017[1]; Pinheiro, Langa and Pausits, 2015[99]). Civic and social engagement plays an important role in the overarching mission for higher education (i.e. the legislative framework or other national policy) in all participating jurisdictions and in their funding programmes. Civic and social engagement is also included as part of the organising legislation for higher education systems in many countries, for example Estonia and Norway.

In Estonia, the concept of civic engagement is embedded in the legislation, which states objectives and learning outcomes to be achieved at the higher education level (Estonian Parliament, 1995[39]). Student engagement normally takes place through representation on relevant decision-making bodies within higher education institutions. Institutional civic engagement is also fostered through set expectations that are incorporated in the curricula. For example, in order to be awarded a bachelor's degree, a student is expected to be able to evaluate the role of discipline-specific knowledge and the consequences of his or her professional activities in society; a similar approach applies to the awarding of a master's and a doctorate degree.

In Norway, students can demonstrate their civic engagement through representation on the relevant decision-making bodies in higher education institutions. Under the Universities and University Colleges Act 2005, students have the right to organise and they must be consulted on all matters that concern them. Students are also given the opportunity to engage in public debates through student organisations at the local, institutional and national levels (Government of Norway, 2010[68]); this approach is supported through legislation and funding for student organisations.

Norwegian higher education institutions also play an important role in promoting democratic values in society. The Universities and University Colleges Act 2005 states that all higher education institutions should facilitate the participation of its staff and students in public debate (Government of Norway, 2010[68]). The responsibility of higher education institutions to participate in public debate and set the social agenda is also outlined in the White Paper on Quality Culture in Higher Education (Norwegian Ministry of Education and Research, 2016[100]).

Some initiatives have taken a step further, aiming to measure community and civic engagement. For instance, the EU-funded project, Towards a European Framework for Community Engagement of Higher Education (TEFCE), aims to develop tools to assess the community engagement of universities in Europe. The project aligns with the EU's Renewed Agenda for Modernisation of Higher Education, which prioritises building inclusive and connected higher education systems (European Commission, 2017[101]). The project will last from 2018 to 2020 and will include leading researchers, universities, local authorities and university networks from seven EU member states. The main aim of the project is to better prepare higher education institutions in their engagement efforts in order to address pressing social issues (NESET II, 2018[102]).

Other tools have also been developed to measure community and civic engagement, For example, the Carnegie Foundation has initiated a pilot project in Ireland to implement the Classification for Community Engagement in twelve higher education institutions in the country (Box 7.8).

Box 7.8. The Carnegie Community Engagement Assessment Pilot in Ireland

The Carnegie Classification™ has been the leading framework for recognising and describing higher education institutions in the United States for over 40 years.

The Carnegie Foundation's Classification for Community Engagement is a voluntary classification that was developed in 2006 by the Carnegie Foundation for the Advancement of Teaching to determine whether an institution qualifies for recognition as a community engaged institution.

Community engagement is defined as:

> *Community engagement describes collaboration between institutions of higher education and their larger communities (local, regional/state, national, global) for the mutually beneficial exchange of knowledge and resources in a context of partnership and reciprocity.*
>
> *The purpose of community engagement is the partnership of college and university knowledge and resources with those of the public and private sectors to enrich scholarship, research, and creative activity; enhance curriculum, teaching and learning; prepare educated, engaged citizens; strengthen democratic values and civic responsibility; address critical societal issues; and contribute to the public good (Brown University, 2018[103]).*

The classification involves data collection and documentation of institutional practice to be used in a process of self-assessment and quality improvement. The documentation is reviewed by a National Review Panel. The application process for the Elective Community Engagement Classification takes place on a five-year cycle and is currently administered by the Swearer Center at Brown University (Brown University, 2018[104]).

There is currently an international pilot underway to apply the community engagement classification framework outside of the United States for the first time. A pilot was conducted with 12 higher education institutions in Ireland to measure community and civic engagement. The pilot project is largely focused on research to assess the feasibility of a national measurement tool that could be created and adopted to allow higher education institutions in Ireland to measure community and civic engagement (Carnegie Community Engagement Assessment Framework Ireland, 2019[105]).

Higher education is associated with other forms of civic engagement. For example, individuals with higher education report that they participate more frequently in formal and informal volunteering than those with lower levels of education (OECD, 2015[106]). On average across OECD countries with available data, the proportion of adults reporting that they participate in volunteer activities is 10% higher for those with higher education compared to those below upper secondary education. Particularly large differences are observed in the United States, where the difference amounted to 26 percentage points in 2012. This difference represented 7-8% in Estonia and the Netherlands and 10% in Flanders and Norway (OECD, 2014[107]).

The notion of the "Civic University", as defined in Table 7.1, embraces a broad, civic role for higher education institutions and sees active engagement as an important feature of both education and research activities (Box 7.9).

Box 7.9. The Civic University

The notion of the "Civic University" recognises that the process of engagement itself has value; it is not just a means to an end, but is also an end in itself (Ehrlich, 2000[108]; Goddard et al., 2016[3]; OECD, 2007[5]). Civic universities view themselves as anchor institutions in their communities, i.e. institutions of higher learning that also cultivate their roles as centres for culture and the arts, public service and continuing education. When engagement is embedded as a core function of the institution, it facilitates greater responsiveness to societal needs through education and research.

Growing interest in pluralistic forms of evidence and participatory research in higher education has also facilitated more inclusive approaches to solving society's intractable problems (Benneworth, 2013[96]; Inman and Schuetze, 2010[109]). Service learning, for instance, is a pedagogical approach that incorporates community engagement as part of the curriculum. Using the community as a classroom or research laboratory provides a richer learning environment for students and opens up opportunities for collaborative research with community partners (Ehrlich, 2000[108]; Inman and Schuetze, 2010[109]). This also encourages the development of competences, values and attitudes that promote civic participation, social inclusion, sustainability thinking and global citizenship (Grau et al., 2017[110]).

Higher education and cultural engagement

Culture acts as an agent of development by enhancing quality of life, attracting and retaining social creativity (e.g. through arts and music), and enhancing enterprise formation, productivity and employment (OECD, 2007[5]). Higher education institutions can facilitate public cultural engagement by making their cultural infrastructure available to the public, such as libraries, auditoriums, orchestra, sports and media facilities as well as galleries and museums (since many are owners or custodians of cultural assets). They can add to the body of knowledge by producing culturally based research, and contributing to capacity building in cultural groups. Moreover, higher education institutions can be culture champions and provide policy advice as well as services to culturally enrich communities (OECD, 2007[5]).

In Estonia, the preservation of culture has been embedded in legislation. It is part of the mission of universities to support initiatives that aim to preserve, develop and promote the national culture through institutional co-operation and social engagement in the production of research and creative work (Estonian Parliament, 1995[39]). Some of the activities provided by higher education institutions open to both students and the public include: access to library services, museums, botanical gardens, sport facilities and leagues. In addition, higher education institutions offer various events to students and the public, such as open lectures, concerts, student festivals (e.g. the regional (Estonia, Latvia and Lithuania) student singing and dance festivals called Gaudeamus have taken place every four years since 1956). Furthermore, Estonia's Research Development and Innovation Strategy 2014-2020 plans to create favourable conditions for culture and the sustainable development of Estonia.

The Norwegian Ministry of Culture, with the co-operation of other ministries, is responsible for the overall framework of cultural policy in the country. The responsibilities of the Ministry of Culture are broad and include the policy areas of art, culture, copyright, church, the media, sport and the voluntary sector. More specifically, the Norwegian Federation of Arts in Education (*Fellesrådet for kunstfag i skolen*) aims to enhance art subjects in all levels of education, including higher education. The Federation has around 2 000 members, and is a profession-based organisation, advising the government and other stakeholders on policies (European Commission, 2018[111]).

A report commissioned by the Arts Council England and the National Museums Director's Council in 2013 showed that arts and culture create spill-over effects through tourism, support commercial creative industries, improve national productivity, and work as a catalyst for economic regeneration (Centre for Economics and Business Research Ltd., 2013[112]). The report also highlights the role arts and culture play in supporting research activities, with many respected museums having officially been recognised as research organisations and having received the right to supervise research degrees. According to the report, 599 arts organisations in the UK had a relationship with at least one higher education institution and 244 higher education institutions have established links with national museums. In Australia, the government's Excellence in Research for Australia (ERA) framework has recognised creative work of artists, dancers, filmmakers and similar professions as research (Australian Research Council, 2017[75]).

Higher education can also support and promote Indigenous cultures and languages. The Kindred Peoples Programme (1999) fosters the promotion of Estonian culture in higher education by supporting the development of language and culture of the Indigenous Uralic population. In addition, various fields of R&D, including activities related to the Estonian language, culture and language technology, are supported by government. Scholarships for higher education are also available for targeted groups (i.e. Finno-Ugric, Samoyed peoples and the Livonians) (Fenno Ugria, 2010[113]).

The Norwegian Constitution protects the Sámi people,[5] their culture and traditional livelihoods. Higher education institutions play an important role by promoting and strengthening research and education in relation to Sámi and other Indigenous people. The Sámi University of Applied Sciences is an Indigenous institution that preserves and promotes Sámi culture and language. The institution promotes a Sámi perspective in research and teaching and focuses on Sámi teacher training and journalism. The Arctic University of Norway (UiT) also has a Centre for Sámi Studies, which aims to promote and strengthen multi-disciplinary research and education related to Sámi and other Indigenous peoples.

7.4.4. Using engagement activities to promote sustainability

Ensuring green growth and sustainable development is one of the key challenges of modern society. A clean and healthy environment is essential for supporting economic activity and well-being in the long-term. Higher education, through its education, research and engagement functions, can support countries in achieving a sustainable and inclusive development.

The Sustainable Development Goal 4 (SDG4), one of the UN's 17 Sustainable Development Goals (SDGs) adopted in 2015, seeks to achieve education for sustainable development and global citizenship. Higher education also plays an important role in the other goals, including climate change (SDG13), which includes the target to "improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning" (UNESCO, 2015[114]).

As part of the United Nations Economic Commission for Europe (UNECE), the participating jurisdictions all promote Education for Sustainable Development (ESD) in the region through network platforms. Through these networks, higher education institutions have identified common goals and shared sustainability practices and research, as well as curricula and learning. Some examples of networks include the Baltic University Programme (225 higher education institutions from the Baltic Sea region), the Copernicus Alliance (55 higher education institutions from 33 countries), the Global Universities Partnership on Environment and Sustainability, and the University Educators for Sustainable Development (a consortium of higher education institutions, organisations, agencies and associations situated around four regions across Europe) (UNECE, 2016[115]).

Estonia is engaged in UNESCO's ESD programme, mainly through primary and secondary education. However, the government has also provided direct funding to support initiatives in higher education (Estonian Ministry of Education and Research, 2016[116]). For example, since 2003, the Ministry of Research and Education, together with universities and the Environmental Investment Centre, has funded student science conferences on sustainable development (Kalle, 2013[117]).

In the Flemish Community, sustainable higher education embeds the ecological, economic and social principles and practices of sustainable development in its core objectives (Flemish Environment, Nature and Energy Department, 2018[118]). Ecocampus, for example, provides a space in which teachers, researchers and students can study and experiment with sustainability challenges (Box 7.10).

Box 7.10. Ecocampus: Sustainable development in Flemish higher education

The Ecocampus programme promotes sustainable development in the Flemish higher education system by aiming to:

- provide a favourable and enterprising environment so that teachers, researchers and students have the space and the opportunity to work on sustainability
- assist teachers, researchers and students in developing knowledge, skills and attitudes necessary to respond to pressing problems on climate change, energy, food security, poverty and quality of life, as well as qualities necessary to critically examine their practices in the context of sustainability.

Ecocampus aims to fulfil these goals through various means, including by providing information (e.g. publications), offering tools and exchanging good practices, including:

- thematic learning networks that serve as platforms to connect educators from higher education institutions and provide spaces for learning exchange on sustainable development teaching practices
- education videos, including "Sustainability in Research, an Answer to Wicked Problems," where four Flemish researchers and policy directors share their views on the meaning and use of sustainability in higher education research
- a kit for teachers, which shows two approaches of resource management as a sustainability issue (one from Flanders and the transition towards a circular economy, and one from Peru and its mining industry)
- dissemination of a theoretical framework for sustainable higher education through publications. These publications provide a view on several concepts, such as sustainable development, sustainable higher education, barriers, and ways forward (Flemish Environment, Nature and Energy Department, 2018[118]).

Environmental education has a long history in the Netherlands; yet it has been mainly focused on primary education. Higher education contributes through annual programmes funded by the Sustainability Framework 2017-2020. Through these programmes, the government engages social partners, including the higher education sector, on its efforts to achieve a more green and sustainable economy. The policy framework is based on three main concepts: circular economy, local engagement (social entrepreneurship), and value-added, inclusive partnerships (DuurzaamDoor, 2018[119]).

In 2016, Norway was the first OECD member country to ratify the Paris Agreement. In the Long-Term Plan for Research and Higher Education 2015–2024, the government sets the six priority areas of Norwegian higher education and research, which include two broad environmentally related areas: climate, environment and renewable energy; and seas and oceans.

Beyond the participating jurisdictions, the United States has been very active in energy and environmental education stewardship. At the federal level, environmental education is one of the services provided by the Environmental Protection Agency. Almost half of the agency's budget is allocated to grants to various organisations, including education institutions. Grants can be invested on education programmes, professional and youth recognition awards, funding opportunities, publications and more. A useful tool developed by the agency is a platform with information on all initiatives by state, including programmes delivered by higher education institutions (United States Environmental Protection Agency, 2018[120]).

In addition, states have customised approaches for the promotion of sustainable development. For example, the state of Massachusetts developed the *Leading by Example* programme to encourage state agencies and higher education institutions to adopt new practices to reduce their negative impact on the environment. In 2008, the programme created a guide on Campus Sustainability Best Practices, as well as a Greenhouse Gas Inventory Guide for Massachusetts Colleges and Universities. Both the guide and the inventory were based on studies that reviewed thousands of projects happening at the institutional level across the country and provided a list of best practices for local higher education institutions (Patrick, Murray and Bowles, 2008[121]).

In Canada, the federal and the provincial level share jurisdiction in environmental law. At the federal level, educational activities broadening public awareness of climate change are mainly based on partnerships between academics and government scientists in the area; research grants; and the recruitment of students through "co-operative education," which is the terminology used for work-based learning in Canada (Government of Canada, 2013[122]). Co-op placements are assigned with the government or private organisations focusing on environmental policy and climate change, respectively.

An important initiative at the provincial and territorial levels in Canada is the Networks of Centres of Excellence (NCE). These networks bring together academics, industry and non-profit organisations, leading multi-disciplinary research partnerships and attracting strategic investment in the area. NCEs are usually centred at university campuses, two examples are the ArcticNet (Laval University) and the Marine Environmental Observation Prediction and Response Network (Dalhousie University) (Government of Canada, 2013[122]). In addition, many higher education institutions in Canada have adopted a "whole-institution" approach as a result of the Sustainability Tracking Assessment and Reporting System of the American Association for Sustainability in Higher Education. "Whole-institution approaches involve the learners, the institution and the community working together to embed sustainability in curriculum, learning approaches, facilities, operations and community interaction" (UNECE, 2016[115]).

Japan addresses existing social challenges, including climate change, poverty and human rights, in order to achieve sustainable development through an ESD programme (Japanese Ministry of Education, Culture, Sports, Science and Technology, 2019[123]). In 2008, the national ESD implementation plan called for the development of higher education model programmes in this area. Since then, the government supports ESD in higher education through funding, including grants for sustainable science research, and community activities, such as the provision of ESD certificates at higher education institutions and the establishment of a higher education forum on ESD (Nomura and Abe, 2010[124]).

7.5. Concluding remarks

This chapter reviewed engagement with the wider world, the third function of higher education, focusing on engagement efforts that help build human capital, contribute to innovation and support wider development. It explored relevant higher education policies with a particular focus on the four participating jurisdictions, and highlighted developments at conceptual and practical levels, pointing out gaps in the existing information base.

This concluding section focuses on summarising some of the key messages of the chapter, along with the limitations of available information, which prevent a deeper analysis. Key concluding points are:

- Most of the internationally comparable data on engagement at the system level are based on engagement between higher education and enterprises, and business contributions to higher education expenditure on R&D, enabling only a partial understanding of higher education engagement.
- Governments are playing a critical role in developing entrepreneurship in higher education in all fields of study, as well as developing and updating the skills of society through continuing education. Data on the development and diffusion of entrepreneurship across educational programmes, as well as a common definition and provision of continuing education across OECD countries would contribute to a better understanding of how and why policies are being developed. This could provide a better ground for countries to learn different ways to make their higher education systems more relevant to their societies and sustainable.
- Surveys that measure engagement between higher education and enterprises measure perceptions of university-business collaboration and factual collaboration, providing an overview to policy makers of performance and public opinion. More comprehensive data collection on collaboration could improve countries' overview of their capacity to meet society's needs.
- As governments develop legal and policy frameworks, guidelines and initiatives to encourage greater openness in science, it will be important to also develop internationally comparable indicators to measure progress across the OECD.
- Discussions about the definitions of, as well as agreement on, common indicators are becoming increasingly important as the emphasis on civic engagement and the social impact of higher education grows. Due to the lack of data to measure performance, assessments at this stage are not feasible, but countries can greatly benefit from learning about each other's good practices in these areas through policy and practice benchmarking. Efforts to define and collect data will become even more important as engagement efforts increase.

Due to the lack of available data, the benchmarking approach to the study of engagement with the wider world focuses more heavily on policies and practices. Table 7.3 summarises key policies and practices presented in the chapter. As discussed in this chapter, some OECD countries have developed or are developing indicators to measure the social impact of engagement activity in research. These developments are still in the early stages, but have the potential to eventually contribute towards the definition of comparable indicators across OECD countries, with additional conceptual development.

Table 7.3. Selected policies from the participating jurisdictions (2017)

	Motivation	Policies
Estonia	Improving accessibility in higher education through continuing education	▪ Legislation determines the responsibility of higher education to provide education services to society. ▪ The provision of continuing education is among the criteria used in institutional accreditation. ▪ There are also goals related to the provision of continuing education in performance agreements, which are tied to funding. ▪ Around 20% of funding is allocated based on performance, and one indicator pertains to revenues from study activities (i.e. funding coming from tuition fees and provision of continuing education).
The Flemish Community	Increasing environmental sustainability through higher education	• The government (at various levels) supports the development of programmes that promote sustainability. EcoCampus is an example of how higher education institutions can engage with society to promote sustainability, including preservation of the environment, by assisting teachers, researchers and students to develop knowledge, skills and attitudes necessary to critically examine sustainability practices. ▪ EcoCampus provides information (publications), offers tools and the exchange of good practices, including thematic learning networks, education videos, a kit for teachers in economic lessons, dissemination of a theoretical framework for sustainable higher education through publications, etc. ▪ Curieuzeneuzen, a collaboration project to engage citizens in scientific research and the Participatory Platform for Sustainable Energy Management (PARENT), is also an example of an engaged research project with direct impact on the environment and on the community. The programme promotes the reduction of household energy consumption in the local community.
The Netherlands	Encouraging the development of policies to increase the social impact of research and better integrate higher education locally	• In 2010, the Valorisation Programme was initiated with the aim of professionalising the knowledge transfer process. The programme created several regional consortia centred on one or more higher education institutions. The consortia brought together companies, knowledge and research institutes, civil society organisations, and local and regional governments. Co-funding of 50% was provided for valorisation plans, on the condition that plans would be carried out by a public-private consortium. Funds supported entrepreneurial education; screening and scouting knowledge transfer opportunities; IP applications; pre-seed funding; proof-of-concept funding; network creation; and other activities that contribute to knowledge transfer. • Using society as a learning environment for students is part of the Strategic Agenda for Higher Education and Research 2015-25. Students formulate the relevant research questions together with researchers and partners in the field through activity such as community service, knowledge workshops, field laboratories and student housing in the learning environment itself .For example, the City Deals on Education aims to find solutions for social challenges in cities through the large-scale involvement of businesses, researchers, lecturers and students.
Norway	Fostering entrepreneurship and innovation across the higher education system, including place-based innovation systems	• The 2014 Action Plan urged higher education institutions to expand and diversify their entrepreneurship education provision. As a result, a nationally funded peer-mentoring project to support the development of entrepreneurship was piloted from 2014 to 2016, and has since been adopted by other institutions across Norway. • The newly introduced performance agreements include indicators for entrepreneurship and innovation for some institutions. • The Research Council of Norway also finances the Student Entrepreneurship (STUD-ENT) programme, which promotes a stronger entrepreneurship culture in higher education institutions. • As for better integrating higher education in place-based innovation systems, in 2007, Norway established a ten-year funding programme for regional R&D and innovation through the Research Council. The funding programme aimed to promote greater regional collaboration between trade and industry, R&D institutions and government authorities, and the establishment of closer ties with other national and global networks. • As part of the performance-based component of funding for Norwegian higher education institutions, additional funding is awarded based on reported income from regional research grants and grants from the Research Council.

Source: Adapted from information provided by the participating jurisdictions. See the reader's guide for further information.

Notes

[1] "Third stream" is the term used in the United Kingdom to refer to the engagement function of higher education.

[2] Scientific publications are accredited in the form of publication points. In the calculation of publication points, scientific works are ranked according to form of publication, level and number of authors (Fossum-Raunehaug, 2017[127]).

[3] Scholarship of engagement refers to the need to place academic research in a larger context through the scholarship of discovering, integrating, sharing and applying knowledge. This involves creating a climate "in which academic and civic cultures communicate more continuously and more creatively with each other" (Boyer, 1996[125]; Sandmann, 2008[126]).

[4] At the time of the publication of the plan, the coalition of stakeholders included: DANS, The Young Academy, DTL, GO FAIR, National Library of the Netherlands (KB), The Royal Netherlands Academy of Arts and Sciences (KNAW), the National Coordination Point for Research Data Management (LCRDM), the Netherlands eScience Center, the Netherlands Federation of University Medical Centres (NFU), the Netherlands Organisation for Scientific Research (NWO), the PhD Candidate Network Netherlands (PNN), SURF, 4TU.Centre for Research Data, the Dutch consortium of the thirteen university libraries and the National Library of the Netherlands (UKB), the Netherlands Association of Universities of Applied Sciences (VH), the Association of Universities in the Netherlands (VSNU) and the Netherlands Organisation for Health Research and Development (ZonMw).

[5] The Sámi people traditionally inhabit a territory known as Sápmi, which traverses the northern parts of Norway, Sweden, Finland and the Russian Kola peninsula.

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Chapter 8. Assessing performance in higher education

Previous chapters of this report analysed the inputs, activities and outcomes of higher education systems in OECD countries, with special attention to the four jurisdictions participating in the benchmarking exercise. This chapter builds on the previous analysis to examine the performance of the four participating jurisdictions and reflect more generally upon the benchmarking approach taken in this project.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

8.1. Introduction

The benchmarking higher education systems performance exercise envisaged a comparative assessment of how well higher education systems are able to conduct research, educate students, and provide value to the broader economy and society through engagement activities. This chapter discusses challenges to the benchmarking of higher education performance that arose from gaps in evidence and data. It also outlines reflections and lessons learned from the project on measuring performance at the system level, and possible future directions for benchmarking activities.

8.2. Benchmarking process and results

8.2.1. Evidence gathered and used for the OECD system benchmarking project

The OECD benchmarking approach was designed to integrate quantitative and qualitative evidence and provide a system-level view of higher education performance that could inform deliberations on government strategy for higher education. Public sector performance measurement models, including a model developed by the OECD Public Management Programme (PUMA) currently known as the OECD Public Governance Committee, informed the project. The ambition of the project was to measure the "full span" of performance against criteria of relevance, efficiency, effectiveness, economy, cost-effectiveness, utility and sustainability (OECD, 2017[1]).

The benchmarking exercise carried out a comprehensive assessment of indicators from international data sources potentially useful for assessing performance in higher education, taking into account statistical limitations and the various economic and social contexts in which higher education systems operate. Comparative data is presented throughout this report for all OECD countries, augmented with descriptions and comparisons of policies and practices (mainly for the four participating jurisdictions), with the aim of enhancing understanding of the links between policies, practices and indicator values.

Review and selection of benchmarking indicators from existing sources

The indicators used for the benchmarking exercise were selected through a multi-step process. First, existing higher education indicators and datasets from international data sources (Table 8.1) were gathered and mapped onto the project's conceptual framework (OECD, 2017[1]). Over 800 different indicators aggregated at the national level and related to the context, organisation and resourcing of higher education, as well as its education, research and engagement functions, were reviewed in this way.

Table 8.1. International data sources for the benchmarking indicator mapping

Actual sources (surveys, projects or databases)	Institutional source
ACA Institutional Survey	Academic Cooperation Association
European Labour Force Survey (and related ad-hoc modules), Community Innovation Survey, European Union Statistics on Income and Living Conditions (EU-SILC), Adult Education Survey, Personal well-being indicators	Eurostat
More2, E3M	European Commission and associated contractors
OECD Statistics database, Indicators of Education Systems (INES) ad-hoc surveys, OECD Survey of Adult Skills (PIAAC), OECD Programme for International Student Assessment (PISA), OECD Main Science and Technology Indicators, Career of Doctorate Holders (CDH) Survey	OECD
Science, Technology and Innovation Database	UNESCO-UIS
Global Competitiveness Index	World Economic Forum
Intellectual Property Statistics	World Intellectual Property Organization (WIPO)

Note: International data sources from which no higher education indicators were drawn, or providing only indicators also available elsewhere, are not reported in this table.

Approximately 100 indicators were chosen to create a data infrastructure for the benchmarking project. Decisions on inclusion in the data infrastructure were based on criteria including:

- **Coverage and parsimony.** The set of indicators were chosen to cover the full scope of inputs, activities, outputs and outcomes in the functions of education, research and engagement, while at the same time minimising duplication and overlap.
- **Relevance and comparability.** The baseline indicators were chosen on the basis of their alignment to the concepts relevant to the assessment of higher education performance, and on the basis of consistent collection with a common and transparent methodology used across countries.

Development of new indicators

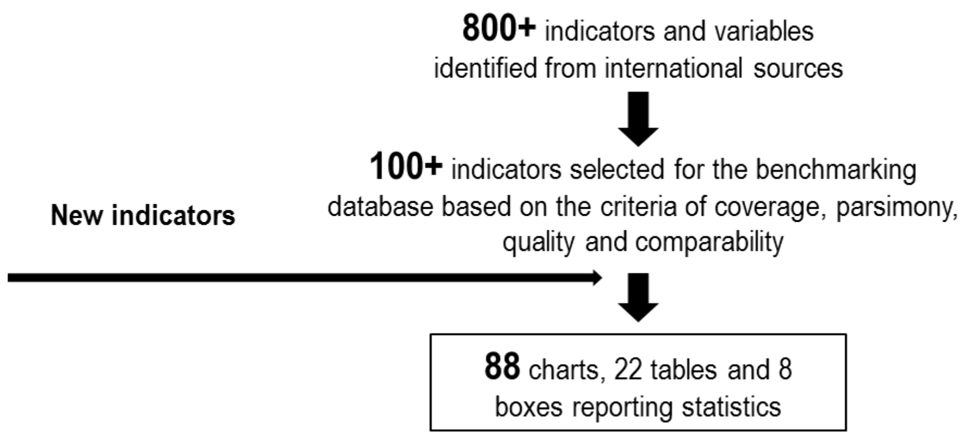
In addition to reviewing existing indicators, the project generated new higher education indicators by integrating data from disparate sources and using existing databases in new ways. For example, new indicators were developed from existing data sources such as:

- institution-level financial and human resource data from the European Tertiary Education Register, which was used to compute additional indicators such as the ratio of non-academic to academic staff, and proportions of private third-party institutional funding
- individual-level data from the Survey of Adult Skills, which was used to generate new indicators on graduate skills and labour market outcomes
- individual-level data from the social media platform LinkedIn, which was used to produce indicators on graduate career paths.

Other indicators were calculated based on national data provided by the four participating jurisdictions. For example, the disaggregation of indicators by subsector (universities vs. professional HEIs) throughout the report is based on this national data collection.

This work of statistical synthesis and production was used to produce the quantitative information included in the report, covering figures, tables and boxes reporting statistics (Figure 8.1).

Figure 8.1. Summary of the statistical work involved in the benchmarking exercise



Note: These numbers refer to the statistical work involved in producing Chapters 1-7 of this report.

Policy and practice information for the participating jurisdictions

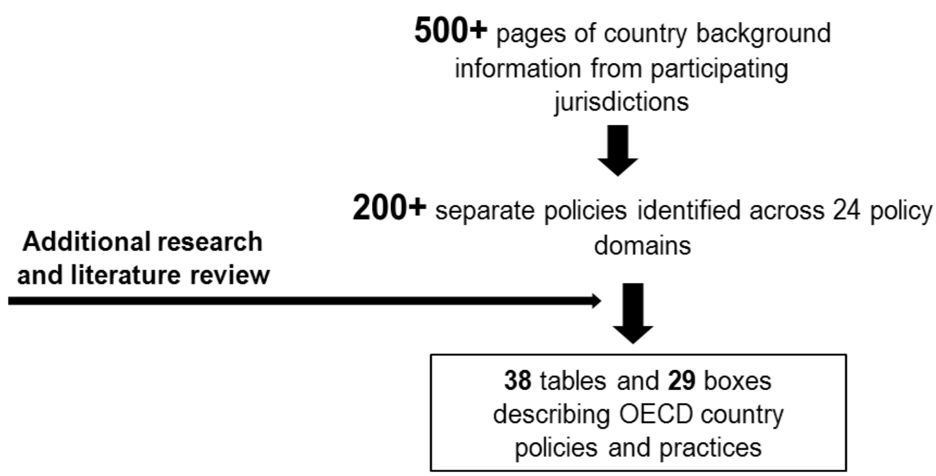
Qualitative information was collected from the four participating jurisdictions through a country background questionnaire that elicited a total of approximately 500 pages of narrative information with respect to 24 policy domains. These 24 domains were identified during the development of the conceptual framework for the benchmarking project and cover aspects of the structure, governance, resourcing and functions of higher education systems (Table 8.2).

Table 8.2. Policy domains covered by the benchmarking exercise

System organisation, governance and resourcing	System functions (education, research and engagement)
System structure	Equity
Diversity of provision	Participation
Consultation processes	Digitalisation
Admission processes	Continuing education
Quality assurance	Lifelong learning
Qualifications	Internationalisation
Policy priorities	Labour market relevance
Funding mechanisms	Research and Development
Student financial assistance	Technology transfer and innovation
Autonomy and Accountability	Regional development
Governance mechanisms	Regional integration
Academic career	Social and civic engagement

The information on policies provided by the four participating jurisdictions was supplemented by additional desk-based research, which primarily focused on the identification of international higher education policy initiatives and additional country practices. The totality of the qualitative information gathered formed the basis for the tables and boxes in the report containing comparative analysis and examples of specific policies and practices (Figure 8.2).

Figure 8.2. Summary of the policy and practice evidence in the benchmarking exercise



Note: These numbers refer to the policies and practices information included in Chapters 1-7 of this report.

8.2.2. Strengths, challenges and performance in the participating jurisdictions

The benchmarking exercise provided an opportunity to review the current state of higher education in OECD countries and identify some pressing performance issues facing higher education systems. However, reviewing combinations of indicators at the country level demonstrates the complexity of making summary judgements about the performance of higher education systems. Table 8.3 shows the position of Estonia, the Flemish Community, the Netherlands and Norway within the OECD distribution based on a scorecard of 45 indicators used in the benchmarking process, using quartiles (Box 8.1).

Box 8.1. Explanation of indicator scorecards

Indicator scorecards are used in this chapter and in the individual country reports to provide a synthetic view of the relative position of each of the four participating jurisdictions within the OECD distribution. In this chapter, a scorecard of 45 indicators covering each of the three functions of higher education is presented for the four participating jurisdictions (Table 8.3). All of the indicators contained in the scorecard correspond to charts and fuller discussion presented in previous chapters of this report.

Quartiles are used to compare each country with the full membership of OECD countries. Location in the bottom quartile means that a jurisdiction is among the one-quarter of OECD countries with the smallest values for that indicator, while location in the top quartile means that a jurisdiction is among the one-quarter of OECD countries with the highest values for that indicator. The coloured square for each indicator represents the position in the OECD distribution, from the bottom quartile (left square) to the top quartile (right square). The square is shaded in grey (instead of black) when data are available for less than half of the OECD countries (the minimum number of countries with available data is 14). No coloured square means that data are missing. In each case, the indicator is presented for the most recent year available.

For the portions of the scorecard related to resourcing higher education, positioning in the top or the bottom quartile in itself does not imply a high or low relative performance, as these indicators relate to the relative levels of inputs only. Instead, the scorecard indicators on resourcing should be considered in relation to the indicators in the education and research portions of the scorecard, where positioning in a higher quartile can be more easily interpreted to mean higher performance relative to other OECD countries, and vice-versa. For example, a country with many research and development related outputs or outcomes in the top quartiles of the OECD, but investment in research in the lower quartiles could be considered to have a relatively efficient system of higher education research.

The following important points should also be noted for Table 8.3:

- for the indicator ‘socio-economic gap in HE access’: the top quartile implies that the difference between 18-24 year-olds with tertiary educated parents and those with non-tertiary educated parents is smaller.
- For Estonia, the entry rates to bachelors-level education include all entrants rather than first-time entrants, which creates a slight overestimate of the entry rate.
- Due to a change in methodology in 2013 in Estonia, the data for “change in expenditure between 2008 and 2015” in the Resources section should also be interpreted with caution.
- For the Flemish Community, indicators marked with an asterisk refer to Belgium rather than the Flemish Community.

Table 8.3. Indicator scorecard for the participating jurisdictions

	Estonia	Flemish Community	The Netherlands	Norway
Resources				
Expenditure on HE, % of GDP	□□□■	□■□□	□□■□	□□□■
*Public expenditure on higher education, % of public expenditures	□□■□	□■□□	□□■□	□□□■
Expenditure per student by higher education institutions	□■□□	□□□■	□□□■	□□□■
Expenditure per student, 2015 relative to 2008	□□□■	■□□□	□■□□	□■□□
HE R&D expenditure, % of GDP	□□■□	□□■□	□□□■	□□□■
Expenditure on R&D activities, %	□□■□	□□□■	□□□■	□□□■
Household expenditure on higher education institutions per student	■□□□	□■□□	□□■□	■□□□
Non-household private expenditure on higher education institutions, %	□□□■	□■□□	□□■□	■□□□
Expenditure per student on grants and scholarships	□■□□	□□□■	□□■□	□□□■
Academic staff younger than 35, %	□□■□	□■□□	□□□■	□□□■
Academic staff older than 60, %	□□□■	■□□□	□■□□	□□■□
Women among academic staff, %	□□□■	□□□■	□□■□	□□■□
Expenditure on staff costs, %	□■□□	□□□■	□□■□	□□■□
Ratio of academic staff to student	□□■□	■□□□	□□■□	□□□■
Non-academic staff per 100 academic staff	□□□□	▒□□□	□▒□□	□▒□□
Education				
Entry Rates into bachelor or equivalent education	□□■□	□□□■	□■□□	□□□■
Students in master's and doctoral programmes, %	□□■□	□■□□	□■□□	□□■□
**Socio-economic gap in HE access	□□▒□	□□□□	□▒□□	□□□▒
New entrants older than 25, bachelor's programmes, %	□□□■	■□□□	■□□□	□□■□
Part-time students in bachelor's programmes, %	□■□□	□□■□	□■□□	□□□■
International students in master's programmes, %	□■□□	□□■□	□□■□	□■□□
Completion rates of bachelor's students	▒□□□	□□▒□	□▒□□	□□□▒
Young population (aged 25-34) with a higher education qualification, %	□■□□	□□■□	□□■□	□□■□
Graduates above literacy proficiency level 3, %	□□■□	□□□■	□□□■	□□■□
Employment rates of master's graduates aged 25-34, %	□■□□	□□□■	□□□■	□□□■
Employment premium for higher education graduates aged 25-34	■□□□	□■□□	□□■□	□■□□
Graduates (aged 15-29) employed or in education, %	□■□□	□□□■	□□□■	□□□■
*Relative earnings of bachelor's graduates	□■□□	■□□□	□■□□	■□□□
Graduates' relative level of self-reported health (odds ratio)	■□□□	□□■□	□□■□	□□□■
Graduates' relative level of interpersonal trust (odds ratio)	□□■□	□■□□	□■□□	□□■□
Research and engagement				
Full-time equivalent researchers per 1 000 of the population	□■□□	□□■□	□□■□	□□□■
Researchers working in higher education, %	□□□■	□■□□	■□□□	□■□□
Women researchers in higher education, %	□□□■	□□■□	□■□□	□□□■
Doctorate holders in the population, %	□■□□	■□□□	□■□□	□□■□
Foreign citizen doctorate holders, %	□□▒□	□□□▒	□▒□□	□□□▒
*Business enterprise funding of HERD, %	□□■□	□□□■	□□■□	□■□□
*Higher education-business collaboration in R&D	□■□□	□□□■	□□□■	□□■□
*SMEs collaborating with higher education on innovation, %	□□□■	□□□■	□□■□	□□□■
*Patent Cooperation Treaty applications from higher education R&D, %	□□□■	□□■□	■□□□	□■□□
*Higher education R&D funding on basic research, %	□□□■	■□□□	□□■□	■□□□
*Number of publications per 1 000 population	□■□□	□□■□	□□□■	□□□■
*Publications among the 10% most cited, %	□□■□	□□□■	□□□■	□□■□
*International scientific collaboration	□■□□	□□□■	□□□■	□□■□
*International net flows of scientific authors	□□□■	□■□□	□■□□	□□□■
*Open access of scientific documents, %	■□□□	□■□□	□□□■	□□□■

Note: See Box 8.1.

StatLink https://doi.org/10.1787/888933941880

It is also important to note that the scorecard shows relative position only; a position in the top quartile does not signify high performance in areas where performance is generally weak across the OECD. Many performance indicators signal that higher education systems in OECD countries have significant scope for improvement, regardless of their position within the OECD. For example, gaps in higher education access by socio-economic background continue to be substantial across countries, indicating considerable room for improvement in equity. In addition, completion rates in bachelor-level education show that one-third or more of entrants do not complete their studies in many OECD countries, indicating weaknesses with respect to both efficiency and equity (Chapter 5).

According to the scorecard, each participating jurisdiction is indicated to have a relatively well-functioning higher education system overall, when considering their positions in the OECD distribution. Measured across the scorecard dimensions associated with performance in education, research and engagement, they are less frequently in the bottom quartile in relation to other OECD jurisdictions and are more likely to be in the top quartile. However, there are differences in the frequency of the appearance of each of the four jurisdictions in either the top or the bottom quartiles (Table 8.4).

Table 8.4. Frequency of appearance of participating jurisdictions in the top and bottom quartiles of the benchmarking scorecard

Based on counts of the numbers of appearances in the top and bottom quartile

	Estonia		The Flemish Community		The Netherlands		Norway	
	Bottom Quartile	Top Quartile	Bottom Quartile	Top Quartile	Bottom Quartile	Top Quartile	Bottom Quartile	Top Quartile
Education	3	1	2	4	1	3	1	7
Research/Engagement	1	6	2	6	2	5	1	7

Importantly, the scorecard also shows that patterns of performance across different domains are unique to individual jurisdictions, limiting the utility of overall system performance judgements across countries. For example, Norway appears in the top quartile of performance in total 14 times across the 30 education, research and engagement indicators. At the same time, while Estonia also appears almost the same number of times as Norway in the top quartile of indicators on research and engagement, it is much less likely to appear in the top quartile of indicators related to the education function (Table 8.4).

Within each of the four jurisdictions, there are also evident differences in inputs relative to other OECD countries across the suite of metrics. For example, the values for both the Netherlands and Norway tend to lie in the upper quartiles of OECD countries when considering the indicators of financial and human resources invested in the system. However, there is more variation in the positioning of the Netherlands across quartiles than Norway when considering the suite of indicators used to measure education and research performance. These variations further highlight the difficulty in developing overall judgements of higher education systems, as aggregation or simplification of the data can lead to unwarranted or inadequately justified performance assessments.

Through analysis of the scorecards for each benchmarking jurisdiction, important individual strengths and challenges relative to other OECD countries become evident, depending on which indicator and performance area is considered (Table 8.5).

Table 8.5. Examples of strengths and challenges in the participating jurisdictions relative to other OECD countries

Selected indicators where each jurisdiction lies in the bottom or top quartile of OECD countries in the education, research and engagement sections of the scorecard.

	Areas of challenge (jurisdiction is in bottom quartile)	Areas of strength (jurisdiction is in the top quartile)
Estonia	Completion rate of bachelor's students; open access of scientific documents	New entrants older than 25 in bachelor's programmes; Women researchers in higher education
The Flemish Community	Proportion of doctorate holders in the population; new entrants older than 25 in bachelor's programmes	Entry rates into bachelor or equivalent education; graduates above proficiency level 3
The Netherlands	New entrants older than 25 in bachelor's programmes; patent applications from the higher education sector	Higher education graduates (age 15-29) employed or in education; publications among the 10% most cited
Norway	Relative earnings of bachelor's graduates, share of higher education R&D funding on basic research	Open access of scientific documents; socio-economic gap in higher education access

8.2.3. Combining indicator values to measure performance

Indicators used to describe the performance of higher education systems, such as those outlined in the scorecard in the previous section, focus on one aspect of the higher education system, separately measuring inputs, outputs or outcomes. However, assessing the performance of higher education systems against the criteria of efficiency or cost-effectiveness requires a more complex exercise, linking inputs to outputs or outcomes.

Efficiency is concerned with the question of how well inputs such as financial and human resources are converted into outputs such as graduates and research results, while cost-effectiveness measures how inputs are translated into outcomes, such as increased skills levels among graduates. The development of actionable measures of efficiency in the higher education sector is complicated by the multiplicity of inputs and outputs that cannot be directly mapped to each other, difficulties in measuring inputs themselves, ascertaining the level of control over the inputs, and attaching an importance weighting to the outputs (Johnes and Johnes, 2004[2]; Johnes, 2006[3]). Actionable measures of cost-effectiveness are even more difficult to achieve, as outcomes such as labour market success and skills acquisition depend on much more than the performance of the higher education system.

To test whether benchmarking indicators could be combined to generate simple and reliable measures of efficiency, five measures of educational and research efficiency (expenditure on completing and non-completing students, expenditure to produce a skilled graduate, the number of publications per researcher and expenditure per publication) were calculated, and their results were considered in terms of comparability and validity.

Expenditure on completing and non-completing students

The core output of the higher education system is graduates, particularly graduates at the bachelor's and master's level, which make up the majority of degree outputs across the OECD. The level of expenditure by higher education institutions per first-degree graduate is a function of both the expenditure required to educate students at this level, and the duration of their study programmes. The mix of first-degree programmes can also vary across OECD countries; while some countries only offer first-degree programmes at the bachelor's level, other systems also have longer programmes that award a master's level (ISCED 7) qualification without first awarding a bachelor's level qualification (Chapter 2).

Using 2015 data on annual expenditure per student and the typical duration of first-degree programmes in OECD countries at either the bachelor's or master's level, it is possible to produce some comparative estimates of the cumulative theoretical expenditure required to produce a first-time graduate (Figure 8.3). A number of limitations apply:

- Data availability for this indicator is limited to the countries that reported the theoretical durations of their first-degree programmes and provided details of expenditure at the bachelor's to doctoral level (ISCED 6-8) in the UNESCO, OECD and Eurostat (UOE) data collections.
- Across OECD countries, it is generally not feasible for average expenditure per student to be disaggregated between bachelor's , master's and doctoral levels of education, as staff costs and other forms of expenditure are often shared between programmes spanning all three levels. Therefore, the average non-R&D expenditure per student at ISCED levels 6-8 is used in these calculations as the closest approximation of the annual expenditure required to educate a student in undergraduate programmes that award either a bachelor's or master's degree.
- These estimates do not take into account the significant proportion of students who take longer than the typical duration to complete their studies, and therefore may require a higher level of expenditure.

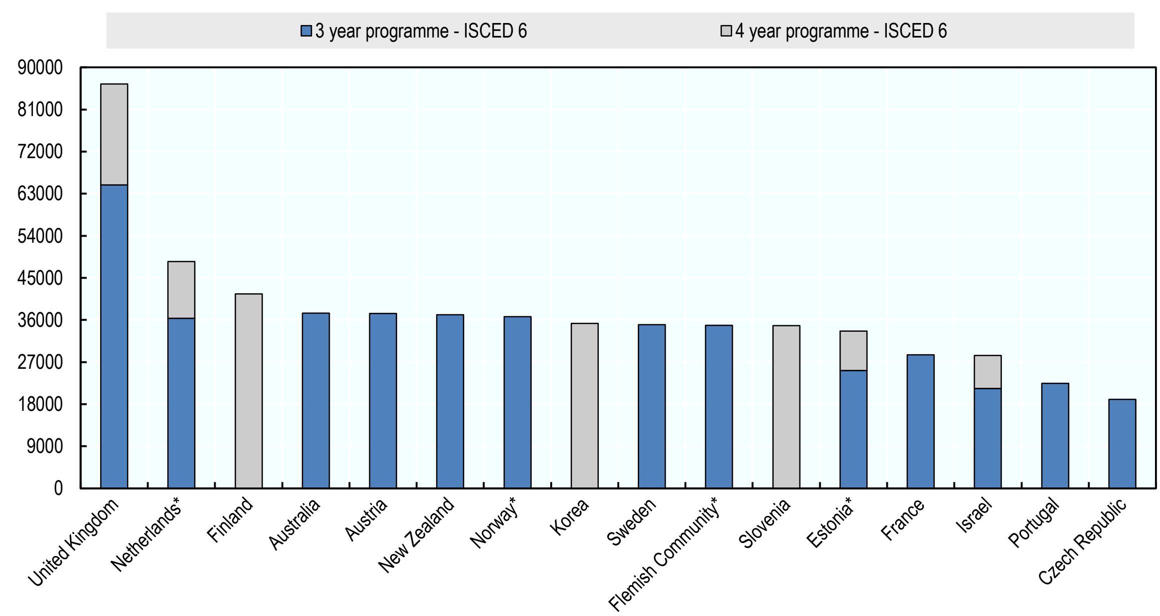
At the same time, as expenditure amounts are expressed using purchasing power parities and take into account the specific duration of programmes within countries, the average cumulative theoretical expenditure is comparable across countries.

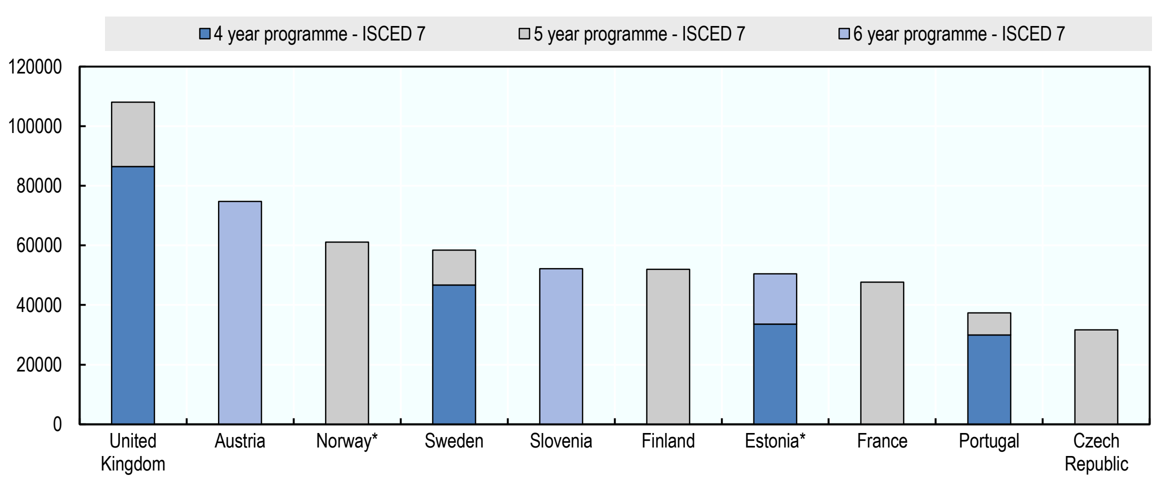
The estimates indicate that there is a substantial variation in how much higher education systems spend to produce a first-time graduate at the bachelor's and master's level across the OECD (Figure 8.3). As might be expected, cumulative spending is related to the duration of the programme, with longer-duration programmes generally costing more to produce a graduate.

Differences in expenditure across countries can also be large enough to create exceptions to this pattern. For example, in Australia, Sweden and the Flemish Community, the average estimated expenditure to produce a graduate from a three-year bachelor's programme is similar to the expenditure to produce a graduate from a four-year bachelor's programme in Korea and Slovenia. Similarly, at the master's level, the cumulative expenditure to produce a graduate from a five-year programme is lower in Norway, Finland and France than for a four-year programme in the United Kingdom.

Figure 8.3. Estimated expenditure for first-degree graduates (2016)

Expenditure over the theoretical programme duration, in 2015 USD PPP





Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018. Master's level programmes in this calculation refer to first-degree programmes that award a master's level qualification only, as opposed to postgraduate programmes.

Source: Adapted from OECD (2018[4]), *Education at a Glance 2018: OECD Indicators*, https://doi.org/10.1787/eag-2018-en.

StatLink http://dx.doi.org/10.1787/888933941899

High rates of programme non-completion also signal inefficiency in higher education systems, as investment by the government and private individuals does not create the expected output.[1] The cost of non-completion in each jurisdiction depends on the proportions of students who do not complete, as well as the cost of educating students. Using the levels of expenditure per student in 2015 and applying country-level non-completion rates from the 2014 UOE data collection on student completion, a conservative estimate of the cumulative expenditure on non-completing students from first degree programmes from one entry cohort can be obtained for each of the four participating jurisdictions (Table 8.6).

The estimate makes two simple assumptions:

- All students who eventually do not complete leave their programmes during their first three years.
- Expenditure per student is constant at 2015 levels over the duration of study of the non-completing students.

In reality, as both participation and the costs of higher education are increasing over time across the OECD (see Chapter 3) and some students may leave programmes at a point beyond the first three years (and therefore incur higher expenditure) the figures in Table 8.6 are likely to represent more conservative estimates of the true levels of expenditure on non-completing students.

Table 8.6. Estimated expenditure on non-completing first-degree students

Based on numbers of students in 2016 entry cohort and 2015 expenditure in USD PPP

	Annual expenditure per student 2015, excluding R&D (USD PPP)	New entrants 2016 (number)	No qualification three years after the end of theoretical duration and not in education (2014)	Estimated overall expenditure on non-completing students for 2016 entry cohort (USD millions PPP)	Estimated minimum proportion of 2015 annual expenditure (excluding R&D) of higher education institutions on non-completing students
The Flemish Community	11 537	52 822	22%	160.9	6.0%
Estonia	8 404	9 168	43%	39.8	9.1%
The Netherlands	12 115	120 146	22%	384.3	4.2%
Norway	12 225	47 139	21%	145.2	5.3%

Note: This calculation assumes the distribution of the attrition rate of students as 85% of non-completers leaving during their first year, 10% in their second year and 5% in their third year, and assumes constant costs per student in each jurisdiction at 2015 USD PPP. Increasing year-on-year costs per student, or a distribution of attrition which is skewed more towards later years would further increase estimated costs.
Source: Adapted from OECD (2018[4]), *Education at a Glance 2018: OECD Indicators*, https://doi.org/10.1787/eag-2018-en.

As can be seen in Table 8.6, even the use of conservative assumptions for the estimation can imply a substantial annual expenditure of non-completion in each of the participating jurisdictions, when considered in relation to the overall expenditure by higher education institutions (excluding R&D). As Estonia has the highest rates of non-completion, lower student numbers and costs indicate an estimated annual expenditure of close to USD 40 million that does not result in graduate output, a figure that represents about 9% of the 2015 expenditure on education in Estonia. In the Netherlands, with a higher cost structure and a much larger entry cohort, the amount reaches USD 384 million, but represents less than 5% of the total expenditure in 2015. Depending on how higher education is funded in national contexts, this cost of this expenditure is shared between governments and households.

Expenditure to produce a skilled graduate

The estimates presented in the previous section for expenditure on completing and non-completing students do not take into account any measure of the quality of the outputs. Figure 8.4 shows an association between GDP per capita and an estimate of the expenditure on higher education institutions per higher education graduate reaching at least literacy proficiency level 3 (according to the OECD Survey of Adult Skills). The expenditure of higher education institutions, as well as GDP per capita, is measured in USD using purchasing power parity data. Higher education expenditure in this case includes R&D expenditure, as graduates from all higher education programmes are considered in the calculation. The estimate of graduates reaching at least proficiency level 3 has been calculated for each jurisdiction as the product of the following two variables:

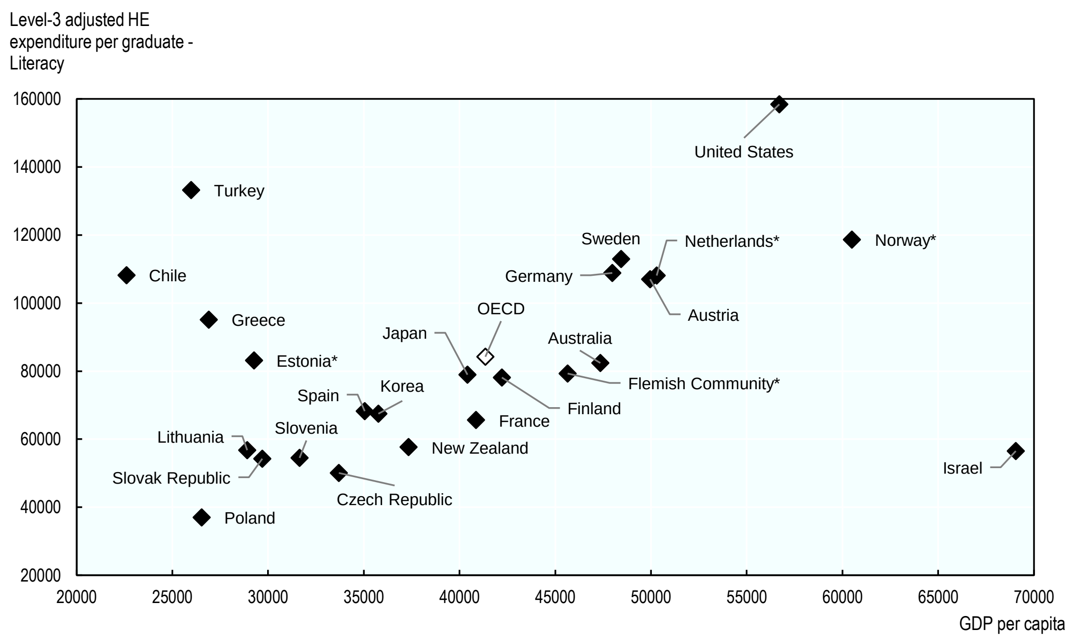
- the total number of higher education graduates in 2015
- the estimated share of higher education graduates reaching at least literacy proficiency level 3 among those who completed their studies in the ten years before being surveyed (the Survey of Adult Skills took place in 2012 or 2015, depending on the jurisdiction).

This measure provides a comparative estimate of the ratio between a fundamental input (financial resources) and output (graduates with level 3 literacy skill proficiency) in a particular year across higher education systems. Its main strength is the transparent calculation methodology, which makes it possible to compare values across countries. However, this measure of the input/output ratio has a number of limitations:

- It does not take into account differences in the costs of education across different programmes, or costs spent to provide education to students who do not receive a degree (as outlined in the previous section).
- It ignores the complex timing of the education process. The cost of the education of students who graduated in 2015 was incurred by the higher education system in the years preceding graduation, as well as the years in which the fixed costs to set up that programme and institution were sustained.
- It does not take into consideration the contextual factors affecting the higher education process and the skills of graduates, and in particular student skills at entry from secondary education (whose skills at 15 years of age are observed to have significant variation).
- It makes a very narrow definition of “skilled graduate” in terms of achievement of moderate to advanced skills in one domain only.

Figure 8.4. Expenditure per higher education graduate (with a level 3 or higher literary skill proficiency) across OECD higher education system (2015)

Expenditure per level 3 literary proficient graduate, compared to GDP per capita



Note: *Participating in the Benchmarking Higher Education System Performance exercise 2017/2018. The OECD marker refers to the OECD total (not average).
Source: Adapted from OECD (2018[5]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en; OECD (2018[6]), *OECD National Accounts Statistics*, https://doi.org/10.1787/na-data-en; OECD (2018[7]), *OECD Survey of Adult Skills*, www.oecd.org/skills/piaac/data/.

StatLink http://dx.doi.org/10.1787/888933941918

As shown in Figure 8.4, jurisdictions with a similar economic context (proxied by their GDP per capita) tend to have similar amounts of expenditure per graduate reaching at least proficiency level 3. For example, in 2015 the Netherlands had a similar level of expenditure per graduate reaching at least proficiency level 3 as Austria, Germany and Sweden. When compared to the Netherlands, these were also the three countries with the closest level of GDP per capita. As another example, Spain, New Zealand and Korea had similar levels both of GDP per capita and of expenditure per graduate reaching at least proficiency level 3.

However, there are some exceptions to the general statistical pattern. For example, Estonia in 2015 had a substantially larger expenditure per graduate reaching at least proficiency level 3 than countries with a comparable level of GDP per capita. This could be partly explained by the increase in higher education expenditure, and the reduction in the number of students, in the years preceding 2015.

Measuring efficiency in research

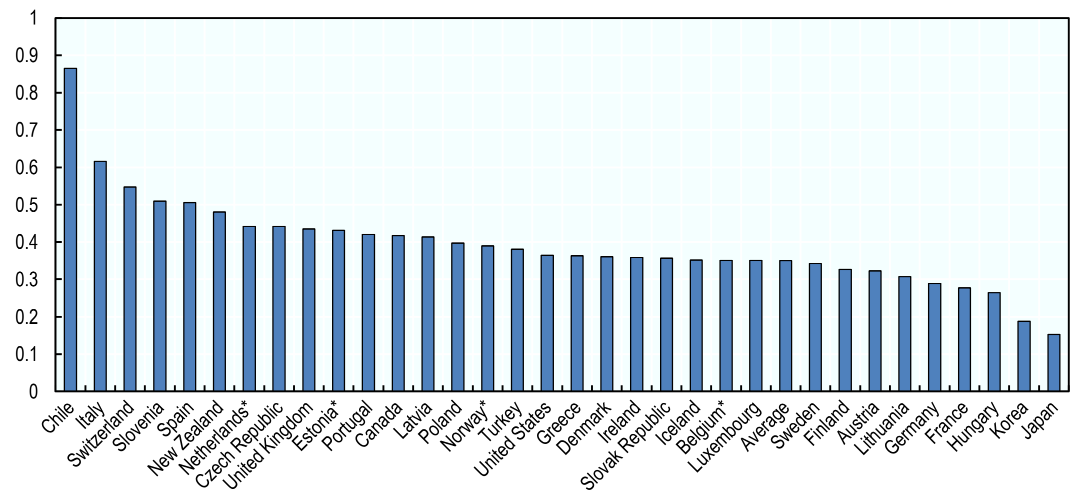
Research efficiency can be measured by considering the levels of research outputs that are produced compared to research inputs. As seen in Chapter 6, there is variation across the OECD in the concentration of researchers across the population in OECD countries. As might be expected, this also has an impact on the proportional volume of research outputs. For example according to 2016 data, there is a positive linear relationship (correlation coefficient = 0.82) between the number of researchers per 1000 of population and research publications per 1000 of the population (as recorded in the Scopus database of scientific publications (OECD, 2017[8])).

Publications per researcher

One possible measure of efficiency in research is to consider the average number of publications per researcher across systems, as an indicator of which systems are more productive. Figure 8.5 shows the estimated number of publications produced per researcher in 2015 across OECD countries. This estimate is subject to a number of limitations, including:

- Publications in 2015 were considered due to data availability, but are likely to be based on cumulative research performed by researchers over a number of years prior to 2015. In a context of increasing numbers of researchers in recent years, this may lead to these figures producing underestimates of research efficiency.
- The figure for 2015 publications includes publications for all research sectors in each country. While the majority of scientific publications have at least one academic author, the inability to disaggregate scientific publications by sector means that scientific publications that did not originate in the higher education sector may lead to an overestimate of research efficiency.
- The Scopus database does not include all scientific production. For example, it excludes contributions to conferences and some types of books, as well as collaboration with the private or public sector for the application of knowledge.
- The number of publications used to calculate this indicator includes publications authored by researchers working outside higher education (although the large majority of scientific publications come from the higher education sector (Johnson, Watkinson and Mabe, 2018[9])).

Figure 8.5. Estimated annual publications per researcher (2015)



Source: Adapted from OECD (2017[8]), *OECD Science, Technology and Industry Scoreboard 2017: The digital transformation*, http://dx.doi.org/10.1787/9789264268821-en.

StatLink https://doi.org/10.1787/888933941937

Figure 8.6 suggests that, on average across OECD countries, under the conditions of the measurement, around 0.4 annual publications are produced per researcher, implying that an average researcher may publish new knowledge roughly once every 2.5 years.

Expenditure per scientific publication

Figure 8.6 reports an estimate of the expenditure per scientific publication across OECD countries. This estimate is calculated for each jurisdiction as the ratio between the total amount spent by higher education institutions on R&D in 2015, in USD at purchasing power parity and total number of scientific publications in the Scopus database in 2015 The calculation methodology of this R&D input/output ratio exposes it to a number of limitations:

- Distinguishing between R&D and other expenditure in higher education can be challenging, due to the close connection between research and education activities (Chapter 3). This reduces the precision of the measure of expenditure.
- As in the previous indicator, the Scopus database does not have complete coverage and includes some publications from other R&D sectors. In addition, the long timelines involved in scientific production are not taken into account.

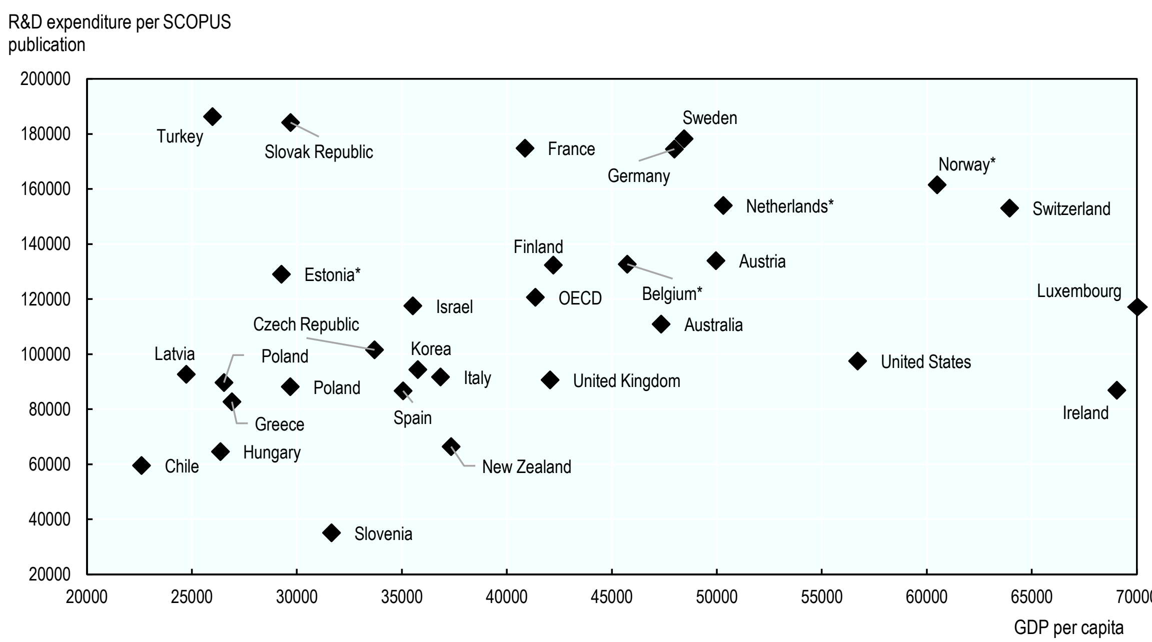
Higher education R&D expenditure per Scopus publication is therefore a simple ratio between research input and output indicators based on internationally agreed definitions and statistical procedures. Despite the outlined limitations, it has the important advantage of being comparable across countries.

Across OECD countries, one scientific publication was produced for every USD 120 000 of R&D expenditure by higher education institutions in 2015 (not including technical assistance and other expenditure).

In Figure 8.6 the input/output ratio is also plotted against the level of GDP per capita in 2015, to highlight the comparison between countries with a similar economic context. Figure 8.6 bears some resemblance with Figure 8.4, as countries with higher GDP per capita generally spend a higher amount per unit of output than less wealthy countries (even though the relationship between the input/output ratio and GDP per capita is less strong in Figure 8.6 than in Figure 8.4).[2]

Figure 8.6. Higher education R&D expenditure per scientific publication (2015)

Higher education institutions' expenditure on R&D per publication in the Scopus database



Note: The OECD marker refers to the OECD total (not average).
Source: Adapted from OECD (2018[5]), *OECD Education Statistics*, https://doi.org/10.1787/edu-data-en; OECD (2017[8]), *OECD Science, Technology and Industry Scoreboard 2017: The digital transformation*, http://dx.doi.org/10.1787/9789264268821-en.

StatLink http://dx.doi.org/10.1787/888933941956

All in all, Figure 8.4 and Figure 8.6 allow Estonia, the Flemish Community (or Belgium), the Netherlands and Norway to be compared with countries with a similar level of GDP per capita on two different indicators of the input/output ratio in higher education. Despite their limitations and different calculation methodology, these indicators suggest that the expenditure per unit of output in the participating jurisdictions for the most part tends to be similar to other countries at a similar level of economic development.

Discussion

The five indicators described in this section are presented as examples of simple measures of efficiency and cost-effectiveness that could be computed using existing data. The key benefit of these measures is their comparability across OECD countries subject to the specified limitations. This means that countries can have an indication of where they stand compared to other OECD countries on the financial and human resource costs associated with the key outputs of higher education systems, and can provide a starting point for further investigation of the drivers of differences between countries (whether statistical or structural).

However, further improvements would be required to increase the validity and policy relevance of indicators on efficiency and cost-effectiveness of higher education before they could become actionable measures of higher education performance. For example, almost no account can be taken of the quality of the outputs, due to the lack of available data, which severely limits the scope and value of cost-effectiveness measures. The inability to disaggregate programme costs at different levels of higher education and distinguish between teaching and research costs also complicates the process of providing estimates that would be beneficial to policymakers. The following section outlines some of the identified data gaps in more detail.

8.3. Lessons learned from the benchmarking exercise

8.3.1. A number of benefits of the benchmarking exercise can be identified

There were a number of clear benefits to carrying out the benchmarking project, which can be summarised as follows:

- The broad scope of the analysis allowed for a comprehensive updating of the OECD knowledge base on all aspects of higher education, and therefore this report offers the widest stocktaking of higher education systems in the OECD since the 2008 publication of Tertiary Education for the Knowledge Society (OECD, 2008[10]).
- The data development exercise for the benchmarking project resulted in the creation of a benchmarking data infrastructure that can be automatically refreshed as new data becomes available. This data infrastructure has the potential to be used for online dissemination of data related to the benchmarking project.
- New data sources were explored and some new indicators were developed, which can be improved and further integrated into future work. New types of reporting and analysis were also carried out for countries, such as the generation of performance scorecards and scenarios for the participating jurisdictions (see the accompanying county notes of the four jurisdictions).
- Important gaps in data and evidence were identified, some of which may be filled in the future though the development of new OECD indicators in conjunction with the OECD Indicators of Education Systems (INES) project.
- The project provided a forum for peer dialogue and policy learning during the regular meetings between the OECD Secretariat, and the national co-ordinators from the participating jurisdictions.

8.3.2. Evidence gaps and difficulties in linking qualitative data to performance created limitations

Although there were a number of significant benefits among the project outcomes, difficulties arose which made applying the conceptual framework more challenging than anticipated.

Data gaps and poor data coverage

Despite the extensive data review exercise that was carried out by the benchmarking project (as described in section 8.2.1), it was not possible to obtain coverage of all inputs, activities, outputs and outcomes of higher education. Given the limitations of the data many of the performance criteria outlined in the conceptual framework (such as economy and effectiveness) proved impossible to measure, while others (such as efficiency) allowed only narrow experimental measures to be estimated.

Areas related to resourcing higher education and each of the missions of higher education that lack data coverage have been explicitly indicated in the concluding sections of the previous chapters of this report. Some of the areas with little to no comparative data available relate to the core functions of higher education, resulting in gaps in knowledge, which do not exist at other levels of education that attract similar levels of investment (i.e. primary and secondary education). For example:

- Chapter 7 highlighted the increasing focus on the mission of higher education to provide broader societal benefits, along with some of the policies and practices that have emerged in higher education systems in recent years to extend the range of engagement activities. However, information required to produce indicators of successful performance on engagement with the broader community is still sparse. While some data are available, they are mainly related to the collaboration of higher education with industry and do not adequately cover the full span of engagement activities in which higher education institutions are involved in. For example, no comparative data are available on the social and regional engagement activities of higher education institutions or the impact of these activities.
- Comparative data on learning outcomes of higher education students are not widely available, which severely restricts the possibilities for assessment of higher education programme quality outcomes. Standardised assessments of learning outcomes are in use in some national contexts and for some professions, and a number of experimental models have been developed through national or international initiatives that cover both domain-specific learning outcomes and more generic learning outcomes (Chapter 5). However, unlike at the primary or secondary levels of education, there are no widely adopted international assessments of higher education learning outcomes administered on either a representative or a census basis.
- Instructional inputs and methods in higher education, especially human resources, are not well measured in international data collections (and, often, national data collection systems). For example, there is currently no standardised, recurrent collection of internationally comparable information on the distribution of staff across different staff categories, levels of seniority and contract type or the division of the workload of staff between teaching, research and engagement activities. This limits the insight available on teaching and learning conditions in the instructional environment, and forces reliance on poor proxies, such as student-to-staff ratio.

Qualitative information on policies and practices could not be easily linked to available indicators

The benchmarking project had the stated goal of linking data about policies and practices to outputs, making inferences about the impact of higher education policies and practices on system-level performance. However, developing these links was not possible in practice.

Pre-existing structured data with respect to higher education policies and practices, as well as comparative information on system organisation and features needed to support causal inferences were not available. Qualitative evidence with respect to over twenty domains of national higher education policy was collected in open-ended narrative form from participating jurisdictions. This required extensive time and effort on the part of national authorities, and proved to be difficult to transform into standardised and comparable data. Moreover, comparable information was not available for the remaining OECD countries, meaning that information on policy and practice, even if transformed into standardised data, could not be used to explain variation in performance without a wider coverage of countries (Section 8.4.2).

8.3.3. Global systems judgements are unlikely to be the most policy relevant performance measures

Higher education systems are more complex than lower levels of education in most OECD countries, due to the increased presence of market forces, greater levels of institutional autonomy and the broad range of missions and functions of higher education systems. Approaches to measuring performance need to reflect this complexity. Institution-level rankings based purely on a small set of indicators can fail to take into account the many ways in which higher education systems demonstrate good performance, and can also mask areas of lower performance that are not covered by the available data.

On the other hand, system-level analysis that aggregates results across higher education subsystems with sharply dissimilar missions, resourcing levels and student profiles produces average values that may have limited policy analytic use. Higher education "systems" are heterogeneous, often highly so. In Mexico, for example, there are thirteen legally recognised subsystems of higher education, while in the United States, with more than 3 000 higher education institutions, analyses of higher education performance typically proceed based on taxonomies consisting of many sectors. Diverse modes of provision of higher education exist within systems with differing levels of institutional differentiation, which adds to the challenge of evaluating the collective performance of institutions within a system in a consistent manner. While the national social, political and economic context provides a common background and links institutions together, their individual characteristics and missions differ greatly. For national authorities – whose legislation, regulation, and funding may operate at the subsystem level – characterisation of system-level performance across heterogeneous sectors of higher education systems may not be a helpful activity, since it aligns poorly to policy instruments and associations.

In contrast, comparisons at the subsystem level, such as how teaching colleges or applied science universities in their system compare to others across the world may be much more useful for policy development or assessment. For this reason, the benchmarking exercise included a review of the performance of different subsectors in the three participating jurisdictions, which have binary systems. As Table 8.7 shows, the professional HEIs in all three jurisdictions cater more heavily to non-traditional student groups, such as students over 30 and part-time students, and are less likely than universities to enrol international students and attract funding from non-government sources. At the same time, completion rates are higher in some cases in professional HEIs and available employment rates of graduates show that professional HEIs have results as favourable as universities. However, the extent to which these tendencies hold varies substantially between jurisdictions. It is clear that different strengths and weaknesses exist not only between subsectors in the national context, but also when comparing subsectors of the same type across jurisdictions (Table 8.7).

Table 8.7. Performance of professional HEIs relative to universities in the participating jurisdictions

2016 or most recent year available.

	Estonia – Professional HEIs	The Flemish Community – Professional HEIs	The Netherlands – Professional HEIs
Relative size of the sector (Share of new entrants in the total for professional higher HEIs and universities (%)	31	62	69
Ratio of annual expenditure per student relative to the university sector (excluding R&D)	0.70	1.12	1.08
Ratio of the proportion of funding from non-government sources relative to the university sector		0.25	0.02
Ratio of first-time graduates older than 30 relative to the university sector	1.88	3.85	4.73
Ratio of part-time students in bachelor's programmes relative to the university sector	1.28	1.33	7.55
Ratio of international students in bachelor's programmes relative to the university sector	0.16	0.76	0.56
Ratio of on-time completion relative to the university sector	M:1.00 F: 1.54	M: 0.86 F: 1.00	M: 1.49 F: 1.30
Ratio of non-completion relative to the university sector (not in education and not graduated three years after duration)	M:1.75 F: 0.87	M: 0.55 F: 0.79	M: 1.03 F: 1.30
Ratio of employment rates of 25-34 year-olds relative to the university sector	1.04		1.27

Note: For ratios, university sector is equal to 1.
Source: Adapted from information provided by the participating jurisdictions. See the reader's guide for further information.

8.4. Future directions

This section describes and motivates some key areas of policy focus to improve future capacity for measuring higher education performance.

8.4.1. Key comparative data gaps need to be filled

More and better data is needed on how much students are learning in higher education

There is an increasing focus on improving teaching quality in higher education. Many countries have strengthened higher education quality assurance processes to enhance institutional accountability for teaching and learning. However, unlike other levels of education, there is currently no means of assessing the skills and competencies of higher education students or graduates in a comparable manner.

There is no broadly accepted definition of what educational quality should deliver or how quality should be measured. It has been demonstrated (for example, through initiatives such as the CALOHEE and AHELO projects) that common assessment frameworks can be agreed and valid measurements of learning outcomes across countries are possible. AHELO and other higher education international assessment initiatives also show that there are a number of practical difficulties in administering such tests across countries, in reaching the requirements for national samples to allow for international comparisons, and also in taking into account the diversity of contexts and defining learning outcomes for different subjects. (OECD, 2013[11]).

New ways of measuring engagement activities are needed

In light of government and public expectations, the social impact of higher education is likely to become a more important part of the higher education performance landscape. While many higher education institutions have a strong commitment to community, regional, or even global engagement, there are no mechanisms in place to report and monitor these activities and assess their impact. This weakens incentives for institutions to broaden their engagement activities, as the absence of agreed measurement results in the neglect of this performance dimension in public funding, performance evaluation and quality assurance processes.

More work is needed to expand common international definitions for higher education activities

While higher education programmes can be mapped from national qualifications frameworks to international standards (through ISCED); there are very few other international definitions applicable to the sector. For example, there is no standard international classification for academic staff categories. Not only does this make comparison of systems difficult from a policy perspective, it may also inhibit mobility, as academic staff may not be able to easily distinguish the meaning and duties of job categories in different countries.

Similarly, higher education institutions cannot be classified in a meaningful way across jurisdictions according to missions and orientations. There are key national and regional data collection systems that function at an institutional level, such as the United States Integrated Post-Secondary Education Data System (IPEDS) and the European Tertiary Education Register (ETER). However, these databases do not yet have a data structure and definitions that permit them to be joined in support of analysis. This creates a limitation for students, academics and policymakers alike in understanding and comparing institutions and systems across jurisdictions, and represents a lost opportunity for policymakers to learn from other contexts.

Developing common international classifications for higher education institutional data could therefore deliver substantial benefits to comparing system features and measuring performance.

Finally, international data collection systems such as the UNESCO, OECD and Eurostat (UOE) collection infrequently collect data about key dimensions of higher education – such as revenues, expenditures, staffing and graduation rates – at the subsystem level, as there are currently no common taxonomies that permit this.

There is a serious information gap on teaching staff in higher education.

Staff costs represent the biggest financial outlay in higher education systems across the OECD. At the same time, there is almost no internationally comparable information available on the working conditions, experience, well-being, pedagogical knowledge, time use or teaching practices of teaching staff in higher education.

Instructional inputs and methods in higher education, especially human resources, are not well measured in international data collections (and, often, national data collection systems). Instructional practices in higher education are sometimes reported in student surveys, but these surveys are beset by serious methodological problems that call into question their validity and they lack cross-national comparability.

This situation is in sharp contrast to the richness of information available at other levels of education, for example through the OECD Teaching and Learning International Study (TALIS). The collection of internationally comparable self-reported instructional practices in higher education is possible, in principle, using a structured survey instrument based in a large-scale international assessment or survey. An extension of TALIS to the higher education sector, or a similar international study could allow experiences and practices of staff in different settings within the higher education sector to be evaluated, and provide the insight necessary for the improvement of teaching and learning in higher education.

8.4.2. Policy benchmarking could help to fill core gaps in knowledge

As well as improving the range of indicators available to assess higher education performance, the OECD member countries and key stakeholders could additionally benefit from having detailed and comparable information about the design of policies in their higher education systems, such as characteristics of institutional funding models, student loan systems, faculty career systems and retirement policies. Therefore, future benchmarking exercises could also focus on the collection of comparative policy information for a large number of OECD countries.

Data about policy design could permit policymakers and nongovernmental groups across the OECD to benchmark their policy choices to others, assess what is feasible, and foster deeper and more productive peer-learning discussions across OECD member countries. Fixed response policy benchmarking surveys, properly planned and coordinated, would minimise response burden on the part of governments, avoid duplication of effort and maximise comparability across systems. Surveys could be implemented in collaboration with other relevant international organisations, and with the OECD Indicators of Education Systems (INES) project and its networks, including the network on education system level information (NESLI), which has previously undertaken structured policy surveys relevant to higher education, including a survey on national criteria and admission systems for first-degree programmes.

For example, if policymakers were contemplating the redesign of a student grant system, they would have access to detailed information about these choices in other jurisdictions, such as criteria for student grant eligibility, methodologies for needs assessment and policies with respect to income verification. Policymakers could use this information in the design of their own policy proposals, to inform national policy debates, and to seek expert advice about policy design and implementation from systems with policy features they plan to adopt. Furthermore, the availability of structured policy data would allow for greater future possibilities for linking performance indicators and policy data to make stronger inferences about the relationship between policies and performance in higher education.

8.4.3. Concluding remarks

The benchmarking exercise has reviewed a wealth of quantitative data and qualitative information in order to assess the relative performance of higher education systems across OECD jurisdictions, particularly the four participating jurisdictions. The benchmarking project has provided a valuable opportunity to identify key evidence gaps that prohibit a deeper performance analysis. Future OECD work can build on the findings of this report and explore ways to expand the comparative evidence available to policymakers in higher education systems across the OECD.

Notes

[1] Although, as noted in Chapter 5, there may possibly be some benefit to even partial completion of higher education in some OECD countries, overall, the returns are much lower than for those completing higher education.

[2] When excluding four outliers (Chile, Greece, Ireland and Turkey), the correlation between the two series in Figure 8.4 is 0.87. By comparison, excluding any quadruplet of countries does not result in a correlation higher than 0.58 in Figure 8.6.

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Chapter 9. Benchmarking Higher Education System Performance: Estonia

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

9.1. Higher education performance in Estonia

9.1.1. Introduction

This country note for Estonia draws on the evidence base of the OECD Benchmarking Higher Education System Performance project to review the performance of the higher education system in Estonia. Its purpose is to assist Estonia in taking stock of where it stands in relation to other OECD member countries on different aspects of higher education and to provide input into future national policy-planning processes.

This stocktaking exercise is supported in this note in two ways. First, a scorecard of 45 indicators is presented, which highlights Estonia's position within the OECD. This scorecard draws on the evidence compiled during the benchmarking exercise and is organised into three domains: financial and human resources; education; and research and engagement. The first sections of this note contain a brief discussion of Estonia's position within these three domains.

The final section of the note contains a scenario exercise to support future policymaking. Topics chosen for scenarios in the benchmarking country notes are issues that appear to present important policy challenges for jurisdictions and are likely to persist for the foreseeable future. Assumption choices used for the scenarios take into account recent trends in Estonia and across the OECD. Following the presentation of the scenarios, a set of policy options are examined that could be feasible responses to the challenges under discussion and consideration is given to how successful action might orient the system towards the achievement of more positive scenarios.

9.1.2. Context and structure of higher education in Estonia

Estonia is one of the smallest and newest countries in the OECD. Since regaining independence in 1991, the Estonian economy has been developing rapidly, particularly in recent years, with growth in gross domestic product (GDP) per capita surpassing the OECD average in the last decade (OECD, 2017[1]). The education system has also been transformed in the decades since independence and, as a result, Estonia ranks highly in the OECD on the skill levels of its young population.

The higher education system in Estonia has also undergone a number of reforms in recent years. Investment has been on an upward trajectory and expenditure per student is close to the OECD average levels, although this is also a result of a decreasing population and falling enrolments in recent years. In addition, Estonia has come out of the financial and economic crisis with one of the lowest levels of public debt in the OECD, creating more favourable conditions for future growth in public investment. At the same time, the decreasing population is also contributing to tightening labour market conditions (OECD, 2017[1]), putting pressure on the higher education system to produce graduates with the necessary skills to boost the economy.

Estonia's higher education system serves more than 50 000 students across 21 higher education institutions. This makes Estonia the third smallest higher education system in the OECD in terms of students, after Iceland and Luxembourg. As in many OECD countries, there is a binary divide in the orientation of institutions, with universities (*ülikool*) mainly offering academically oriented programmes and professional higher education institutions (*rakenduskõrgkool*) mainly offering professionally oriented programmes.

There is a strong policy focus on equality and lifelong learning in higher education in Estonia. The Estonian Strategy for Lifelong Learning is oriented towards increasing opportunities for all students to participate in higher education, and aligning opportunities for lifelong learning to the needs of the labour market (Estonian Ministry of Education and Research, 2014[2]). Estonia has also reformed the funding policy for higher education with the goal of improving both equity and quality. Performance-related criteria are included in the funding model for higher education institutions, and since 2013, full-time students studying programmes in Estonian do not have to pay tuition fees (see Chapter 4 of (OECD, 2019[3])).

9.1.3. Estonia's higher education scorecard

Table 9.1 shows a summary of the relative position of Estonia within OECD countries according to a set of 45 indicators spanning the resourcing and the education, research and engagement functions of higher education, in a scorecard format (where each box relates to one of the quartiles of the OECD distribution). These indicators are drawn from the compilation of evidence in the synthesis report of the OECD Benchmarking Higher Education Systems Performance project, in which Estonia participated during 2017-2018.

As can be seen in the scorecard, Estonia is in the top quartile of the OECD countries in a number of areas related to higher education performance. For example, Estonia invests one of the highest proportions of GDP in the OECD on education. Gender equity is also more well-established than in most OECD countries, with proportions of women researchers and women among academic staff in the top quartile of OECD countries. There are also some indications that Estonia is performing strongly on engagement between research and the business sector, with the level of reported collaboration between higher education and small and medium enterprises in the top quartile of OECD countries.

On the other hand, the scorecard also points to a number of areas where higher education performance in Estonia could be improved. For example, completion rates for bachelor's programmes are lower than in most other OECD countries with comparable data. Furthermore, while Estonia appears to be relatively successful in providing opportunities for older people to enter higher education, the proportions studying part-time and the proportions of international students are lower than the median level in the OECD. Improving performance and sustaining the system in a context of demographic decline is an important policy challenge for Estonia and may require action on a number of fronts, as outlined in the scenario exercise presented in Section 9.5.

A wider discussion of the topics covered in this note, as well as many other topics spanning the resourcing, missions and performance of higher education can be found in the synthesis report for the benchmarking project in (OECD, 2019[3]).

Table 9.1. Higher Education system benchmarking: Estonia

Selected higher education (HE) indicators and country position in the OECD distribution (by quartile). Reference year range: 2005-2017

Financial and human resources	← Low			→ High
Expenditure on HE, % of GDP				■
Public expenditure on HE, % of public expenditure			■	
Expenditure per student by HE institutions		■		
Expenditure per student, 2015 relative to 2008				■
HE R&D expenditure, % of GDP			■	
Expenditure on R&D activities, %			■	
Household expenditure on HE institutions per student	■			
Non-household private expenditure on HE institutions, %				■
Expenditure per student on grants and scholarships		■		
Academic staff younger than 35, %			■	
Academic staff older than 60, %				■
Women among academic staff, %				■
Expenditure on staff costs, %		■		
Ratio of academic staff-to-student			■	
Non-academic staff per 100 academic staff				

Education	← Low			→ High
Entry rates into bachelor's or equivalent programmes			■	
Students in master's and doctoral programmes, %			■	
*Socio-economic gap in HE access			▒	
New entrants older than 25, bachelor's programmes, %				■
Part-time students in bachelor's programmes, %		■		
International students in master's programmes, %		■		
Completion rates of bachelor's students	▒			
Young population (23-34) with a HE qualification, %		■		
HE graduates above literacy proficiency level 3, %			■	
Employment rates of master's graduates (25-34)		■		
Employment premium, HE graduates (25-34)	■			
HE graduates (15-29) employed or in education, %		■		
Relative earnings of bachelor's graduates (25-34)		■		
HE graduates' relative level of self-reported health	■			
HE graduates' relative level of interpersonal trust			■	

Research and Engagement	← Low			→ High
FTE researchers per 1 000 population		■		
Researchers working in HE, %				■
Women researchers in HE, %				■
Doctorate holders in the population, %		■		
Foreign citizen doctorate holders, %			▒	
Business enterprise funding of HERD, %			■	
Higher education-business collaboration in R&D		■		
SMEs collaborating on innovation, %				■
PCT published applications from HE R&D, %				■
HE R&D funding on basic research, %				■
Number of publications per 1 000 population		■		
Publications among the 10% most cited, %			■	
International scientific collaboration		■		
International net flows of scientific authors				■
Open access of scientific documents, %	■			

Note: The coloured squares represent Estonia's position in the OECD distribution, from the bottom quartile (left square) to the top quartile (right square). The square is shaded in grey (instead of black) when data are available for less than half of the OECD countries (the minimum number of countries with available data is 14). No coloured square means that data are missing for Estonia. For more information on methodological issues and metadata, see OECD (2019[3]). Follow the *Statlink* to download the data underlying the calculation of the scorecard.

*The top quartile implies that the difference between 18-24 year-olds with tertiary educated parents and those with non-tertiary educated parents is smaller.

Source: Adapted from OECD (2019[3]), *Benchmarking Higher Education System Performance*, https://doi.org/10.1787/be5514d7-en.

StatLink https://doi.org/10.1787/888933941975

9.2. Financial and human resources

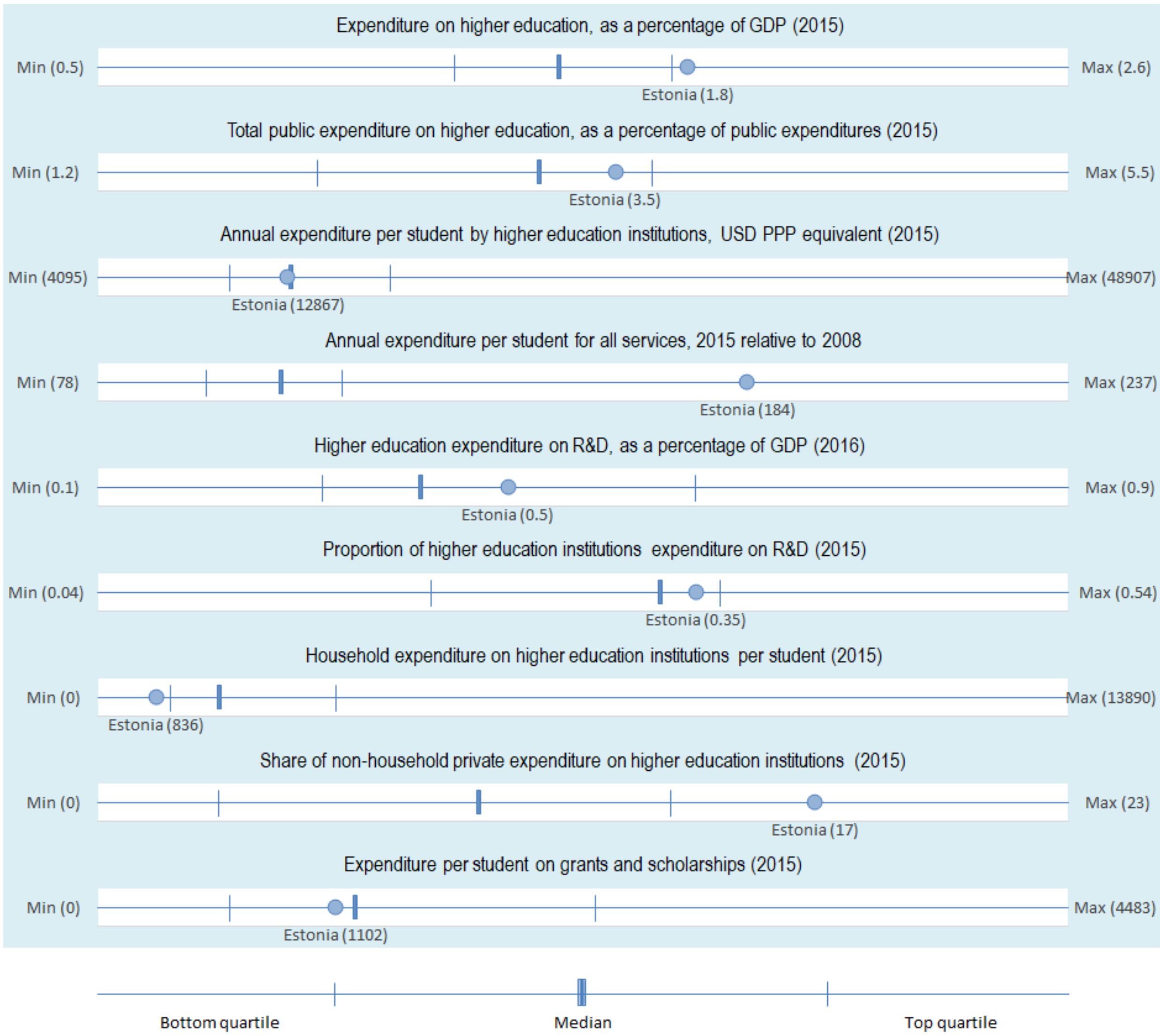
Highlights

- Public higher education expenditure has grown rapidly in Estonia in recent years, reflecting recent changes in the higher education system, including the removal of tuition fees for most students. Higher education expenditure represents a relatively large share of GDP and of public expenditure.
- The amount spent per student is close to the OECD median. With continued economic growth and stable rates of public investment in higher education, Estonia's per student spending may continue to rise.
- About one-third of higher education expenditure is allocated to R&D, in line with the OECD median. As in other jurisdictions, R&D expenditure in higher education is concentrated in universities.
- Higher education funding in Estonia comes from a variety of sources, including household sources (from the minority of students who pay tuition fees) and international sources (mostly, the European Union). However, funding from the European Union will be reduced after 2020, posing questions about whether and how it will be replaced.
- Government spending per student for grants and scholarships is just below the OECD median and larger than the average amount of household expenditure per student. Public student loans have low take-up: only 5% of Estonian graduates had one in 2016.
- Estonia has a relatively large proportion of academic staff aged 60 or older, even though the share of those who are younger than 45 is in line with the OECD median. Women represent around half of academic staff in all age categories, in the top quartile of OECD countries.
- The average annual earnings of full-time academic staff in Estonia are lower than in most other OECD countries, and academics are less likely to be employed with a permanent contract than their peers in the Flemish Community, the Netherlands and Norway.

9.2.1. Financial resources

Figure 9.1 shows a more detailed view of the portion of the benchmarking scorecard related to resourcing higher education, and the position of Estonia within the OECD distribution.

Figure 9.1. Where does Estonia stand in the OECD distribution? Financial resources



Note: The indicators represented in this chart are a subset of the indicators presented in Table 9.1. The coloured circle represents Estonia's position in the OECD distribution. The circle is not coloured when data are available for less than half of the OECD countries (the minimum number of countries with available data is 14). For more information on methodological issues and metadata, see OECD (2019[3]). Follow the *Statlink* to download the data underlying the calculation of the scorecard.

Source: Adapted from OECD (2019[3]), *Benchmarking Higher Education System Performance*, https://doi.org/10.1787/be5514d7-en.

StatLink https://doi.org/10.1787/888933941994

Estonia prioritises investment in higher education, and public expenditure on higher education has increased rapidly

Estonia spent the equivalent of 1.8% of its GDP on higher education institutions in 2015 (the year of reference for international indicators on education expenditure used in the benchmarking exercise). This proportion is in the top quartile of OECD member countries, at a level of investment similar to that of Finland, and above that of its Baltic neighbours Latvia and Lithuania. Higher education R&D expenditure as a share of GDP was also above the OECD median in 2015 (Figure 9.1).

This relatively high level of higher education expenditure relative to GDP is consistent with Estonia's commitment to the development of a knowledge-intensive, service-based economy (OECD, 2017[1]). Higher education appears to be highly prioritised within the public budget. In 2015, the Estonian government spent 3.5% of total public expenditure on higher education.[1] This places Estonia above the median of OECD countries in terms of the share of public funding devoted to higher education, and at a level higher than Finland, Latvia and Lithuania.

Across OECD countries, expenditure per student on higher education institutions is closely associated with GDP per capita. Wealthier countries find it easier to reach relatively high levels of expenditure per student, even if they allocate a relatively low share of public expenditure or GDP to higher education. In 2015, Estonian GDP per capita was about 25% lower than the OECD median. Notwithstanding this relatively low GDP per capita, expenditure per student on higher education institutions (around USD 12 900) in 2015 was nearly at the OECD median (USD 13 000).

As a result of a strong national commitment to higher education and financial support from the European Commission, expenditure per student on higher education institutions almost doubled in Estonia between 2008 and 2015, a much larger increase than in all but two other OECD countries (Poland and the Slovak Republic). A contemporaneous decline in the number of students contributed to this change. However, while the full-time equivalent number of students declined by 22% between 2008 and 2009, total expenditure on higher education institutions increased by 45% over the same period (calculations from OECD (2018[4])).

Higher education expenditure is also outpacing economic growth; its value as a share of GDP increased from 1.3% to 1.8% from 2008 to 2015. By comparison, the OECD median of higher education expenditure relative to GDP grew by just 0.1 percentage point during the same time period, and only the Slovak Republic grew at faster pace among OECD countries (calculations from OECD (2018[4])). If current economic trends persist, the capacity of Estonia to invest in higher education may also continue to improve.

Educational spending per student is lower in professional higher education institutions (HEIs) than in universities

Spending per student in professionally-oriented HEIs generally is less than in universities, due to the fact that professional HEIs typically tend to carry out fewer R&D activities (Lepori and Kyvik, 2010[5]). In Estonia, the Flemish Community and the Netherlands, expenditure per student is about two times higher in universities than in professional HEIs.

However, when R&D is excluded, expenditure per student is around 10% higher in professional HEIs in the Flemish Community and the Netherlands. In contrast, in Estonia, expenditure per student is substantially (30%) lower in professional HEIs than in universities, and far below the per student spending levels in the Flemish Community and the Netherlands. In 2015, Estonian professional HEIs spent about USD 6 600 per student (parity adjusted), excluding R&D, just over one-half of the amount spent by Dutch and Flemish professional HEIs. Estonian professional HEIs tend to be small in size and scope, focusing on specialised fields of study such as health care, theology, art, aviation and defence.

Table 9.2. Annual expenditure per student for all services, by subsector (2015)

In PPP USD, based on full-time equivalents

		Estonia	The Flemish Community	The Netherlands
Universities	Total expenditure	14 394	24 321	29 286
	Excluding R&D	9 390	11 137	11 537
Professional HEIs	Total expenditure	6 773	12 787	12 972
	Excluding R&D	6 595	12 173	12 497

Source: Adapted from OECD (2019[3]), *Benchmarking Higher Education System Performance*, https://doi.org/10.1787/be5514d7-en.

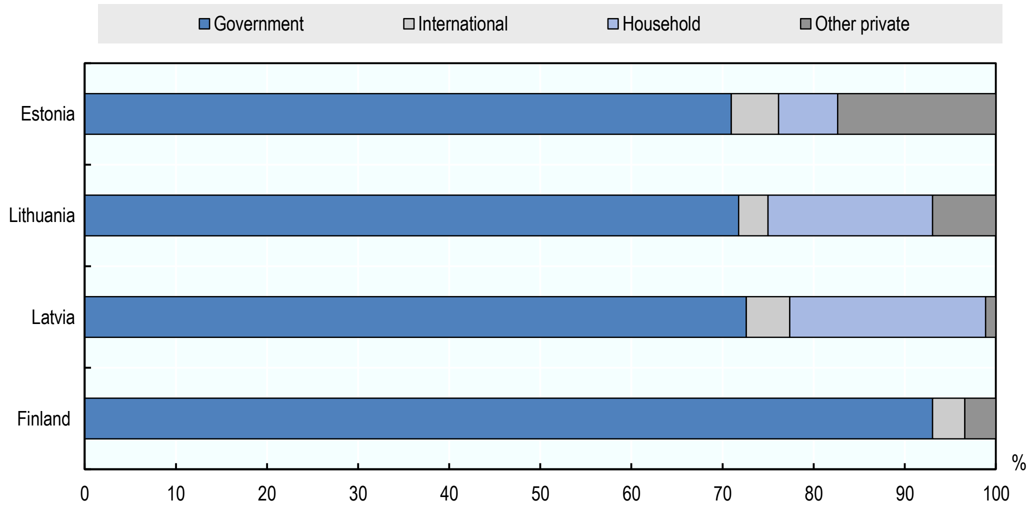
Higher education funding sources are moderately diversified in Estonia

Higher education institutions in Estonia can obtain funding from a variety of sources outside of governments including, for example, households, international sources, and income from the commercialisation of knowledge and research outputs. These resources can help to ensure financial sustainability, for example in periods where the government faces budgetary austerity. Developing and maintaining private financing from private sources outside of households also helps to create ties between higher education institutions and funders that support productive collaboration in research, development, and innovation.

In 2015, private funding other than from households accounted for 17% of funding to higher education institutions in Estonia. However, this was due to particular property transactions in Estonian universities during that year; in other years, the proportion of income from non-household private sources is lower and tends to fluctuate (for example, in 2014, the percentage of higher education funding from non-private sources was 7%, while in 2013 it was 1%). This suggests that the higher education system in Estonia has yet to develop a steady and sustainable source of income from the non-household private sector.

The contribution of households to spending on higher education depends on the category of student. Students studying full-time in Estonian do not pay tuition fees since 2013, shifting the majority of the funding of student tuition from households to the government. At the same time, around 6.5% of the funding for the higher education system came from households in 2015, consisting of fees paid by other categories of students, such as part-time students and students taking programmes in other languages. Estonian higher education institutions have autonomy to set the level of tuition fees for these groups of students. Estonia also aims to incentivise institutions to attract further private investment by including related performance indicators in the institutional funding formula, such as the ratio of public to private funding from educational activities (see Chapter 4 of (OECD, 2019[3])).

Figure 9.2. Share of higher education expenditure, by source of funding (2015)



Source: OECD (2018[4]), *OECD Education Statistics*, https://doi.org/10.1787/edu-data-en.

StatLink https://doi.org/10.1787/888933942013

Estonia provides support to students through loans, grants and scholarships, though relatively few students take up the loan offer

The Estonian government spent over USD 1 100 per student on grants and scholarships in 2015. This amount is below the OECD median, though it is above the amount spent by neighbouring Finland, and around double the amounts spent per student in the other Baltic states (Latvia and Lithuania).

In 2015, Estonian households spent, on average, about USD 800 on higher education institutions, principally through tuition and other fees (e.g. administrative fees). This is in the bottom quartile of payments made by households in OECD member countries, implying a relatively low burden on households.

However, the total cost of attending higher education for students who do not live with their families is much higher than tuition and fees. Student loans can assist learners in meeting living costs and ensuring financial constraints do not limit them from completing their studies. Estonia has a public student loan system in place. However, only 5% of Estonian graduates had availed of a student loan in 2016. This may be because of the student loan interest rate, currently set at 5%, higher than in other countries. For example, in Japan, the Netherlands and Sweden, the interest rate on public student loans in equal to or lower than the cost of government borrowing, so that it does not exceed 2%. It could also be related to the fact that Estonian students tend to work longer weekly hours in their part-time jobs, and therefore have more income from employment to help defray living costs (see Section 9.5).

The availability of international financial resources is declining

In recent years, the Estonian higher education system has relied for a relatively large part on international funding, particularly from the European Commission. The proportion of the total funding accounted for by international sources has varied over time, but on average it constituted 14% of total funding between 2012 and 2015 (Table 9.3).

Table 9.3. Higher education expenditure, by source of funding in Estonia (2012-2015)

Millions, euro

	2012	2013	2014	2015	Average
All sources	285.44	m	355.25	361.01	333.9
International sources	99.58	125.81	19.49	25.94	48.35
% international sources	35%	m	5%	7%	14%

Note: The average excludes 2013.
Source: OECD (2018[4]), *OECD Education Statistics*, https://doi.org/10.1787/edu-data-en.

International funding has helped broaden the funding base of higher education, and to raise the level of spending. The initiatives co-funded by the European Union in Estonia cover a wide range of activities, from recognising prior learning (Primus Programme), to raising awareness of diverse teaching and research practices (Dora Programme), to improving graduate labour market outcomes (see Section 9.3.2).

As Estonia grows wealthier, it is likely to qualify for less international funding. Funding levels from international sources have already begun to decline and are likely to decrease further in the coming decade, due to the rapid economic growth, which reduces the ability to qualify for international financial assistance. The current allocation of European Structural and Investment Funds to Estonia ends in 2020, and the contribution of international funding, which has already reduced since 2014, will be much lower thereafter. Estonian policymakers face the challenge of ensuring that activities supported by international funding and aligned with national policy priorities find comparable funding after 2020, if they wish for them to continue.

9.2.2. Human resources

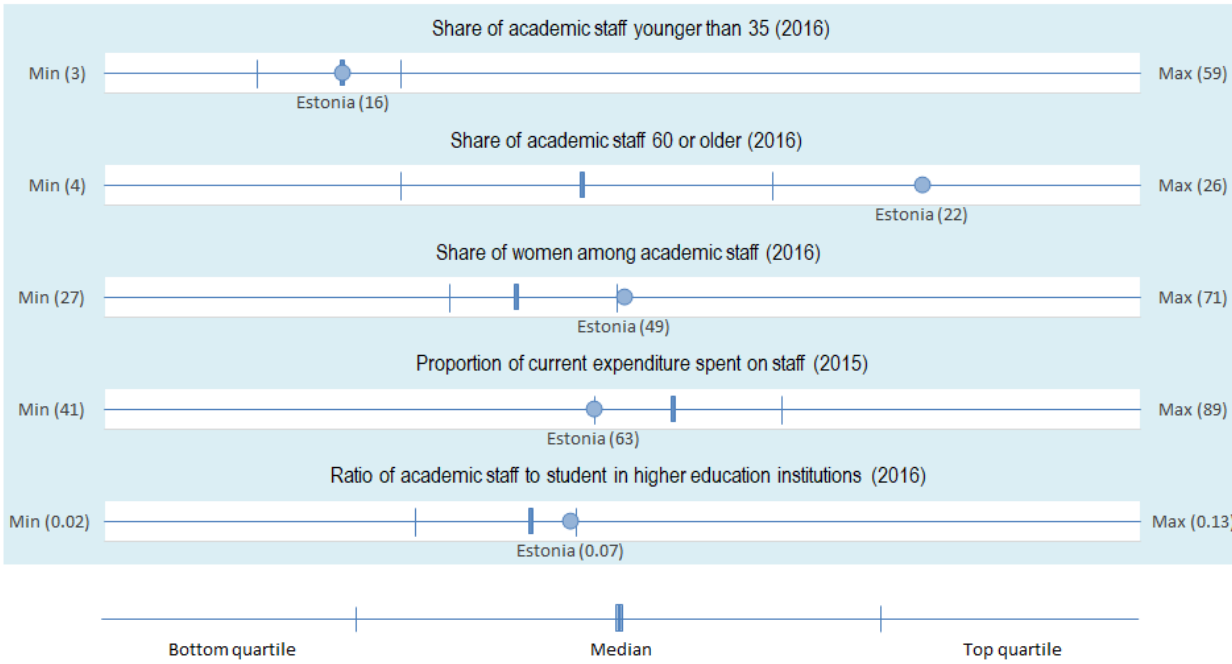
Figure 9.3 shows the position of Estonia within the OECD distribution on the scorecard of indicators related to human resource inputs into higher education.

Estonia has a relatively large proportion of older staff, and working conditions could be more attractive for young staff

An ageing body of academic staff can have significant budgetary implications, as older staff are more likely to be in senior positions and therefore have higher salaries. Estonia had a relatively large cohort of older academics in 2016 (the proportion of academic staff older than 60), making up 22% of total academic staff, in the top quartile of OECD countries.

In addition, a larger older cohort implies that it will be necessary to attract a large number of younger academic staff in the near future, as the older employees retire. In Estonia, the share of academic staff younger than 35 in 2016 was 16%, in line with the OECD median; while the share of staff aged 35-44 was above the OECD median. Full-time equivalent staff numbers have declined slightly in the most recent years (by about 7% between 2014 and 2016) (OECD, 2018[4]). As student numbers have also declined, this in itself does not represent a challenge for Estonia. However, adequate and competitive working conditions are necessary to maintain a stready stream of high-quality academic staff into the future.

Figure 9.3. Where does Estonia stand in the OECD distribution? Human resources



Note: The indicators represented in this chart are a subset of the indicators presented in Table 9.1. The coloured circle represents Estonia's position in the OECD distribution. The circle is not coloured when data are available for less than half of the OECD countries (the minimum number of countries with available data is 14). For more information on methodological issues and metadata, see OECD (2019[3]). Follow the *Statlink* to download the data underlying the calculation of the scorecard.
Source: Adapted from OECD (2019[3]), *Benchmarking Higher Education System Performance*, https://doi.org/10.1787/be5514d7-en.

StatLink https://doi.org/10.1787/888933942032

In 2014, the average annual gross salary of academic staff in public and government-dependent higher education institutions was about USD 55 000 (parity adjusted) in the median OECD country. The Estonian data is not directly comparable to other countries, because it includes only university staff, while most other OECD countries include data for staff in all higher education institutions. Therefore, the data for Estonia are likely to overestimate the overall level of salary of academic staff in all institutions, as on average, university academic staff are likely to earn more than academic staff in professional HEIs, at least if salary is aligned with qualifications. In Estonia, the share of academic staff with a doctoral degree is 56% at universities, and 14% at professional higher education institutions; academic staff with a bachelor's degree or less account for just 1% academic staff in universities, and for one-quarter in professional HEIs.

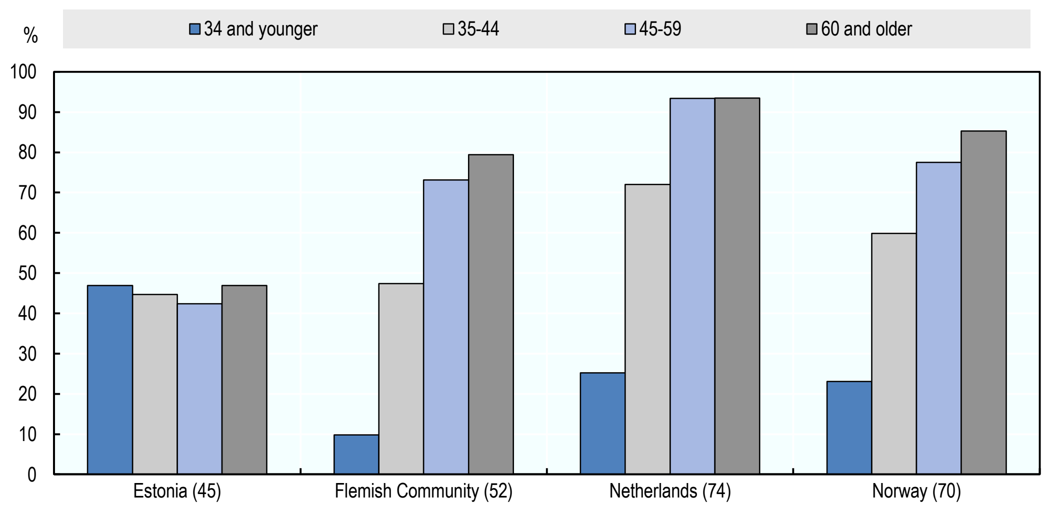
However, Estonian salary data is directly comparable to the data for Finland, which also reported data only on university academic staff. Academic staff in Estonian universities earned an annual gross salary of USD 37 500[2] in 2015. By comparison, the average staff salary in 2015 was USD 47 200 in neighbouring Finland. Lower salary levels can make it difficult for higher education institutions to recruit internationally, and to attract foreign talent and Estonian academics who work abroad.

While salary is an important aspect of the working conditions of teaching staff, security and continuity of employment are also important, both for teachers and students. According to existing regulations, university councils or professional HEIs should prepare an open competition process to select candidates to be hired on a permanent basis. Non-permanent contracts may be used if a position cannot be filled through the open competition process.

Notwithstanding these regulations, a relatively low share of teaching staff are employed based on permanent contracts. In 2016, 45% of academic staff with teaching duties in Estonia had a permanent contract. This is lower than in the Flemish Community, the Netherlands and Norway (Figure 9.4).

Figure 9.4. Share of teaching staff with permanent contracts, by age (2016)

Academic staff with teaching duties, excluding doctoral students.The share with permanent contracts across all ages is reported in brackets.



Source: Adapted from OECD (2019[3]), *Benchmarking Higher Education System Performance*, https://doi.org/10.1787/be5514d7-en.

StatLink https://doi.org/10.1787/888933942051

Notably, in contrast to other jurisdictions, in Estonia, the share of teaching staff with permanent contracts does not vary substantially with age; older Estonian academic staff are as likely to be on non-permanent contracts as younger staff. Estonia plans to establish a system of tenure for academic staff in new higher education legislation, which may result in an improved academic staff profile in terms of age and permanence of employment.

Women represent around 50% of academic staff in Estonia

The share of women among academic staff is nearly 50%, placing Estonia in the top quartile of the OECD distribution, along with Finland and its Baltic neighbours Latvia and Lithuania. This gender balance holds for all age groups; the share of women is 51% among both staff younger than 35 and staff in the age bracket of 35-44 years-old, and it is 52% among 45-59 year-olds. Estonia and New Zealand are the only countries with such a balanced gender composition of academic staff across all age cohorts (excluding the cohort older than 60, where the share of women is around 40% for both countries).

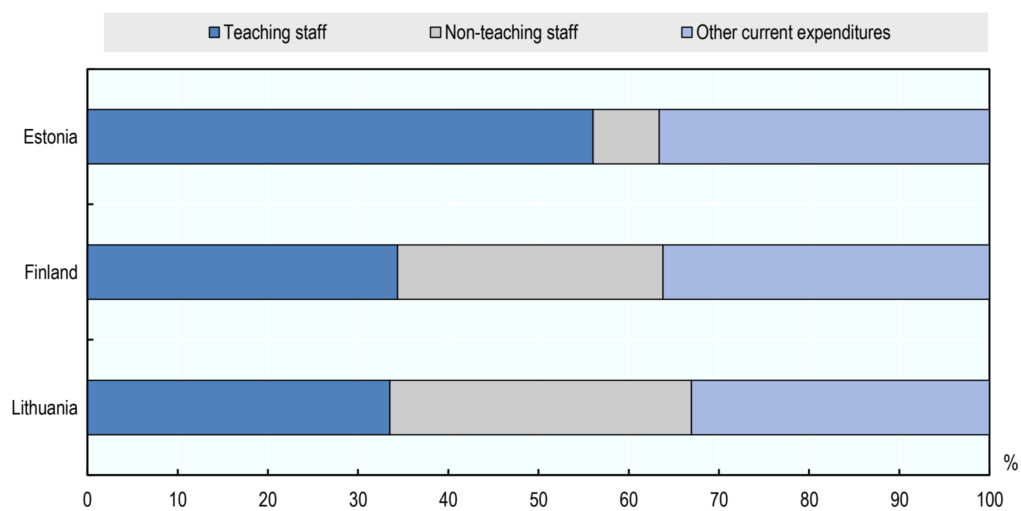
Balanced gender participation in the academic workforce does not guarantee gender equality in the profession. Women often remain underrepresented at senior levels of academia and management in higher education (see Chapter 4 (OECD, 2019[3])).

Estonia spends a large proportion of higher education current expenditure on teaching staff relative to the OECD median, but very little on non-teaching staff

The distribution of current expenditure among cost items varies across higher education systems, shaped by how higher education activity is organised. In some systems, higher education institutions offer more administrative and logistical support to their academic staff than in others, and therefore employ more non-academic staff.

Overall, in 2015, staff expenditures accounted for 63% of the current expenditure of Estonian higher education institutions, in the bottom quartile of the OECD distribution.

Figure 9.5. Higher education current expenditure, by cost category (2015)



Source: OECD (2018[4]), *OECD Education Statistics*, https://doi.org/10.1787/edu-data-en.

StatLink https://doi.org/10.1787/888933942070

The distribution of staff expenditures between teaching and other staff is atypical among OECD countries. Teaching staff expenditures account for 56% of current expenditure, the highest share in the OECD area after Austria and Greece, while expenditure on non-teaching staff represents just 7% of current expenditure, the lowest proportion among OECD countries except Austria.

There are more academic staff per student than in most other OECD countries

Contact time spent by academic staff with students can be valuable to enhance student learning. Academic staff can teach or support students through lectures, tutorials and practical sessions, as well as by providing individual advice and feedback. In the absence of other data on the quality of teaching and learning in higher education, staff-to-student ratios are often used as an imperfect proxy for learning quality, based on the assumption that fewer students per staff member allows for a greater level of student-teacher interaction.

In Estonia, there were 0.072 academic staff members per student in 2016, or approximately one academic staff member for every 14 students. This is a larger ratio than the OECD median (1:15) and also larger than the ratio in neighbouring Finland, Latvia and Lithuania. However, it should be noted that staff-student contact time also depends on the breakdown of academic staff time between teaching, research or other tasks (see Chapter 3 of (OECD, 2019[3])).

9.3. Education

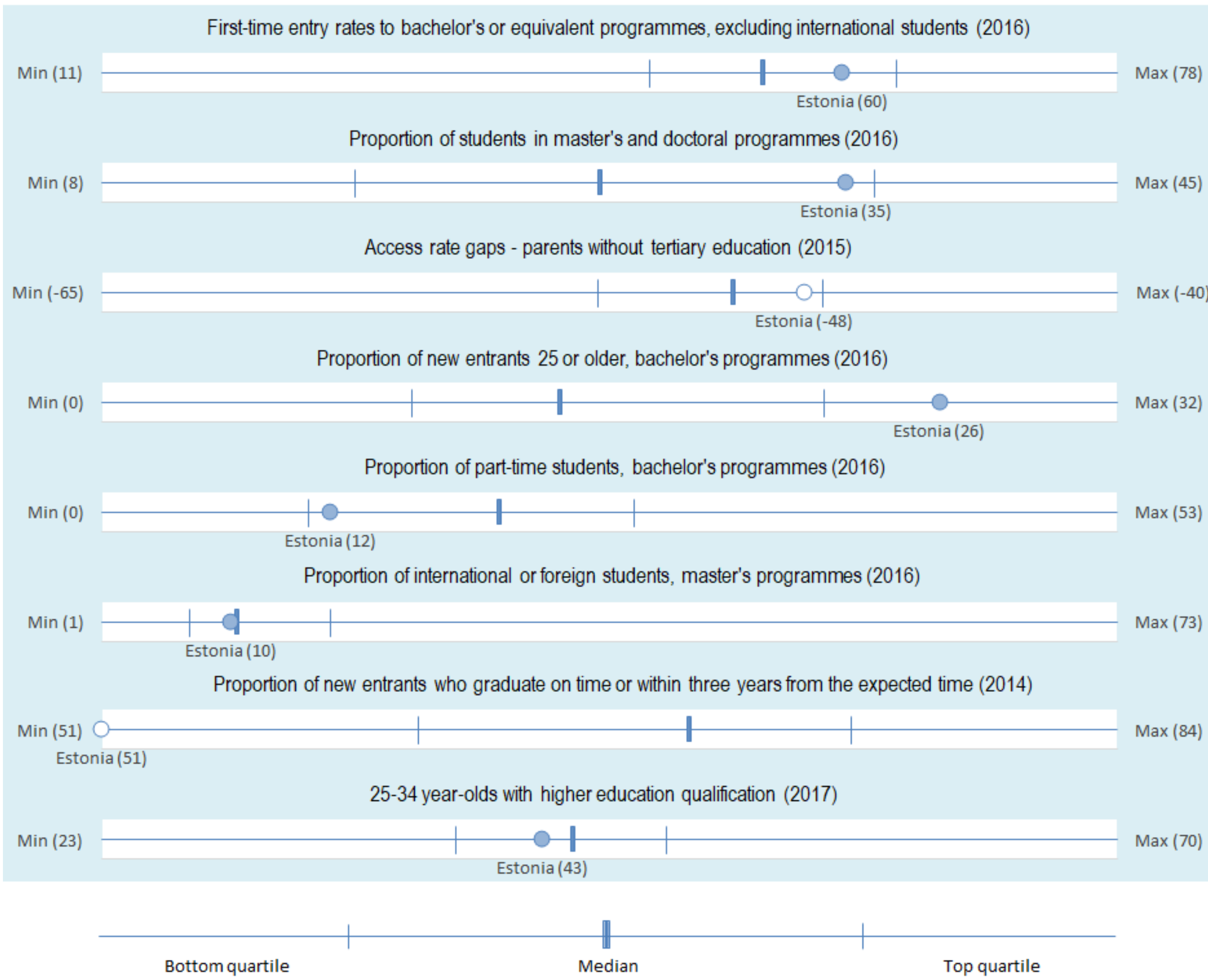
Highlights

- Estonia has an overall high level of access and attainment in higher education. This is noteworthy, since it does not offer short-cycle higher education programmes, which contribute to the high levels of attainment in many OECD countries. Access to higher education is unequal across demographic groups, though less so than in many other countries.
- Estonia has a large proportion of entrants[3] to higher education who are 25 or older, and a relatively small proportion of part-time students. This is atypical among OECD countries, in which older students typically study on a part-time basis. Estonian students work and have dependent children at rates above the OECD average.
- Estonia has had an especially low rate of completion (51%) within three years from the expected time, the lowest among OECD countries reporting this indicator.
- Estonia has a policy of attracting international students that includes direct financial incentives to institutions. The proportion of international students in Estonia in 2016 is near the OECD median, and rapidly rising.
- Young higher education graduates aged 16-34 in Estonia performed relatively well on literacy and numeracy proficiency in the OECD Survey of Adult Skills compared to those with lower levels of educational attainment. They were also more likely to report that they are in good health and they tend to trust others.
- In 2016, higher education graduates earned about 20% more on average than those without higher education. According to data from the Survey of Adult Skills, higher education graduates younger than 35 are also less likely than upper secondary graduates to work in jobs with routine tasks where little learning is involved.
- However, employment premia for graduates appear to be smaller than those observed in other OECD countries. For example, in Estonia, the employment rate of higher education graduates in 2016 was just 1% above that of individuals with only upper secondary or post-secondary non-tertiary education. This could be attributed to the current labour market in Estonia, where employment rates are high in general and there are shortages of qualified staff in some industries.

9.3.1. Access, student profile, completion

Figure 9.6 shows a detailed overview of the benchmarking scorecard indicators related to higher education access, profile of students and their success in completing their studies.

Figure 9.6. Where does Estonia stand in the OECD distribution? Access, student profile, completion



Note: In Estonia, all entrants are included in the indicator on "first time entry rates to bachelor's or equivalent programmes". The indicators represented in this chart are a subset of the indicators presented in Table 9.1. The coloured circle represents Estonia's position in the OECD distribution. The circle is not coloured when data are available for less than half of the OECD countries (the minimum number of countries with available data is 14). For more information on methodological issues and metadata, see OECD (2019[3]). Follow the *Statlink* to download the data underlying the calculation of the scorecard.

Source: Adapted from OECD (2019[3]), *Benchmarking Higher Education System Performance*, https://doi.org/10.1787/be5514d7-en.

StatLink https://doi.org/10.1787/888933942089

Over 40% of Estonian 25-34 year-olds have a higher education degree

Higher education attainment among Estonia’s 25-34 year-old age cohort was just below the OECD median in 2017. This could be partly related to the country’s focus on higher-level programmes (bachelor’s, master’s and doctoral), and the absence of short-cycle programmes, which were reclassified as vocational education in Estonia in 2009. For example, higher education attainment in Estonia is just above that of Finland, another country where short-cycle higher education programmes are not available.

For expected entry rates to bachelor’s programmes, Estonia lies above the median of the OECD distribution, with 60% of young people expected to enter a bachelor’s programme at least once in their lifetime based on current age-specific entry patterns. Students in Estonia are also more likely to be studying for higher qualifications; over one-third of higher education students in Estonia are enrolled at the master’s or doctoral level, a proportion close to the top quartile of the OECD distribution.

Access to higher education varies by social background, though less than in other OECD countries

In Estonia, as in other OECD countries, higher education enrolment rates vary according to family background. Young adults (aged 18-24) whose parents did not complete higher education are about half as likely as those whose parents did attain a higher education qualification to enter a bachelor’s or long first degree (integrated bachelor's/master's long-cycle study) programme. The gap in access by parental education is narrower in Estonia than in many other OECD countries. Estonia ranks 6th among the 16 countries with available data on this indicator (i.e. Estonia has the 6th narrowest gap in entry rates).

Women completed their bachelor’s studies in larger proportions than men in all countries with available data, but the gender gap in completion observed in Estonia is the largest among the 16 OECD countries apart from Finland. Some 42% of women who started their studies in 2008 completed on time (in 2011), compared to 22% of males.

Fewer higher education students complete their study programmes than in many other OECD countries

Only about half of entrants to higher education who started their bachelor’s studies in Estonia in 2008 had graduated by 2014, three years after their expected graduation time. This is the lowest rate among the 16 OECD higher education systems with available data.

Women completed their bachelor’s studies in larger proportions than men in all countries with available data, but the gender gap in completion observed in Estonia is the largest among the 16 OECD countries apart from Finland. Some 42% of women who started their studies in 2008 completed on time (in 2011), compared to 22% of males.

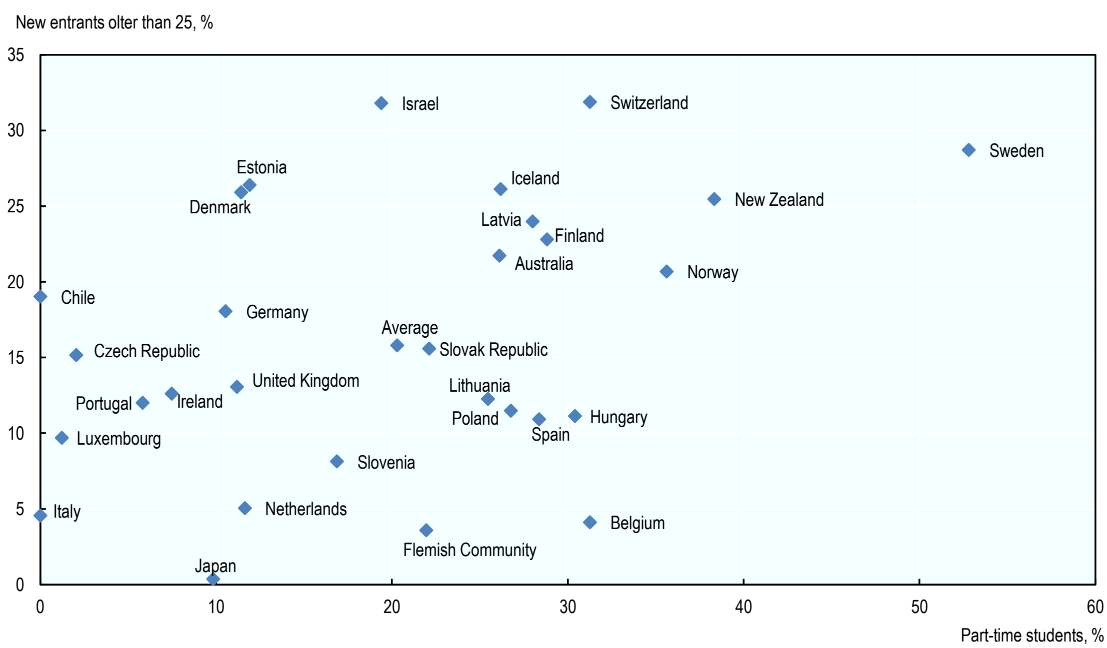
Few students study part-time, even though many start their studies when they are 25 or older

Estonia is atypical among OECD countries for having a high rate of adults who are 25 or older among entrants, and a relatively low proportion of part-time students. Denmark is in the same situation, with over one-quarter of new entrants to bachelor’s programmes aged 25 or older, and only around 10% of bachelor’s students enrolled part-time.[4] Among OECD countries in general, an older student population tends to be associated with a larger share of students studying part-time, possibly because older students have less time to devote to study, due to work and family obligations.

Over half of Estonian students work during the lecture period (Hauschildt, Vögtle and Gwosć, 2018[6]). On average, they spend 50 hours a week working or studying, 20 hours of which are spent working paid jobs unrelated to studies, the highest amount among countries participating in the EUROSTUDENT survey (Hauschildt, Vögtle and Gwosć, 2018[6]).

The relatively small proportions of part-time students, together with the low completion rate, could be a function of the fee structure for higher education. Higher education is free only for full-time programmes taught in Estonian. This provides incentives for adults entering higher education to choose the full-time enrolment option, even when studying part-time might better suit their personal situation. And, because higher education institutions can ask for reimbursement of tuition fees of full-time students failing to progress at the right pace, they have weak incentives to propose part-time study. Limited support for flexible and part-time study appears to therefore limit higher education participation and, especially, study completion.

Figure 9.7. Proportion of students older than 25 and of part-time students, bachelor's programmes (2016)



Note: See Chapter 5 of (OECD, 2019[3]) for methodological information on the indicators represented in this chart.
Source: Adapted from OECD (2018[4]), *OECD Education Statistics*, https://doi.org/10.1787/edu-data-en.

StatLink https://doi.org/10.1787/888933942108

Estonia has a relatively high proportion of entrants to higher education with children, especially among women (Table 9.4). For students with children under 7 years-old, there are no tuition fees, regardless of study progress, making it easier for them to balance family and study commitments. In addition, students with children younger than 3 years-old have the option to undertake study activity and assessments even while on academic leave (a period during which a student can suspend studies while remaining enrolled).

Table 9.4. Share of 18-29 year-old new entrants to higher education with dependent children, by gender (2015)

The share of individuals with children in the overall 18-29 year-old population is indicated in brackets

	Estonia	Finland	Lithuania	Norway	United States	Median
Women	5.9 (39.8)	5.8 (18.9)	1.9 (29.7)	4.1 (16.3)	11.5 (36.8)	4.4 (18.9)
Men	2.6 (23.1)	2.5 (11)	0.8 (18.3)	0.7 (5.9)	6.1 (23.9)	2.5 (11)

Note: Data refer to first-year students for Estonia and Lithuania. The medians are calculated across 11 countries, including Canada and Germany, whose data refer to first-time graduates. See Chapter 5 of (OECD, 2019[3]) for other metadata.
Source: Indicators of Education Systems (INES) Survey on Equity in Tertiary Education.

The proportion of international students in Estonia is close to the OECD median

International students in Estonia – those who have entered the country for the purpose of study – are not numerous, though their numbers have been increasing in recent years. One master's student in ten is an international student (below the OECD median), while at the bachelor's level, 5% of students are international, a similar level to the OECD median. However, Estonia has experienced an increase in the proportion of international students, which has almost doubled between 2014 and 2016. This is one of the highest rates of increase in the OECD member countries. Estonia is now close to a 1:1 ratio between the number of incoming foreign students and the number of national students who pursue their studies abroad, as compared to an OECD median of around 2:1. Much of the international mobility to Estonia is of a regional nature, with half of international students coming from neighbouring countries, in particular Finland (where 40% of all international students originate).

Table 9.5. Selected indicators on international students (2016)

	Number of international students per national student abroad	Percentage of international or foreign students coming from neighbouring countries	National students enrolled in other OECD and partner countries in 2016, 2013=100	Incoming mobile students in 2016, 2013=100
Estonia (OECD quartile)	0.9 (2)	50 (3)	95 (1)	185 (4)
OECD median	1.9	28	110	124
Finland	2.3	16	125	106
Latvia	1.2	18	86	184
Lithuania	.	.	89	140

Source: Adapted from OECD (2018[7]), *Education at a Glance 2018: OECD Indicators*, https://doi.org/10.1787/eag-2018-en.

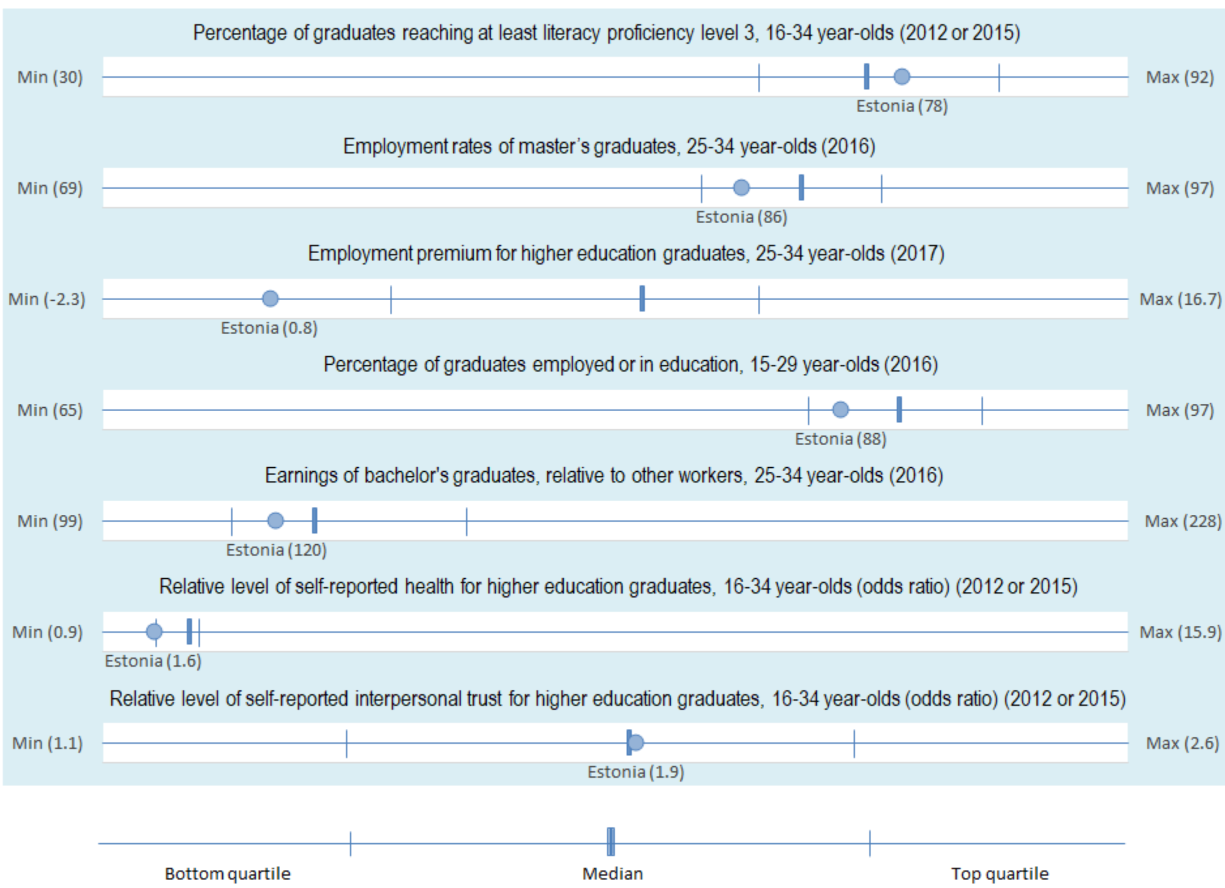
Estonia will benefit most from international students if they can be retained after graduation to meet labour market needs. However, international students have a comparatively low rate of entry to the Estonian labour market. Only 20% of bachelor's and master's international students stay in Estonia after graduation compared to, for example, around 60% of bachelor's and 40% of master's international students in Norway.

International students enrolled in occupationally specific programmes offered at professional HEIs are more likely to find employment in Estonia after graduation than those enrolled in universities (Estonian National Audit Office, 2015[8]; Estonian Ministry for Education and Research and Archimedes, 2015[9]). However, the proportion of international students is much lower in professional higher education institutions (1%) than in universities (8%), and as professional HEIs do not offer programmes in English, students studying there must already speak Estonian, which also makes subsequent labour market integration an easier process.

9.3.2. Graduate outcomes

Figure 9.8 shows the position of Estonia within the OECD distribution on the set of scorecard indicators associated with the outcomes of graduates.

Figure 9.8. Where does Estonia stand in the OECD distribution? Graduate outcomes



Note: The indicators represented in this chart are a subset of the indicators presented in Table 9.1. The coloured circle represents Estonia's position in the OECD distribution. The circle is not coloured when data are available for less than half of the OECD countries (the minimum number of countries with available data is 14). For more information on methodological issues and metadata, see OECD (2019[3]). Follow the *Statlink* to download the data underlying the calculation of the scorecard.
Source: Adapted from OECD (2019[3]), *Benchmarking Higher Education System Performance*, https://doi.org/10.1787/be5514d7-en.

StatLink https://doi.org/10.1787/888933942127

Higher education graduates in Estonia have high levels of literacy and numeracy proficiency

Internationally comparable measures of higher education learning outcomes are not currently available. However, the OECD Survey of Adult Skills can provide some insight into the cognitive and workplace skills of young graduates. These data allow for the performance assessment of higher education graduates in basic skills such as literacy and numeracy.

In Estonia, around three-quarters of 16-34 year-old higher education graduates reached level 3 of the proficiency scale of the Survey of Adult Skills (PIAAC), in both literacy and numeracy, slightly above the OECD median level. A proficiency level of 3 implies an ability to understand and respond appropriately to dense or lengthy texts, and complete tasks that require an understanding of mathematical information that may be embedded in unfamiliar contexts.

When compared to upper secondary graduates, and controlling for basic demographic and social characteristics, young Estonian higher education graduates were substantially more likely to reach level 3 on both the literacy and numeracy scales than individuals with only upper secondary education. The odds ratio[5] of reaching proficiency level 3 for 16-34 year-old higher education graduates, compared to individuals with only upper secondary education, is over 2 for both numeracy and literacy proficiency, slightly below the OECD median.

Higher education also yields social and personal benefits

Higher education graduates younger than 35 were more likely than individuals with only upper secondary education to report more positive social outcomes in Estonia, according to their reports in the background questionnaire of the OECD Survey on Adult Skills. These indicators show that substantial non-monetary benefits are associated with higher education, even though these benefits might be less pronounced in Estonia than in other countries in some cases.

For example, the odds ratio of reporting trust in other people was about twice as large for higher education graduates, as compared to upper secondary graduates (close to the OECD median level). Higher education graduates were also more likely than upper secondary graduates to report being in good health (1.6 higher odds, compared to upper secondary graduates), though the difference between these groups is smaller than in most other OECD countries.

The economic benefits of higher education for graduates are mixed when compared to other countries

About 90% of Estonian higher education graduates under 30 are employed or in education. Among 25-34 year-old graduates of higher education, the employment rate was nearly the same as that for graduates of upper secondary education (or post-secondary, non-tertiary education) in 2017. Higher education graduates with a bachelor level qualification do, however, achieve a 20% earnings premium on average.

The limited labour market advantages of Estonian higher education graduates can be attributed, in part, to two disparate factors. First, Estonia has experienced a large emogration of young higher education graduates relative to other OECD countries, whose earnings are not captured in national labour market indicators. Jaggo, Reinhold and Valk

(2016[10]) estimate that information on labour market outcomes cannot be obtained for over 10% of Estonian graduates, who are most likely living abroad.

Second, Estonia has a relatively high level of labour market inactivity, due to a variety of reasons. The share of young people with dependent children is relatively high in Estonia, with 40% of women and over 20% of men in the 18-29 year-old cohort having at least one child (Table 9.4). Family care is a common reason for labour market inactivity. Furthermore, young men usually spend a year serving the national conscript obligation, and a common period to undertake this duty is immediately after graduation. Therefore, it is not surprising that that many Estonian graduates are inactive, even though few are involuntarily unemployed. The share of Estonian graduates younger than 30 who are inactive and not in education (10%) is the fifth-highest in the OECD area, whereas the share of unemployed, not-in-education graduates (2%) is the sixth-lowest.

Apart from these factors, other indicators point to a more positive picture of graduate labour market outcomes in Estonia, also in comparison to other OECD countries. Less than 5% of Estonian higher education graduates reported working in jobs with routine tasks in the Survey of Adult Skills, one of the lowest shares in the OECD area.

The Estonian government is seeking to improve the labour market outcomes of graduates

The government set a target of 88% for the employment rate of higher education graduates by 2020, and also has put in place a number of policy initiatives to enhance the labour market relevance of higher education (Table 9.6). For example, the information needed to monitor and improve the employment situation and working conditions of graduates is being gathered through a national graduate survey. In addition, evidence to support planning for future provision is generated through OSKA, a forecasting tool used to anticipate labour market and skills needs based on quantitative and qualitative evidence (European Commission, 2017[11]).

The government has introduced a number of measures to ensure employment for higher education graduates. The share of graduates employed or in education is included in the formula funding, providing a financial incentive to higher education institutions to ensure that higher education programmes confer the necessary skills for further study or work.

The graduate employment rate is also one of the criteria involved in the quality assessment of study programme groups in Estonia (EKKA, 2011[12]). In addition, higher education institutions are required to take the needs of the labour market into account when designing new study programmes under a government regulation on the Standard of Higher Education (Estonia, 2009[13]).

Table 9.6. Initiatives to improve labour market relevance in Estonia (2017)

Information gathering	National Graduate Survey
	OSKA programme to develop labour market forecasts
	Utilisation of administrative records
Incentives to institutions	Share of graduates in education or employment included in institutional formula funding
	Graduate employment rate included in the criteria for study group assessment
	Obligation for institutions to take into account labour market information when designing new programmes
Work-based learning	A requirement for all higher education programmes, and particularly for less academically oriented programmes
	PRÕM programme to develop the necessary co-operation between education institutions and employers

Source: Adapted from information provided by the Estonian Ministry of Education and Research.

Estonia aims to have some form of work-based learning included in all higher education programmes (European Commission/EACEA/Eurydice, 2016[14]). In particular, the more professionally-oriented programmes are required to include a traineeship, a period of work-based learning which typically takes place following the completion of academic work on a programme and makes up a minimum of 15% of the study load. Since 2016, PRÕM, a programme co-funded by the European Union, aims to favour co-operation between institutions and enterprises for the development of work-based learning in higher and vocational education, through creating programmes where most study is completed in the workplace rather than in lectures.

9.4. Research and engagement

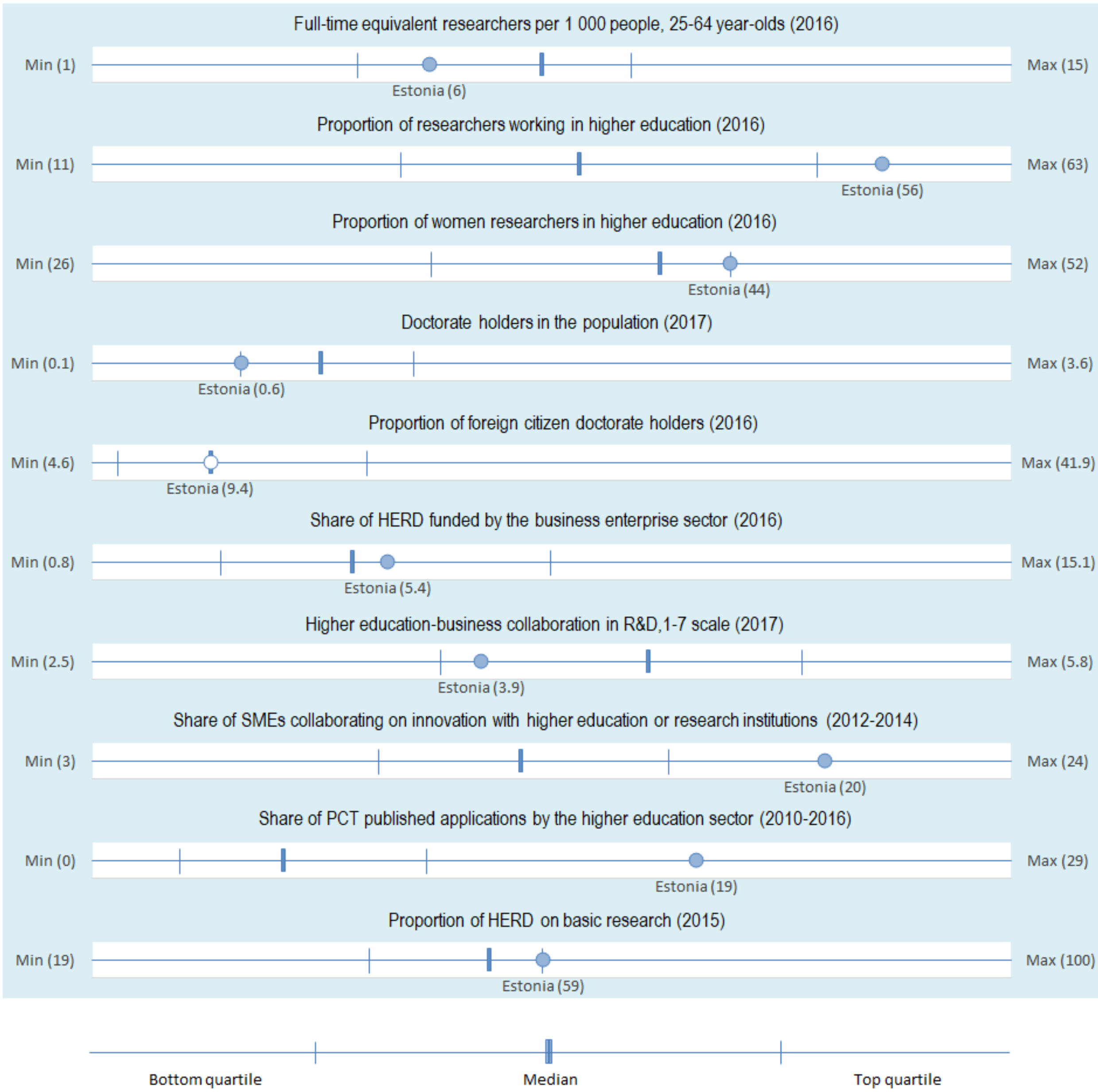
Highlights

- The higher education research and development sector plays a leading role in the research and innovation system in Estonia, with 56% of all researchers in the country working in higher education in 2016.
- Gender parity among researchers has been reached in all but the oldest age groups. Overall, in 2016, women researchers made up almost 45% of the total cohort of researchers in the population.
- Survey data suggests that Estonia achieves relatively high levels of collaboration between business and the higher education sector compared to many other OECD countries. This higher level of collaboration also extends to small and medium enterprises in Estonia, which report one of the highest levels in the OECD of collaboration on innovation with the higher education sector.
- In 2016, in Estonia international scientific collaboration, as measured by joint authorship of scientific publications, was close to the OECD median. In the same year, net flows of scientific authors were positive for Estonia, suggesting a net brain gain of researchers.
- Estonia produces a lower volume of publications overall per 1 000 people aged 25-64, with 2.5 publications in 2017, below the OECD median. In 2017, over one-tenth of all Estonian publications were among the 10% most cited publications, the same level as the OECD median.
- Estonia is in the bottom quartile of OECD countries in the amount of scientific knowledge that is made publicly available. In total, 23% of publications from Estonian research activities were available in some form of open access in 2016, a proportion which is among the lowest in OECD countries.

9.4.1. Inputs and activities

Figure 9.9 provides a detailed overview of the benchmarking scorecard indicators associated with research inputs and activities.

Figure 9.9. Where does Estonia stand in the OECD distribution? Research inputs and activities



Note: The indicators represented in this chart are a subset of the indicators presented in Table 9.1. The coloured circle represents Estonia's position in the OECD distribution. The circle is not coloured when data are available for less than half of the OECD countries (the minimum number of countries with available data is 14). For more information on methodological issues and metadata, see OECD (2019[3]). Follow the *Statlink* to download the data underlying the calculation of the scorecard.

Source: Adapted from OECD (2019[3]), *Benchmarking Higher Education System Performance*, https://doi.org/10.1787/be5514d7-en.

StatLink https://doi.org/10.1787/888933942146

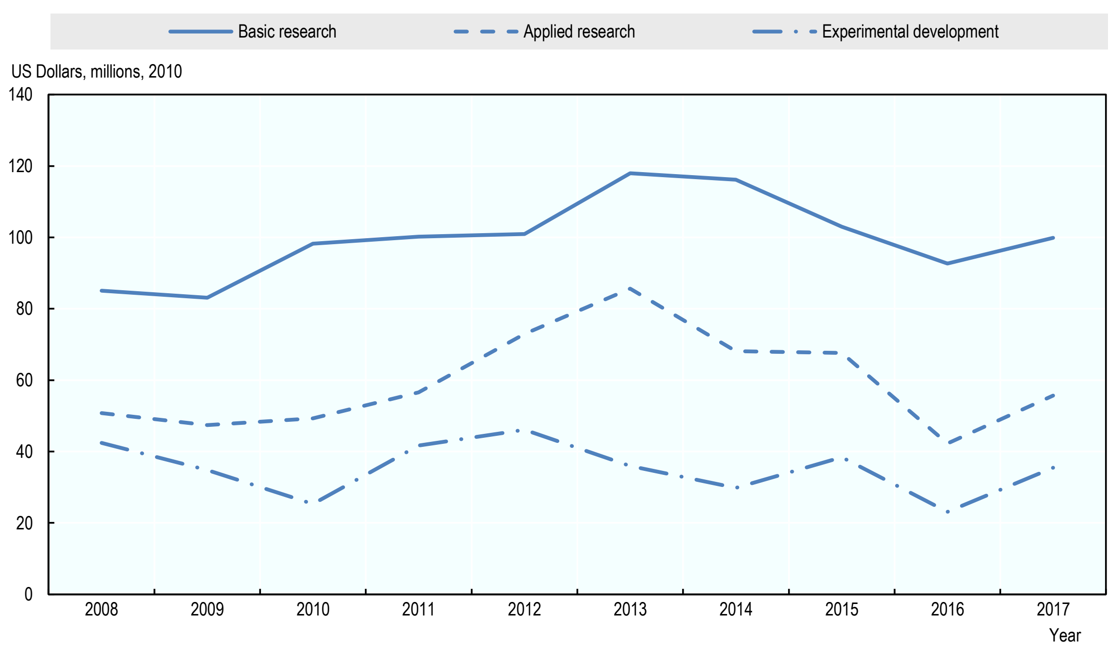
Estonia has strengthened R&D capacity in recent years

Estonia has prioritised the development of national capabilities in research and development in recent years. While previous national research strategies have focused on increasing investment and building capacity, the most recent strategy covering the period of 2014-2020 is geared towards harnessing the value created by the R&D sector in Estonia for the good of the economy and society (Estonian Ministry of Education and Research, 2014[15]).

The higher education sector plays a larger role in national R&D activity in Estonia than in many other OECD countries. The proportion of researchers working in the higher education sector was in the top quartile of OECD countries in 2016, comprising 56% of all researchers in Estonia, close to the maximum proportion of 63%.

There is marginally greater emphasis on basic research (research aimed at creating new general knowledge without a specific purpose in mind) in Estonia than in many other OECD countries, with 59% of higher education research classified as basic research in 2015, slightly above the median OECD level of 54%. However, as much of the funding in higher education research and development in Estonia is project-based, the apportionment of investment between different types of research is volatile over time (Figure 9.10).

Figure 9.10. Gross domestic expenditure on higher education R&D, by type of activity in Estonia (2008-2017)



Source: Adapted from OECD (2018[16]), *OECD Science, Technology and R&D Statistics*, https://doi.org/10.1787/strd-data-en.

StatLink https://doi.org/10.1787/888933942165

Basic research is crucial to expanding and improving the body of knowledge available for the benefit of society, and the higher education sector is where the majority of basic research is carried out across the OECD. At the same time, many public research investment strategies in OECD countries are targeting increases in spending on applied research and experimental development, to orient research more towards tackling specific challenges. This is also the case in Estonia, where specific policy instruments support the development of applied research in areas of smart specialisation, business R&D and co-operation between higher education institutions and business (see Chapters 6 and 7 of (OECD, 2019[3])).

Gender balance in academia has largely been achieved

The relative proportion of female researchers overall in Estonia is in the top quartile of OECD countries. Gender parity has been reached in all age groups except the over-60 category; in total, 44% of researchers in the higher education sector were women in 2016. This also reflects Estonia's strong relative position in terms of gender equity among academic staff as a whole (see Section 9.2.2).

Estonia has put in place a range of supportive policies which promote gender equity, including gender balance monitoring in the hiring process, and alignment with the principles to support gender equity in the research profession included in EU policy initiatives such as the European Charter and Code of Conduct for the recruitment of researchers, and the European Research Area Innovation Committee (see Chapter 4 of (OECD, 2019[3])).

There is a relatively low supply of doctorate holders and researchers in the population

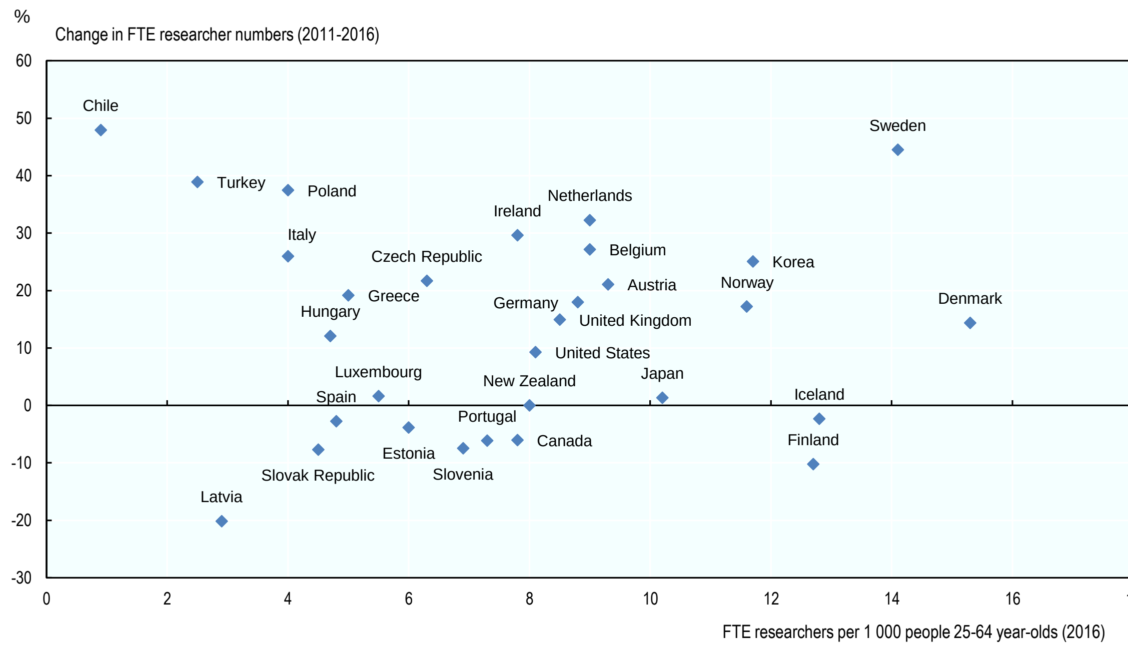
The proportion of doctorate holders in the population is below the OECD median in Estonia, at 0.6% of the population, compared to the OECD median proportion of 1%. At the same time, the numbers of doctoral graduates from Estonian higher education institutions appear to be growing slowly; there were 190 new doctoral graduates in 2012, while by 2016 the number had increased to 239 (OECD, 2018[4]).

A similar picture can be seen with regard to the proportion of researchers in the population in Estonia. Overall concentrations of researchers in the labour force are also at the lower end of OECD countries, below median levels, and they have been static over the period 2011-2016. As Figure 9.11 shows, other countries with lower proportions of researchers in the population have been able to surpass Estonia in terms of growth in recent years.

According to the OECD Careers of Doctorate Holders survey, around 10% of the population with a doctoral qualification living in Estonia were foreign citizens in 2016, the same proportion as the OECD median level. Estonia has potential to increase both the numbers of native and foreign doctorate holders further in the future. The numbers of foreign doctoral candidates choosing Estonia for their studies has grown by more than 50% between 2013 and 2016 (from 218 in 2013 to 339 in 2016). At the same time, the numbers of Estonian doctoral candidates choosing to study in other OECD countries has increased at a much slower rate, from 264 candidates in 2013 to 289 in 2016 (OECD, 2018[4]).

Figure 9.11. Researcher concentration and recent growth in OECD countries (2011-2016)

Full-time equivalent (FTE)



Source: Adapted from OECD (2018[16]), *OECD Science, Technology and R&D Statistics*, https://doi.org/10.1787/strd-data-en.

StatLink https://doi.org/10.1787/888933942184

Estonia appears to have built solid links between higher education R&D and the business sector

Estonian higher education appears to have created stronger links with the business sector compared to some other OECD countries. The proportion of higher education expenditure on research and development (HERD) funded by business in 2016 was slightly above the median level of OECD countries. It should be noted, however, that funding for HERD from business is generally low across the OECD, with the median OECD country receiving just 5% of higher education research and development funding from business in 2016.

Enterprises also are more likely to co-operate with the higher education sector on research and development (R&D) in Estonia. This may reflect the fact that the higher education sector performs a comparatively greater portion of R&D compared to other OECD countries, making it a more prominent potential partner for collaborative efforts with businesses. In the 2014 Community Innovation Survey, Estonia ranked in the top quartile of OECD countries in the level of reported collaboration between higher education and small and medium enterprises on innovation.

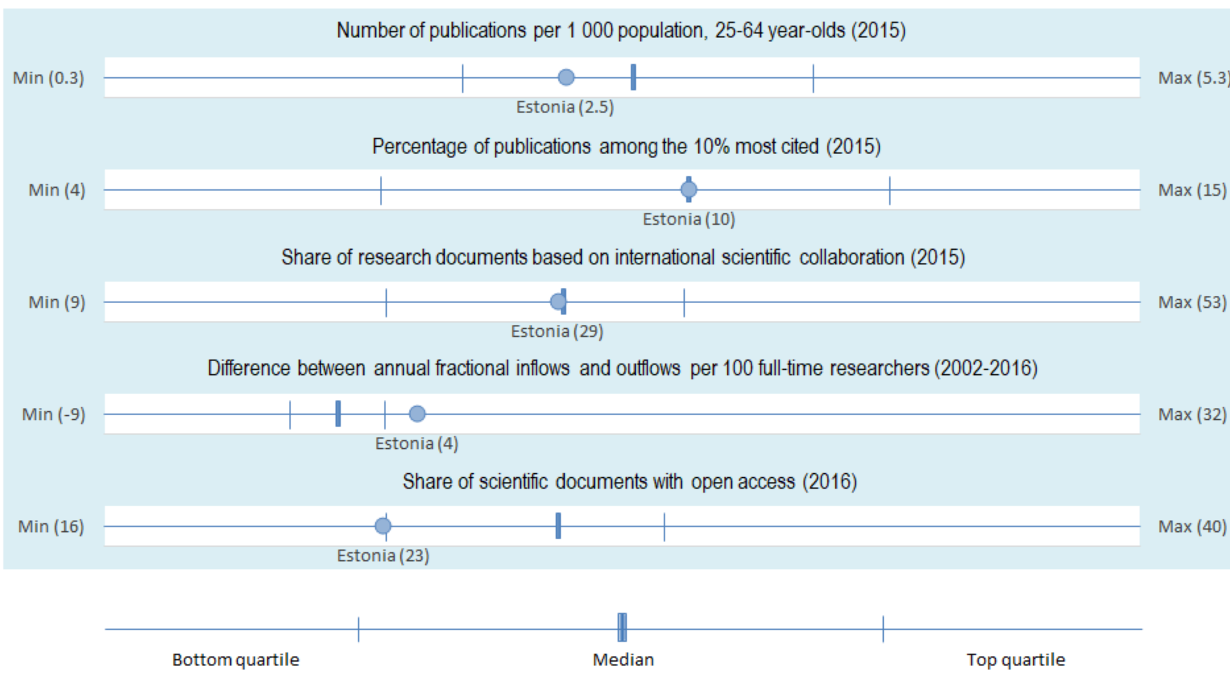
Co-operation between business and higher education is particularly visible in the information and communications technology (ICT) sector. For example, the IT Academy is a joint initiative of the government, businesses and higher education institutions to support students, learning and research in the ICT sector and related areas of study.

Estonia is building on this record by introducing new initiatives to further strengthen collaboration with business. For example, the recently-formed ADAPTER network of universities and research institutes creates a framework for co-ordinating education and other contract services to business enterprise, while the NUTIKAS initiative provides targeted funding for public research institutes to support applied research and develop commercial products in conjunction with business enterprises.

9.4.2. Internationalisation and knowledge production

Figure 9.12 shows the position of Estonia within the OECD distribution on the scorecard of indicators related to internationalisation of research and development activities and knowledge production.

Figure 9.12. Where does Estonia stand in the OECD distribution? Internationalisation and knowledge production



Note: The indicators represented in this chart are a subset of the indicators presented in Table 9.1. The coloured circle represents Estonia's position in the OECD distribution. The circle is not coloured when data are available for less than half of the OECD countries (the minimum number of countries with available data is 14). For more information on methodological issues and metadata, see OECD (2019[3]). Follow the *Statlink* to download the data underlying the calculation of the scorecard.

Source: Adapted from OECD (2019[3]), *Benchmarking Higher Education System Performance*, https://doi.org/10.1787/be5514d7-en.

StatLink https://doi.org/10.1787/888933942203

International collaboration could be further improved

As a small economy, Estonia recognises that international collaboration is essential for achieving their R&D goals. Numerous policy initiatives have been put in place to promote greater internationalisation of higher education research and development, including the Mobilitas programme, which funds doctoral and post-doctoral positions for international researchers.

Bibliometric indicators can be used to provide some indications of the level of mobility of researchers and collaboration on research across national borders. These measures suggest that while flows of researchers in and out of Estonia in any one year are small as a proportion of overall researchers, net flows of scientific authors as a proportion of the overall research community over the period 2002-2016 were positive, and were in the top quartile of OECD countries. In that period, Estonia experienced a net gain of 4 researchers for every 100 full-time researchers in the population (Figure 9.12).

Estonia's contribution to research documents based on international scientific collaboration is close to the OECD median, with 29% of research documents published as the result of international joint work.

Volume of outputs are lower, but the impact of research appears higher according to bibliometric indicators

Estonia produces fewer publications overall per 1 000 people aged 25-64, with 2.5 publications in 2016, below the OECD median level and less than one-half that of the most productive countries (Figure 9.12). But Estonia performs better on the impact of the publications, as measured by citations of scientific documents produced by researchers. In 2017, over one-tenth of all Estonian publications were among the 10% most cited publications, placing Estonia at the OECD median level on this indicator.

The impact of research is often measured by considering how successfully knowledge is transformed into useful products or services. Patent application statistics are one way of measuring this. The Estonian higher education R&D sector is responsible for a relatively high proportion of overall patents. This is unsurprising, as higher education accounts for a larger than average share of the overall R&D sector, and Estonia appears to have forged some strong links with the enterprise sector. However, the overall volume of patents from the higher education sector per 100 researchers remains relatively low, below the median of OECD countries for which data is available.

While the the number of researchers and publications per 1 000 of the population are lower than median levels (Figure 9.13), the estimated annual number of publications per researcher is slightly above the OECD median level. Estonian researchers produce an estimated 0.5 scientific publications annually, compared to the OECD median of just under 0.4 (see Chapter 8 of (OECD, 2019[3])).

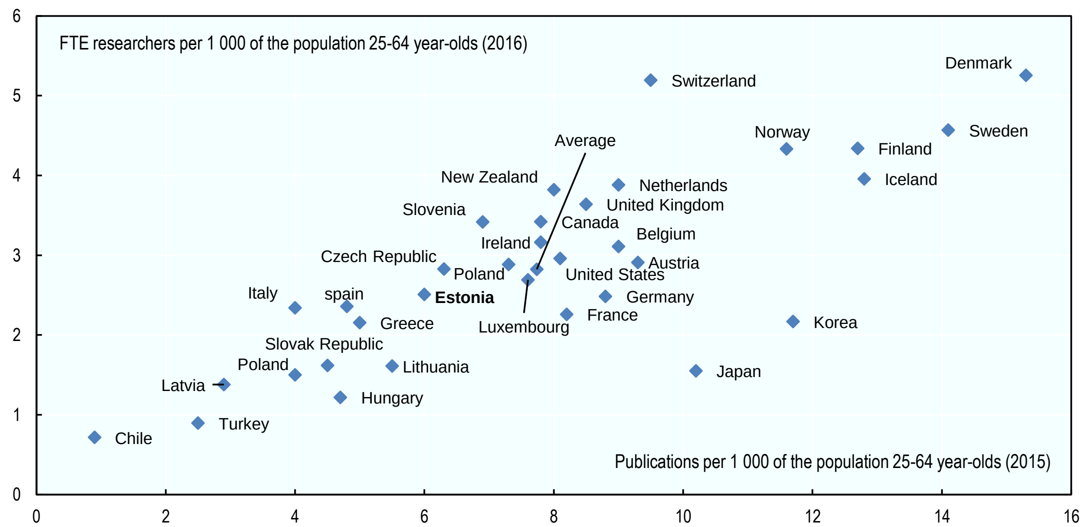
Access to knowledge in Estonia is less open than in many other OECD countries

Making research results widely available through open access mechanisms can support research efficiency and quality by reducing duplication, and by increasing the ability to replicate results and generate knowledge spillovers (OECD, 2019[3]). Estonia is in the bottom quartile of OECD countries in making knowledge publicly available. In total, 23% of publications were available in some form of open access in 2016, a proportion which is among the lowest in OECD countries.

Open access may become more common in the future in Estonia, as a new Open Science strategy has been developed to cover the period 2016-2020, based on the outcomes of the deliberations of a specially established expert group on open science in 2015 (Open Science Expert Group of the Estonian Research Council, 2016[18]). Estonia is also aligning national open science infrastructures to the European Commission's European

Open Science Cloud, which has a goal of ensuring that all scientific publications are FAIR (Free, Accessible, Interoperable and Reusable) (European Commission, 2018[19]). In addition, regulations on institutional and personal research funding require all publications arising from a supported research project or research grant to be registered on the public Estonian research portal, the Current Research Information Systems (CRIS).

Figure 9.13. Researchers and scientific publications per 1 000 people aged 25-64 (2015 and 2016)



Source: Adapted from OECD (2019[3]), *Benchmarking Higher Education System Performance*, https://doi.org/10.1787/be5514d7-en.

StatLink https://doi.org/10.1787/888933942222

9.5. Scenarios for policy

This section of the note extends the comparisons drawn in the previous sections by looking forward, and presenting a set of scenarios relevant to the future of Estonia's higher education system. The purpose of these scenarios is to provide evidence-based conjectures about future trends in areas of national policy importance, which can stimulate debate and support policy-planning exercises (Box 9.1).

Box 9.1. Scenario development for policy analysis

Governments plan for the future of higher education in the context of a number of sources of uncertainty. Scenarios can be defined as descriptions of hypothetical futures that could occur and that, although somewhat speculative in nature, are nonetheless internally consistent and causally coherent (OECD, 2006[20]). The development of scenarios can provide support to national discussions on contextual and systemic trends, highlight possible consequences of current circumstances on higher education and the economy, and outline the main available policy directions.

In a context of increasing complexity in societies and economies, more emphasis is being placed on anticipatory exercises in the policy process (OECD, 2015[21]). Contemplating different policy scenarios can feed into the development of broad long-term strategic planning for higher education systems or pre-policy research related to particular policy topics.

Short and medium-term scenarios are likely to be more accurate and useful to the decision-making process of policymakers. The scenario exercise presented in Section 5.1 therefore focuses on the immediate decade ahead (i.e. up to 2030), and is developed using the following steps:

- statement of a subject area or issue of national policy concern and the rationale for the concern
- outline of the assumptions used to develop the set of future scenarios
- explanation of the likely impact of the assumptions on future trends
- discussion of implications for policy.

9.5.1. Continued demographic changes may pose difficult challenges for Estonia's higher education system

Box 9.2. Summary of policy concern

Estonia is undergoing a period of demographic transition, which is affecting its higher education system and the labour market. The number of young people has been decreasing for more than a decade. This has resulted in falling higher education enrolments and a shrinking workforce. International student numbers are growing, but are insufficient to replace domestic enrolment demand. However, the number of students may start to grow again in the coming years. This poses the question of how Estonia can effectively plan for sustained growth and improvement in the higher education system in a context of uncertainty about future demand.

9.5.2. Key related evidence

Estonia's population is among the smallest of OECD countries. It has approximately 1.3 million inhabitants (Statistics Estonia, 2019[22]), and the population has been declining and ageing in recent years. The share of young people entering higher education has also reduced; entry rates of young Estonians under 25 have decreased from 53% in 2013 to

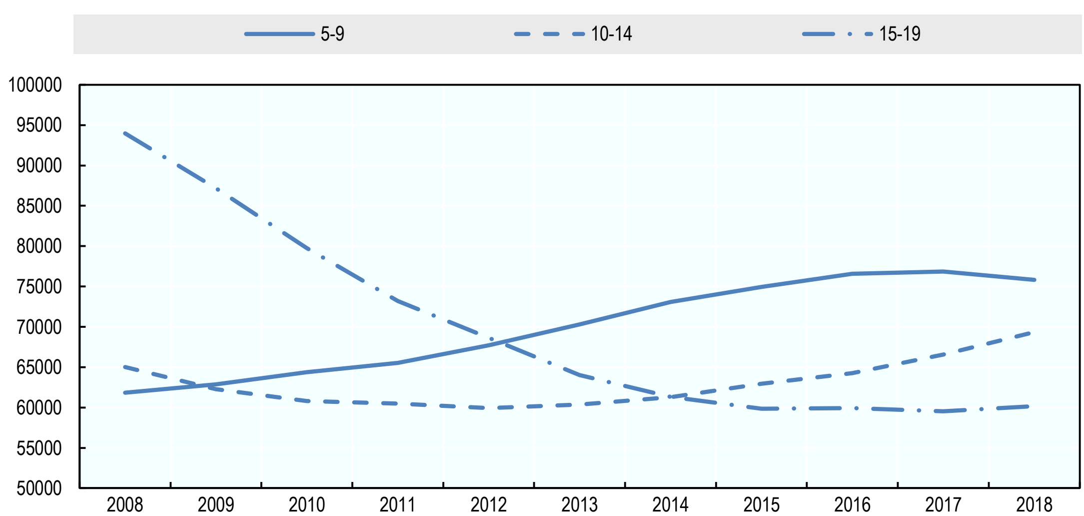
48% in 2016 (OECD, 2018[4]). As a result of these two trends, the total number of students in Estonian higher education students institutions decreased by 16% between 2005 and 2016.

However, demographic data suggests that the rate of decline could diminish in the coming years. The 10-14 year-old age cohort has begun to increase modestly, while changes to the size of the 5-9 and 15-19 year-old age cohorts have been smaller in recent years (Figure 9.14). This could allow domestic demand for higher education to stabilise in the near future, if there is no further decline in entry rates to higher education.

Estonia has managed to increase the number of international students substantially in recent years; however, these numbers are currently not large enough to offset the decline in domestic student numbers. Estonia also has a relatively high level of higher education participation among older age groups, with the proportion of students aged older than 25 already among the highest in OECD countries. In addition, enrolment rates among individuals older than 25 as a percentage of the population are above the median of OECD countries. This may limit the extent to which expanding enrolment among older students could replace falling enrolment numbers among traditionally-aged entrants.

Declining higher education enrolments and graduates are limiting the availability of skilled workforce to the labour market. Evidence suggests that the Estonian labour market is tight, i.e. in short supply of labour and skills. Unemployment is generally low, the size of the workforce is shrinking, and employers indicate skills shortages as one of the main barriers to expanding their economic activity (OECD, 2017[1]). Further declines in enrolment and graduates will worsen this problem, sharpening the constraints that skill availability already places on the growing economy.

Figure 9.14. Estonia's young population by different age groups (2008-2018)



Source: Statistics Estonia (2019[22]), *Statistical database*, http://pub.stat.ee/px-web.2001/dialog/statfile1.asp.

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While gaps in the labour market can be filled by migration, Estonia has also faced challenges in attracting and retaining skilled workers. There are a relatively small number of international immigrants compared to other OECD countries; 6 000 permanent entries of foreign citizens were registered in 2016, which is 0.5% of the total population. In addition, Estonia has had one of the highest emigration rates of skilled labour in the OECD area in the past decade, although return migration has been increasing in recent years. In 2010/11, around 16% of native-born Estonians with higher education credentials lived abroad (OECD, 2015[23]; OECD, 2017[1]).

9.5.3. Scenarios for Estonia up to 2030

Scenarios can be used to consider where the recent trends observed in Estonia might lead in future years. They can be used as a basis for contemplating how policy initiatives or contextual factors could change future enrolment in higher education; and to plan for future policy actions by considering which of the hypothetical futures presented are most desirable or most likely to be realised in the Estonian context.

Table 9.7 outlines a set of assumptions which are used to create a set of simple scenarios for future demand for higher education in Estonia. Assumptions focus on the three key subgroups of prospective higher education students; the younger cohort, the older cohort and international students. Assumptions are made for the period out to 2030 and are based on:

- the age-specific enrolment rates in higher education in Estonia and in other OECD countries, beginning from age 19
- the share of international students in Estonia, and the growth in international student numbers in other OECD countries.

Using these assumptions, two "negative" scenarios and three "positive" scenarios are generated for higher education enrolment in Estonia in the period out to 2030. Contemplating each of these scenarios in turn can help policymakers to consider ways to consolidate the system to increase efficiency in the case of more negative enrolment scenarios, or develop new initiatives to achieve more positive enrolment scenarios.

The "baseline" set of assumptions presented in Table 9.7 assumes an extrapolation of the situation as it was in 2016 (the most recent year for which data are available) until 2030, given the current enrolment rates across different age groups[6]. It also assumes that the number of international students will remain constant at their 2016 level. Therefore, the projected changes to enrolment using the baseline set of assumptions are based purely on the changes in the underlying demographics.

The main alternative assumptions on the changes to enrolment rates and international student numbers are based on the most recent (2016) levels of the same indicators in other OECD countries for which data are available. The assumptions made for growth in enrolment rates could be considered reasonable targets for Estonia to attain, given the fast-growing economy and the increasing public investment in the higher education system in recent years. In addition, they are rates that have already been achieved by at least one-quarter of the other OECD countries.

Table 9.7. Assumptions for the calculations of enrolment scenarios

	Underlying demographics	Enrolment rates of 19-24 age cohorts (2017-2030)	Enrolment rates of 25+ age cohorts (2017-2030)	International student growth (2018-2030)
Baseline	Based on the size of younger cohorts in previous year[7]	For each individual age group, the rate is set to its 2016 value, adjusted for international students[6]	For each individual age group, the rate is set to its 2016 value, adjusted for international students[6]	The number of international student is constant between 2016 and 2030
Younger cohort reduction	Same as in baseline scenario	Enrolment rates reduce linearly by 10% (bringing them in the bottom quartile of the 2016 OECD distribution)	Same as in baseline scenario	Same as in baseline scenario
Older cohort growth	Same as in baseline scenario	Same as in baseline scenario	Enrolment rates grow linearly by 30% (bringing them to the top quartile of the 2016 OECD distribution)	Same as in baseline scenario
International growth	Same as in baseline scenario	Same as in baseline scenario	Same as in baseline scenario	Numbers grow linearly to 2.5 times their 2016 levels by 2030
Younger cohort growth	Same as in baseline scenario	Enrolment rates grow linearly by 40% (bringing them to the top quartile of the 2016 OECD distribution)	Same as in baseline scenario	Same as in baseline scenario

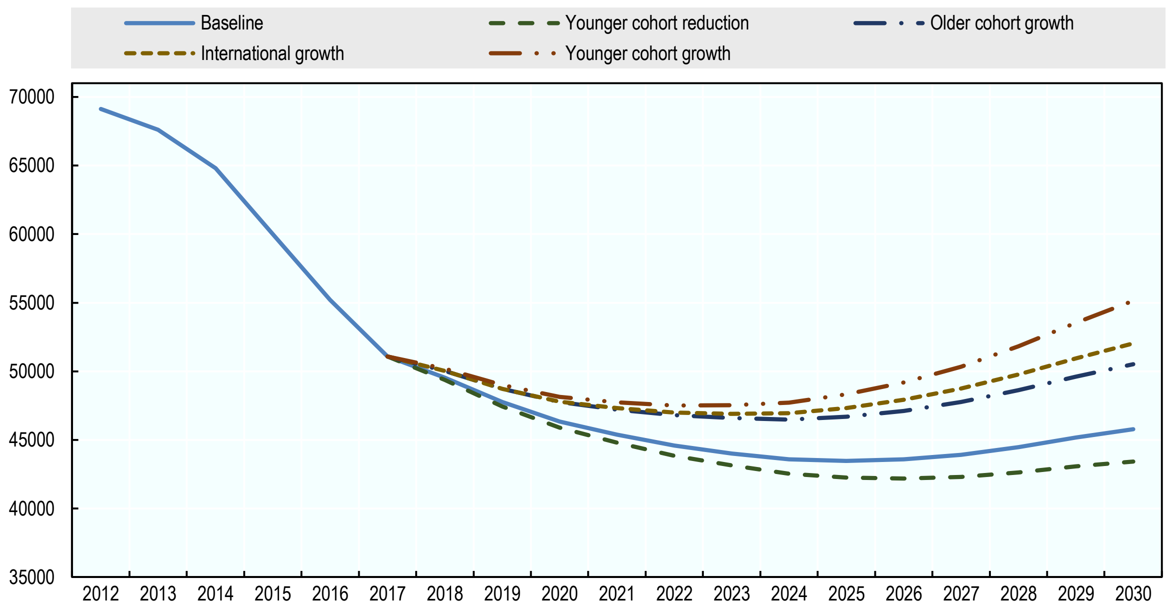
The “younger cohort growth” and “older cohort growth” assumptions increase the age-specific enrolment rates in one age group, while keeping the enrolment rates in the other age group at the same levels as the baseline. The “younger cohort growth” assumption is that the enrolment rates for people aged 19-24 will increase linearly until they reach the level of the 2016 top quartile of OECD countries (which equates to an increase of approximately 40% in enrolment rates for Estonia on 2016 levels). In the case of the “older cohort growth” assumption, enrolment rates increase by 30% on their 2016 levels by 2030, which would bring Estonia into line with the 2016 top quartile of the OECD.

Under “international growth” assumptions, the population of international students would expand and meet the growth rates achieved by the most successfully internationalised (top quartile) OECD countries over the period 2004-2016. This implies that international student numbers would increase by approximately 2.5 times their 2016 levels by 2030, to a level of over 10 000 students (compared to the 2016 level of 3 500 students).

Finally, a more negative “younger cohort reduction” assumption is included, where enrolment rates in the cohort aged 19-24, already relatively low in 2016, would continue to reduce by a further 10%. This would bring enrolment rates into the bottom quartile of the 2016 OECD distribution by 2030.

Figure 9.15 illustrates how the development of student numbers in the Estonian higher education system might unfold under these five different sets of assumptions.

Figure 9.15. Higher education enrolment in Estonia: five possible scenarios



Note: See Table 9.7 to see the assumptions underlying the calculations of the values for each scenario.

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Under the baseline assumptions, based on a continuation of the most recent enrolment trends, Estonia can expect that enrolments will continue to fall in the short term. However, the projected trend suggests that Estonia is over the largest part of its higher education enrolment decline. In the baseline scenario, higher education enrolment should therefore contract at a slower pace in the coming years, and eventually may begin to pick up during the mid-2020s. Despite the increase in the latter part of the period, there would still be an estimated 5 000 fewer higher education students in 2030 than in 2016 (with about 46 300 students projected), making this scenario a more negative one in terms of future growth in student numbers.

In the “younger cohort reduction” scenario, which assumes a further 10% decline in enrolment rates of the young population, enrolment would fall to about 42 300 students by 2024 and only increase by about an additional 1 500 students over the following six years to 2030.

Figure 9.15 also indicates how increasing enrolment rates from different groups of students could have an impact on the overall student numbers by 2030. Enrolment rates of the younger age group (19-24) in Estonia are comparatively lower in relation to other OECD countries than those aged 25 and older. This implies that the “younger cohort growth” assumption, where enrolment rates in the 19-24 age cohorts grow towards the top quartile of OECD countries, is likely to provide greater increases in student numbers than the “older cohort growth” assumption. The “younger cohort growth” assumption implies a scenario where higher education enrolments could recover to a level of around 56 700 students by 2030, while in an “older cohort growth” scenario, the gains in enrolment might be more modest, reaching a level of 51 400 by 2030.

Under the assumptions of "international growth", notable increases could be made to the size of the student population in Estonia. In this scenario, even if enrolment rates of Estonian students do not change from 2016 levels, the numbers of students in Estonia could be at a level of 53 100 students by 2030. However, a strong growth in the numbers of international students, without other positive changes, will also not be sufficient to return the higher education system to previous peak enrolments.

It is clear that neither demographic change alone, nor gradual increases in enrolment rates, nor substantial increases in international students will suffice to bring higher education enrolment numbers in Estonia near to their peak at the beginning of the decade. Only a composite of the three positive scenarios occurring together could restore the size of the student population to its previous peak.

Estonia could therefore consider which of the scenarios are most likely to occur or are most achieveable in the current context, and plan accordingly.

9.5.4. Implications for policy

Managing demographic transition effectively and increasing the size of the highly skilled workforce – in part by expanding or sustaining the number of skilled graduates – is likely to be a policy priority for Estonia in the coming years.

Without successful intervention, the baseline scenario of declining enrolments and the more negative "younger cohort reduction" scenario are likely to create a continued shortage of advanced skills. There are a number of options to sustain or increase the number of higher education graduates, many of which Estonia is already pursuing. Potential policy choices include demand-side options, where policy efforts are made to increase demand for existing higher education services and achieve the more positive scenarios for enrolment outlined in the previous section.

However, supply-side policy initiatives, where efforts are made to create greater efficiency and effectiveness in the current system, can also be pursued to reduce potential adverse impacts in the case of the more negative scenarios occurring, or to streamline the system to prepare for future enrolment increases.

Demand-side options to achieve more positive scenarios

Estonia has positive prospects for increasing future demand for higher education. The economy grew by 17% between 2010 and 2017 (OECD, 2018[24]). The average salary level increased by 18% in the same period (OECD, 2018[25]), and unemployment is generally low (OECD, 2017[1]). The growing economy, together with Estonia's reputation as one of the most advanced digital economies in the world, has created the potential for attracting both skilled and non-skilled workers into the country. Net migration has been positive in recent years and reached a record high in 2017, as more Estonians returned home to live, and increasing numbers of immigrants arrived from the surrounding regions (Statistics Estonia, 2019[22]).

If Estonia is also able to build on the progress and strengths of its higher education system and achieve one or more of the growth scenarios outlined in the previous section, the adverse effects of falling enrolments could be mitigated more quickly and the level of adjustment required by the system could be reduced.

Achieving the "younger cohort growth" scenario

Achieving higher enrolment rates among the 19-24 year-old cohort could have the strongest potential impact on enrolment numbers (Figure 9.15). Systemic features could be addressed, which could increase future enrolment rates in the younger age cohort.

Estonian students generally do not finish upper secondary school until age 19, and increasingly are choosing not to immediately continue to higher education (OECD, 2019[3]). Apart from conscription requirements which delay entry in some cases, the tight labour market ensures that potential students can easily find jobs. Relatively low levels of financial support for living costs of full-time students, combined with higher fees for part-time students, make continued labour market participation for secondary graduates attractive. Strengthening support for living costs while studying could help to raise enrolment rates in younger cohorts, and boost their chances of completing their studies.

Estonian 15-year-olds are high performers in PISA, and impact on socio-economic factors on student performance is lower in Estonia than in most OECD countries (OECD, 2016[26]). Therefore, students from lower socio-economic backgrounds are more likely in Estonia than in many other countries to have the necessary foundational skills to progress to higher education. A strong student support package could also increase opportunities for students from disadvantaged backgrounds to enter and complete higher education.

Box 9.3. Degree apprenticeships in the United Kingdom

The degree apprenticeship model in the United Kingdom was launched in 2015, and combines a period of apprenticeship with higher education study, which leads to a qualification at bachelor's or master's level. Apprentices typically spend 20% of their time studying in the higher education institution and the remainder of their time in the workplace. Qualifications for entry can be specified by the employer, depending on the field or industry of the apprenticeship.

The apprenticeships are supported financially by the government through a designated degree apprentice fund. Apprentices do not pay tuition fees, and are paid at least the national apprentice wage by the employer. Students therefore are less likely to have debt at graduation, and will have developed labour market relevant skills along with completing a recognised higher education qualification. Analysis by the Office for Students in the United Kingdom has also found that degree apprenticeships benefit both upper secondary graduates from disadvantaged backgrounds and mature learners, potentially increasing social mobility.

An independent evaluation of the degree apprentice fund has also found that participation in the process has been transformative for many higher education providers and is allowing for stronger and wider collaborative partnerships to be built between higher education and enterprise. The degree apprenticeship has also been used as a successful means to address specific skills gaps, for example in public sector areas such as nursing, social work and policing.

Source: Warwick Economics & Development (2019[27]), *Evaluation of the Degree Apprenticeship Development Fund - Report to the Office for Students by Warwick Economics & Development*, https://www.officeforstudents.org.uk/media/7cd79cd8-536f-49e5-a55f-ebd83b344b16/dadfevaluation.pdf.

An additional policy option for Estonian higher education is to recognise and formalise students' relationship with the labour market. Since there is high demand in the labour market in some industries, scope exists to build more innovative formal arrangements between the higher education sector and enterprises to support dual learning or longer paid student work placements than currently exist. This would help in achieving a better balance between study and work obligations. New programmes of this nature could allow students to enter studies with greater financial support, while also helping to meet labour market demand and achieve Estonia's aim of increasing work-based learning. For example, the United Kingdom recently introduced a "degree apprenticeship" model of study, which leads to a qualification at bachelor's or master's level (Box 9.3).

Achieving the "older cohort growth" scenario

Estonia already has a relatively high proportion of older students; however, in contrast to other OECD countries, these students tend not to study part-time and therefore often enrol in full-time education while working and managing other personal obligations. This is as a result of the tuition fee structure in Estonia; students studying full-time in Estonian do not pay tuition fees if they can make enough study progress, while part-time students are charged fees that are at the discretion of institutions (see Chapter 3 of (OECD, 2019[3])).

More flexible study options could help attracting new entrants and support lifelong learning or further study for existing graduates. Other jurisdictions, for example the Flemish Community of Belgium, have created flexible study modalities that are specifically aimed at students who wish to combine work and study (Box 9.4). This could also help to achieve Estonia's ambitious future vision for lifelong learning of its citizens (Estonian Ministry of Education and Research, 2014[2]).

Box 9.4. Flexible study in the Flemish Community of Belgium

The Flemish Community is the only jurisdiction in the European Union that requires all higher education institutions to offer part-time studies and that all degree programmes be provided in the form of flexible learning pathways. The Flexible Learning Paths Act (2004) provides the framework to support flexible pathways, based on a definition of study programmes as an aggregate of modules, each of which is a well-defined unit of learning, teaching and assessment activities. Higher education institutions validate the completion of a module by issuing a credit certificate. Tuition fees are based on the number of credits in which students are enrolled, and there is no distinction between part-time and full-time students in terms of financial support. This, together with other policies on flexible study provision, is likely to contribute to the comparatively high share of students studying part-time in the Flemish Community.

Source: OECD (2019[3]), *Benchmarking Higher Education System Performance*, https://doi.org/10.1787/be5514d7-en.

Finally, Estonia could consider introducing an enhanced system for the recognition of prior learning. Of the four jurisdictions participating in the benchmarking exercise, Estonia was the only one that did not report having a policy in place for the full recognition of prior learning. Prior learning can be recognised in some cases. For example, the TULE programme funded the completion of higher education for students who had previously achieved 50% of the credits towards a qualification, implying the recognition of credits previously earned within the higher education system. However, Estonian higher education institutions cannot admit students solely on the basis of recognition of prior learning. Furthermore, institutions themselves can also set various conditions to RPL processes. One-fifth of Estonian students leave school annually without an upper secondary qualification (Estonian Ministry of Education and Research, 2018[28]), meaning that a significant proportion of the population may not have any alternative pathway to access the higher education system without first obtaining an upper secondary qualification.

Creating a national infrastructure for the recognition of prior learning, combined with flexible study options, could help to increase demand and achieve the "older cohort growth" scenario. National indicators and statistics related to this objective could be defined and collected, which would help to monitor progress.

Achieving the "international growth" scenario

Internationalisation of the student body has progressed at a relatively fast pace in Estonia, but stepped-up efforts to attract students could help to further increase demand from abroad and realise a scenario of higher international growth.

Of particular importance for Estonia concerning internationalisation are the connections to the region, including Scandinavia and the Baltic states. Estonia is well positioned to benefit from its membership of the Council of the Baltic Sea states as well as its membership of the European Union and other regional networks. For example, Nordplus, a regional co-operation, provides opportunities for short-term student mobility at all levels of education within the Baltic/Nordic region, which could help increase future regional demand for study experiences abroad. In addition, continued participation in European Union student mobility initiatives means that Estonia can benefit from the Europe-wide drive to further increase student mobility.

Strategic programme partnerships with higher education systems in neighbouring regions can allow Estonia to tap into wider regional demand. There are some indications that Estonia is already starting to move towards harnessing these regional links. For example, regional joint degree partnerships, such as the University of Tartu joint programme with the University of Stockholm on Sociolinguistics and Multilingualism (University of Tartu, n.d.[29]), can fulfil government objectives of increasing student mobility and promoting the Estonian language and culture.

Joint campus arrangements with peer countries can also promote stability in the system and increase demand for education in Estonia. A recent example in Estonia is the establishment of a campus of the Finnish Hospitality School in Tallinn (Haaga-Helia, n.d.[30]). Developing more of these linkages would lead to a strengthened system with more potential to draw from the regional pool of potential students.

Estonia could also increase demand from international students outside of the local and European region. This would require a broader strategy and package of measures covering both the education and research functions to compete in the global marketplace, as research performance and reputation weigh heavily in the decision-making process of prospective international students. Estonia has a large and varied suite of scholarship programmes that support international inward and outward mobility of both domestic and foreign students, as well as academic staff (see Chapters 5 and 6 of (OECD, 2019[3])). These could be continued or even expanded. However, without considerably increasing capacity for higher education research and development, it may be more difficult in the longer term to achieve and maintain substantial growth in international student numbers from outside the local region, and outside the EU.

Supply-side options to manage more negative scenarios

Many OECD countries are experiencing a decline in higher education student numbers, and with this, an increase in per-student costs, as fixed costs prove difficult to reduce. In Estonia, where full-time equivalent student numbers have fallen by almost 16% between 2010 and 2014, expenditure per student has risen by 60%.

However, increased per-student funding can only deliver benefits if used effectively. While successful policy initiatives could lead to the achievement of the more positive growth scenarios, these will take time to realise. In the meantime, Estonia can adopt supply-side policy initiatives to achieve near-term efficiencies and to increase supply to the labour market from the existing demographic base.

Estonia can improve efficiency and prepare for the future

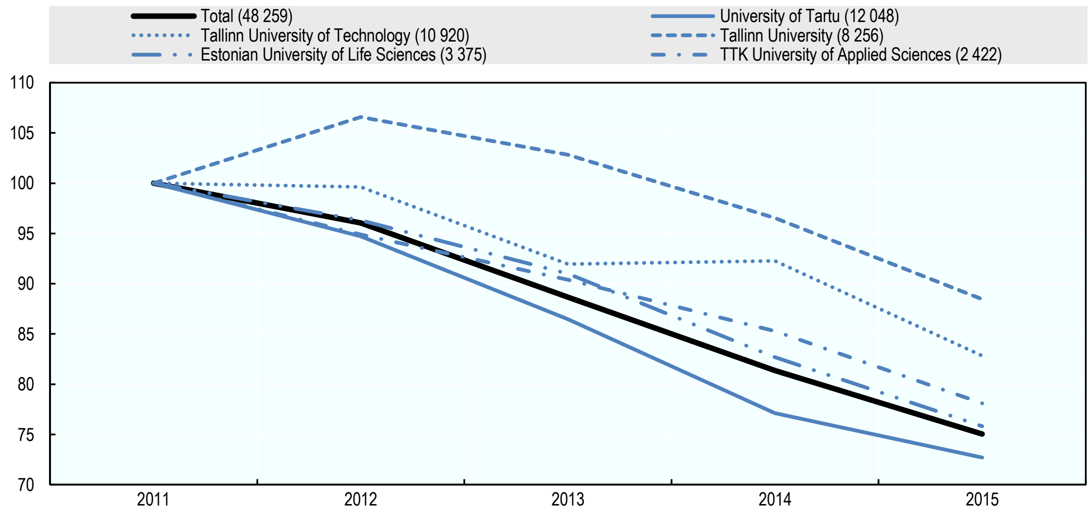
In Estonia, changes in enrolment have impacted differently across institutions (Figure 9.16), making effective future planning at both system and institutional level more difficult. For example, some institutions may be maintaining larger buildings than necessary, or could be left with large payrolls relative to their revenues, and be unable to reduce costs effectively.

Possible remediation initiatives include institutional mergers and other forms of consolidation and redeployment of staff. Some countries in the region, such as Denmark and Finland, have used mergers to gain efficiency and quality in their higher education systems. By preserving the existing institutional units, mergers can maintain the role of institutions to cater to people living in remote locations or preferring less popular programmes of study (Williams, 2017[31]). Estonia has also made use of mergers to reduce the number of institutions in recent years, which can help existing institutions dealing with enrolment fluctuations (OECD, 2019[3]).

However, Estonia must also be mindful of possible future growth in demand and ensure that flexibility remains to expand the system to meet future needs. Other forms of consolidation within the higher education system, such as building alliances or networks between institutions in specific regions, programmes or categories of students, could also be a way to manage fluctuating demand. Estonia, with a smaller higher education system and a relatively flat governance structure, could be better placed than many other countries to pilot some innovative means of collaboration between institutions.

Figure 9.16. Change in student enrolments at the five largest institutions (2011-2015)

2011 = 100



Note: The numbers in brackets in the legend show the number of student enrolments in 2015.
Source: European Tertiary Education Register (ETER) (2018[32]), *ETER Database*, www.eter-project.com/.

StatLink https://doi.org/10.1787/888933942279

Redeployment of academic staff throughout the higher education system is difficult due to the specialised nature of staff. In Estonia, this difficulty could be compounded by the fact that the terms of employment for academic staff are within the remit of higher education institutions, and as a result, moving between institutions can imply a change in working conditions. Estonia has already brought forward legislation that could standardise the tenure qualification conditions of academic staff.[8] Standardising a wider range of terms and conditions for higher education staff could have the additional benefit of creating more flexibility in the workforce and also improving career prospects for younger academics, given that more than one-fifth of current academic staff in Estonia are likely to reach retirement age in the coming decade.

Estonia could also use the recent changes in the system as an opportunity to pilot new models of organising teaching and research in higher education institutions, other than the traditional "department-based" model. There is an increasing recognition of the importance of interdisciplinary research and study programmes to promote entrepreneurialism and innovation in higher education (Box 9.5). While interdisciplinary programmes already exist in Estonia, they are mainly at the master's level. Estonia could therefore explore the possibility of creating incentives in the system for introducing interdisciplinary curricula at other levels of education. This could have the joint benefit of maximising the recognised benefits of interdisciplinary activity and also work towards building a less specialised future academic workforce with interdisciplinary knowledge and competencies.

Box 9.5. HEInnovate and interdisciplinary study

HEInnovate is a framework developed by the European Commission and the OECD for higher education institutions to self-assess how they manage resources; build organisational capacity; collaborate with external stakeholders; create and nurture synergies between their core functions; embed digital technology; promote entrepreneurship; and support knowledge exchange with the wider world (European Commission and OECD, 2018[33]).

The framework puts a high emphasis on the value of interdisciplinary activity, and recognises that creating interdisciplinary learning and research environments is a core task required to create an entrepreneurial university. Linking interdisciplinary education and research to important local or societal challenges can stimulate promotion and participation in interdisciplinary education environments. According to the framework, interdisciplinary education activities should be publicly recognised and awarded, for example cross-faculty summer schools, interdisciplinary research groups, cross-campus idea competition or campus-wide student associations.

Tackling non-completion could help mitigate adverse effects of the more negative scenarios

An additional avenue for increasing skilled labour market supply from the higher education sector is to tackle the problem of non-completion. Higher completion rates mean that more students achieve the maximum benefit from their higher education experience in terms of skill and knowledge acquisition. Furthermore, in the presence of a shrinking student and working population, high completion rates are important to minimise the constraints that skills shortages pose to the economy.

Among OECD countries with available data, Estonia had the lowest completion rate for the entry cohort of 2008, as just 51% of new entrants managed to complete their bachelor level programme within three years of the theoretical graduation rate. Given falling demand and labour market constraints, low completion represents a serious inefficiency in the Estonian system, and it is estimated by the OECD to cost Estonia around USD 40 million, or just under 10%, of higher expenditure annually (see Chapter 8 of (OECD, 2019[3])).

Increasing completion rates could deliver substantial benefits to the Estonian labour market and wider economy. National evidence suggests that the current level of non-completion is making it difficult to meet labour market demand in certain industries. Key reasons identified for non-completion include a lack of comprehensive information on the curricula, which can cause students to underestimate the requisite and workload associated with a programme; and the need for students to work to financially support themselves and gain experience (Kori et al., 2015[34]).

The Estonian government is already working to reduce non-completion rates through a mixture of initiatives including increasing funding for student support; the inclusion of non-completion rates among the indicators used to allocate formula funding to institutions and set national targets; and adopting measures to attract non-completers back into higher education. However, continued low levels of financial support combined with labour market demand even for non-completing students from certain fields of study, such as

ICT (University of Tartu et al., 2015[35]), can work against the success of government efforts.

High non-completion rates are also the result of the tuition fee structure in Estonia, which incentivises full-time study even when part-time study would be the most suitable option for students. According to 2016 EUROSTUDENT data, Estonian students are much more likely to work while studying than students in other European countries (Hauschildt, Vögtle and Gwosć, 2018[6]). Estonia can consider ways to reduce the difference between the cost of studying full-time and part-time and remove the incentive to enrol full-time in order not to pay fees. Higher education insitutions already charge some fees to full-time students who do not make sufficient study progress. However, this can act as an additional impetus not to continue with studies for students who are already not progressing quickly.

As removing part-time fees would also further reduce the non-government income stream available to insitutions, Estonia could instead explore a means for full-time students to contribute financially towards their education, and use the income earned to incentivise their completion and provide additional financial supports. For example, Estonia could use additional income from the contributions of full-time students to increase financial student support.

Finally, increasing evidence suggests that well designed structures for guidance and academic and social support of higher education students can increase completion (Mann Levesque, 2018[36]; Salmi, 2018[37]). New support schemes with dedicated human resources could help to better orient students before entry and offer academic and social support (for example, remedial courses and counselling services) to students at risk of non-completion. In the Netherlands and the Flemish Community of Belgium, there has been increasing policy focus on improving student guidance in recent years (see Chapter 5 of (OECD, 2019[3])).

Notes

[1] This figure includes expenditure outside higher education institutions, such as government loans, grants and scholarships.

[2] The salaries are expressed in US Dollars using purchasing power parities (PPPs) for GDP.

[3] In Estonia, the data related to entrants are for all entrants, whereas in most other OECD countries the data refer to new entrants only.

[4] Part-time students are those with an intended study load less than 75% of a full-time load.

[5] The odds ratio reflects the relative likelihood of an event occurring for a certain group relative to a comparison group. If the odds ratio is greater than 1, then it is more likely that the event (scoring at level 3 or above) occurs for people in the group of interest (individuals with higher education) than in the comparison group (individuals with upper secondary education).

[6] The extrapolation of the demographic trends is carried out by projecting forward the current size of the age cohorts in the Estonian population. For example, the number of 19 year-olds in 2022 is assumed to be equal to the number of 18 year-olds in 2021.

[7] The number of people with a certain age in a given year is equal to the number of people who are one year younger in the previous year.

[8] A Higher Education Act passed the Estonian Parliament on 20 February 2019, and was proclaimed by the President on 7 March 2019.

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Chapter 10. Benchmarking Higher Education System Performance: The Flemish Community of Belgium

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

10.1. Higher education system performance: the Flemish Community of Belgium

10.1.1. Introduction

This country note draws on the evidence base of the OECD Benchmarking Higher Education System Performance project to review the performance of the higher education system in the Flemish Community. Its purpose is to assist the Flemish Community in taking stock of where it stands in relation to OECD member countries on different aspects of higher education and to provide input into future national policy planning processes.

This stocktaking exercise is supported in this note in two ways. First, a scorecard of 45 indicators is presented, which highlights the Flemish Community's position within the OECD. This scorecard draws on evidence compiled during the benchmarking exercise and is organised into three domains: financial and human resources; education; and research and engagement. The first sections of this note contain a brief discussion of the higher education system's position within these three domains.

The final section of the note contains a policy scenario exercise. Topics chosen for scenarios in the benchmarking country notes are issues that appear to present important policy challenges for jurisdictions and are likely to persist for the near future. Assumption choices used for the scenarios take into account recent trends in the Flemish Community and across the OECD. Following the presentation of the scenarios, a set of policy options are examined that could be feasible responses to the challenges under discussion and consideration is given to how successful action might orient the system towards the achievement of more positive scenarios.

10.1.2. Context and structure of higher education in the Flemish Community

The Flemish Community has responsibility over education policy for the language community of Flemish speakers, which has a working-age (15-64) population of over 4 million people, the large majority of whom live and work in the Region of Flanders (data source: Flemish Ministry of Education and Training).

Flanders has a level of gross domestic product (GDP) well above the EU average, both relative to the population and to the size of the workforce. Its economy, strongly oriented towards exports (which accounted for 80% of GDP in 2017), is based on a fabric of small and medium enterprises with a strong capacity for in-house innovation (European Commission, 2019[1]). An important function of the Flemish higher education system is to support this international and innovative economy, both in terms of skills and innovation.

In total, around 300 000 students are enrolled in higher education in the Flemish Community. Higher education is offered in universities (*universiteiten*) and professional higher education institutions (*hogescholen*), which can be public or government-dependent but fall under the same regulatory framework. Independent private institutions also enrol a small percentage (less than 1%) of students. Since 2003, professional higher education institutions were required to join associations comprising at least one university, with the aim to build better connections between the two subsectors, improve efficiency of programme offerings, and develop learning pathways across education levels and institution types.

To encourage participation, the Flemish Community introduced a flexible higher education system where students can enrol in the modules they want (without necessarily enrolling in a whole programme), pay a proportionate amount of tuition fees and receive a certificate upon completion of these modules. In addition, a system of means-tested grants supports student from poorer households.

Higher education policy is regularly reviewed and updated in the Flemish Community. Long-term plans are issued approximately every 5 years for both education policy (by the Flemish Ministry of Education and Training) and innovation policy (by the Department of Economy, Science and Innovation). The government aims at making the higher education system more internationalised and inclusive, with a transparent and competitive funding system (see Chapter 2 of OECD (2019[2])).

10.1.3. The Flemish Community's higher education scorecard

Table 10.1 shows a summary of the position of the Flemish Community relative to OECD countries according to a set of 45 indicators spanning the resourcing and the education, research and engagement functions of higher education, in a scorecard format where each box relates to one of the quartiles of the OECD distribution. These indicators are drawn from the compilation of evidence in the synthesis report of the OECD Benchmarking Higher Education Systems Performance project,[1] in which the Flemish Community participated in 2017-2018.

As shown by the most recent available data, the Flemish Community's higher education system displays a good general level of performance across the indicators on the resourcing of higher education, and on the education, research and engagement missions. The Flemish Community excels in terms of access to higher education, with one of the highest entry rates among OECD higher education systems. It is also has one of the highest levels of literacy proficiency and employment among higher education graduates.

In addition, over the last decade, the Flemish higher education system made great progress in the gender balance among academic staff. In the most recent year with available data, women represented around 50% of academic staff and 45% of higher education researchers, among the highest shares in the OECD area.

Flemish higher education institutions are well funded, even though expenditure per student has decreased between 2008 and 2015. Student financial support through grants and scholarships is also among the highest in the OECD countries. The decrease in the level of funding per student is a potential problem for the Flemish Community, and this is discussed in Section 10.5.

The most recent available data show that Belgium is among the OECD countries with the highest level of scientific productivity (i.e. the production and impact of academic publications); co-operation between higher education and the business sector; and research internationalisation. Bibliometric and third party funding data for the Flemish Community suggest it performs at least at the same level in all three of these dimensions. However, the share of scientific documents accessible for free by the public (i.e. open access) in Belgium is lower than the median for OECD member countries.

Table 10.1. Higher Education system benchmarking: The Flemish Community of Belgium

Selected higher education (HE) indicators and country position in the OECD distribution (by quartile). Reference year range: 2005-2017.

Financial and human resources	← Low			→ High
Expenditure on HE, % of GDP		■		
*Public expenditure on HE, % of public expenditure		■		
Expenditure per student by HE institutions				■
Expenditure per student, 2015 relative to 2008	■			
HE R&D expenditure, % of GDP			■	
Expenditure on R&D activities, %				■
Household expenditure on HE institutions per student		■		
Non-household private expenditure on HE institutions, %		■		
Expenditure per student on grants and scholarships				■
Academic staff younger than 35, %		■		
Academic staff older than 60, %	■			
Women among academic staff, %				■
Expenditure on staff costs, %				■
Ratio of academic staff to student	■			
Non-academic staff per 100 academic staff	▒			

Education	← Low			→ High
Entry rates into bachelor's or equivalent programmes				■
Students in master's and doctoral programmes, %		■		
Socio-economic gap in HE access				
New entrants older than 25, bachelor's programmes, %	■			
Part-time students in bachelor's programmes, %			■	
International students in master's programmes, %			■	
Completion rates of bachelor's students			▒	
Young population (23-34) with a HE qualification, %			■	
HE graduates above literacy proficiency level 3, %				■
Employment rates of master's graduates (25-34)				■
Employment premium, HE graduates (25-34)		■		
HE graduates (15-29) employed or in education, %				■
*Relative earnings of bachelor's graduates (25-34)	■			
HE graduates' relative level of self-reported health			■	
HE graduates' relative level of interpersonal trust		■		

Research and Engagement	← Low			→ High
FTE researchers per 1 000 population			■	
Researchers working in HE, %		■		
Women researchers in HE, %			■	
Doctorate holders in the population, %	■			
Foreign citizen doctorate holders, %				▒
*Business enterprise funding of HERD, %				■
*Higher education-business collaboration in R&D				■
*SMEs collaborating on innovation, %				■
*PCT published applications from HE R&D, %			■	
*HE R&D funding on basic research, %	■			
*Number of publications per 1 000 population			■	
*Publications among the 10% most cited, %				■
*International scientific collaboration				■
*International net flows of scientific authors		■		
*Open access of scientific documents, %		■		

Note: The coloured square below each value represents the Flemish Community's position in the OECD distribution, from bottom quartile (left square) to top quartile (right square). The square is shaded in grey (instead of black) when data are available for less than half of the OECD countries (the minimum number of countries with available data is 14), while no coloured square means that data are missing for the Flemish Community. For more information on methodological issues and metadata, see OECD (2019[2]) and the references cited therein. Follow the *Statlink* to download the data underlying the calculation of the scorecard.

* The value refers to Belgium.

Source: Adapted from OECD (2019[2]), *Benchmarking Higher Education System Performance*, https://doi.org/10.1787/be5514d7-en.

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10.2. Financial and human resources

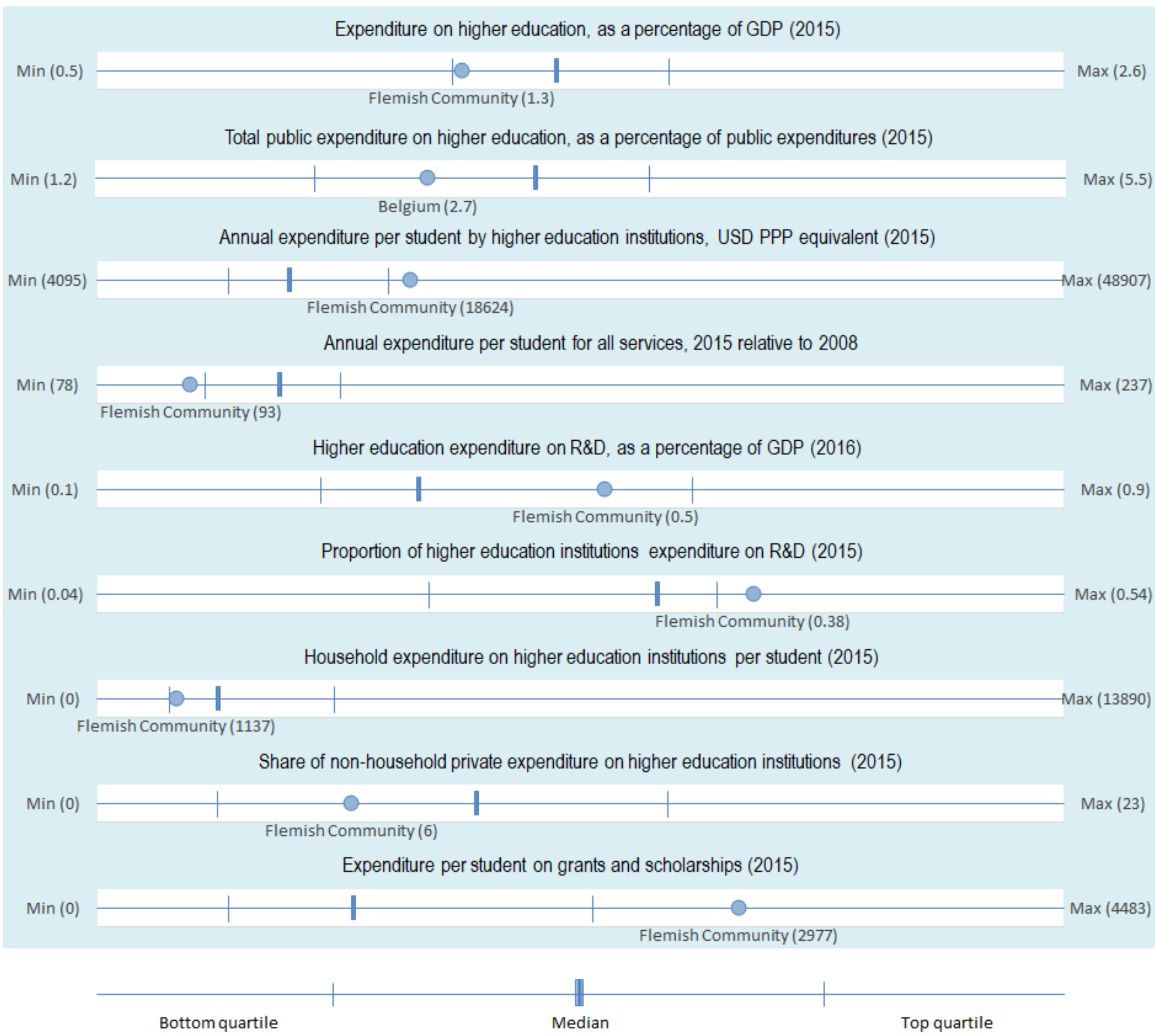
Highlights

- The Flemish Community was in the top quartile of OECD countries for annual expenditure on higher education institutions per student in 2015. Expenditure per student decreased by 7% between 2008 and 2015, in contrast to an upward trend in most OECD countries.
- The government contributes the majority of higher education expenditure. Private funding, both household and non-household, accounted for 12% of expenditure on higher education institutions in 2015. The share of private spending is higher than in the Nordic countries, but lower than in the Netherlands.
- The Flemish Community does not have a student loan system, but its public expenditure on grants and scholarships per student was one of the highest among OECD countries in 2015.
- Flanders spent 0.5% of its GDP on R&D within higher education (HERD) in 2016, a level close to the top quartile of OECD countries and comparable to that of Germany. Nearly 40% of per student higher education expenditure was allocated to R&D activities in 2015. This placed Flanders in the top quartile of OECD countries, and approximately at the same level as the Netherlands.
- The share of academic staff older than 60 (7%) was one of the lowest among OECD countries in 2016. Middle-aged (35-59) academic staff represented over three-quarters of academic staff, one of the highest proportions among OECD countries, while the share of younger academic staff, 16%, was slightly below the median.
- Women represented nearly half of academic staff (i.e. higher education personnel whose primary assignment is instruction or research) in 2016, in the top quartile of OECD countries. The share increased by over 10% between 2008 and 2015, which was the second highest increase among OECD countries, after Korea.
- Over half of academic staff with teaching duties (teaching staff) worked with a permanent contract in 2016, a relatively low share among the four jurisdictions that participated in the benchmarking exercise. The share of teaching staff with a permanent contract was particularly low among the younger age group (34 or younger).
- The Flemish Community spent a considerable share (75%) of its higher education current expenditure on staff in 2015, placing it in the top quartile of OECD countries.

10.2.1. Financial resources

Higher education expenditure is relatively high on a per student basis compared to other OECD countries, but it is decreasing

Figure 10.1. Where does the Flemish Community stand in the OECD distribution? Financial resources



Note: The indicators represented in this chart are a subset of the indicators presented in Table 10.1. The coloured circle represents the Flemish Community's position in the OECD distribution. The circle is not coloured when data are available for less than half of the OECD countries (the minimum number of countries with available data is 14). For more information on methodological issues and metadata, see OECD (2019[2]) and the references cited therein. Follow the *Statlink* to download the data underlying the calculation of the scorecard.
Source: Adapted from OECD (2019[2]), *Benchmarking Higher Education System Performance*, https://doi.org/10.1787/be5514d7-en.

StatLink https://doi.org/10.1787/888933942317

In 2015, annual higher education expenditure per student in the Flemish Community was USD 19 000, in the top quartile of OECD countries. This is a similar level of spending per student to that of the Netherlands, and higher than neighbouring France, Germany and the national average of Belgium. Annual higher education expenditure per student has been decreasing in the Flemish Community, contrary to the upward trend observed in most OECD countries. Expenditure decreased by 7% between 2008 and 2015, which was one of the largest decreases among OECD countries. While Germany also decreased its annual higher education expenditure per student at a similar rate during this period, France and the Netherlands increased expenditure by around 6-7% over the same period.

Higher education expenditure as a percentage of GDP is not precisely measured

Flanders spent 1.3% of its GDP on higher education in 2015, close to the bottom quartile of OECD countries. However, it should be noted that GDP refers to the Region of Flanders, while education expenditure refers to the education system of the Flemish Community. The two entities do not coincide exactly, making this statistic not directly comparable with the international data.

When excluding research and development, spending per student is distributed evenly between subsectors

Annual higher education expenditure per student differ between universities and professional higher education institutions (HEIs) in the jurisdictions with available data (Estonia, the Flemish Community and the Netherlands). While universities spent over USD 24 000 in 2015, professional HEIs spent nearly half of that amount, USD 13 000 (Table 10.2). However, when R&D expenditure is excluded, the amount of expenditure becomes similar, with professional HEIs spending slightly more.

Table 10.2. Annual higher education expenditure per student, by subsector (2015)

In PPP USD, based on full-time equivalents

		Estonia	The Flemish Community	The Netherlands
Universities	Total expenditure	14 394	24 321	29 286
	Excluding R&D	9 390	11 137	11 537
Professional HEIs	Total expenditure	6 773	12 787	12 972
	Excluding R&D	6 595	12 173	12 497

Source: Adapted from OECD (2019[2]), *Benchmarking Higher Education System Performance*, https://doi.org/10.1787/be5514d7-en.

Public expenditure on grants and scholarships is one of the highest among OECD countries

The Flemish Community places a strong emphasis on student support when financing higher education. Public expenditure on student grants and scholarships on a per student basis was USD 3 000 in 2015, the third highest among OECD countries. Students receiving means-based grants and scholarships also pay lower tuition fees in the Flemish Community.

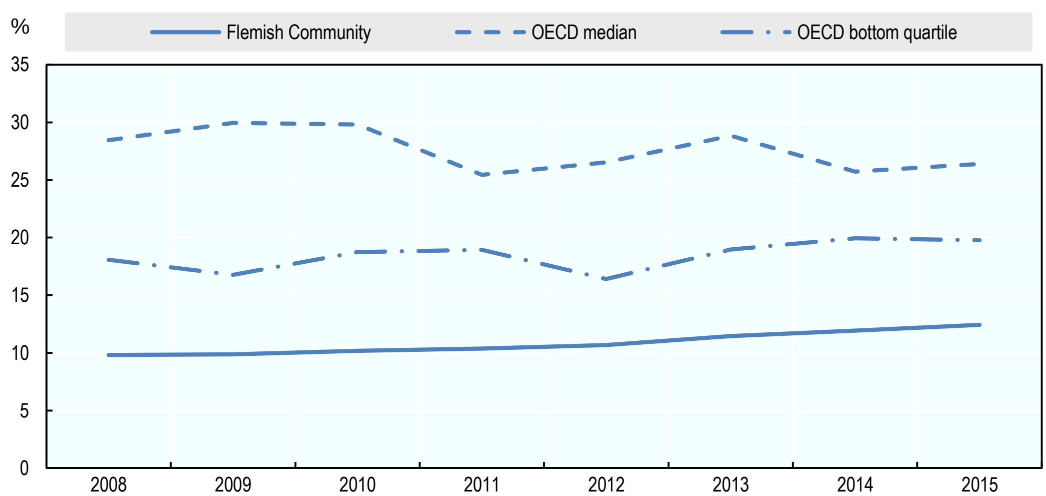
Unlike the neighbouring Netherlands, the Flemish Community does not have a student loan system. When combining grants, scholarships and loans, the average Flemish student received an amount in 2015 that was below the top quartile among OECD countries, but well above the median of USD 1 400.

A relatively high degree of cost sharing compared to the Nordic countries, but not as high as the Netherlands

The government financed 85% of higher education expenditure in 2015, a share that places Flanders in the top quartile of OECD countries, though below the Nordic countries. The share of expenditure from private sources on Flemish higher education institutions increased steadily between 2008 and 2015, from 10 to 12%, but remained among the lowest among OECD countries throughout this period (Figure 10.2).

Figure 10.2. Higher education expenditure from private sources (2008-2015)

As a share of total expenditure on higher education institutions



Note: Private sources include both households and other non-educational private sources.
Source: Adapted from OECD (2018[3]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en; data provided by the Flemish Ministry of Education and Training.

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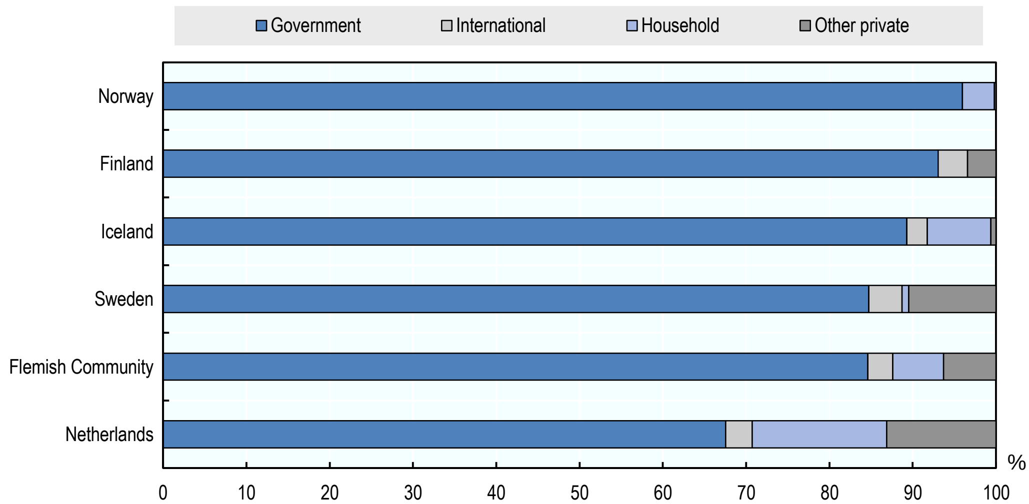
Figure 10.3. Share of higher education expenditure, by source (2015)



Source: Adapted from OECD (2018[3]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en; data provided by the Flemish Ministry of Education and Training.

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Annual household expenditure per student stood at USD 1 100 in 2015, which accounted for 6% of the total expenditure per student in the Flemish Community. In the Flemish Community, higher education institutions charge tuition fees, the level of which is determined by legislation. Public and government-dependent private institutions charge full-time bachelor's and master's students a maximum fee of around EUR 1 000 per year.

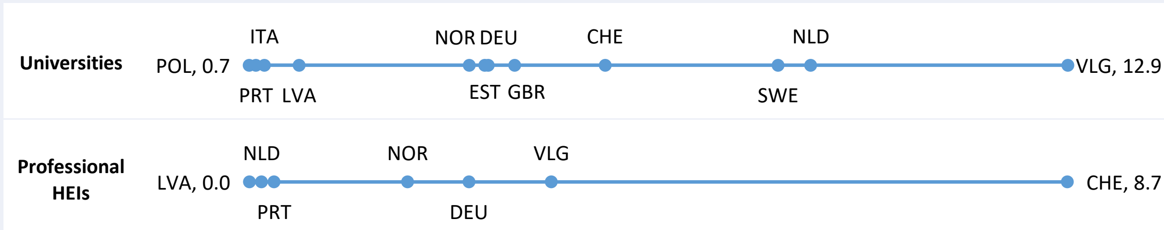
The share of funding from private sources other than households was 6% in 2015 (Figure 10.3), a proportion below the median of OECD countries, and well below that of the Netherlands. However, there are signals that Flemish higher education institutions are able to connect to the private sector to obtain funding for specific projects (Box 10.1).

Box 10.1. Private third party funding in Flemish institutions

Relative to other European countries, Flemish higher education institutions receive a large amount of private third party funding, i.e. revenue from private sources earmarked for specific activities and institutional units, typically through contracts, and often for research. Private third party funding accounted for 13% of current revenues in Flemish universities in 2015, the highest share among European member countries of the OECD. In Flemish professional HEIs, this share was much lower (3%), but it was the second highest across countries with available data.

Figure 10.a Private third party funding in higher education, as a proportion of current revenues (2015)

By type of institution



Note: CHE = Switzerland; DEU = Germany; EST = Estonia; GBR = United Kingdom; ITA = Italy; LVA = Latvia; NLD = Netherlands; NOR = Norway; POL = Poland; PRT = Portugal; SWE = Sweden; VLG = Flemish Community.
Source: European Tertiary Education Register (ETER) (2019[4]), *ETER Database*, www.eter-project.com/.

StatLink https://doi.org/10.1787/888933942431

The high proportion of third party funding in the Flemish Community is consistent with the high reported level of collaboration between business and higher education institutions in Belgium (Section 10.4.1). However, because of the differences in methodology and coverage, it is not comparable to the share of non-household education expenditure presented in Figure 10.3.

High emphasis on R&D activities in higher education institutions

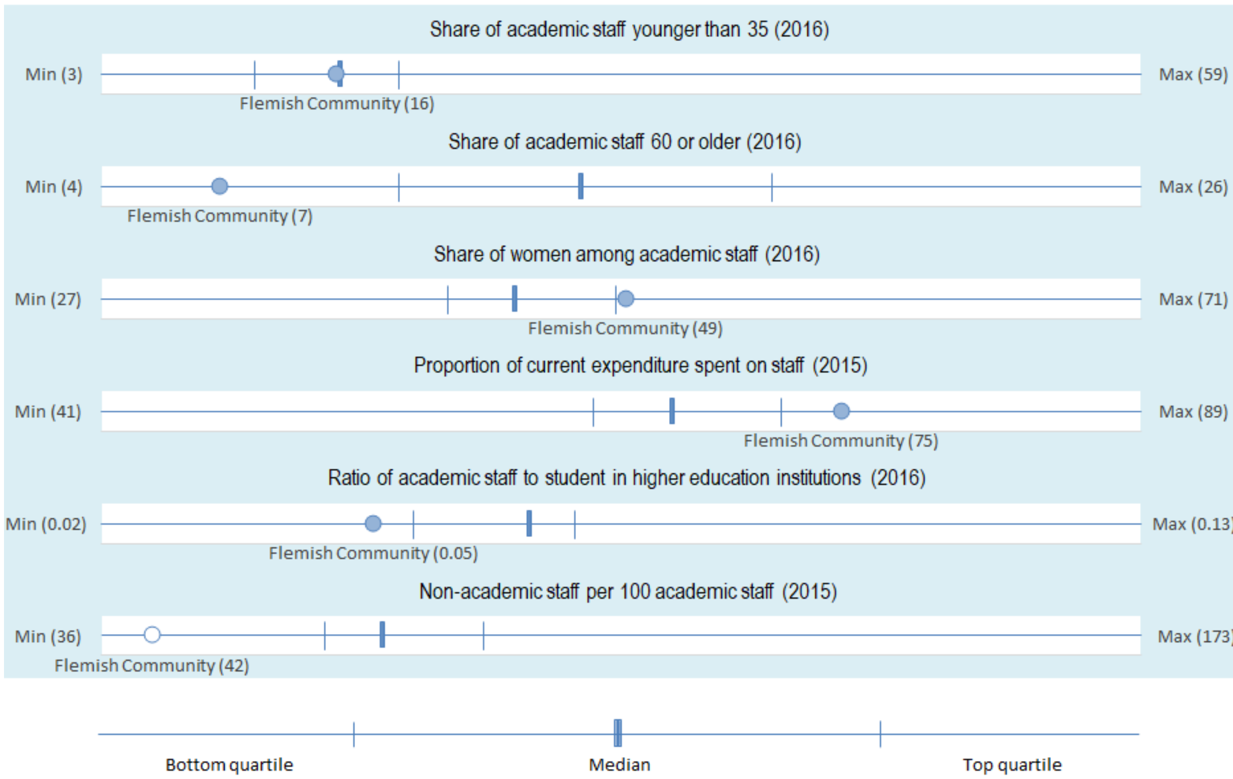
Flanders spent 0.5% of its GDP on R&D activities in the higher education sector in 2016, which was in the top quartile of OECD countries. In addition, annual higher education expenditure on R&D activities on a per student basis was USD 7 000 in 2015, which was 38% of the total expenditure. This share places Flanders in the top quartile of OECD countries, at around the same level as the Netherlands.

10.2.2. Human resources

The Flemish Community has a young age profile of academic staff, relative to other OECD countries

The international definition of “academic staff” covers a wide range of job titles in Flemish universities and professional HEIs. These include full-time professors, associate professors, assistant professors, teaching assistants, tutors, practice tutors, junior researchers, senior research fellows and doctoral students when employed by a higher education institution.

Figure 10.4. Where does the Flemish Community stand in the OECD distribution? Human resources



Note: The indicators represented in this chart are a subset of the indicators presented in Table 10.1. The coloured circle represents the Flemish Community's position in the OECD distribution. The circle is not coloured when data are available for less than half of the OECD countries (the minimum number of countries with available data is 14). For more information on methodological issues and metadata, see OECD (2019[2]) and the references cited therein. Follow the *Statlink* to download the data underlying the calculation of the scorecard.

Source: Adapted from OECD (2019[2]), *Benchmarking Higher Education System Performance*, https://doi.org/10.1787/be5514d7-en.

StatLink https://doi.org/10.1787/888933942374

The share of younger academic staff (below 35) was 16% in the Flemish Community in 2016, slightly below the median of OECD countries. The share of older academic staff (above 60) was 7%, one of the lowest among OECD countries, resulting in a relatively young age profile of academic staff, and mitigating issues associated with the ageing of staff experienced by some other countries (see Chapter 4 of (OECD, 2019[2])).

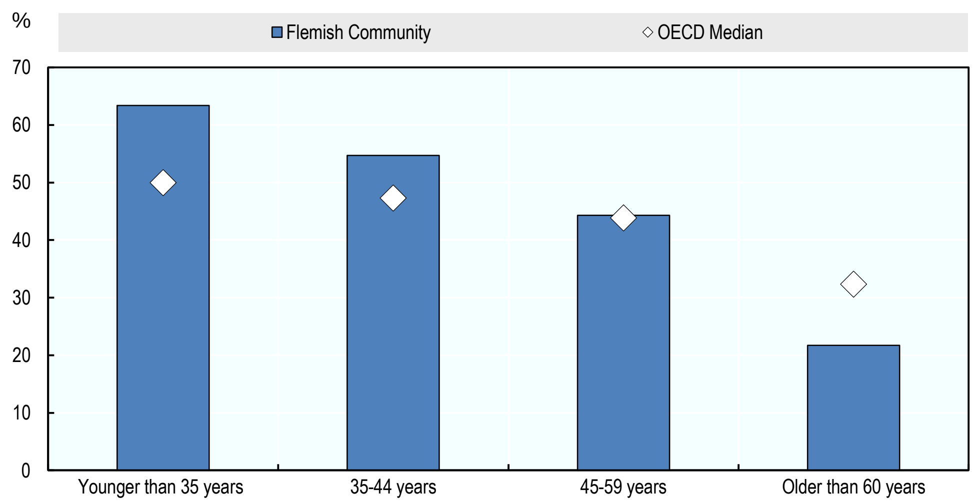
The share of women among academic staff increased by 10% over the past decade – one of the highest increases among OECD countries

Nearly half of all academic staff in the Flemish Community were female in 2016. This share was in the top quartile of OECD countries, slightly below Belgium as a whole and above the Netherlands. The share increased by over 10% between 2008 and 2016, which was the second highest increase among OECD countries after Korea.

Gender equality has been a key goal of higher education policy in the Flemish Community in recent years. For example, gender diversity in academic staff is one indicator in the formula for allocating funding to higher education institutions. In addition, almost all Flemish higher education institutions have adopted the principles contained in the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers, including those aimed at promoting gender equality (see Chapter 4 of (OECD, 2019[2])).

Women comprised a larger share of academic staff among younger age groups than older ones, both in the Flemish Community and in the majority of OECD countries. Women comprised almost two-thirds of Flemish academic staff younger than 35 in 2016 (Figure 10.5).

Figure 10.5. Share of women among academic staff in higher education, by age group (2016)



Source: Adapted from OECD (2018[3]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en; data provided by the Flemish Ministry of Education and Training.

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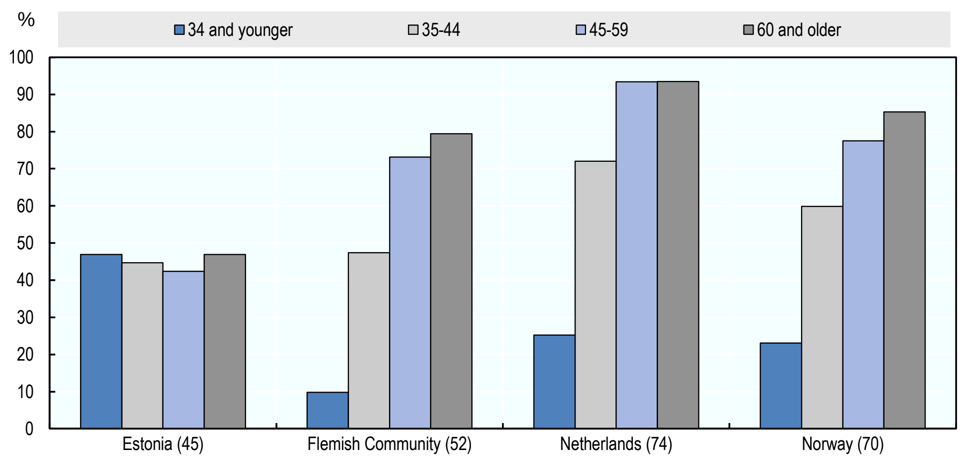
The share of young teaching staff with a permanent contract is relatively low when compared to Estonia, the Netherlands and Norway

Overall, about half of academic staff with teaching duties (teaching staff) had a permanent contract in 2016. This share was relatively low among the four jurisdictions participating in the benchmarking exercise (Figure 10.6). Younger academic staff in particular appeared to be in a relatively precarious employment position, as only 10% of staff in this category worked with a permanent contract, a much lower level than in the other benchmarking jurisdictions.

Figure 10.6. Share of teaching staff with permanent contracts, by age (2016)

Academic staff with teaching duties, excluding doctoral students. The share with permanent contracts across all ages is reported in brackets.



Source: Adapted from OECD (2019[2]), *Benchmarking Higher Education System Performance*, https://doi.org/10.1787/be5514d7-en.

StatLink https://doi.org/10.1787/888933942412

A high share of current expenditure is spent on staff, particularly on teaching staff

Higher education current expenditure covers goods and services consumed within the current year to sustain the activities of institutions. It includes compensation of personnel (both academic and administrative) as well as other costs, for example, for general supplies and for contracted services such as building, cleaning and maintenance.

The Flemish Community spent three-quarters of its higher education current expenditure on staff in 2015, placing it in the top quartile of OECD countries. Teaching staff accounted for over 60% of all staff expenditure, which was also a relatively high share among higher education systems with available data. The remaining 40% of staff expenditure was spent on non-teaching staff (which includes academic staff without teaching duties, administrative and other support staff). In the Flemish higher education system, there were 42 non-academic staff per 100 academic staff in 2015, one of the lowest rates among OECD countries reporting data.

The academic staff-to-student ratio is higher than in the Netherlands and Estonia

Students benefit from interacting with academic staff, for example through individual meetings, lectures or tutorials. Therefore, it is usually assumed that a large academic staff-to-student ratio contributes to student learning, despite the important limitations of this indicator (see Chapter 4 of OECD (2019[2])).

In the Flemish Community, the academic staff-to-student ratio was about 1:20 in 2016, a ratio placing Flanders in the bottom quartile of OECD countries. However, this indicator only includes senior academic staff for the Flemish Community, meaning that it excludes employed doctoral students, post-doctoral researchers and other junior categories. Therefore, it is not directly comparable to other OECD countries.

Data on the academic staff-to-student ratio by subsector show that, in 2016, it was higher in the Flemish Community than in Estonia and the Netherlands in both universities and professional HEIs. In contrast to the ratio included in the scoreboard, the breakdown by subsector is comparable across the jurisdictions with available data, because it includes both junior and senior academic staff categories for the Flemish Community as well as for Estonia and the Netherlands. This indicator also shows that there were wide differences between the subsectors; in the Flemish Community, the ratio was 1:7 in universities and 1:15 in professional HEIs. The larger staff-to-student ratio in universities can be attributed, at least in part, to the larger share of staff time that is spent on research within these institutions.

10.3. Education

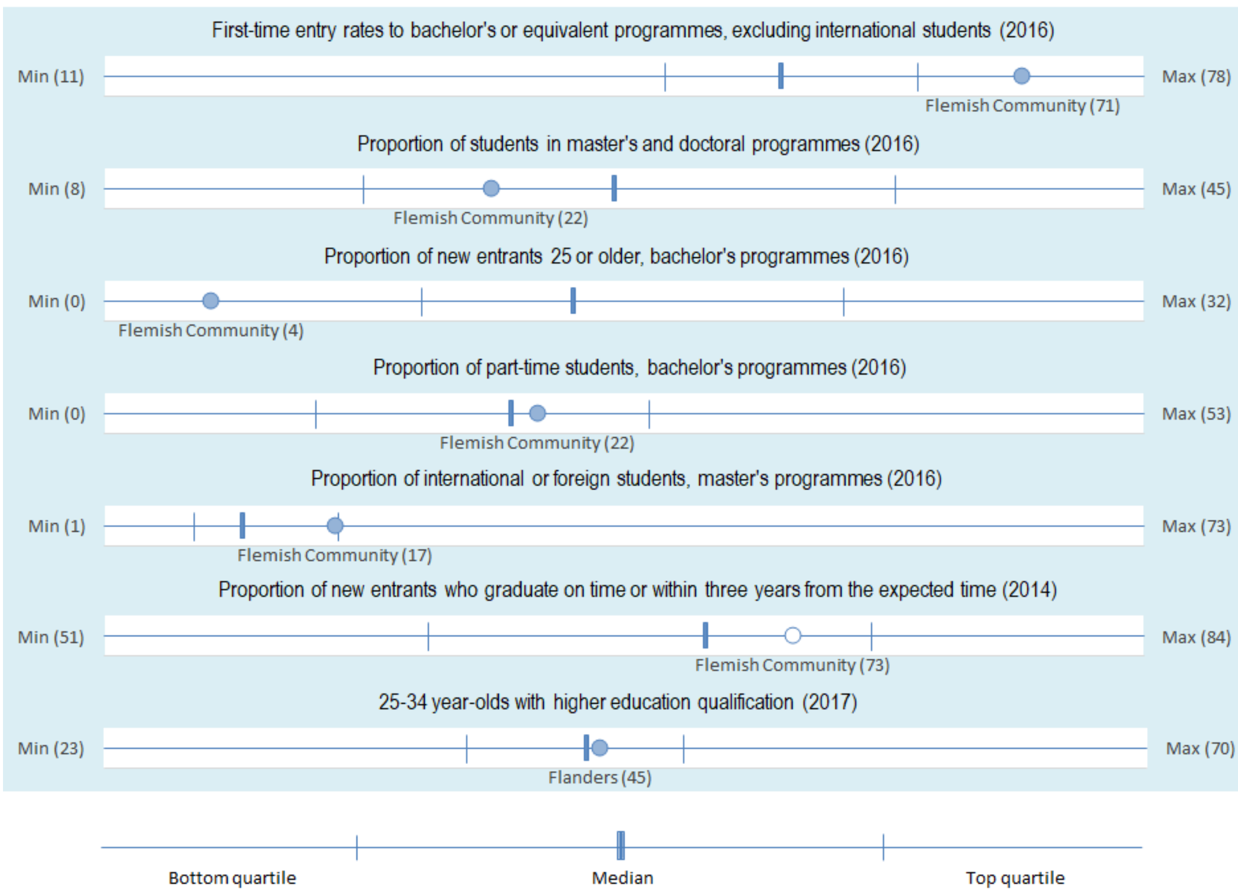
Highlights

- Around 45% of 25-34 year-olds had obtained a higher education degree in Flanders in 2017, which is around the median of OECD countries. Over two-thirds of young adults are projected to enter a bachelor's programme at least once in their lifetime, one of the highest rates among OECD countries.
- Nearly one-fourth of students in bachelor's programmes are enrolled part-time (planning to obtain less than 45 credits in one year) in the Flemish Community in 2016, above the OECD median. The Flemish Community has distinctively flexible study provision: all higher education institutions were required to offer their study programmes part-time in 2017; students can also register for single modules.
- The proportion of new entrants who graduated on time or within three years from the expected graduation year was around 70% in 2014, which is above the median of OECD countries.
- The share of mature students (25 or older) in bachelor's programmes was less than 5% in 2016, one of the lowest among OECD countries. The shares of international students were 17% at a master's level and 40% at a doctoral level in 2016, in the top quartile of OECD countries.
- According to the OECD Survey of Adult Skills (PIAAC), the Flemish Community has one of the highest shares of 16-34 year-old higher education graduates with good (level 3 or above) literacy and numeracy skills among OECD countries participating in PIAAC. The difference between higher education graduates and upper secondary education graduates in the probability of reaching this good level of skills is among the largest in the OECD area.
- Data from the OECD Survey of Adult Skills also show that higher education graduates in the Flemish Community tend to enjoy better social outcomes than secondary graduates, as is the case in most of OECD countries. The difference between the two groups is at around the median of OECD countries.
- The Flemish Community had a high employment rate among individuals aged 25-34 across all levels of education attainment in 2017. As a result, the graduate employment premium – the difference in the employment rate between the graduates of bachelor's programmes and upper secondary education graduates – was just above the bottom quartile of OECD countries. In addition, there was no

difference in the employment rate of bachelor's and master's graduates, perhaps related to the strong employment outcomes of bachelor’s graduates in professional HEIs.

10.3.1. Access, student profile, completion

Figure 10.7. Where does the Flemish Community stand in the OECD distribution? Access, student profile, completion



Note: The indicators represented in this chart are a subset of the indicators presented in Table 10.1. The coloured circle represents the Flemish Community’s position in the OECD distribution. The circle is not coloured when data are available for less than half of the OECD countries (the minimum number of countries with available data is 14). For more information on methodological issues and metadata, see OECD (2019[2]) and the references cited therein. Follow the *Statlink* to download the data underlying the calculation of the scorecard.

Source: Adapted from OECD (2019[2]), *Benchmarking Higher Education System Performance*, https://doi.org/10.1787/be5514d7-en.

StatLink https://doi.org/10.1787/888933942450

Around 45% of 25-34 year-olds have a higher education qualification, and over two-thirds of young adults are projected to enter higher education in the course of their life

In Flanders, over one-third of adults (25-64 year-olds) had completed higher education in 2016, just below the OECD median. In the younger age group (25-34 year-olds), nearly half of them had obtained a higher education qualification in 2017, which was slightly above the median of OECD countries.

Around 70% of young adults are projected to enter a bachelor's programme at least once in their lifetime. This share is one of the highest in the OECD area. The high entry rate, as well as the large proportion of students studying part-time may be attributable partly to flexible study provision in the Flemish Community (Table 10.3). This lowers the barriers to access by increasing the available options through which students can participate in higher education.

Table 10.3. Flexible learning pathways in the Flemish Community (2017)

All higher education institutions are required to offer all of their programmes as part-time and modular education
Students can enrol in single modules and receive a credit certificate from the institution upon completion
Under certain conditions, students can enrol only for the assessment and obtain credits without attending classes
Tuition fees are based on the number of credits in which students enrol (i.e. they change with study load)
No distinction between part-time and full-time students in terms of financial support

Source: Adapted from information provided by the Flemish Ministry of Education and Training.

Access to higher education varies by social background, but the access gap appears lower than in many other OECD countries

Flemish data on access rate gaps by socio-economic background are not directly comparable with international data, but show that maternal education has an impact on youth participation in higher education. Two-thirds of Flemish students leaving upper secondary education in 2015 (either with a diploma or not) entered a higher education programme in the Flemish Community within the next three years. That compares to 83% of upper secondary students whose mother had a higher education degree and 55% of students whose mother did not.

These data imply a relative gap in the probability to access higher education of 34% between children of mothers without higher education and other students leaving upper secondary education. As a comparison, the median access gap for 18-24 year-olds with and without at least one parent with higher education across OECD countries with data was 50%, and around 40% for Norway (the smallest access gap across countries with comparable data).

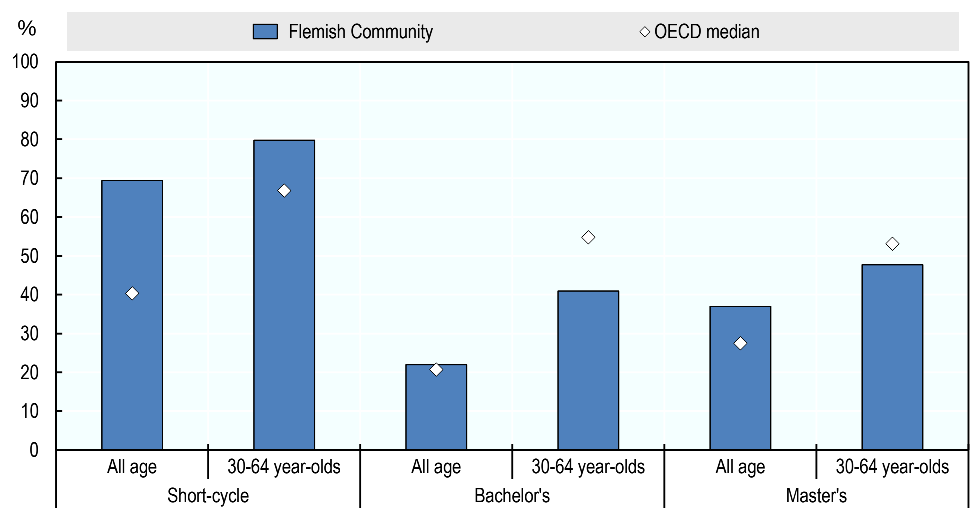
The share of part-time students across all age groups is relatively large but the share of mature students is relatively small, as compared to OECD countries

Nearly one-fourth of all students in bachelor's programmes were enrolled part-time in the Flemish Community in 2016, which is above the OECD median (Figure 10.8). Part-time students accounted for an even larger share of enrolment in short-cycle tertiary education programmes (69%) and master's programmes (39%), with the Flemish Community in or close to the top OECD quartile for both education levels.

Mature students (25 or older) accounted for less than 5% of new entrants to bachelor's programmes in the Flemish Community in 2016. This share was one of the lowest among OECD countries, slightly below the Netherlands. The shares of mature students were similarly small at other levels – less than 2% in short-cycle tertiary education programmes and around 15% in master's programmes.

The share of 30-64 year-old students who were enrolled in bachelor's programmes part-time was around 40% in the Flemish Community, well below the median of OECD countries. In most OECD countries, the share of part-time students in 2016 was higher among the 30-64 age group than across all age groups; this was also the case in the Flemish Community. However, the difference between the two age groups was relatively low in the Flemish Community. This indicates that the Flemish Community had a relatively large proportion of younger students (below 30) studying part-time compared to other OECD countries.

Figure 10.8. Share of part-time students in higher education, by age and ISCED level (2016)



Source: Adapted from OECD (2018[3]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en; data provided by the Flemish Ministry of Education and Training.

StatLink https://doi.org/10.1787/888933942469

The majority of students are enrolled in bachelor's programmes

The majority of students in the Flemish Community were enrolled in bachelor's programmes in 2016. Around 20% of students were enrolled in master's programmes, below the median of OECD countries. Less than 10% of students were enrolled in short-cycle tertiary education programmes, around the median of OECD countries offering short-cycle tertiary education programmes.

Around one-quarter of new entrants have not yet completed their programmes three years after the expected graduation year

New entrants refer to students who enter a programme at a given level of education for the first time. In the Flemish Community, around 40% of new entrants to bachelor's programmes in 2008 obtained a bachelor's degree within the expected duration of the programme. This was at around the median of OECD countries and economies with available data, and below Denmark, Finland, France and Norway. Another one-third of new entrants completed the bachelor's programme within three years from the expected graduation year. However, over 20% of new entrants did not complete the programme and were not in education in 2014, three years after the expected graduation year.[2]

The completion rate at the bachelor's level differed among different student groups. Male students, particularly those in professional HEIs, had a lower completion rate as compared to female students. Part-time students also had a relatively low completion rate, as compared to full-time students.

More than one-third of doctoral students are international students, which is one of the highest shares among OECD countries

In 2016, international students comprised 17% of master's level students and 40% at the doctoral level, which was in the top quartile of OECD countries, at around the same level as the Netherlands, and slightly below Belgium as a whole. The share of international students was 5% at the bachelor's level, which was around the OECD median.

The government has attempted to increase the number of incoming students through grants and through mobility programmes, including the ASEM-DUO Fellowship Programme (student exchange with Asia-Europe Meeting (ASEM) partner countries in Asia) and the "mobility with countries in transition" programme (student exchange with Brazil, Morocco, South Africa and Turkey). It also has set the target that one-third of students in the Flemish Community would have an international experience by 2020 (see Chapter 5 of OECD (2019[2])).

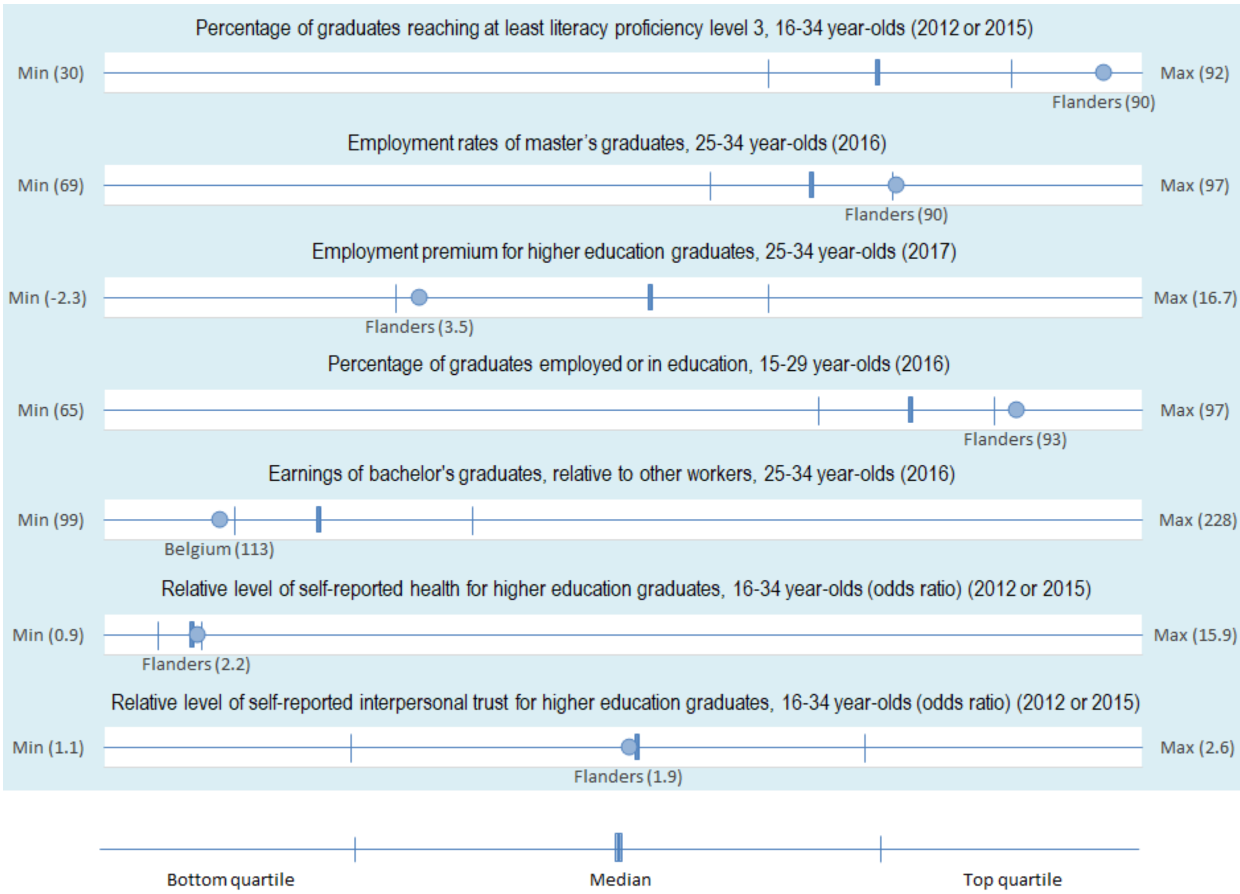
10.3.2. Graduate outcomes

The majority of young higher education graduates have good literacy and numeracy skills

No internationally comparable data are currently available on the learning outcomes of higher education at the system level. In its absence, it is possible use the OECD Survey of Adult Skills (PIAAC) to assess skills proficiency among higher education graduates.

In Flanders, approximately 90% of higher education graduates aged 16-34 reached level 3 of the PIAAC proficiency scale (a scale from below level 1 – the lowest – to level 5 – the highest) in 2012,[3] both in terms of literacy and numeracy. This share was one of the highest among OECD countries participating in PIAAC for literacy, and the highest for numeracy.

Figure 10.9. Where does the Flemish Community stand in the OECD distribution? Graduate outcomes

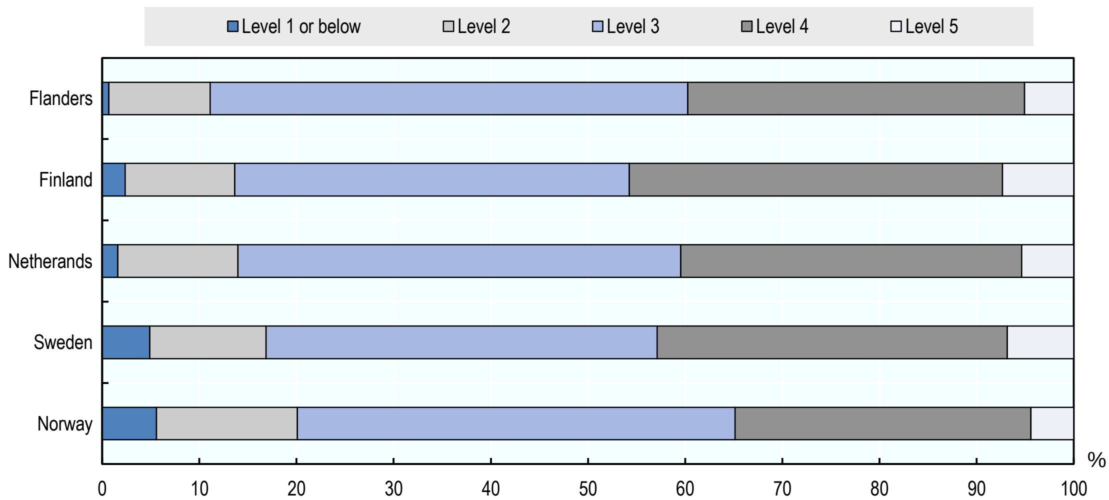


Note: The indicators represented in this chart are a subset of the indicators presented in Table 10.1. The coloured circle represents the Flemish Community's position in the OECD distribution. The circle is not coloured when data are available for less than half of the OECD countries (the minimum number of countries with available data is 14). For more information on methodological issues and metadata, see OECD (2019[2]) and the references cited therein. Follow the *Statlink* to download the data underlying the calculation of the scorecard.

Source: Adapted from OECD (2019[2]), *Benchmarking Higher Education System Performance*, https://doi.org/10.1787/be5514d7-en.

StatLink https://doi.org/10.1787/888933942488

Figure 10.10. Numeracy proficiency distribution among graduates younger than 35 (2012)



Source: Adapted from OECD (2018[5]), *OECD Survey of Adult Skills*, www.oecd.org/skills/piaac/data/.

StatLink https://doi.org/10.1787/888933942507

Higher education graduates have higher literacy and numeracy skills and enjoy better social outcomes, as compared to secondary education graduates

In 2012, the odds of reaching proficiency level 3 were over four times higher for Flemish higher education graduates younger than 35 than for upper secondary graduates in the same age group, for both literacy and numeracy proficiency (controlling for age, gender, immigrant and language background and parents' educational attainment). These are among the largest odds ratios among OECD countries participating in the OECD Survey of Adult Skills, and they are significantly different from 1 at the 5% confidence level. This difference could result from the capacity of the higher education system to increase students' literacy and numeracy skills, the selection of individuals with higher levels of skills into higher education, or some combination of the two.

Education not only prepares graduates for working life, but also fosters democratic engagement among citizens, participation in civil society, trust, and well-being. In 2012, Flemish higher education graduates younger than 35 had about twice the odds of disagreeing with the following statements: "people like me don't have any say about what the government does" (a measure of political efficacy) and "only few people can be trusted", as compared to secondary education graduates in the same age group. They also had two times the odds of reporting to be in good or excellent health. The differences between higher education graduates and upper secondary education graduates for these indicators are statistically significant at the 5% confidence level, and they are around the median across OECD countries participating in the OECD Survey of Adult Skills.

The employment rate of 25-34 year-olds is high in general, including for higher education graduates across education levels and fields of study

The employment rate is higher in Flanders than in most OECD countries across a range of education levels. The employment rates of 25-34 year-old graduates were around 90% for bachelor's (one of the highest among OECD countries) and master's programmes (in the top quartile) in 2017. Similarly, that of upper secondary education graduates was 87%, which is the highest among OECD countries.

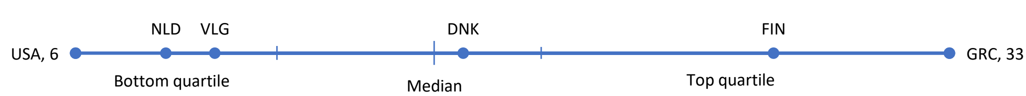
Over 90% of higher education graduates younger than 30 were either employed or in education in Flanders in 2017. This share is in the top quartile of OECD countries, slightly above Belgium as a whole and slightly below Germany and the Netherlands.

Due to the high rate of employment across education levels, the graduate employment premium – the difference between the employment rate of higher education graduates and upper secondary education graduates – was relatively low among OECD countries in 2017. In addition, in Flanders, there was almost no difference between the employment rate of master's and bachelor's graduates, contrary to most OECD countries where master's graduates were more likely to be employed.

The differences in the employment rates of 25-34 year-olds across fields of study were also small in Flanders relative to other OECD jurisdictions. In Flanders, the difference between the employment rate of 25-34 year-old higher education graduates in the field of study with the highest employment rate (services) and that with the lowest (arts and humanities) was 10% in 2017 (Figure 10.11). This was one of the smallest differences among OECD higher education systems.

Figure 10.11. Spread in the graduate employment rate across fields of study (2017)

25-34 year-olds across all ISCED fields of study



Note: DNK = Denmark; FIN = Finland; GRC = Greece; NLD = Netherlands; USA = United States; VLG = Flanders.
Source: Adapted from OECD (2018[3]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en; data provided by the Flemish Ministry of Education and Training.

StatLink https://doi.org/10.1787/888933942526

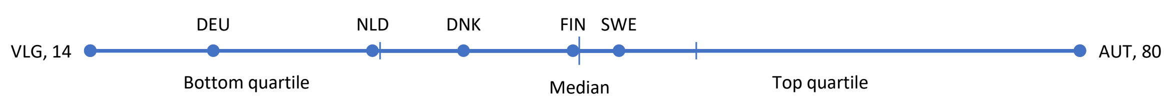
Higher education attainment results in a relatively low earnings premium for graduates

For the indicator on earnings premiums, only the national average of Belgium is available. Higher education graduates in Belgium enjoy relatively low earnings premiums on average compared to those in other OECD countries. In 2015, the full-time, full-year earnings of bachelor's graduates (25-34 year-olds) were 10% higher than the average equivalent earnings of the same age cohort with only upper secondary or post-secondary non-tertiary education. The earnings premium for bachelor's graduates is in the bottom quartile of OECD countries. Master's and doctoral graduates earned 140% of the average earnings of the same age cohort with upper secondary or post-secondary non-tertiary education, 4 percentage points below the OECD median.

Higher education graduates are less likely than other workers to work in jobs with routine tasks

Although higher education graduates have a relatively low employment and earnings premium, according to data from the OECD Survey of Adult Skills, in 2012 only 2% of Flemish higher education graduates younger than 35 worked in jobs with routine tasks where little learning is involved, compared to 15% of workers with only upper secondary education. This is a lower relative proportion of higher education graduates with routine tasks than in any other country participating in the OECD Survey of Adult Skills (Figure 10.12).

Figure 10.12. Relative share of workers with higher education in jobs with routine tasks (2012 or 2015)



Note: AUT = Austria; DEU = Germany; DNK = Denmark; FIN = Finland; NLD = Netherlands; SWE = Sweden; VLG = Flanders.
A value of 14 for Flanders implies that workers with higher education are 14% as likely as workers with upper secondary education to have jobs with routine tasks. When calculating this indicator, workers are considered to be in jobs with routine tasks if they report to be unable to choose or change "the sequence of tasks" and "how to do the work" (OECD, 2013[6]).
Source: Adapted from OECD (2018[5]), *OECD Survey of Adult Skills*, www.oecd.org/skills/piaac/data/.

StatLink https://doi.org/10.1787/888933942545

The employment rate for short-cycle higher education graduates is low relative to other levels of education – but this could change when short-cycle programmes are absorbed into professional HEIs

The employment rate of 25-34 year-old graduates in short-cycle programmes was 65% in 2017, the lowest among OECD countries and much lower than the employment rate for other higher education graduates from the Flemish Community.

Table 10.4. Employment rates of 25-34 year-old bachelor graduates, by subsector (2016)

	Estonia	Flanders	The Netherlands
Universities	79.3	m	73.3
Professional HEIs	82.5	93.2	92.9

Note: The year of reference is 2013 for the Flemish Community, and 2016 for the Netherlands. In the Flemish Community, only a small percentage of university bachelor's graduates enter the labour market before earning a master's degree.
Source: Adapted from OECD (2019[2]), *Benchmarking Higher Education System Performance*, https://doi.org/10.1787/be5514d7-en.

This could change in the future, as in 2019, most short-cycle higher education programmes became the responsibility of professional HEIs (centres for adult education previously offered most short-cycle programmes). Professional HEIs in the Flemish Community have been successful in ensuring that a large proportion of their graduates have a job. In 2013, the employment rate of 25-34 year-old bachelor's graduates from professional HEIs was 93% in Flanders, in line with the Netherlands and above Estonia.

10.4. Research and engagement

Responsibility for research and development is delegated to the communities and regions of Belgium. The Flemish research and development system attracts more than 60% of national gross expenditure on research and development (GERD) (Department of Economy, Science and Innovation, 2017[7]).

Many of the research and engagement indicators used in the benchmarking exercise (particularly those related to internationalisation and collaboration) are not available with comparable regional breakdowns. Therefore, the national performance of Belgium is used in much of the discussion that follows in this section, although where possible the analysis is augmented with Flemish data.

Highlights

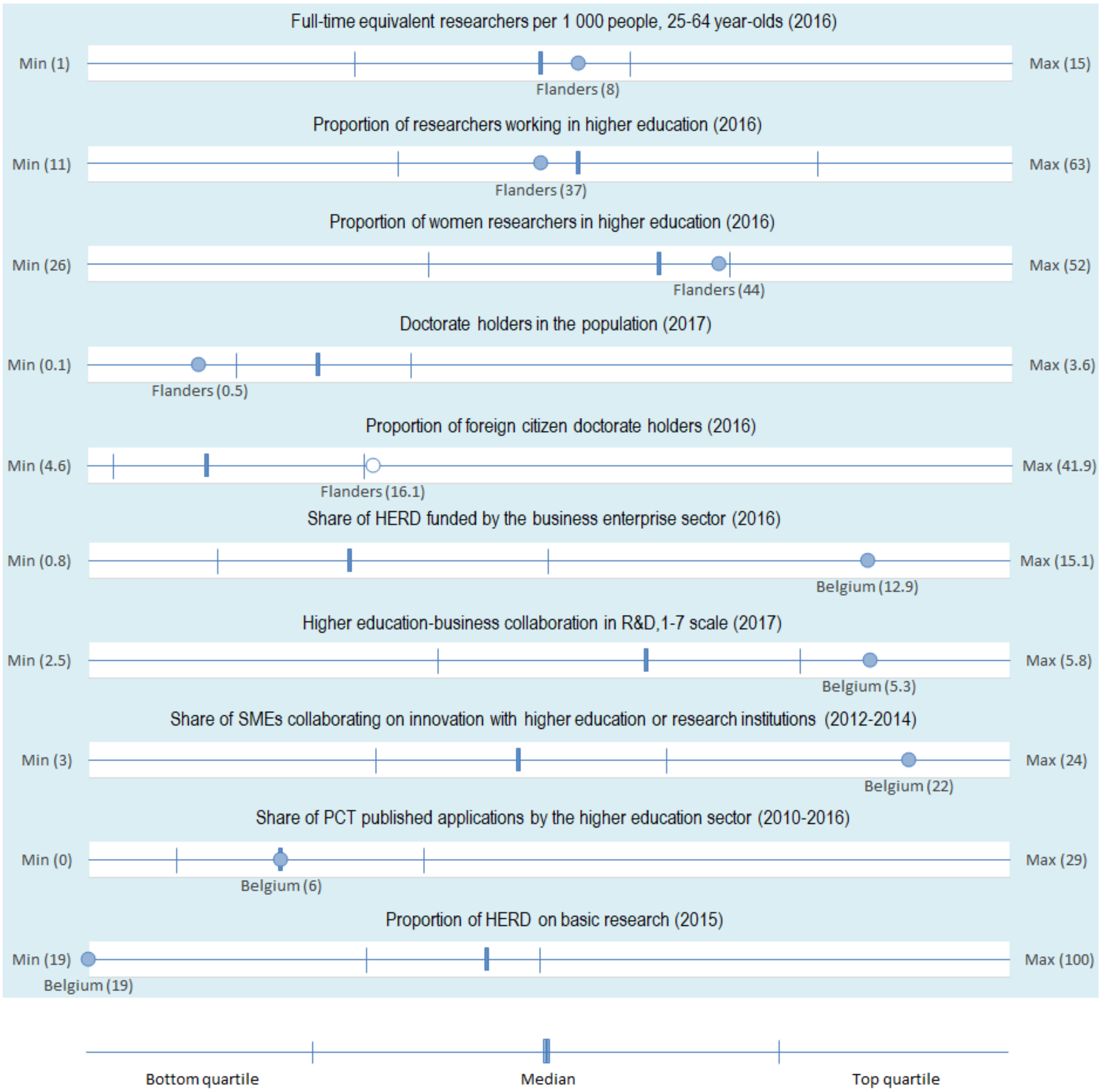
- Women are better represented in research compared to most other OECD countries. In 2016, 44% of all researchers were female, reflecting the strong policy focus on gender equity in research in the Flemish Community.
- The proportion of researchers working in higher education is close to the OECD median, although the proportion of expenditure on research and development allocated to the higher education sector is lower than in most OECD countries.
- Flanders had a lower proportion of the population with a doctorate compared to the OECD median in 2017. Following policy efforts, the numbers of doctoral graduates have been growing in recent years.
- The proportion of expenditure on basic research performed in 2015 in the Belgian higher education sector was the lowest among OECD countries. However, the time series for Belgium in the shares of basic research, applied research and experimental development present an important discontinuity between 2013 and 2014, which could reflect changes in the underlying classifications and definitions.
- There are relatively strong links between the higher education and business sectors in Flanders. Levels of reported collaboration in 2014 between both large and small businesses were well above the OECD median.
- Belgium produced more scientific publications per 1 000 people than the OECD median in 2016, and was in the top OECD quartile of the proportion of publications among the top 10% most cited in the SCOPUS database.

10.4.1. Inputs and activities

Women are better represented in research than in most other OECD countries

The proportion of women working as researchers in the Flemish R&D system is higher than the median level across the OECD, and is moving towards parity with male researchers. In 2016, 44% of all researchers were women, placing Flanders near the top quartile of the OECD distribution (Figure 10.13).

Figure 10.13. Where does the Flemish Community stand in the OECD distribution? Research inputs and activities



Note: The indicators represented in this chart are a subset of the indicators presented in Table 10.1. The coloured circle represents the Flemish Community's position in the OECD distribution. The circle is not coloured when data are available for less than half of the OECD countries (the minimum number of countries with available data is 14). For more information on methodological issues and metadata, see OECD (2019[2]) and the references cited therein. Follow the *Statlink* to download the data underlying the calculation of the scorecard.

Source: Adapted from OECD (2019[2]), *Benchmarking Higher Education System Performance*, https://doi.org/10.1787/be5514d7-en.

StatLink https://doi.org/10.1787/888933942564

As discussed in Section 10.2, Flanders places a strong emphasis on gender equity in research by including gender diversity indicators in the decision process for R&D funding. In addition, almost all higher education institutions in the Flemish Community have adopted the human resources strategy and principles contained in the European Charter and Code for hiring researchers, which also incorporates measures to promote gender equity (see Chapter 4 of (OECD, 2019[2])).

The proportion of research staff working in higher education research and development is slightly below the median

Flanders has a concentration of researchers in the population that is close to the OECD median – around 8 researchers per 1000 people aged 25-64 in 2016. The proportion of researchers working directly in the higher education sector in 2015 was slightly below the median, at 37% compared to the OECD median of 39%. However, the higher education sector received just over 20% of overall gross expenditure on R&D in 2016, one of the lower levels in the OECD. This could be due to many junior researchers in higher education being paid through tax-exempt scholarships, reducing the cost of research personnel for higher education institutions.

There are many career options open to researchers in Flanders, given the range of institutions in the public research system. Types of institutions include specialist research centres, policy research institutes and Strategic Research Centres (SRC), which each focus on one key area of expertise. In addition, there are ten federal scientific establishments in Belgium, which often carry out joint projects with Flemish and French higher education institutions (see Chapter 6 of (OECD, 2019[2])).

The proportion of the population aged 25-64 in Flanders with a doctoral qualification (a basic requirement for entry to a career in higher education research) is 0.5%, lower than the OECD median of 1%. Planned increases in research and development activity in the Flanders, if achieved, may increase demand for doctoral qualifications. National data indicate that the number of people who had obtained a doctoral degree in Flanders increased by almost 40% between 2011 and 2016 (Department of Economy, Science and Innovation, 2017[7]). This may reflect funding incentives, as the number of doctoral degrees awarded is included as an indicator in the allocation of funding to institutions (see Chapter 3 of (OECD, 2019[2])). In addition, the Flemish government has increased the availability of scholarships for doctoral students in recent years (Flemish Ministry for the Economy, Science and Innovation, 2011[8]).

At the same time, it is unclear how the increased numbers of graduates may translate into supply for research and development in Flanders, as no data are available for the proportions of these graduates who subsequently pursue a career outside of Flanders (Department of Economy, Science and Innovation, 2017[7]).

Belgium is one of the least active performers of basic research

Basic research is research that is aimed at creating new knowledge without a specific purpose or application in mind, while applied research is focused on creating new knowledge with a specific practical aim (OECD, 2015[9]). Public funding of basic research is considered a fundamental requirement to ensure continued production of new knowledge. The knowledge created from basic research can underpin the development of novel products or processes, or ensure that topics or research areas that have social and cultural value, but not necessarily economic value, are pursued (see Chapter 6 of (OECD, 2019[2])).

In general, about three-quarters of basic research across the OECD was carried out in the higher education sector in 2015. In Belgium, a relatively small proportion of expenditure was allocated to basic research. In 2015, the majority of R&D activity in the higher education system was classified as applied research or experimental development, in contrast to the majority of OECD countries.[4]

There are strong links between the higher education sector and business in Belgium

In general, the reported levels of co-operation between the business and higher education sectors across the OECD were low, with proportions of businesses reporting collaboration over the period 2012-2014 ranging from 7% to 23% (see Chapter 7 of (OECD, 2019[2])). Belgium performs relatively well compared to other OECD countries in creating an environment for strong engagement between the business sector and the higher education sector. More than one-fifth of enterprises reported recent collaboration with the higher education sector on R&D in 2014, well above the OECD median level of almost 13%. The higher levels of collaboration also extended to small and medium sized enterprises (SMEs), where almost 22% reported collaborating with higher education institutions on innovation, a proportion in the top quartile of OECD countries.

Public policy to promote collaboration between higher education and other sectors of the economy is essential to ensure that the knowledge produced by higher education institutions can diffuse into innovation processes (OECD, 2016[10]). Flanders has a number of initiatives that specifically target greater collaboration with businesses, including SMEs. For example, the TETRA-fund provides financial support for knowledge transfer activities specifically targeted at SMEs and social enterprises. In addition, the Flemish Agency for Innovation and Entrepreneurship (AIO) offers the "Baekeland" scholarships to doctoral students carrying out research in collaboration with companies (see Chapters 6 and 7 of (OECD, 2019[2])).

10.4.2. Internationalisation and knowledge production

Compared to most other OECD countries, Belgium produces a higher volume of research output, and research appears to have greater impact

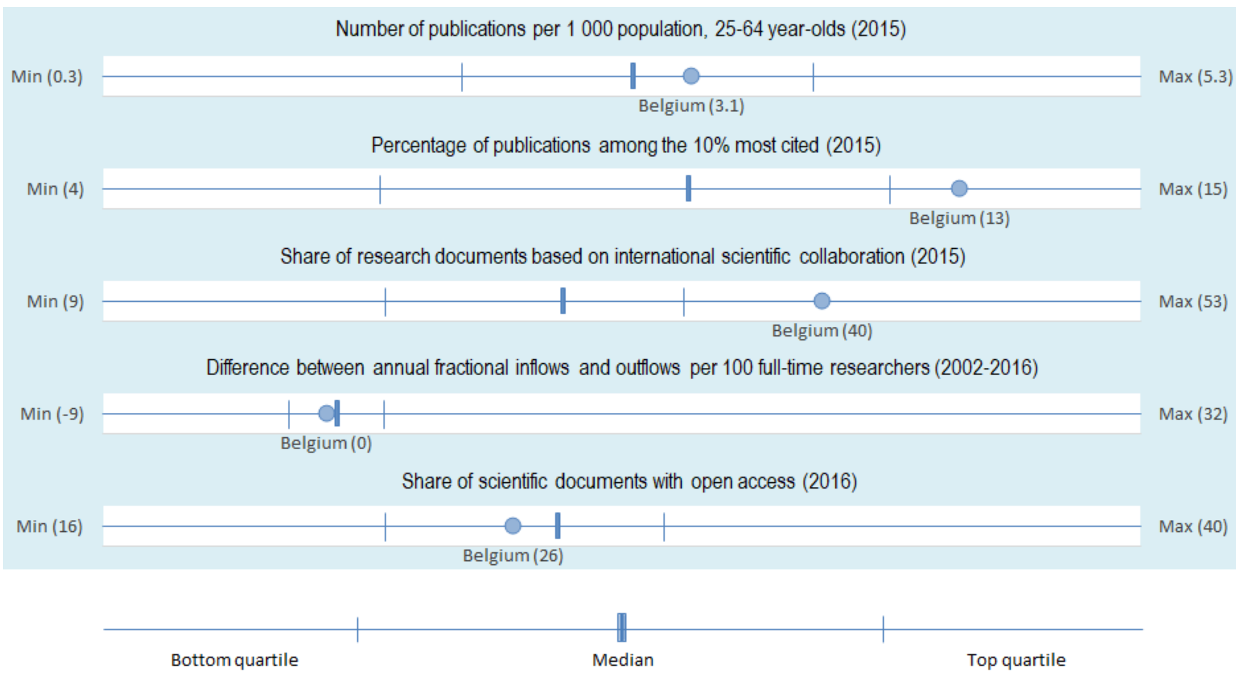
Bibliometric indicators are increasingly used to provide comparative assessments of the output and impact of research and development activities (OECD and SCImago Research Group (CSIC), 2015[11]). While bibliometric data cannot easily be divided between sectors of research performance, the majority of scientific papers published in journals originate from academic authors (Johnson, Watkinson and Mabe, 2018[12]).

In 2016, Belgium produced more than 3.1 scientific publications per 1 000 inhabitants, which is above the OECD median (2.8 publications per 1 000 people). Belgium also demonstrated high performance on the impact of research, as measured by citations of scientific publications in other research papers. In 2016, 13% of scientific publications in Belgium were among the top 10% of most cited publications listed on the SCOPUS database (a large database of scientific publications), a proportion which puts Belgium in the top quartile of OECD countries (Figure 10.14).

While data from the SCOPUS database are not available for Flanders, the available information suggests that performance in the quantity and quality of scientific output in Flanders is on a par with or exceeds the national performance of Belgium. In 2014, Flanders produced almost three-quarters of the total volume of scientific production of Belgium.[5]

Flanders has also been successful in substantially growing its volume of scientific output. In 2015, Flanders produced 2.5 scientific publications per 1000 inhabitants,[6] an increase from a level of 1.6 publications per 1000 inhabitants in 2007 (Department of Economy, Science and Innovation, 2017[7]).

Figure 10.14. Where does the Flemish Community stand in the OECD distribution? Internationalisation and knowledge production



Note: The indicators represented in this chart are a subset of the indicators presented in Table 10.1. The coloured circle represents the Flemish Community's position in the OECD distribution. The circle is not coloured when data are available for less than half of the OECD countries (the minimum number of countries with available data is 14). For more information on methodological issues and metadata, see OECD (2019[2]) and the references cited therein. Follow the *Statlink* to download the data underlying the calculation of the scorecard.
Source: Adapted from OECD (2019[2]), *Benchmarking Higher Education System Performance*, https://doi.org/10.1787/be5514d7-en.

StatLink https://doi.org/10.1787/888933942583

International scientific collaboration is increasing in Flanders

Levels of international collaboration in research and development, along with mobility of talent, can provide an indication of the ability of research systems to participate in global research and innovation networks (OECD, 2019[2]).

In 2016, 16% of 25-64 year-old doctorate holders in Flanders are foreign citizens. This share was in the top quartile of the OECD distribution.

In addition, around two-thirds of publications produced in Flanders were publications with international collaboration (i.e. publications with at least one foreign co-author) in

2014, a proportion in line with the national average in Belgium (66%).[4] This represents an increase of more than 12 percentage points on the proportion of publications produced in Flanders with international collaboration since 2005.

Using the benchmarking indicator on international collaboration (the percentage of domestically authored documents involving some collaboration with researchers in other countries), Belgium scores in the top quartile of OECD countries, with almost 40% of publications in 2015 involving some foreign collaboration (based on fractional counts[7]).

Belgium has one of the higher rates of "brain circulation" in OECD countries, as measured by flows of scientific authors between jurisdictions. Net inflows and outflows were at similar levels in 2016 (around 9% and 8% of all scientific authors respectively), implying a very slight net "brain gain" for Belgium, though at a level below the OECD median.

The share of patent applications from the higher education sector in Belgium is in line with the OECD median

Patent application statistics are one way to measure innovative activity. The proportion of Patent Co-operation Treaty (PCT) published patent applications in Belgium that originated in the higher education sector in 2016 was the same as the OECD median, at 6%. This is above neighbouring France, Germany and the Netherlands (between 2% and 3%), and just below Denmark. The share of patent applications from the higher education sector is an indicator of the structure of the national innovation system, and it does not necessarily reflect higher education research productivity. For example, a low share of patents from higher education in a country may indicate the presence of an innovative private sector with strong patenting activity.

Regional data indicate that Flanders is responsible for the greater portion of patents coming from Belgium. In 2014, just under 65% of PCT patent applications in Belgium originated with a Flemish requester or inventor. However, the overall numbers of patents filed have decreased slightly in recent years (from 1 320 in 2012 to 1 169 in 2014). Furthermore, national data indicate that the proportion of patent applications to the European Patents Office originating from the higher education sector in Flanders has also been in decline, from almost 14% in 2012 to 10% in 2014.[8]

The Flemish Community has been working to strengthen higher education research capacity. This includes capacity to transfer knowledge for innovation through increasing the overall levels of investment in the system, and through specific funding incentives such as Industrial Research Funds (IOF), which are available to institutions that engage in technology transfer activities (see Chapter 6 of (OECD, 2019[2])).

Belgium has a level of open access to scientific publications in line with the median for OECD countries

National governments are increasingly recognising the value of open science, including open data as a way of ensuring that the knowledge produced in the higher education sector achieves broader public benefit (see Chapter 7 of (OECD, 2019[2])). Open access also makes up one of the six priority areas of the European Union's Responsible Research and Innovation initiative, part of the Horizon 2020 programme.

In 2016, Belgium had a similar proportion of scientific documents available with at least some form of open access as the median level in the OECD, approximately one-quarter of all publications (based on a random sample of 100 000 documents available in the

SCOPUS database). In the Flemish Community, as part of the Work, Economy, Science and Innovation 2014-2019 Strategy, Flemish universities have been encouraged by the government to develop a consistent open access and open data policy (Flemish Ministry for Work, Economy, Innovation and Sport, 2014[13]).

10.5. Scenarios for policy

This section of the note extends the comparisons drawn in the previous sections by looking forward, and presents a set of scenarios for the future of the Flemish Community's higher education system. The purpose of these scenarios is to provide evidence-based conjectures about future trends in areas of national policy importance, which can stimulate debate and support policy-planning exercises (Box 9.1).

Box 10.2. Scenario development for policy analysis

Governments plan for the future of higher education in the context of a number of sources of uncertainty. Scenarios can be defined as descriptions of hypothetical futures that could occur and that, although somewhat speculative in nature, are nonetheless internally consistent and causally coherent (OECD, 2006[14]). The development of scenarios can provide support to national discussions on contextual and systemic trends, highlight possible consequences of current circumstances on higher education and the economy, and outline the main available policy directions.

In a context of increasing complexity in societies and economies, more emphasis is being placed on anticipatory exercises in the policy process (OECD, 2015[15]). Contemplating different policy scenarios can feed into the development of broad long-term strategic planning for higher education systems or pre-policy research related to particular policy topics.

Short and medium-term scenarios are likely to be more accurate and useful to the decision-making process of policymakers. The scenario exercise presented in Section 5.1 therefore focuses on the immediate decade ahead (i.e. up to 2030), and is developed using the following steps:

- statement of a subject area or issue of national policy concern and the rationale for the concern
- outline of the assumptions used to develop the set of future scenarios
- explanation of the likely impact of the assumptions on future trends
- discussion of implications for policy.

10.5.1. Higher education expenditure has not been growing at the same pace as the number of students

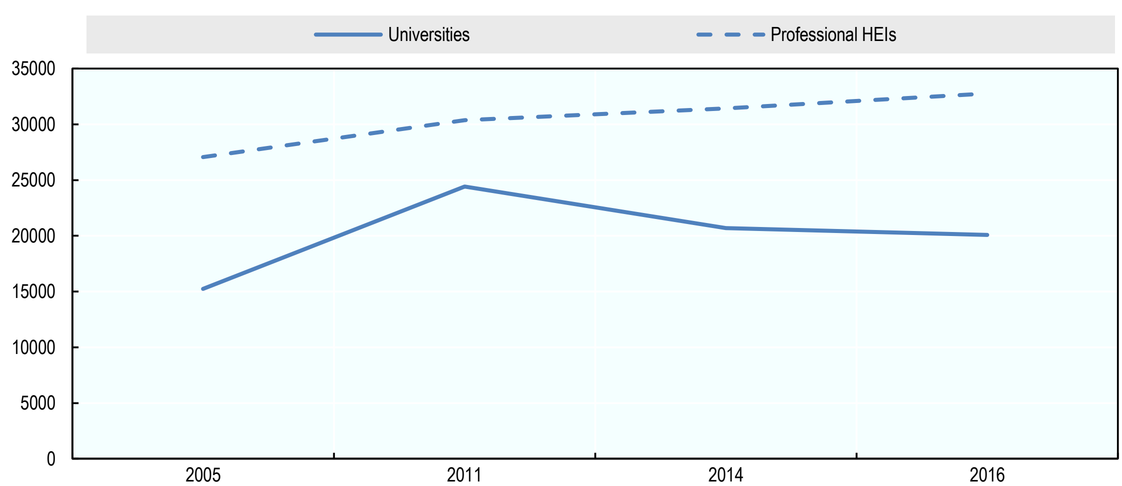
Summary of policy concern

Funding per student decreased by 7% in the Flemish Community between 2008 and 2015 (although it has partly recovered since then), while increasing in most OECD countries. Total expenditure on higher education institutions increased in the Flemish Community during this period, but not at the same pace as the number of students. The salaries of academic staff tend to increase over time. Decreasing expenditure per student typically implies that student-staff ratios are rising, or the salaries of academic staff relative to other highly trained workers is decreasing. To maintain current instructional practices and ensure the attractiveness of higher education for highly qualified staff, the Flemish Community may need to consider options for maintaining or increasing funding per student in higher education.

10.5.2. Rationale

The Flemish higher education system experienced a substantial increase in the number of students in the last decade. The numbers of new entrants to bachelor's programmes in professional HEIs increased by over 20% between 2005 and 2016 (Figure 10.15). In universities, new entrants have increased by almost one-third in the same period, although the increase has levelled off since 2011.

Figure 10.15. New entrants to bachelor's programmes, by subsector (2005-2016)



Source: Adapted from data provided by the Flemish Ministry of Education and Training.

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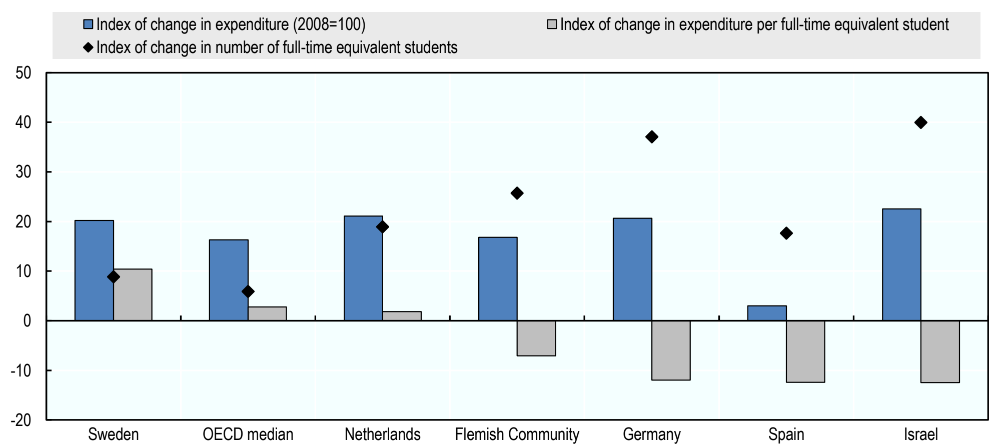
Rising student numbers can pose some challenges to governments trying to maintain a stable level of higher education funding. In the Flemish Community, expenditure on higher education institutions increased by 17% between 2008 and 2015. Despite this increase in total spending, expenditure per student decreased by 7% in the same period due to the rapid growth in student numbers, which increased by around 25% (Figure 10.16). A similar situation is also occurring in some other OECD countries. For example, in Germany, Israel and Spain, the growth in higher education funding was substantially smaller than the growth in student numbers. By contrast, in the Netherlands, enrolment growth was matched by a nearly proportional increase in the funding available to higher education institutions, resulting in a modest increase in overall expenditure per student.

Figure 10.16. Change in the number of students and the amount of expenditure in higher education in selected OECD countries (2008 and 2015)

Index of change (GDP deflator 2008 = 100, constant prices)



Source: Adapted from OECD (2018[3]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en; data provided by the Flemish Ministry of Education and Training.

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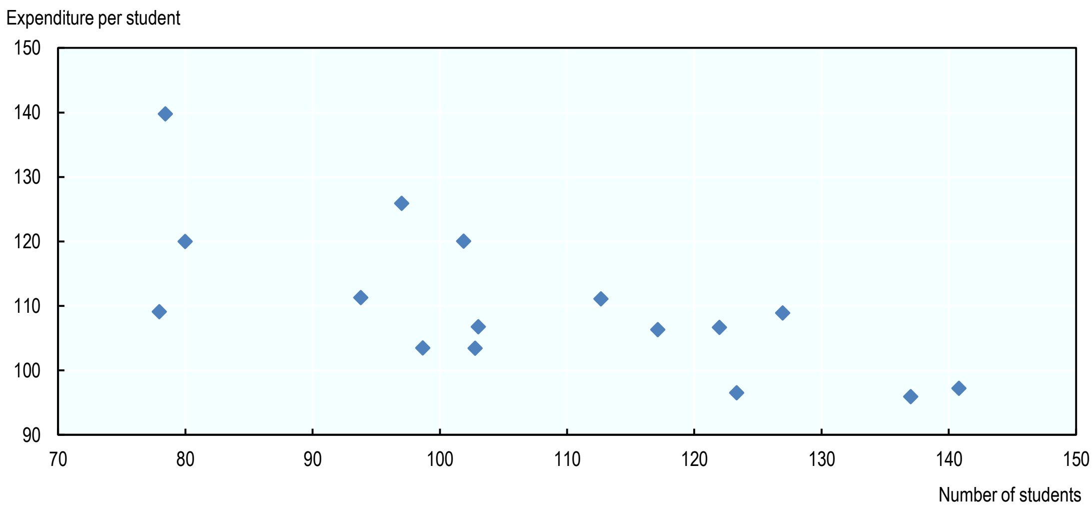
Projected growth in the younger population in Belgium in the coming years implies that demand for higher education could continue to rise (Eurostat, 2019[16]), creating additional funding pressure. A decrease in funding per student implies increasing pressure on the resources available to hire staff, carry out research and educate students. In the absence of successful efforts to improve efficiency, this can result in a reduction in quality of teaching, learning and research over time.

Depending on how changes in funding and student numbers are distributed throughout the higher education system, individual institutions can be impacted in different ways. The decrease in expenditure per student has been particularly sharp in those higher education institutions where student numbers grew more rapidly (Figure 10.17). The negative relationship between the change in expenditure per student and student number growth at the institutional level is due, at least in part, to public funding in the Flemish higher education system adjusting to student numbers over the course of a few years. Nonetheless, it illustrates the difficulty in promptly matching the rapid increase in student numbers with a corresponding increase in financial resources.

Figure 10.17. Number of students and expenditure per student in Flemish higher education institutions (2015)

2011 = 100



Note: Data are shown for 16 of the 17 Flemish institutions with available, validated data.
Source: European Tertiary Education Register (ETER) (2019[4]), *ETER Database*, www.eter-project.com/.

StatLink https://doi.org/10.1787/888933942640

10.5.3. Scenarios for the Flemish Community up to 2025

Managing funding requirements and planning for financial stability and sustainability in diverse higher education systems is a challenge many OECD governments face. Stable and efficient investment in higher education is required to ensure that higher education systems can continue to make progress in providing accessible high quality education (OECD, 2017[17]). Table 10.5 outlines a set of assumptions used to create scenarios for the possible evolution of higher education expenditure per student in the Flemish Community covering the period 2015 to 2025. These assumptions are based on:

- trends and levels of expenditure on higher education institutions per student in the Flemish Community and in OECD countries
- the share of expenditure on higher education institutions by source of funding.

The basis for the formulation of the assumptions is the observed recent trends in higher education per student expenditure in the Flemish Community and in the top quartile of OECD countries. In 2008, the Flemish Community spent over USD 20 000 per student, in the top quartile of OECD countries. However, the decline in expenditure per student in the Flemish Community, and the concomitant increase in other OECD countries meant that by 2015, the relative position of the Flemish Community had deteriorated compared to the other OECD countries in the top quartile.

The baseline scenario assumes that real (i.e., inflation-adjusted) expenditure per student in the Flemish Community remains constant at its 2015 level in the near future. This is a conservative assumption, as the most recent government data show that expenditure per student increased by 3% between 2015 and 2016 (in combination with a stable number of students). In 2017, the government granted some additional funding based on the number of students, helping expenditure to keep the pace with the number of students.

However, the assumption of a constant level of expenditure per student in the Flemish Community is justified when looking at the broader international situation. Across the OECD area, the presence of competing public priorities makes it difficult to increase higher education expenditure per student based on government funding while facing increasing student numbers (OECD, 2017[17]; OECD, 2008[18]). Therefore, a baseline assumption of constant public funding stresses the potential challenges for the Flemish government in substantially increasing expenditure per student in the future, given the current level of private funding.

Other scenarios are based on the assumption that the Flemish Community could work to bring the level of expenditure from private sources in line with the current levels in the top quartile of the OECD distribution by 2025. Therefore, the results of our scenario calculations are based on the observed current performance of actual countries, and aim to answer the question: "where would the Flemish higher education system stand if it were able to reach spending targets already observed in other countries?".

Under the "household expenditure growth" scenario, household expenditure per student in the Flemish Community increases by about USD 2 300 until the current (2015) top quartile of the OECD distribution by 2025. In the "non-household private expenditure growth" scenario, other private expenditure increases by about USD 900, again reaching the top OECD quartile. Expenditure from governmental and international sources is assumed to remain in the top quartile of OECD countries (Table 10.5).

In 2015, countries close to the starting point of the OECD top quartile of household expenditure per student (within a range of ±USD 500) were Italy, the Netherlands, Spain and Portugal; countries close to the starting point of the OECD top quartile of non-household private expenditure per student were Australia, Estonia, France, Israel, Korea and the Netherlands.[9]

To show how the Flemish position within the OECD could change across different scenarios, for this exercise, the overall OECD top quartile and median points are assumed to grow at the same pace as during the period from 2008-2015. This implies that the OECD median is projected to stand at about USD 14 000 in 2025, while countries in the top OECD quartile are assumed to spend about USD 22 000 or more per student.

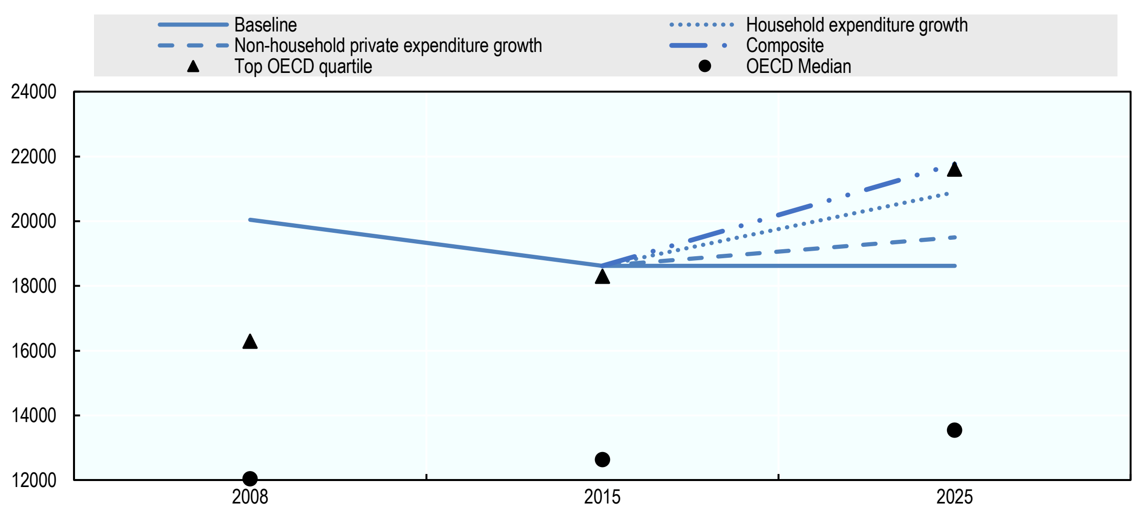
By remaining constant at around USD 19 000, the level of expenditure of the Flemish Community in the baseline scenario would be between the OECD median and the top quartile by 2025 (Figure 10.18). In 2015, countries close to the median level of expenditure per student (within a range of ±USD 1 000) were Estonia, Iceland, Spain and Portugal; countries close to the starting point of the OECD top quartile were Belgium, Finland, Japan and the Netherlands.

Table 10.5. Assumptions for the calculations of expenditure scenarios

	Expenditure per student from government sources	Expenditure per student from international sources	Expenditure per student from households	Expenditure per student from other private sources
Baseline	Remains constant between 2015 and 2025 in real terms	Remains constant between 2015 and 2025 in real terms	Remains constant between 2015 and 2025 in real terms	Remains constant between 2015 and 2025 in real terms
Household expenditure growth scenario	Same as in the baseline scenario	Same as in the baseline scenario	Reaches by 2025 the top quartile of OECD countries in 2015	Same as in the baseline scenario
Non-household private expenditure growth scenario	Same as in the baseline scenario	Same as in the baseline scenario	Same as in the baseline scenario	Reaches by 2025 the top quartile of OECD countries in 2015
Composite scenario	Same as in the baseline scenario	Same as in the baseline scenario	Same as in the household expenditure growth scenario	Same as in the non-household private expenditure growth scenario
Top OECD quartile, 2025	Determined by extrapolating the annualised rate of growth during 2008-2015 of the starting point of the top OECD quartile, over the period 2015-2025			
OECD median, 2025	Determined by extrapolating the annualised rate of growth during 2008-2015 of the OECD median, over the period 2015-2025			

Note: All monetary amounts are expressed in PPP USD at the price level of 2015. The starting point of the top OECD quartile is the lowest amount belonging to the top quartile.

Figure 10.18. Higher education expenditure per student in the Flemish Community: four possible scenarios



Note: The assumptions underlying these calculations are reported in Table 10.5.
Source: Adapted from data provided by the Flemish Ministry of Education and Training.

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The future impacts of the assumptions outlined in Table 10.5 on expenditure per student are reported in Figure 10.18. In the household growth scenario, expenditure per student in the Flemish Community would increase by over USD 2 000 above the baseline scenario by 2025. In the non-household expenditure growth scenario, it would increase by almost USD 1 000 as compared to the baseline. In the composite scenario, where expenditure from both private sources increases, overall expenditure per student in Flemish higher education institutions matches the OECD top quartile, i.e. the Flemish Community maintains its position within the OECD distribution into the future.

Based on these assumptions, it is clear that neither an increase in household expenditure alone, nor an increase in other private expenditure will suffice to maintain higher education expenditure levels near the projected top quartile among OECD countries. Only in the "composite" scenario, which assumes that the positive changes of other scenarios occur together, does expenditure per student remain at its current relative position in the OECD distribution.

10.5.4. Implications for policy

Increases in student-to-academic staff ratios and falling academic staff wages relative to other skilled labour pose risks to the quality of teaching and research. The following subsections outline some policy options for the Flemish Community to increase expenditure per student in the coming years.

The baseline scenario: stabilising expenditure per student in higher education

The baseline scenario assumes that expenditure per student remains constant between 2015 and 2025. This means that, compared to the period 2008-2015 (when expenditure per student decreased), the government has to provide additional financial resources or the increase in the number of students must be more moderate.

If student demand continues to increase, the Flemish government could consider options to reduce the amount of time that students spend in higher education. This would reduce the number of students, without decreasing the rate of access to higher education.

In the Flemish Community, 38% of those who entered a full-time bachelor's programme in 2008 with a degree contract (i.e. intending to graduate) graduated on time (Section 10.3.1). The others graduated within three additional years (34%), left higher education without completing (22%), or were still enrolled (but had not graduated) three years after the expected graduation time (5%) (see Chapter 5 of (OECD, 2019[2])). A variety of factors can influence timely completion. Some students may choose a study programme not in line with their expectations or their previous knowledge, and consequently either not graduate or change study programmes. In some cases, students or institutions may lack the financial incentives to progress until completion of the degree.

The Netherlands have had a similar problem of low timely completion, and introduced a number of policy measures to tackle this issue. The first three measures in Table 10.6 (study checks, online self-assessment tests, and the study choice web tool) aim at better aligning student skills, prior knowledge and expectations with the programme they choose. The Flemish Community is already starting to implement some similar measures. For example, students are being encouraged or required to take some non-binding tests assessing their overall motivation, interests, skills and (for teacher education and civil engineering) their subject-specific competencies. The Flemish Community is also introducing some forms of binding study advice. This means that, under certain conditions, institutions can refuse to keep students enrolled if they do not make the necessary study progress.

The final two measures reported in Table 10.6 ensure that students and institutions do not have financial incentives to delay graduation. In the Netherlands, students receive public financial support only for the nominal duration of the programme (for means-tested grants) or for additional three years (for loans). Institutions receive financial resources through the block grant formula funding for each student enrolled, except if they have been enrolled longer than the nominal study duration (see Chapter 5 of (OECD, 2019[2])).

In the Flemish Community, the principle of a tighter link between public subsidies and the expected study progress can inspire policy measures to increase timely completion. For some categories of students, an implicit link already exists. Formula funding for students enrolled in single modules (credit contracts), for example, is given to higher education institutions only based on the completion of the modules.

Table 10.6. Policies to improve timely study completion, the Netherlands (2017)

Study checks	Higher education institutions are required to offer students a non-binding "study check" on demand, assessing the match between the programme and the student competencies and expectations (e.g. self-assessment tests, evaluation of motivation letters, or intake interviews)
Online self-assessment test	Prospective students are required to take a non-binding online self-assessment test
Study Choice 123 (Studiekeuze 123)	Government-funded web-based tool providing information for each higher education programme, including labour market prospects, and results from the national student satisfaction survey
Binding study advice	Institutions can provide students with binding study advice at the end of the first year that results in their expulsion from a programme if they have not made sufficient progress
Time-limited financial support	Students who qualify for means-tested grants can receive them only for the expected duration of the programme
Formula funding indicators	Funding formula excludes students who have been enrolled longer than the nominal study duration

Source: Adapted from information provided by the Dutch Ministry of Education, Culture and Science.

Achieving the "household expenditure growth" scenario

A generalised increase in tuition fees

Household expenditure on higher education institutions consists of tuition and other fees paid by students for services offered by higher education institutions. A substantial increase in this source of funding would therefore imply an increase in tuition fees. Increasing tuition fees can find some justification in contexts where there are strong private returns on the acquisition of higher education (OECD, 2008[18]). Most OECD jurisdictions have implemented some changes in the level or structure of tuition fees over the past decade. This includes the Flemish Community, where the annual fees for a full-time bachelor's or master's student paying full tuition increased by EUR 270 between 2015 and 2016 (OECD, 2018[19]).

For most countries with available data, tuition fees have increased in the past 10 years, sometimes substantially. This has not resulted in a visible decrease in the enrolment rates of 18-24 year-olds (Table 10.7). Even in England, where tuition fees in bachelor's programmes rose nine-fold between 1998 and 2013, the increase in student contributions did not lead to a lower participation in higher education, neither in general nor for students from lower socio-economic backgrounds (Geven, 2015[20]; Murphy, Scott-Clayton and Wyness, 2017[21]; Azmat and Simion, 2017[22]).

Table 10.7. Average annual tuition fees in bachelor's programmes (2016)

In brackets: enrolment rate to bachelor's programmes in 2016 for 18-24 year-olds, 2006=100

Australia	Austria	Canada	England (UK)	Italy	Japan	Latvia	Luxembourg	Netherlands	New Zealand	United States
117 (124)	83 (338)	123	415 (108)	113	108	65	75	115 (103)	121 (104)	120 (96)

Notes: The enrolment rate excludes international students. For England, the enrolment rate refers to all higher education and to all of the United Kingdom. For the United States, it is reported the entry rate for all higher education.
Source: Adapted from OECD (2018[3]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en; OECD (2018[19]), *Education at a Glance 2018: OECD Indicators*, https://doi.org/10.1787/eag-2018-en.

The effect of an increase in tuition fees on participation partly depends on the financial student support mechanisms in place. If students have access to financial resources to pay for their education and living costs, either through grants and scholarships or through loans, then the enrolment impact of raising tuition fees may be minimal or absent. Research indicates that income-contingent loans have succeeded in removing financial barriers to participation while avoiding the burden of debt if students are not successful in the labour market (Chapman, 2016[23]). One option for the Flemish Community to increase household expenditure on higher education would be to increase tuition fees and provide public or government guaranteed income-contingent loans (OECD, 2017[24]). In the Netherlands, the government coupled the introduction of a student support system based on income-contingent loans with a legal commitment to spend the additional resources (derived through the repayment of the loan) on higher education.

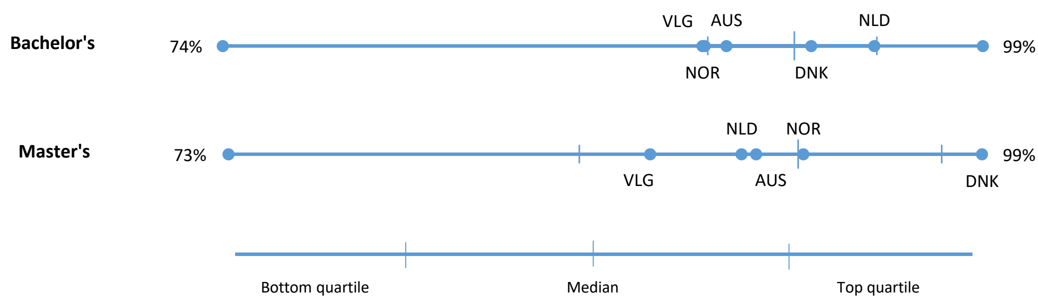
The Flemish Community has both a relatively high entry rate to higher education and a relatively small gap in higher education access between young people without higher educated parents and other people (compared to other OECD countries). This is an important accomplishment and relative strength of the Flemish higher education system, and it is an important consideration when planning additional household contributions.

The "one bachelor's, one master's" policy

An alternative option to increase household expenditure could be to increase tuition fees for those who have already obtained their first degree. This policy, sometimes called the "one bachelor's, one master's" policy, is used with some exceptions in the Netherlands and Estonia. It implies that, for example, a person who already has a bachelor's degree pays a higher fee when enrolling in a bachelor's programme than a person without a bachelor's degree.

A "one bachelor's, one master's" policy would permit an increase in the tuition fees without decreasing first-time access to higher education. In the Flemish Community, 10% of bachelor's graduates are not first-time graduates, indicating that they already obtained a bachelor's degree. This is among the largest shares among OECD countries. By comparison, this share is only 4% in the Netherlands, in the top quartile of OECD countries. The share of graduates who are not first-time graduates is 13% at the master's level for the Flemish Community, larger than at the bachelor's level and also larger than the OECD median (Figure 10.19).

Figure 10.19. First-time graduates as a share of all graduates, by higher education level (2016)



Note: AUS = Australia; DNK = Denmark; NLD = Netherlands; NOR = Norway; VLG = Flemish Community.
Source: Adapted from OECD (2018[3]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en.

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A "one bachelor's, one master's" policy could potentially raise a substantial amount in tuition fees, although it would be unlikely, on its own, to realise the expenditure gains estimated in the "household expenditure growth" scenario. The combined share of graduates who were not first-time graduates in 2016 at the bachelor's and master's level was 11% in the Flemish Community. Under the assumption that the share of "second-time students" (i.e. students studying at a level at which they already obtained a degree) is in line with that of graduates, this is the maximum share of students for whom higher fees would apply (if all students would remain enrolled despite the higher fees). Assuming these 11% of students were charged at the full cost of their education (proxied by the average expenditure per student, excluding R&D), instead of the average tuition fees in 2015, this could yield an increase in household expenditure of about USD 1 200. This estimate, while suffering from a number of limitations,[10] can put into perspective the financial gain that a "one master's, one bachelor's" policy can yield.

Higher tuition fees for second-time students risk decreasing the incentives for graduates to enrol in higher education, even in cases in which the economy and society could benefit from them obtaining a second degree. A partial solution to this problem could be to lift the "one bachelor's, one master's" rule in some circumstances. In both Estonia and the Netherlands, exceptions to the general rule that second-time students pay higher tuition fees exist. In both countries, students in the fields of study of education and health and welfare pay the regular tuition fee regardless of having earned a degree at the same level of education. In addition, in Estonia, second-time students do not pay higher tuition fees if they start the programme after a certain period (three times the nominal duration of the programme) has passed since they earned their last degree. For example, a bachelor's graduate in Estonia can enrol in a bachelor's programme without paying tuition fees after 9 years from the date of graduation (see Chapter 5 of (OECD, 2019[2])).

A second solution would be to provide short, subsidised courses for which second-time students are eligible where there is a strong demand from the labour market. For example, in Ireland the Springboard+ upskilling initiative in higher education provides free vocational courses related to enterprise sectors with well-defined skills needs and growing employment. Courses are usually free or subsidised, part-time and a maximum of 12 months. Employed, self-employed and unemployed people are all eligible, but they may be offered study places under different conditions (Irish Higher Education Authority, 2019[25]).

Achieving the "non-household private expenditure growth" scenario

The Flemish Community has potential to bring the level of non-household private expenditure per student in line with the top OECD quartile. Available evidence shows a high level of collaboration between the private sector and Flemish higher education institutions, relative to other OECD countries. Flemish universities have the highest share of current revenues earned through third party private funding among European OECD countries (Section 10.5.1). While data are not available for the Flemish Community, Belgium has the third-largest share of higher education R&D expenditure funded by the private business sector. In addition, Belgium ranks in the top OECD quartile of the share of both small-medium and large businesses collaborating on innovation with higher education or research institutions (Section 10.4.2).

The high level of collaboration between Flemish higher education institutions and private businesses could be related, in part, to a number of policies set up by the Flemish government (Section 10.4.2). A part of the government Industrial Research Fund (IOF) for universities is distributed based on indicators such as revenue from licencing institutional intellectual property, and the number of patents and spin-off companies established by the higher education institution. This provides incentives to universities to deploy their research in ways that can potentially generate revenues.

In addition, a part of this fund is earmarked for the establishment of technology transfer offices (TTOs), interface structures facilitating the transfer of knowledge from universities to industry and the wider society. The yearly report on the utilisation of the Industrial Research Fund and the government evaluation occurring every five years provide tools to verify that this fund is sufficiently effective in stimulating technology transfer and co-operation between higher education and the business sector. An effective co-operation between university and the business sector can stimulate R&D fundraising (see Chapter 7 of (OECD, 2019[2])).

Despite the high levels of collaboration with business and of third party private funding in universities, the available data show that the Flemish Community has an overall share of non-household private expenditure just in line with the OECD median. A way to increase the overall share of non-household private expenditure could be to stimulate the generation of additional private revenue outside the university-business R&D collaboration, e.g. in the professional HEI sector and through education activities.

Non-household private funding for education activities

Across OECD countries, there are many examples of partnerships between higher education institutions and the private sector for the provision of educational activities, which can deliver financial benefits for the higher education sector. These partnerships mostly develop out of joint interests between higher education and the private sector. The government can encourage and provide platforms for interaction between higher education institutions and the private sector, so that opportunities for collaboration are more likely to develop (see Chapter 3 of (OECD, 2019[2])).

For example, in Estonia, the government launched the IT Academy, a partnership with higher education institutions and businesses in the IT sector, with the purpose of ensuring the necessary skilled workforce for the IT sector. Through a mixture of public and private funds, the IT Academy promotes a range of initiatives in research and training, including scholarships for students in the ICT field of study and grants to institutions to develop ICT curricula.

The Netherlands also offers some examples of stimulating collaboration between higher education institutions and employers. For example, the Dutch government started a pilot project in 2016 to provide focused study activities in the fields of ICT and health and welfare without direct public contributions. The government provides vouchers to students to cover part of the tuition fees, and employers are expected to cover part of the cost as well.

In 2016 in the Netherlands, some 2% of students in professional HEIs were enrolled in dual programmes, i.e. programmes where the training is provided jointly by the higher education institution and by a company employing the student. Establishing partnerships with public and private employers for salaried training periods integrated in higher education programmes is also a goal of the European Association of Institutions in Higher Education (EURASHE, 2010[26]). These types of programmes, even if they do not involve large proportions of students, stimulate co-operation between higher education institutions and the private sector, which can lead to co-funding of some education activities.

Private research funding outside universities

Research in professional HEIs is generally connected with their mission to provide vocational and professionally oriented education and promote regional development (EURASHE, 2010[26]; Lepori and Kyvik, 2010[27]). This makes R&D in professional HEIs suitable for collaboration with stakeholders, such as small and medium enterprises, local government, and other organisations involved in the regional economy.

The Netherlands has been actively encouraging the creation of organisational structures separate from universities and professional HEIs to foster their collaboration with private and public organisations for the provision of research and education. For example, through the Valorisation Programme, a budget of EUR 63 million was allocated by the government for the creation of public-private consortia centred on one or more higher education institutions. The consortia carry out initiatives to apply research and knowledge to boost productivity and help address social problems. These initiatives are funded by the government for up to 50% of their cost and by other partners for the rest. The objective is that the consortia continue their activities after the initial government budget is exhausted, stimulating cost sharing between universities, professional higher education institutions and other partners.

The Centres of Expertise (CoE) are organisations established in co-operation between professional HEIs and other private or public partners. CoEs carry out applied research and provide education in the form of practice-oriented research projects. Centres of Expertise receive public funding, for example through competitive grants awarded for their establishment, but are expected to raise substantial funding from the private sector as well. The Flemish Community could also consider encouraging the development of partnerships between professional HEIs and public and private stakeholders, which could take a variety of organisational forms. They could receive some public funding when established, but additional public funding would be conditional on successful fundraising in the private sector (see Chapter 7 of (OECD, 2019[2])).

Notes

[1] A wider discussion of the topics covered in this note, as well as many other topics spanning the resourcing, missions and performance of higher education can be found in the synthesis report for the project (OECD, 2019[2]).

[2] Data for the Flemish Community refer to students who were not enrolled in either bachelor's or master's degrees or equivalent programmes. They could still be enrolled at other levels.

[3] Adults performing at level 3 in the literacy proficiency scale can understand and respond appropriately to dense or lengthy texts. They understand text structures and rhetorical devices and can identify, interpret, or evaluate one or more pieces of information and make appropriate inferences. They can also perform multi-step operations and select relevant data from competing information in order to identify and formulate responses.

Adults at level 3 of the numeracy scale can successfully complete tasks that require an understanding of mathematical information that may not be explicit and may be embedded in contexts that are not familiar. They can perform tasks requiring several steps and that may involve a choice of problem-solving strategies and relevant processes. They can interpret and perform basic analyses of data and statistics in texts, tables and graphs.

[4] The shares of basic research, applied research and experimental development have changed dramatically for Belgium over the last few years, possibly following changes in the underlying definitions and classifications. For example, the share of applied research in higher education R&D expenditure passed from 33% to 74% between 2013 and 2014, while the share of basic research passed from 46% to 19%. Despite these changes, Belgium remained below the OECD median of the share of basic research in higher education R&D expenditure throughout the period 2012-2015.

[5] *Source*: Data provided by the Flemish Community of Belgium to the OECD and based on the Thomson-Reuters database (a large database of scientific publications).

[6] Data for Flanders on research productivity are relative to all population, using the Thomson-Reuters database, while the benchmarking indicators on scientific production are based on publications per population aged 25-64, using the SCOPUS database of scientific publications.

[7] Using "fractional counts" as a metric implies that authors from different research systems who co-author a publication are each attributed a share of that publication. This is in contrast to "whole counts" where each co-author is attributed one full publication in the statistical analysis.

[8] Data on PCT and EPO patent applications in Flanders were provided directly to the OECD by the Flemish Community of Belgium.

[9] In contrast to other jurisdictions, expenditure data for the Flemish Community exclude expenditure for independent private institutions. However, independent private institutions play a minor role in the Flemish Community, as compared to other higher education systems. For example, no Flemish independent private institution meets the requirements for inclusion in the European Register of Tertiary Education, implying that none have at least 30 full-time equivalent academic staff or 200 students (Lepori et al., 2017[28]). Therefore, the expenditure data for the Flemish Community and other jurisdictions are broadly comparable.

[10] In 2015, the annual average expenditure per student in the Flemish Community excluding R&D and ancillary expenditure amounted to around USD 11 100 in universities and 12 100 in professional HEIs (Section 2.1), which can be thought of as an upper limit to the amount that could be charged to students ("full cost"). This compares with an average level of tuition fees in 2016 for bachelor's and master's programmes which was about USD 600 (OECD, 2018[19]). The difference between the full cost and the average fee currently paid (USD 10 900, averaging the full cost

across universities and professional higher education institutions), multiplied by the assumed share of 11% of second-time students, yields USD 1 200. However, this estimate neglects at least two factors that could introduce a bias in opposite directions.

First, a large proportion (44%) of second-time students in bachelor's and master's programmes are enrolled in "advanced" bachelor's and master's programmes where they already pay a higher tuition fee. While the annual tuition fees paid by advanced bachelor's and master's students is not known on average, it could reach up to USD 2 400 for bachelor's students and up to USD 7 200 for master's students in 2018 (Flemish Ministry of Education and Training and OECD (2018[29])). This imposes an upward bias on the estimate.

Second, if the number of second-time students in education would decrease as a result of higher tuition fees, then expenditure per student in the higher education system would increase for any given level of total expenditure. Given the substantial amount of public subsidies per student, this imposes a sizeable downward bias on the estimate.

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Chapter 11. Benchmarking Higher Education System Performance: The Netherlands

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

11.1. Higher education performance in the Netherlands

11.1.1. Introduction

This country note for the Netherlands draws on the evidence base of the OECD Benchmarking Higher Education System Performance project to review the performance of the higher education system in the Netherlands. Its purpose is to assist the Netherlands in taking stock of where it stands in relation to other OECD member countries on different aspects of higher education and to provide input into future national policy planning processes.

This stocktaking exercise is supported in this note in two ways. First, a scorecard of 45 indicators is presented, which highlights the position of the Netherlands within the OECD. This scorecard draws on the evidence compiled during the benchmarking exercise and is organised into three domains: financial and human resources; education; and research and engagement. The first sections of this note contain a brief discussion of the Dutch higher education system's position within these three domains.

The final section of the note contains a scenario exercise to support policy planning. Topics chosen for scenarios in the benchmarking country notes are issues that appear to present important policy challenges and are likely to persist for the near future. Assumption choices used for the scenarios take into account recent trends in the Netherlands. Following the presentation of the scenarios, a set of policy options are examined that could be feasible responses to the challenges under discussion and consideration is given to how successful action might orient the system towards the achievement of more positive scenarios.

11.1.2. Context and structure of higher education in the Netherlands

The Netherlands is a relatively wealthy country within the OECD. Gross domestic product (GDP) per capita is higher than the OECD average, employment rates are among the highest in the OECD and public debt is relatively low. This provides a favourable context for investment in education; the Netherlands spends relatively highly on higher education as a proportion of GDP per capita. Higher education is also prioritised highly in the public budget; the proportion of public expenditure going to higher education is 20% higher than on average across the OECD. This investment in general appears to pay off; the higher education system in the Netherlands is often cited as an example of a well-performing system in all three of its key functions (education, research and engagement).

The higher education system in the Netherlands serves more than 830 000 full- and part-time students in total. The system in the Netherlands is characterised by a binary divide between two main types of institutions: research universities (*universiteiten*), which are more academically oriented, and universities of applied sciences (*hoger beroepsonderwijs* (HBO) institutions, formerly *hogescholen*), which are more professionally oriented. A number of institutions also exist outside of the binary system, such as specialist higher education institutions. The system is also largely public, with only around 15% of students enrolled in private institutions.

The Netherlands has a robust policy framework for higher education. National strategic goals and challenging policy issues are regularly reviewed, and the Netherlands has a strong history of experimentation with innovative policy solutions. The current strategic agenda for research and higher education focuses on creating excellent (world-class) education, improving course matching and student orientation, and tailoring educational offerings more to the student. Improving the social relevance of higher education is also a key goal, and the agenda emphasises, among other goals, strengthening regional collaboration and working towards making open access to all knowledge and educational materials the standard (see Chapter 2 of (OECD, 2019[1])).

11.1.3. Higher education scorecard for the Netherlands

Table 11.1 shows a summary of the relative position of the Netherlands within OECD countries according to a set of 45 indicators spanning the resourcing, education, research and engagement functions of higher education, in a scorecard format (where each box relates to one of the quartiles of the OECD distribution). These indicators are drawn from the evidence compiled during the OECD Benchmarking Higher Education Systems Performance project, in which the Netherlands participated during 2017-2018.

As can be seen from the scorecard, the Netherlands is in the top quartile of OECD countries in a number of different areas related to higher education performance. For example, employment rates for master’s graduates are among the highest in OECD countries. The Netherlands also appears to have few challenges in attracting young academic staff into the profession, with the proportion of academic staff under 35 in the top quartile of the OECD.

In addition, the Netherlands performs strongly on indicators related to research outputs and outcomes; the numbers of publications per 1 000 of the population, the extent of international collaboration and the proportions of top-cited publications are all in the top quartile of OECD countries. This reflects the high levels of research and development (R&D) expenditure as a proportion of GDP in the Netherlands and the relatively high proportion of the higher education expenditure allocated to R&D activities (the Netherlands is in the top quartile for both of these indicators).

On the other hand, there are areas of the scorecard where the Netherlands is lower in the OECD distribution. For example, the system appears to favour younger students; the proportion of new entrants older than 25 is among the smallest in the OECD. In addition, while the Netherlands has a vibrant R&D sector and one of the more internationalised higher education systems, the proportions of doctorate holders in the population and the proportions of foreign citizen doctorate holders are below OECD median levels.

A wider discussion of the topics covered in this note, as well as many other topics spanning the resourcing, missions and performance of higher education can be found in the synthesis report for the benchmarking project in (OECD, 2019[1]).

Table 11.1. Higher Education system benchmarking: The Netherlands

Selected higher education (HE) indicators and country position in the OECD distribution (by quartile). Reference year range: 2005-2017

Financial and human resources	← Low			High →
Expenditure on HE, % of GDP			■	
Public expenditure on HE, % of public expenditure			■	
Expenditure per student by HE institutions				■
Expenditure per student, 2015 relative to 2008		■		
HE R&D expenditure, % of GDP				■
Expenditure on R&D activities, %				■
Household expenditure on HE institutions per student			■	
Non-household private expenditure on HE institutions, %			■	
Expenditure per student on grants and scholarships			■	
Academic staff younger than 35, %				■
Academic staff older than 60, %		■		
Women among academic staff, %			■	
Expenditure on staff costs, %			■	
Ratio of academic staff to student			■	
Non-academic staff per 100 academic staff		▒		

Education	← Low			High →
Entry rates into bachelor's or equivalent programmes		■		
Students in master's and doctoral programmes, %		■		
*Socio-economic gap in HE access		▒		
New entrants older than 25, bachelor's programmes, %	■			
Part-time students in bachelor's programmes, %		■		
International students in master's programmes, %			■	
Completion rates of bachelor's students		▒		
Young population (23-34) with a HE qualification, %			■	
HE graduates above literacy proficiency level 3, %				■
Employment rates of master's graduates (25-34)				■
Employment premium, HE graduates (25-34)			■	
HE graduates (15-29) employed or in education, %				■
Relative earnings of bachelor's graduates (25-34)		■		
HE graduates' relative level of self-reported health			■	
HE graduates' relative level of interpersonal trust		■		

Research and Engagement	← Low			High →
FTE researchers per 1 000 population			■	
Researchers working in HE, %	■			
Women researchers in HE, %		■		
Doctorate holders in the population, %		■		
Foreign citizen doctorate holders, %		▒		
Business enterprise funding of HERD, %			■	
Higher education-business collaboration in R&D				■
SMEs collaborating on innovation, %			■	
PCT published applications from HE R&D, %	■			
HE R&D funding on basic research, %			■	
Number of publications per 1 000 population				■
Publications among the 10% most cited, %				■
International scientific collaboration				■
International net flows of scientific authors		■		
Open access of scientific documents, %				■

Note: The coloured square below each value represents the Netherlands's position in the OECD distribution, from the bottom quartile (left square) to the top quartile (right square). The square is shaded in grey (instead of black) when data are available for less than half of the OECD countries (the minimum number of countries with available data is 14). No coloured square means that data are missing for the Netherlands. For more information on methodological issues and metadata, see OECD (2019[1]) and the references cited therein. Follow the *Statlink* to download the data underlying the calculation of the scorecard.
*For the indicator 'socio-economic gap in HE access': the top quartile implies the difference between 18-24 year-olds with tertiary-educated parents and those with non-tertiary-educated parents is smaller.
Source: Adapted from OECD (2019[1]), *Benchmarking Higher Education System Performance*, https://dx.doi.org/10.1787/be5514d7-en.

StatLink https://doi.org/10.1787/888933942697

11.2. Financial and human resources

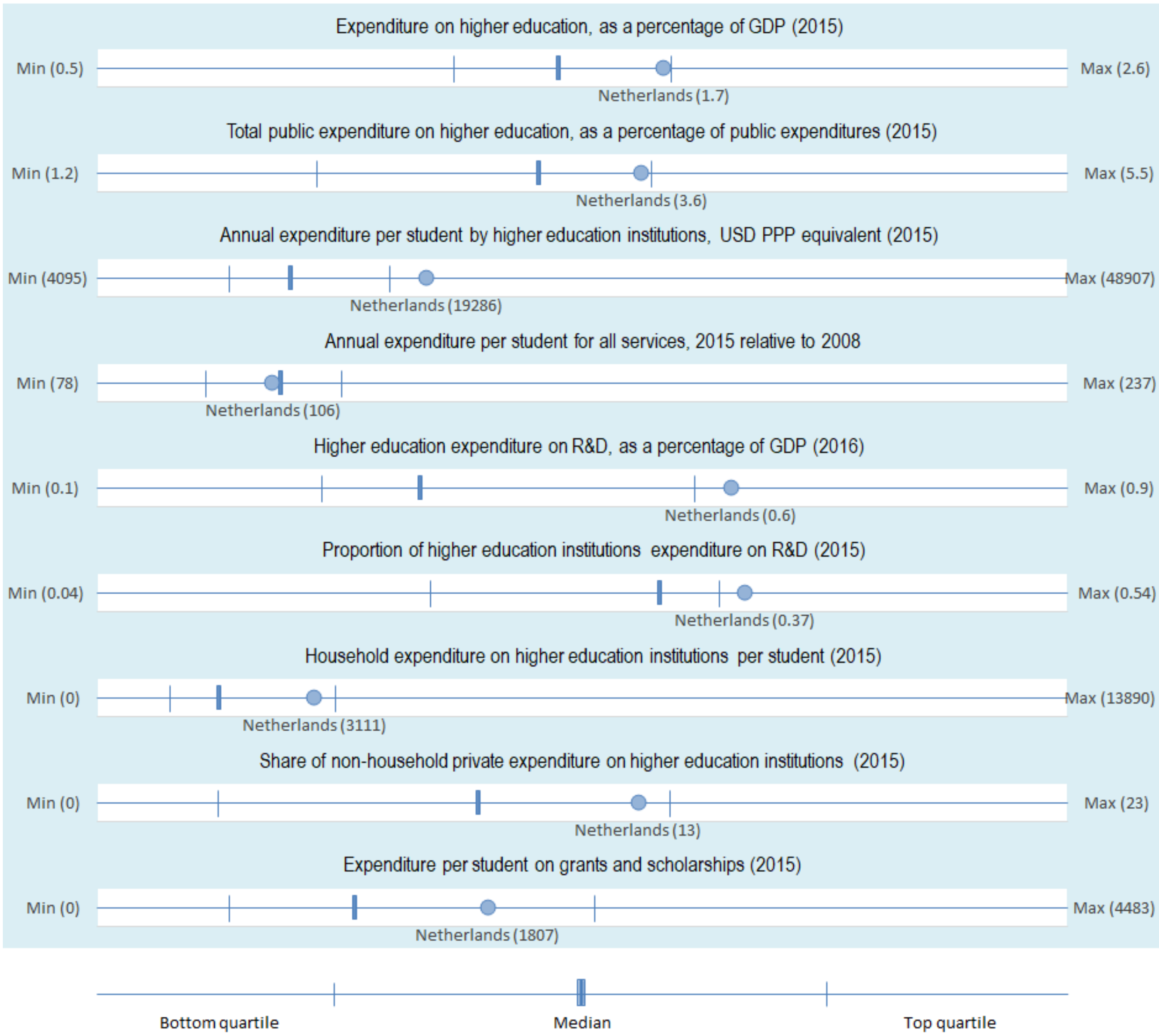
Highlights

- The Dutch higher education system (universities, universities of applied sciences and other institutions) is one of the more well-resourced among OECD countries, due to a combination of high GDP per capita and higher education expenditure as a percentage of GDP. Annual higher education expenditure per student was over USD 19 000 in 2015, placing the Netherlands in the top quartile of OECD countries.
- The share of private expenditure on higher education institutions in the Netherlands is well above the median of OECD countries. Funding from households (tuition and other fees) accounted for 16% of total expenditure in 2015, while other private sources accounted for 13% of expenditure. The government remains the biggest contributor to higher education expenditure, financing over two-thirds of the total expenditure.
- In 2015, the Netherlands was in the top quartile of OECD countries for the average combined amount of public grants, scholarships and loans received per student. A student loan system replaced a student grant system in the same year, which may increase the share of household expenditure in the future.
- Nearly 40% of higher education expenditure per student was allocated to research and development (R&D) activities in 2015, placing the Netherlands in the top quartile of OECD countries.
- The proportion of younger academic staff in the higher education system is relatively high and the proportion of older academic staff is relatively small among OECD countries.
- The share of women among academic staff increased from 35% in 2005 to 45% in 2016, one of the largest increases among OECD countries. Women were better represented in the younger age groups – reaching one-half of academic staff in the age group younger than 35 and the age group aged 35 to 44 in 2016.
- More than half of academic staff worked part-time in 2016, a similar share to the proportion of part-time workers in the population.
- Three-quarters of academic staff with teaching duties (excluding doctoral students, and including all higher education institutions) had a permanent contract in 2016, which is the highest among the four jurisdictions participating in the benchmarking exercise. However, only one-quarter of young teaching staff had a permanent contract.

11.2.1. Financial resources

Figure 11.1 shows an overview of the position of the Netherlands within the OECD distribution on the indicators related to financial resources invested in higher education.

Figure 11.1. Where does the Netherlands stand in the OECD distribution? Financial resources



Note: The indicators represented in this chart are a subset of the indicators presented in Table 11.1. The coloured circle represents the Netherlands's position in the OECD distribution. The circle is not coloured when data are available for less than half of the OECD countries (the minimum number of countries with available data is 14). For more information on methodological issues and metadata, see OECD (2019[1]) and the references cited therein. Follow the *Statlink* to download the data underlying the calculation of the scorecard.

Source: Adapted from OECD (2019[1]), *Benchmarking Higher Education System Performance*, https://dx.doi.org/10.1787/be5514d7-en.

StatLink https://doi.org/10.1787/888933942716

The Netherlands spends a relatively large amount on higher education compared to other OECD countries

The Netherlands spent the equivalent of 1.7% of its GDP on higher education institutions in 2015. This places the Netherlands well above the median of OECD countries, at a level of expenditure similar to that of Nordic countries such as Denmark, Finland, Norway and Sweden, where social services expenditure is generally highly prioritised.

On average, Dutch higher education institutions spent more than USD 19 000 per student in 2015, which is in the top quartile of OECD countries and a similar level of spending to the Flemish Community of Belgium. The Netherlands also increased average higher education expenditure per student by 6% between 2008 and 2015, a rate of increase just below the median increase across OECD countries over the same period.

Higher education expenditure per student differs between universities and universities of applied sciences (UAS). While universities spent USD 29 000 per student in 2015, UAS spent less than half that amount (Table 11.2). However, when R&D expenditure is excluded, the amount of per-student expenditure was similar across the two subsectors, with UAS spending around USD 1 000 more on average. Universities in the Netherlands spent almost USD 18 000 per student on research and development in 2015, while universities of applied sciences spent less than USD 500 per student.[1]

Table 11.2. Annual higher education expenditure per student, by subsector (2015)

In PPP USD, based on full-time equivalents

		The Flemish Community	The Netherlands
Universities	Total expenditure	24 321	29 286
	Excluding R&D	11 137	11 537
UAS	Total expenditure	12 787	12 972
	Excluding R&D	12 173	12 497

Source: Adapted from OECD (2019[1]), *Benchmarking Higher Education System Performance*, https://dx.doi.org/10.1787/be5514d7-en.

The Netherlands has a high share of expenditure from private sources among OECD countries – both household and non-household

In 2015, two-thirds of expenditure on higher education institutions came from public sources in the Netherlands. This was just below the OECD median, and lower than in Belgium and the Nordic countries (Figure 11.2).

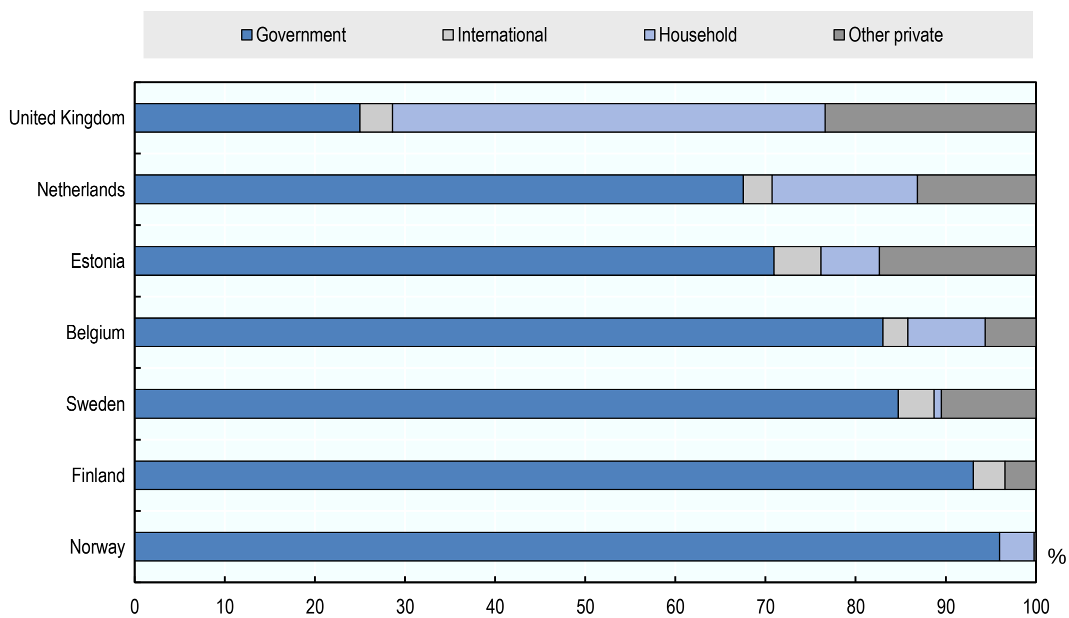
This was not due to a lack of public investment in higher education. The government spent around USD 13 000 on higher education per student in the Netherlands in 2015, a proportion which is in the top quartile of OECD countries (calculations from OECD (2018[2])). When including expenditure outside higher education institutions (e.g. expenditure on grants and loans), the Dutch government spent 4% of its total public expenditure on higher education, well above the OECD median.

Dutch higher education institutions appear to have a relatively strong ability to obtain funding from a variety of sources, compared to most other OECD countries. For example, the share of household expenditure[2] within the total expenditure was 16% in 2015. This is around the OECD median, but it is one of the higher levels among European countries. This is partly due to the cost of tuition fees in Dutch higher education, which is higher than in most neighbouring countries. The annual tuition fee for full-time bachelor's students in Dutch public institutions was around USD 2 400 in 2016, while it was around USD 400 in the French Community of Belgium, and there were no tuition fees in Denmark, Finland, Norway and Sweden (OECD, 2018[3]).

The share of household expenditure is projected to increase following the introduction of a student loan system in 2015, replacing its student grant system. The introduction of student loans is expected to generate additional financial resources of around EUR 0.9 billion per year. The government has committed to invest the totality of funding generated by replacing student grants with student loans for the improvement of higher education. For example, it is intended to hire an additional 4 000 teaching staff for the sector in order to provide more personal and intensive education (Dutch Ministry of Education Culture and Science, 2015[4]).

The share of funding from private sources excluding households was 13%, which is in the top quartile of OECD countries and is one of the largest among European countries. The large share of private sources other than households has been a feature of the Dutch higher education system since at least the late 1990s, reflecting government efforts to encourage the involvement of the private sector in higher education (OECD, 2008[5]).

Figure 11.2. Share of higher education expenditure in selected countries, by source (2015)



Source: Adapted from OECD (2018[2]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en.

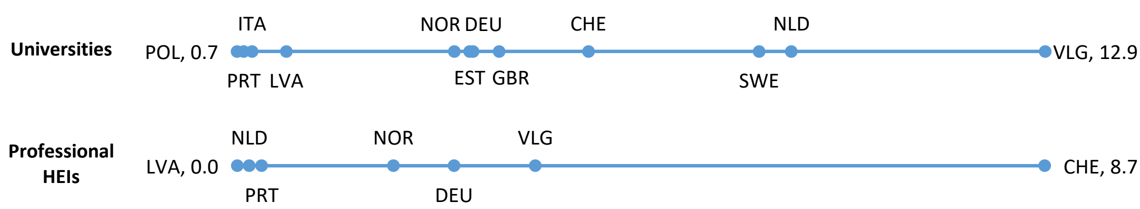
StatLink https://doi.org/10.1787/888933942735

The large amount of non-household private expenditure on higher education, relative to other OECD countries, is reflected in the ability of Dutch universities to attract funding from private partners though research and training contracts (private third party funding). Private third party funding accounted for 9% of the revenues of Dutch universities in 2015, the second-highest share among European OECD jurisdictions after the Flemish Community (Figure 11.3).

However, the share of private third party funding was just 0.2% in Dutch UAS; this is lower than in Dutch universities, but also than in higher education institutions (HEIs) in five of seven higher education systems with available data. This indicates the greater difficulty in attracting private funding in Dutch UAS compared to universities.[3]

Figure 11.3. Private third party funding in higher education, as a proportion of current revenues (2015)

By type of institution



Note: CHE = Switzerland; DEU = Germany; EST = Estonia; GBR = United Kingdom; ITA = Italy; LVA = Latvia; NLD = Netherlands; NOR = Norway; POL = Poland; PRT = Portugal; SWE = Sweden; VLG = Flemish Community.
Source: Adapted from European Register for Tertiary Education (ETER) (2019[6]), *ETER Database*, www.eter-project.com/.

StatLink https://doi.org/10.1787/888933942754

The amount of public expenditure on grants, scholarships and loans is relatively high among OECD countries

The government provides grants, scholarships and loans to support students in higher education financially. The average amount of public expenditure per student on grants and scholarships was USD 1 800 in 2015, and an additional USD 3 300 was spent by the government on loans, for a combined expenditure on student financial support of over USD 5 000. This level of government financial support places the Netherlands in the top quartile of OECD countries, though it is lower than some Nordic countries (i.e. Norway and Sweden). The combined amount of over USD 5 000 spent on grants, scholarships and loans exceeded the average household expenditure per student (USD 3 100). However, the household expenditure of USD 3 100 does not include living expenses.

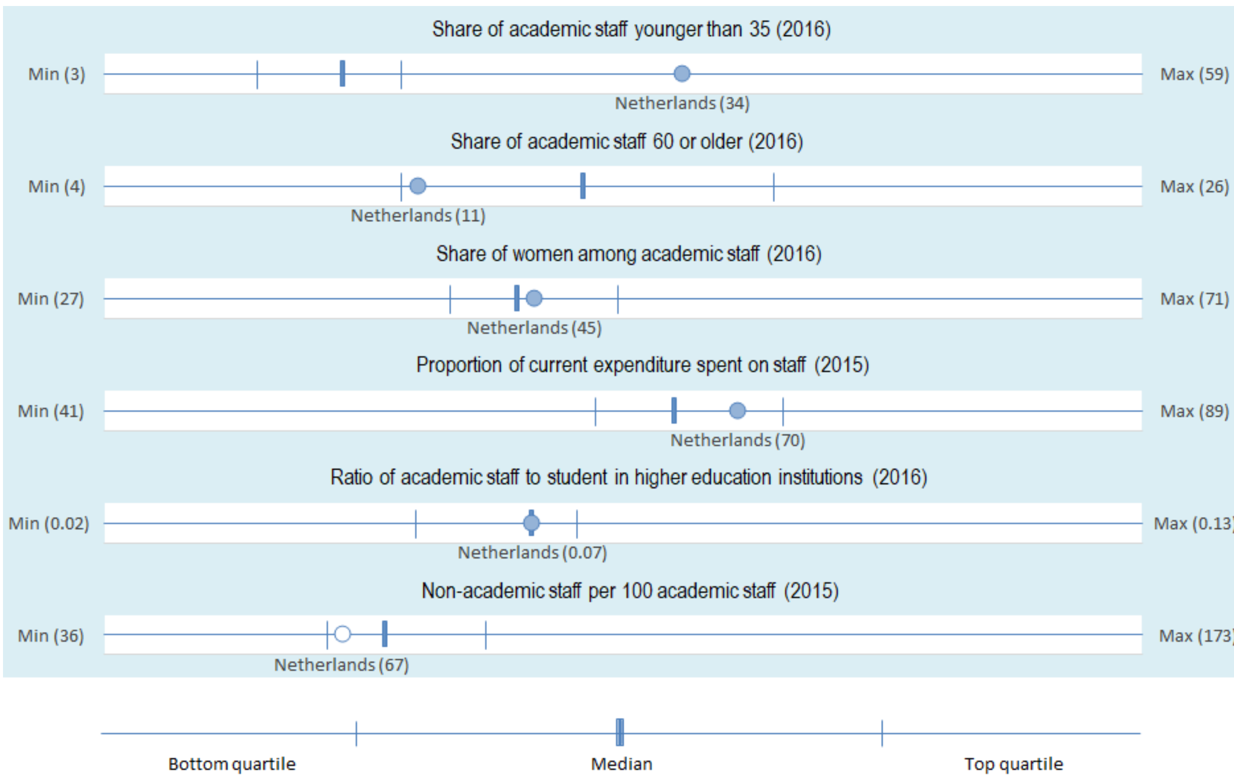
Research in the higher education sector absorbs a large share both of national R&D expenditure and of the expenditure of higher education institutions

Gross domestic expenditure on research and development (GERD) was 2% of GDP in 2016, which is around the OECD median level. Higher education expenditure on research and development (HERD) was 0.6% of GDP, in the top quartile of OECD countries. This shows that a larger part of R&D in the Netherlands happens within the higher education sector compared to other OECD countries and highlights the important role that research has within higher education institutions. In Dutch higher education institutions, nearly 40% of higher education expenditure per student was allocated to R&D activities in 2015, in the top quartile of OECD countries. Universities accounted for the large majority (96%) of R&D expenditure in the Dutch higher education system in 2015, with UAS playing only a minor role.[4]

11.2.2. Human resources

Figure 11.4 shows the position of the Netherlands in the OECD distribution on the scorecard indicators related to human resources in the higher education system.

Figure 11.4. Where does the Netherlands stand in the OECD distribution? Human resources



Note: The indicators represented in this chart are a subset of the indicators presented in Table 11.1. The coloured circle represents the Netherlands's position in the OECD distribution. The circle is not coloured when data are available for less than half of the OECD countries (the minimum number of countries with available data is 14). For more information on methodological issues and metadata, see OECD (2019[1]) and the references cited therein. Follow the *Statlink* to download the data underlying the calculation of the scorecard.
Source: Adapted from OECD (2019[1]), *Benchmarking Higher Education System Performance*, https://dx.doi.org/10.1787/be5514d7-en.

StatLink https://doi.org/10.1787/888933942773

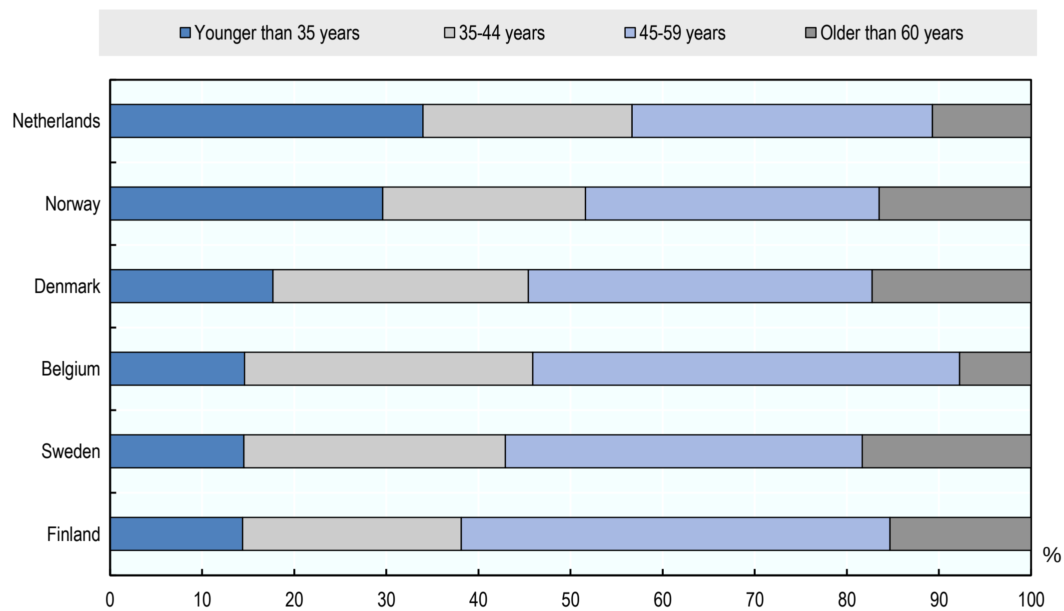
The Netherlands has one of the largest shares of young academic staff in OECD countries

The international definition of "academic staff" covers a wide range of job titles in Dutch universities and UAS. These include professors, associate professors, assistant professors, lecturers, lectors, researchers, post-doc researchers, doctoral candidates and student assistants.

In 2016, one-third of academic staff was younger than 35 in the Netherlands, one of the largest proportions among OECD countries (Figure 11.5). At the same time, the share of academic staff aged 60 or older was around 10%, below the median of OECD countries.

The high share of younger academic staff may be partly explained by the fact that, in the Netherlands, doctoral candidates are often considered as academic staff, which is not always the case in other OECD countries. Around half of all doctoral candidates are employed directly by higher education institutions and are counted as academic staff (although there has been an experiment in recent years allowing for some doctoral students in the Netherlands who receive a scholarship and are not regularly employed by the institution). The remainder of doctoral candidates are either working outside of academia or receive funding for their doctoral studies from an external source (see Chapter 6 of (OECD, 2019[1])).

Figure 11.5. Share of academic staff in higher education, by age group (2016)



Source: Adapted from OECD (2018[2]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en.

StatLink https://doi.org/10.1787/888933942792

Government initiatives to support gender equity appear to be having some success

The share of women among academic staff in the Netherlands increased considerably in the past decade, from 35% in 2005 to 45% in 2016. This is the third-largest increase among OECD countries and economies with available data after the Flemish Community of Belgium and Korea. As a result, the Netherlands now lies above the OECD median in terms of the share of women among academic staff, from a position below the OECD median in 2005.

This progress could reflect the Dutch government's initiatives to promote gender equality and diversity in academia in recent years. For example, it financed the recruitment of 100 additional female professors (the *Westerdijk Talentimpuls* programme). In addition, 10 higher education organisations in the Netherlands have adopted the European Charter for Researchers and the Code of Conduct for Recruitment of Researchers (see Chapter 4 of (OECD, 2019[1])).

As is the case for most OECD countries, women in the Netherlands were better represented among younger academic staff in 2016 than among older staff. In total, women accounted for 50% of academic staff among the age groups up to 44 years old.

Staff costs account for 70% of higher education current expenditure

Staff salaries and benefits are determined through collective labour agreements with the Association of Universities in the Netherlands (VSNU) and the Netherlands Association of Universities of Applied Sciences (VH), which represent higher education institutions, and trade unions, which represent employees. The government does not have a formal role in the negotiation process, which may explain the fact that no data are available on staff compensations for the Netherlands that is comparable to other countries. Overall, the Netherlands spent 70% of its higher education expenditure on staff costs in 2015, which is slightly above the median of OECD countries.

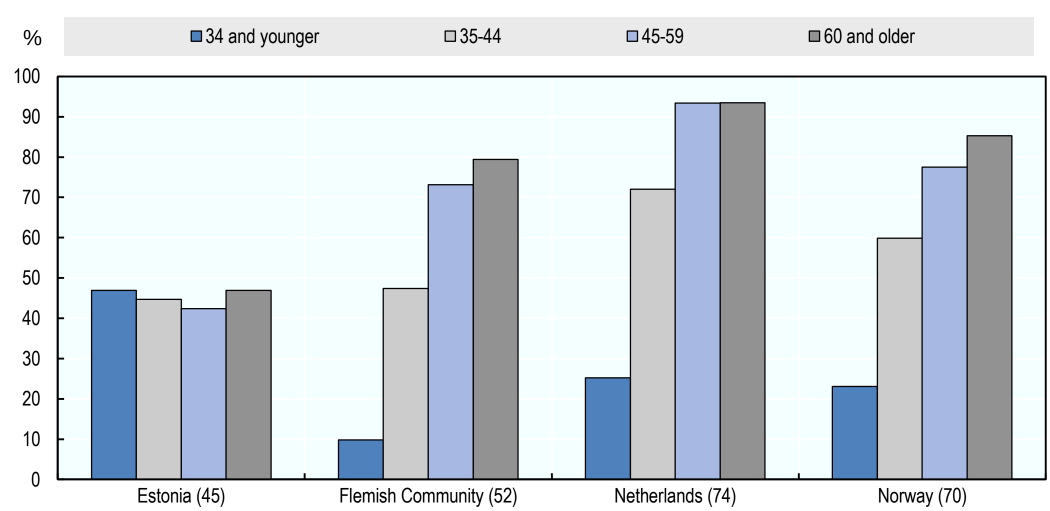
Three-quarters of teaching staff have a permanent contract, but the share is lower for young staff

Across all age groups, 74% of teaching staff (academic staff with teaching duties in universities, UAS and other higher education institutions) had a permanent contract in 2016 in the Netherlands (Figure 11.6). This share is relatively large compared to the other three jurisdictions participating in the benchmarking exercise. This may be related to the national target of 80% of academic staff on permanent contracts, which is pursued by the Association of Universities in the Netherlands (VSNU) and the Netherlands Association of Universities of Applied Sciences (VH).

Figure 11.6. Share of teaching staff with permanent contracts, by age (2016)

Academic staff with teaching duties, excluding doctoral students

The share with permanent contracts across all ages is reported in brackets



Source: Adapted from OECD (2019[1]), *Benchmarking Higher Education System Performance*, https://dx.doi.org/10.1787/be5514d7-en.

StatLink https://doi.org/10.1787/888933942811

However, as in many other OECD countries, the share of teaching staff with a permanent contract differs considerably among the age groups. Only one-quarter of academic staff aged 34 or younger had a permanent contract in 2016, compared to over 90% of academic staff aged 45 or older (Figure 11.6). This could indicate more precarious future career prospects for younger academics in the Netherlands.

Along with work on fixed-length contracts, part-time work tends to be associated more with junior and intermediate staff categories of academic staff (European Commission, EACEA and Eurydice, 2017[7]). More than half of academic staff worked part-time in the Netherlands in 2016, a proportion above the median level of OECD countries. This can be partially explained by differences in definitions, as academic staff in the Netherlands are considered part-time when working less than 90% of a full-time workload, compared to 75% of a full-time workload for the general definition of part-time workers.

In most OECD countries, the share of part-time academic staff is much larger than the overall share of part-time workers across the economy (see Chapter 4 of (OECD, 2019[1])). However, in the Netherlands, the shares of part-time academic staff and part-time workers are similar, as the economy as a whole has one of the highest proportions of part-time workers (almost 50%) among OECD countries.

The academic staff-to-student ratio in the Netherlands is close to the median of OECD countries

The ratio of academic staff to students was about 1:15 in 2016, which is the median of OECD countries. When calculated separately for the subsectors, it was 1:8 in universities and 1:18 in UAS.

This indicator is often considered as a proxy for quality in higher education. However, it fails to consider how academic staff allocate time on teaching, research and other activities. For example, the higher number of students per academic staff in UAS is most likely due to their low research intensity compared to universities. Therefore, this indicator may not necessarily serve as a measure of quality of teaching or accessibility of academic staff for students. National data in the Netherlands, which corrects for staff time spent on research activities, implies a staff to student ratio of around 1: 20 in both subsectors (Central Bureau of Statistics (CBS),, Education Implementation Service (DUO) and Ministry of Education, Culture and Science (OCW), 2019[8]).

There are also a number of recent initiatives in the Dutch system that target the improvement of teaching quality. Examples include:

- increasing the entitlement of teaching staff in both universities and UAS to training and development time
- the *Vliegende Start* programme in UAS to introduce new teaching ideas and practices in higher education
- the Career Framework for University Teaching, designed to support the career progression of academics on the basis of their contribution to teaching and learning (see Chapter 4 of (OECD, 2019[1])).

11.3. Education

Highlights

- Nearly half of 25-34 year-olds had obtained a higher education qualification in 2017, which is above the OECD median. However, as in other OECD countries, access to higher education varies by family background.
- Approximately 70% of new entrants at the bachelor's level were enrolled in universities of applied sciences (UAS) in 2016. The share decreased by 8% between 2005 and 2016. However, it was still larger than in Estonia and the Flemish Community.
- Mature students (25 or older) accounted for 5% of new entrants to bachelor's programmes in 2016, one of the lowest shares among OECD countries. The shares of mature students were around or above the OECD median in master's and short-cycle programmes.
- Part-time enrolment accounted for only 10% of all students in bachelor's programmes in 2016, but the large majority of mature students were enrolled part-time.
- The share of international students in the Netherlands is relatively high at the bachelor's, master's and doctoral levels, compared to other countries.
- Around two-thirds of the new entrants who started a bachelor's programme in 2008 graduated within three years after the expected graduation year, a lower proportion than the median of OECD countries. The Netherlands adopted a number of policies to improve timely completion since then.
- According to the OECD Survey of Adult Skills (PIAAC), around 90% of higher education graduates younger than 35 demonstrated good literacy and numeracy skills (level 3 or above of the PIAAC proficiency scale), which is one of the highest shares among OECD countries participating in PIAAC.
- Higher education graduates (25-34 year-olds), on average, have a higher employment rate and higher earnings than upper secondary education graduates.

11.3.1. Access, student profile and completion

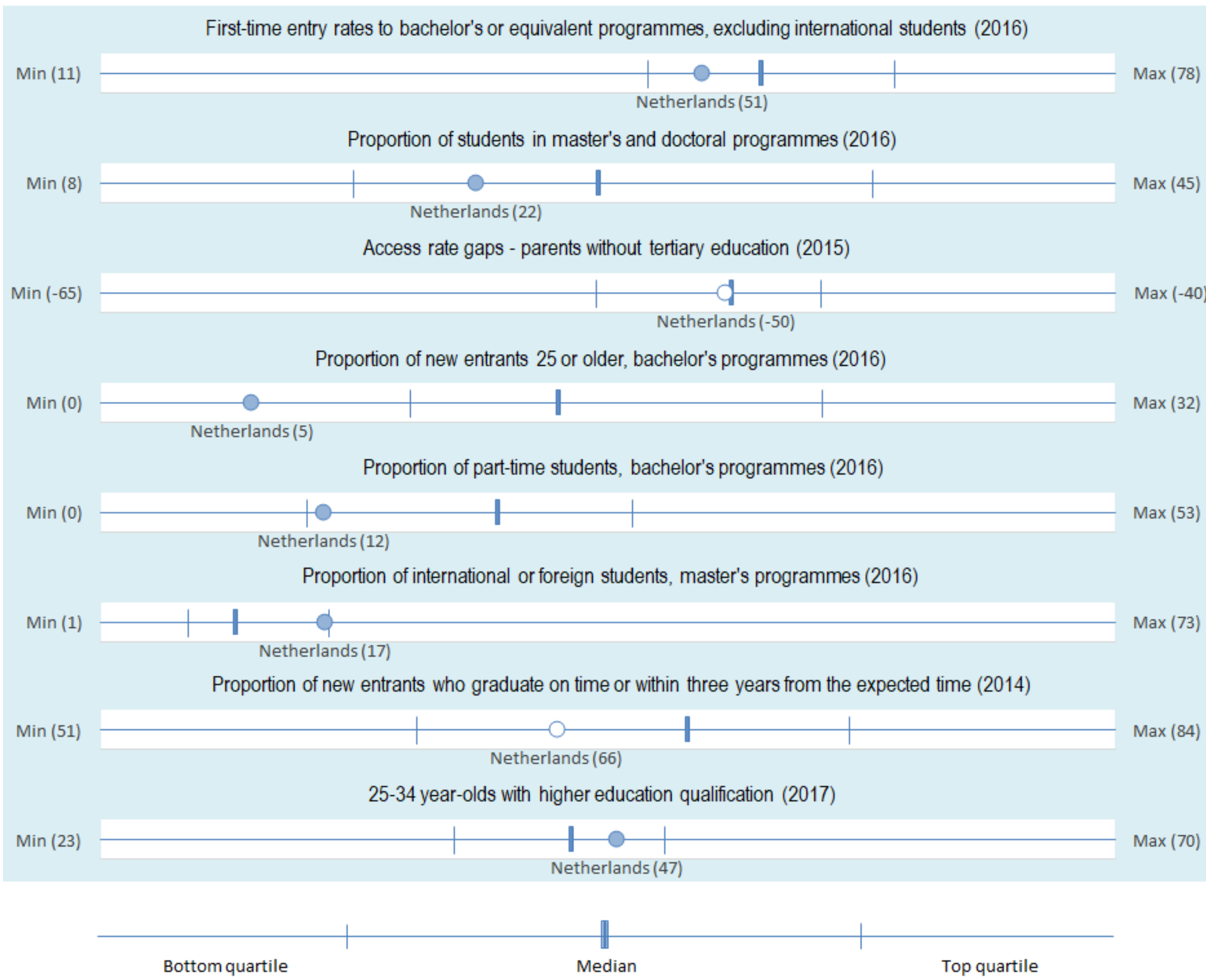
Figure 11.7 shows the position of the Netherlands on indicators related to access to higher education, the profile of students and completion of studies.

Nearly half of 25-34 year-olds have obtained a higher education qualification

In the Netherlands, over one-third of adults (25-64 year-olds) had obtained a higher education qualification in 2017. This share is just below the median of OECD countries, above neighbouring Germany and slightly below Belgium. In the younger age group (25-34 year-olds), nearly half of adults had completed higher education, which is above the median of OECD countries.

Just over half of young adults in the Netherlands are projected to enter a bachelor's programme at least once in their lifetime (international students excluded), if the enrolment patterns observed in 2016 continue into the future; this is below the OECD median of 55%. The gap between the Netherlands and the OECD median increases slightly when considering the expected entry rates into higher education overall (including short-cycle and master's programmes), which stand at 52% for the Netherlands and 59% for the OECD median.

Figure 11.7. Where does the Netherlands stand in the OECD distribution? Access, student profile and completion



Note: The indicators represented in this chart are a subset of the indicators presented in Table 11.1. The coloured circle represents the Netherlands's position in the OECD distribution. The circle is not coloured when data are available for less than half of the OECD countries (the minimum number of countries with available data is 14). For more information on methodological issues and metadata, see OECD (2019[1]) and the references cited therein. Follow the *Statlink* to download the data underlying the calculation of the scorecard.

Source: Adapted from OECD (2019[1]), *Benchmarking Higher Education System Performance*, https://dx.doi.org/10.1787/be5514d7-en.

StatLink https://doi.org/10.1787/888933942830

The majority of students are enrolled in bachelor's programmes, with UAS taking the majority of new entrants at that level of education

In the Netherlands, over three-quarters of higher education students were enrolled in bachelor's programmes in 2016, one of the highest shares among OECD countries. This is partially explained by the fact that 60% or more of the students attend UAS, where bachelor's programmes are the main programme offered. Over 20% of students in total were enrolled in masters and doctoral programmes, which is below the median proportion for OECD countries.

The share of students enrolled in short-cycle tertiary education programmes (associate degree programmes) was 2%, around the bottom quartile of OECD countries offering short-cycle programmes. The small share of short-cycle students reflects the relatively recent introduction of these programmes, which started as tertiary education programmes in 2007 as a pilot scheme and were officially recognised as higher education programmes in 2013. Although short-cycle programmes are not as common as they are in some other OECD countries, enrolments in these programmes have been increasing rapidly.

New entrants are defined as students who enter a programme at a given level of education for the first time. In the Netherlands, approximately 70% of new entrants at the bachelor's level enrolled in UAS in 2016. This share has decreased by 8% between 2005 and 2016, though the proportions entering UAS are still larger than in other participating jurisdictions with a professional higher education sector (Estonia and the Flemish Community).

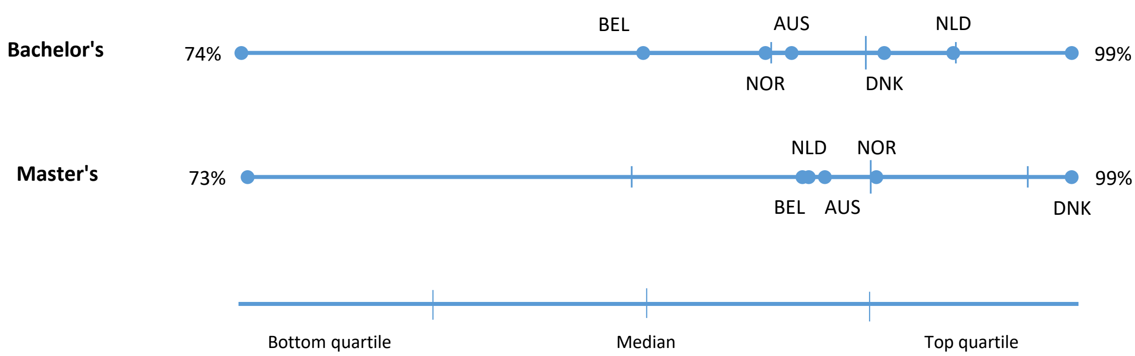
Older students account for only 5% of new entrants at the bachelor's level – one of the lowest shares among OECD countries

In 2016, older students (age 25 or older) accounted for 5% of new entrants to bachelor's programmes in the Netherlands, one of the lowest shares among OECD countries. In contrast, the share of older new entrants was 40% in short-cycle programmes, above the OECD median, and 33% in master's programmes, close to the OECD median.

The "one bachelor's, one master's policy", a rule that higher education students who already have a degree at the level where they are studying pay higher tuition fees, could partly explain the low share of older students at the bachelor's level. Bachelor's programmes are at least three years long, so the prospect of paying high tuition fees for several consecutive years may discourage second-time enrolment, which typically would be most likely for older adults (25 years old and over). In addition, students entering their programme after the age of 30 are not eligible for student financial assistance in the Netherlands, which can create a barrier to participation in lifelong learning.

In the Netherlands, 96% of bachelor's graduates in 2016 were first-time graduates, i.e. they graduated for the first time at the given level of education (bachelor's) during the reference period. This proportion was in the top quartile of OECD countries. In contrast, at the master's level, 90% of graduates were first-time graduates, below the OECD median (Figure 11.8).

Figure 11.8. First-time graduates as a share of all graduates, by higher education level (2016)



Note: AUS = Australia; BEL = Belgium; DNK = Denmark; NLD = Netherlands; NOR = Norway.
Source: Adapted from OECD (2018[2]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en.

StatLink https://doi.org/10.1787/888933942849

Graduate data suggest that the share of older students is larger in UAS than in universities. Some 7% of first-time graduates from UAS were 30 or older in 2016, while the same cohort made up just 1.5% of graduates from universities. The difference between the two subsectors was similar in the Flemish Community (Table 5.3).

Table 11.3. Share of first-time graduates older than 30 by subsector, bachelor's level (2016)

	Estonia	Flemish Community	Netherlands
Universities	18.4	2.0	1.5
UAS	34.5	7.7	7.1

Source: Adapted from OECD (2019[1]), *Benchmarking Higher Education System Performance*, https://dx.doi.org/10.1787/be5514d7-en.

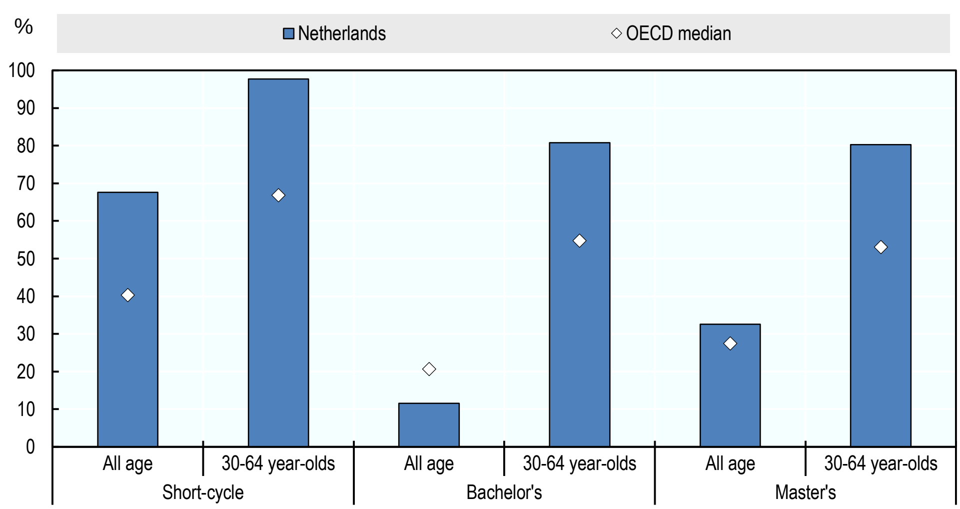
Relatively few bachelor's students study part-time compared to other OECD countries, but part-time studying is more common among older students and in UAS

Around 10% of students in bachelor's programmes were enrolled part-time in 2016, which is below the OECD median (Figure 11.9). Part-time students are not eligible for student financial assistance in the Netherlands (though a special "lifelong learning credit" is available to them since 2017 to cover tuition fees). This could partly explain the low proportion of part-time students at the bachelor's level. Entrants older than 30 receive a lower level of student financial support (compared to younger students) whether they are enrolled part-time or not.

In response to the relatively low share of part-time students at a bachelor's level, the government has launched several initiatives, such as a learning outcomes pilot scheme, which allows institutions to validate prior learning, workplace learning and online learning. This could attract more working students, who are more likely to study part-time. A voucher system has also been piloted, providing students in some health and ICT programmes with vouchers to enrol in modular and part-time education. These schemes are often targeted to UAS, which overall have a higher rate of part-time study (8%) than universities (1%) (both rates are lower than the national average because many Dutch part-time students study at the Open University of the Netherlands).

The share of part-time students is higher at other levels of higher education than at the bachelor's level. Part-time students accounted for two-thirds of total enrolment in short-cycle programmes (around the top quartile) and one-third in master's programmes (above the median). Older (30-64 year-old) students are more likely to study part-time (Figure 11.9). In 2016, over 80% of older students in bachelor's and master's programmes, and 98% of older students in short-cycle programmes (the highest), were studying part-time.

Figure 11.9. Share of part-time students in higher education, by age and ISCED level (2016)



Source: Adapted from OECD (2018[2]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en.

StatLink https://doi.org/10.1787/888933942868

There are substantial differences in access to higher education by socio-economic background

Access to higher education varies by family background in the Netherlands, as in other OECD countries. 18-24 year-olds whose parents did not complete higher education were 50% less likely to enter a bachelor's programme in 2015, compared to those whose parents completed one. This difference is in line with the median of OECD countries with available data.

Children of foreign-born parents were 30% less likely to enter a bachelor's programme, compared to those with native-born parents. This difference is large in absolute terms, even though it is smaller than in most OECD countries with available data.

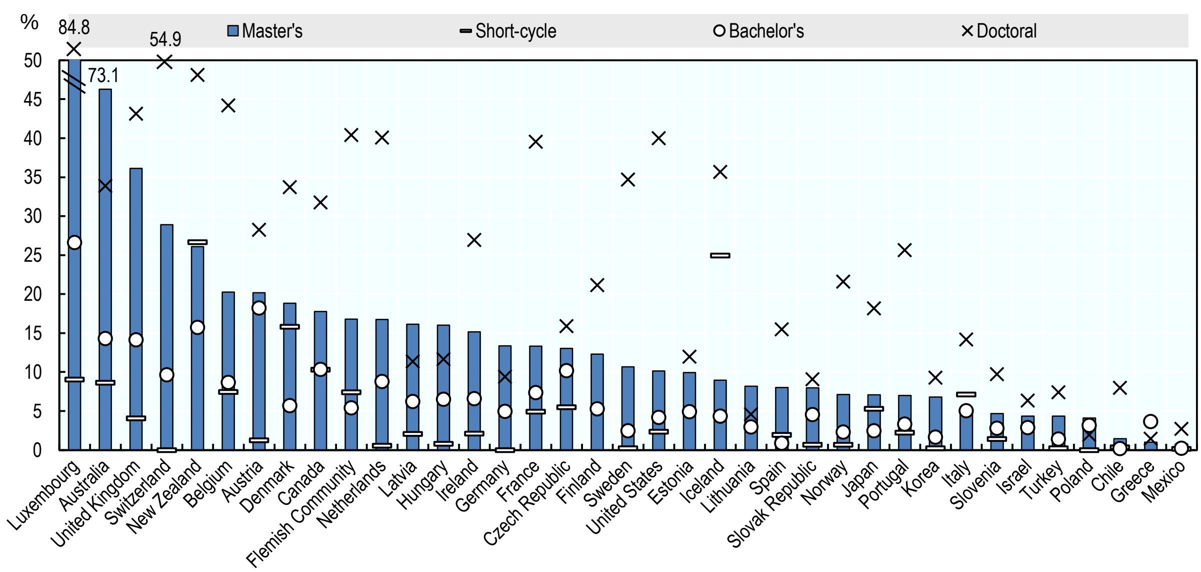
The Dutch government has long been trying to achieve equal access to higher education. Every student (except those studying part-time and those who are 30 or older when they start their studies) can access a universal public loan scheme. In addition, students from poorer households are eligible to receive supplementary means-tested grants.

The share of international students is higher than in the majority of OECD countries – but international students are concentrated in universities

In the Netherlands, international students accounted for 9% of all students at the bachelor's level in 2016, in the top quartile of OECD countries. At the master's level, this share was 17%, well above the median of OECD countries. The share of international students stood at 40% at the doctoral level, but it was just 1% at the short-cycle level, one of the lowest shares in the OECD area (Figure 5.8).

Figure 11.10. International students in higher education (2016)

Proportion of international students, by education level



Notes: The average for bachelor's, master's and doctoral programmes is calculated across countries with available data for all three series, while the average for short-cycle programmes is calculated separately.
Belgium: Data on short-cycle tertiary programmes are based on nationality and refer to the Flemish Community only.
Belgium, the Flemish Community and the Netherlands: Data exclude the Open University of the Netherlands.
The Czech Republic, Greece, Hungary, Israel, Italy, Korea, Mexico, the Slovak Republic and Turkey (all education levels) and the Flemish Community (short-cycle level): Data reflect the proportion of foreign students instead of international students. Foreign students are those who are not citizens of the country in which the data are collected.
Denmark: Students who have completed a bachelor's degree as international students and subsequently enrol in a second programme (e.g. master's programme) are not counted as international students.
Source: Adapted from OECD (2018[2]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en; data provided by the Flemish Ministry of Education and Training.

StatLink https://doi.org/10.1787/888933942887

The low share of international students in short-cycle programmes, which are offered only at UAS, is consistent with the generally lower share of international students in UAS (7% at the bachelor's level) compared to universities (13%).

The Netherlands offers one of the largest proportions of programmes taught in English of all non-English speaking European countries, and has previously been ranked as the leading country in this group on the provision of English-taught programmes (Wachter and Maiworm, 2014[9]). At the system level (including universities and professional HEIs), there is a perception that the large number of programmes offered in English helps to attract international students and prepare Dutch students for an international labour market. However, concerns have also been raised nationally that large proportions of programmes in English could create additional barriers for students from disadvantaged or migrant backgrounds to succeed in higher education. It may also create distances between academia and the Dutch-speaking community (Royal Netherlands Academy of Arts and Sciences (KNAW), 2017[10]).

Around two-thirds of new entrants to bachelor's programmes graduate within three years after the expected graduation year – below the median of OECD countries

According to the most recent OECD Indicators of Education Systems (INES) survey on completion rates in higher education, less than one-third of the new entrants who started a bachelor's programme in the Netherlands in 2008 graduated within the expected duration of the programme, which is one of the lowest among OECD countries with available data. A further third of those had graduated within three years after the expected graduation year; while 20% had dropped out by 2014 (i.e. they had not graduated and were not in education).

The completion rate (graduating within the expected time) of the new entrants who started their bachelor's study in 2008 differed by gender, enrolment status (full-time or part-time) and the subsector. The completion rate was higher among female students than male students, as was the case in the most of the OECD countries with available data. It was also higher among part-time students than full-time students, which was opposite to some jurisdictions, including the Flemish Community of Belgium. Entrants in UAS were three times more likely to leave higher education without a degree, than those in universities. The government has taken a number of measures over the last couple of decades to increase the rate of timely completion (Table 11.4).

Table 11.4. Policies to improve timely study completion, the Netherlands (2017)

Study checks	Higher education institutions are required to offer students a non-binding "study check", assessing the match between the programme and the student competencies and expectations (e.g. self-assessment tests, evaluation of motivation letters, or intake interviews)
Online self-assessment test	Prospective students are often required to take a non-binding online self-assessment test
Study Choice 123 (*Studiekeuze* 123)	Government-funded web-based tool providing information for each higher education programme, including labour market prospects and results from the national student satisfaction survey
Binding study advice	Institutions provide students with binding study advice at the end of the first year that results in their expulsion from a programme if they have not made sufficient progress
Time-limited financial support	Students who qualify for means-tested grants can receive them only for the expected duration of the programme
Formula funding indicators	Funding formula excludes students who have been enrolled longer than the nominal study duration

Source: Adapted from information provided by the Dutch Ministry of Education, Culture and Science.

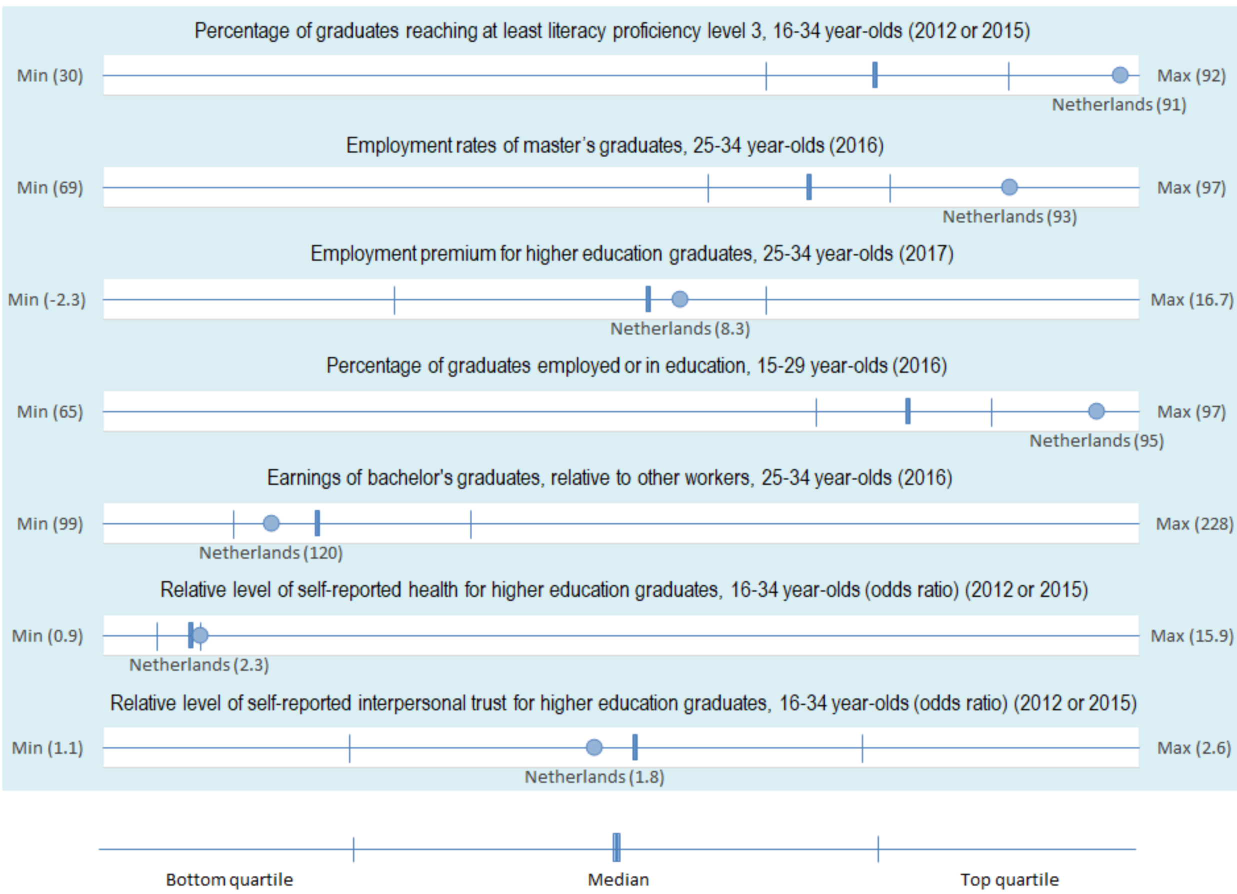
11.3.2. Graduate outcomes

Figure 11.11 provides an outline of the position of the Netherlands within the OECD distribution on the benchmarking indicators related to higher education graduate outcomes.

The majority of young graduates demonstrate good literacy and numeracy skills

Currently, no internationally comparable data are available on the learning outcomes of higher education at the system level. In the absence of an international measure, this note uses the OECD Survey of Adult Skills (PIAAC) to assess skills proficiency among higher education graduates.

Figure 11.11. Where does the Netherlands stand in the OECD distribution? Graduate outcomes



Note: The indicators represented in this chart are a subset of the indicators presented in Table 11.1. The coloured circle represents the Netherlands's position in the OECD distribution. The circle is not coloured when data are available for less than half of the OECD countries (the minimum number of countries with available data is 14). For more information on methodological issues and metadata, see OECD (2019[1]) and the references cited therein. Follow the *Statlink* to download the data underlying the calculation of the scorecard.

Source: Adapted from OECD (2019[1]), *Benchmarking Higher Education System Performance*, https://dx.doi.org/10.1787/be5514d7-en.

StatLink https://doi.org/10.1787/888933942906

The literacy and numeracy proficiency scales range from below level 1 to level 5. A proficiency level of 3 implies an ability to understand and respond appropriately to dense or lengthy texts and complete tasks that require an understanding of mathematical information that may be embedded in unfamiliar contexts. In the Netherlands, 86% of young graduates younger than 35 achieved level 3 of the numeracy proficiency scale and 91% of the literacy proficiency scale – some of the largest proportions in the OECD area.

The odds of young (16-34) higher education graduates of reaching proficiency level 3 are over three times higher than for people with only upper secondary education for both numeracy and literacy; conditional on age, gender, immigrant and language background and parents' educational attainment. This is similar to odds for the OECD median country.

Higher education graduates demonstrate better social outcomes compared to upper secondary education graduates

Education is not only useful to provide the skills needed by the economy, but it is also helps to foster political engagement among citizens, civil society participation and other social outcomes. According to the OECD Survey of Adult Skills (PIAAC), young higher education graduates (16-34) in the Netherlands had three times the odds of disagreeing that "people like me do not have any say about what the government does" (a measure of political efficacy), than upper secondary education graduates, one of the largest differences among the OECD countries participating in PIAAC.

In addition, even though the Netherlands had one of the higher reported levels of trust among OECD countries (OECD, 2018[3]), young higher education graduates still had two times the odds of disagreeing with the statements that "only a few people can be trusted". This indicates that higher education is associated with greater levels of interpersonal trust in the Netherlands, even when overall levels of trust in the population are relatively high.

Higher education graduates enjoy a premium in employment and earnings

Labour market prospects for higher education graduates in the Netherlands are excellent in general. In total, 95% of graduates younger than 30 from all levels of higher education were either employed or in education in 2017, one of the highest shares among OECD countries. In addition, the employment rate of 25-34 year-old higher education graduates was nearly 90% in 2016, 8 percentage points higher than that of young upper secondary education graduates. This employment premium is larger than the OECD median.

In addition, the employment rates were over 90% among graduates of short-cycle programmes (92%) and master's programmes (93%). The employment rate for 25-34 year-old bachelor's graduates was 93% in UAS. This was 20 percentage points higher than for university graduates with bachelor's degrees, though this is influenced by a majority of university graduates continuing with a master's degree after completing their bachelor's.

Dutch graduates have good employment prospects across all fields of study. In the Netherlands, the difference between the employment rate of 25-34 year-old higher education graduates in the field of study with the highest employment rate (services) and that with the lowest (arts and humanities) was 9% in 2017 (Figure 11.12).

Young higher education graduates (25-34 year-olds) working full-time earned more than individuals with upper secondary or post-secondary non-tertiary education in 2017. The difference in gross earnings (relative to the median for upper secondary or post-secondary tertiary education) was 20% for bachelor's graduates and even larger for master's graduates, who earned 45% more than the comparison group (in line with the OECD median).

Dutch graduates also appear less likely to end up in jobs with routine tasks compared to their counterparts in many other OECD countries. Around 5% of higher education graduates younger than 40 in the Netherlands reported being in occupations where they were unable to choose or change "the sequence of tasks" and "how to do the work" (a measure of routine jobs with few opportunities to learn by doing (OECD, 2013[11])). This proportion was similar for bachelor's graduates from UAS and for universities (bachelor's and master's graduates). However, the proportion of workers in routine jobs was over three times larger for individuals with upper secondary education than for higher education graduates (age group: 16-34), above the median across OECD countries participating in PIAAC.

Figure 11.12. Spread in the graduate employment rate across fields of study (2017)

25-34 year-olds across all ISCED fields of study

Note: DNK = Denmark; FIN = Finland; GRC = Greece; NLD = Netherlands; USA = United States; VLG = Flanders.
Source: Adapted from OECD (2018[2]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en; data provided by the Flemish Ministry of Education and Training.

StatLink https://doi.org/10.1787/888933942925

11.4. Research and engagement

Highlights

- The proportion of researchers working in the higher education sector in 2016 in the Netherlands was in the bottom quartile of OECD countries, though the Netherlands also has the highest ratio of research support staff to researchers in the OECD.
- Despite increases in the numbers graduating with a PhD in the Netherlands in recent years, the proportion of the population with a doctoral level qualification remains rather low in the Netherlands compared to other OECD countries.
- The Netherlands appears to have a strong record of collaboration between the higher education research and development sector and business enterprise, with levels of reported collaboration in 2017 in the top quartile of the OECD.
- Bibliometric data indicate that the Netherlands is one of the top performers in the OECD both in the quantity and quality (as measured by citations) of scientific publications. The numbers of publications per 100 researchers and the proportion of publications among the top 10% most cited documents worldwide were both in the top quartile of OECD countries in 2016.
- Dutch researchers are more likely to engage in international collaboration than are researchers in most other OECD countries. In 2015, 35% of scientific documents published by Dutch researchers included some international scientific collaboration, placing the Netherlands in the top quartile of OECD countries.

- International researcher mobility tends towards a neutral net position for the Dutch research system, where the annual flows of researchers out of the Netherlands are roughly equivalent to the numbers of new inflows and returnees.
- The Netherlands is in the top quartile of OECD countries on the proportion of scientific documents that are made available through some form of open access. In 2016, 31% of Dutch scientific documents in the Scopus database[5] were published using an open access model.

11.4.1. Inputs and activities

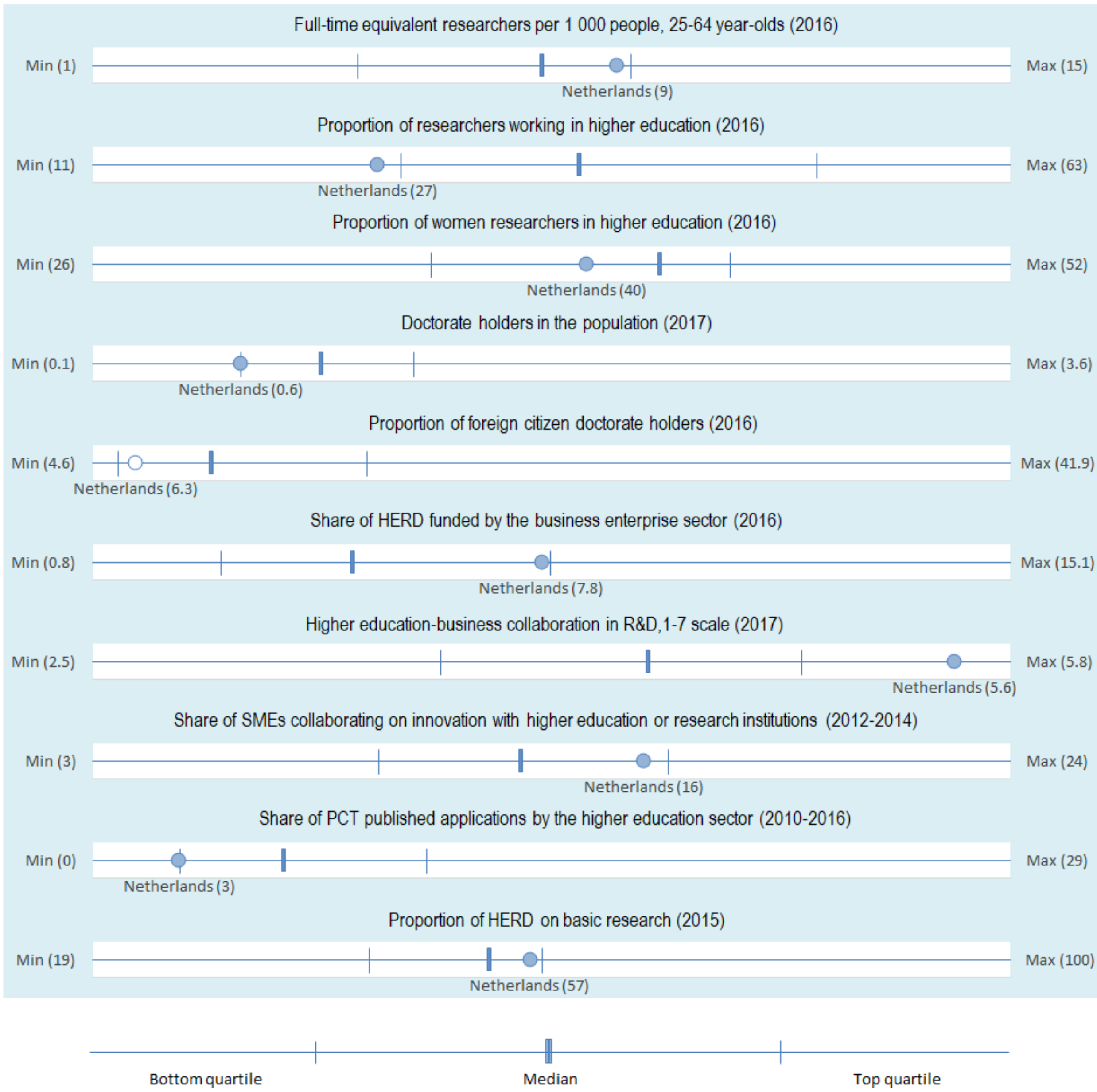
Figure 11.13 shows the position of the Netherlands within the OECD distribution on indicators related to research and development inputs and activities.

The proportion of researchers working in the higher education research sector is lower than the median level

The Netherlands had a greater proportion of full-time equivalent researchers in the population in 2016 compared to the median level across the OECD, at 9 researchers per 1 000 people (Figure 11.13). The proportion of researchers working in the higher education sector is relatively low among OECD countries. In 2016, 28% of all full-time equivalent researchers were working in higher education institutions, compared to the OECD median level of around 40%. In the Netherlands, the lower proportion of researchers in higher education could be partly explained by the fact that research activity tends to be mainly concentrated in universities. In addition the overall science base in the Netherlands is strong, with highly active public research institutes and increasing numbers of enterprises performing R&D (OECD, 2014[12]).

The proportion of researchers working in higher education can also reflect the emphasis on funding for higher education research within the national R&D system. In 2016, the higher education sector attracted about 30% of all gross expenditure on R&D in the Netherlands (OECD, 2019[1]).

Figure 11.13. Where does the Netherlands stand in the OECD distribution? Research inputs and activities



Note: The indicators represented in this chart are a subset of the indicators presented in Table 11.1. The coloured circle represents the Netherlands's position in the OECD distribution. The circle is not coloured when data are available for less than half of the OECD countries (the minimum number of countries with available data is 14). For more information on methodological issues and metadata, see OECD (2019[1]) and the references cited therein. Follow the *Statlink* to download the data underlying the calculation of the scorecard.
Source: Adapted from OECD (2019[1]), *Benchmarking Higher Education System Performance*, https://dx.doi.org/10.1787/be5514d7-en.

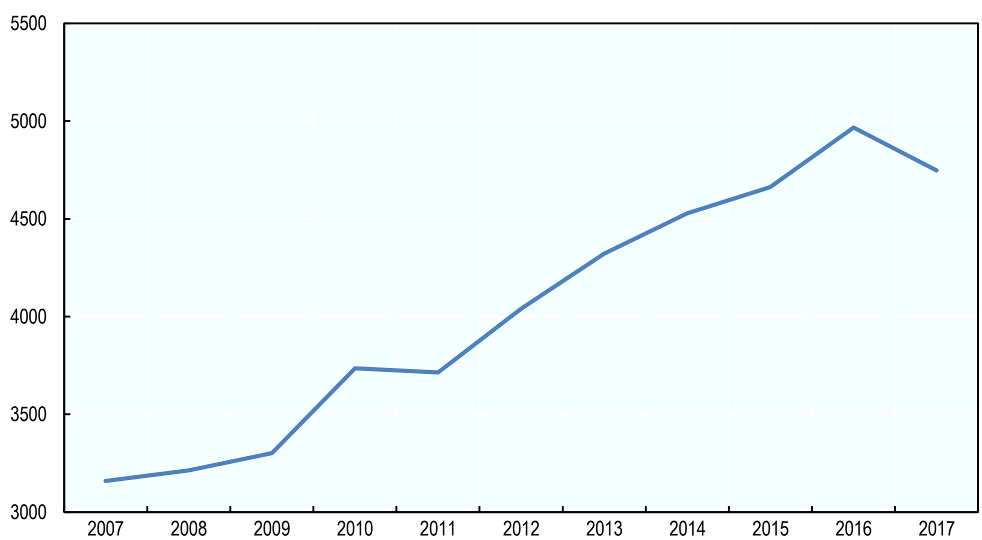
StatLink https://doi.org/10.1787/888933942944

The Netherlands has a lower proportion of the population with a doctorate than most OECD countries

Doctoral education is the entry point into a career in higher education research, and many OECD jurisdictions have been working to increase the numbers of people acquiring a doctoral qualification (OECD, 2019[1]). In the Netherlands, approximately 0.6% of the population aged 25-64 had achieved a doctoral level qualification in 2017, in the bottom quartile of OECD countries, and below the median level of just under 1% of the population. While this is a similar level to neighbouring Belgium (0.7%), it is far below the levels in many other European countries such as Denmark (1.1%), Germany (1.4%), Luxembourg (2.0%) and Switzerland (3.0%).

The Netherlands also seems to attract less doctorate holders from abroad than many other research systems in the OECD. In 2016, foreign citizens made up 6.3% of doctorate holders in the population, a level below the OECD median. However, the numbers of doctorate degrees awarded in the Netherlands have been increasing year-on-year in the past decade, although numbers decreased slightly between 2016 and 2017 (Figure 11.14).

Figure 11.14. New doctorate degrees awarded in the Netherlands (2007-2017)



Source: Rathenau Instituut (2019[13]), *Science in figures*, www.rathenau.nl/en/science-figures.

StatLink https://doi.org/10.1787/888933942963

First-time entry rates into doctoral education remain among the lowest in OECD countries, with 1.9% of the population expected to enter into a doctoral level programme in 2015, although graduation rates are above average.[6] The Netherlands, along with a number of other OECD countries, includes the number of doctoral graduates in the consideration for awarding research funding to institutions.

The position of doctoral fellow is a paid position in the Netherlands, and doctoral candidates are considered as employees rather than students, though there are also a small number of students on scholarships who are not directly employed. At the same time, the recruitment of academic staff (including doctoral candidates) and other criteria related to the career path is generally determined at the level of the institution in the Netherlands, with few regulations set at the national level.

Collaboration levels between the higher education sector and business are in the top quartile of OECD countries

Collaboration with other sectors of the economy is important for higher education R&D to ensure that knowledge is generated, shared and applied in a way that maximises its benefits to the economy and society, and to ensure the research produced by higher education can serve as an input into business innovation processes (Chapter 7 of (OECD, 2019[1])). The Netherlands appears to have a stronger record of collaboration with business than most other OECD countries, according to available evidence. A 2017 survey indicated that on a scale of 1-7 of the extent of collaboration, businesses in the Netherlands indicated a collaboration level of 5.6, one of the highest levels in the OECD.

In a 2014 survey, 16% of small and medium-size enterprises reported that they had recently collaborated with the higher education sector in the Netherlands on innovation development. While this proportion is above the OECD median, it is slightly lower than the reported levels in the other three jurisdictions participating in the benchmarking exercise (ranging from 17% in Norway to 22% in Belgium). It is also less than half of the proportion of larger businesses in the Netherlands reporting collaboration with the higher education sector in the same survey (34%).

The Netherlands has introduced a number of policies that aim to create stronger links between higher education and business. For example, the Regional Attention and Action for Knowledge Circulation programme (RAAK) provides project-based financial support on a competitive basis for UAS that engage in collaborative research with external partners. Other reforms aimed at strengthening the role of UAS in the innovation process include the development of Knowledge Circles (which allow academic staff and local stakeholders to work together on projects of common interest) and Centres of Expertise, which develop and deliver knowledge services based on co-operation between academics, government and industry partners (Chapter 7 of (OECD, 2019[1])).

The Netherlands also attracts a relatively large share of co-funding from the business sector for higher education research and development, compared to other OECD countries. In 2016, 7.8% of total expenditure on higher education research and development was sourced from the business sector, above the OECD median value of 4.9%.

The higher education system in the Netherlands has developed many novel approaches to collaboration and engagement with the wider community. A recent OECD/EU review of the support for entrepreneurship and innovation in higher education in the Netherlands, carried out by applying the HEInnovate tool (HEInnovate, 2018[14]) identified a number of key strengths within the Dutch system in promoting innovative links with the wider economy, and a number of areas which could benefit from further improvement (Box 11.1).

Box 11.1. Applying the HEInnovate framework in the Netherlands

HEInnovate is a framework developed by the European Commission and the OECD for higher education institutions to self-assess how they manage resources, build organisational capacity, collaborate with external stakeholders, create and nurture synergies between their core functions, embed digital technology, promote entrepreneurship and support knowledge exchange with the wider world (HEInnovate, 2018[14]).

In terms of collaboration between the higher education sector and other areas of the economy, applying the HEInnovate framework to the system in the Netherlands highlighted the benefits and potential of the "valorisation" of knowledge (defined as created value from knowledge and translating knowledge into processes or products with economic and social benefit). The higher education sector in the Netherlands was found to have built strong knowledge exchange links with the wider economy and society, through:

- being active in regional initiatives such as the City Deals (see Chapter 7 of (OECD, 2019[1]))
- creating a supportive business environment for start-ups originating in the higher education sector
- providing staff and students with opportunities to participate in innovative activities.

Actions identified which could promote stronger value creation in the future include:

- recognising and rewarding staff participation in activities that can lead to valorisation of knowledge
- moving from project-based funding to the establishment of a sustainable funding base for future valorisation activity
- developing a research programme on processes, outcomes and impacts of valorisation activities, to stimulate future learning and improvement.

Source: OECD/EU (2018[15]), *Supporting Entrepreneurship and Innovation in Higher Education in The Netherlands*, OECD Skills Studies, https://doi.org/10.1787/9789264292048-en.

11.4.2. Internationalisation and knowledge production

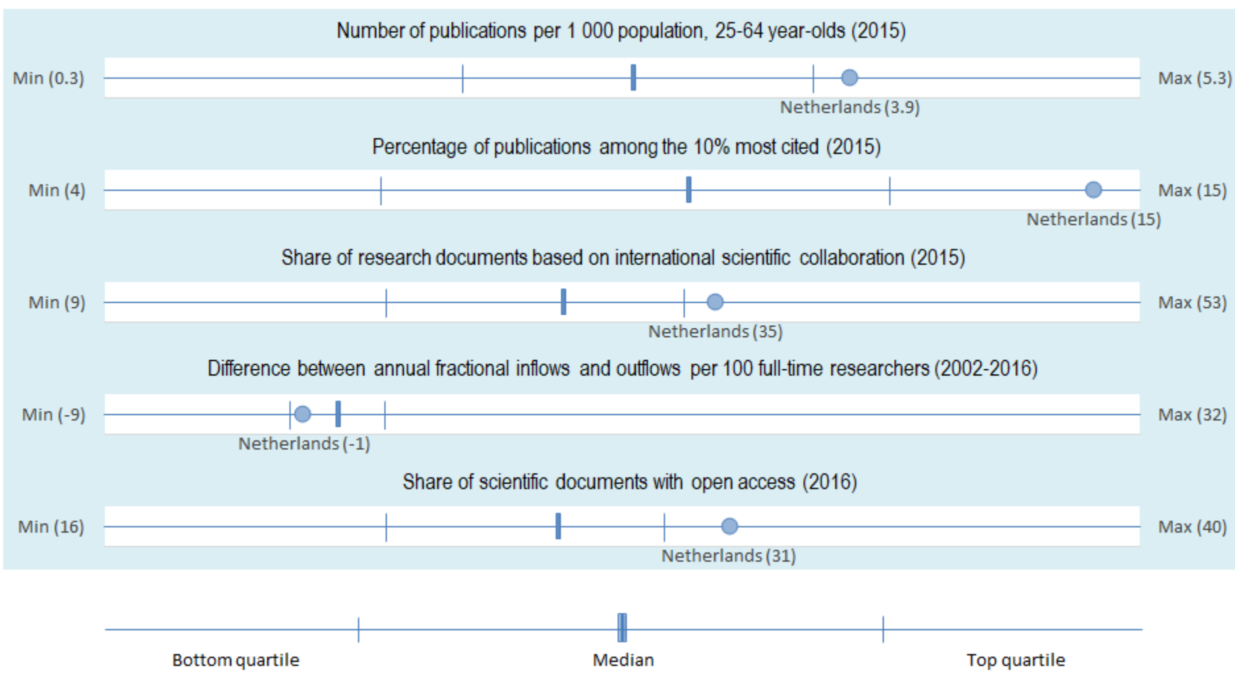
The Netherlands is a high performer on the quantity and quality of scientific output, according to bibliometric indicators

Bibliometric indicators are commonly used by governments and in institutional rankings to assess the quantity and quality of research output (Chapter 2 of (OECD, 2019[1])). The Netherlands is a high performer within the OECD in both quantity and quality of output, according to bibliometric indicators. In 2015, the Netherlands produced 3.9 publications per 1 000 people aged 25-64, a level in the top quartile of OECD countries (Figure 11.15). This was higher than many nearby countries, including France (2.1), Germany (2.5) and Belgium (3.1), though lower than the output attained in Nordic countries (ranging from 4.0 in Iceland to 5.3 in Denmark).

Citation-related bibliometrics are often used as a proxy for measuring the impact of scientific publications on the work of other researchers. Dutch research is also among the highest performing in the OECD on indicators related to citations. In 2015, around 15% of Dutch research publications were ranked in the top 10% most highly cited publications in Scopus (a database of scientific publications), the second-highest percentage in the OECD after Switzerland.

The most recent plan for the Standard Evaluation Protocol for assessing research in the Netherlands, covering the period 2015-2021, focuses less on research output and more on research quality than previous iterations. This protocol is applied to assess the performance of research in Dutch universities (OECD, 2019[1]). While the range of criteria for evaluation included covers both quantitative and qualitative evidence, the numbers of scientific publications and citations are considered as "demonstrable" indicators of research quality in the protocol (Association of Universities in the Netherlands (VSNU), Netherlands Organisation for Scientific Research (NWO) and Royal Netherlands Academy of Arts and Sciences (KNAW), 2014[16]).

Figure 11.15. Where does the Netherlands stand in the OECD distribution? Internationalisation and knowledge production



Note: The indicators represented in this chart are a subset of the indicators presented in Table 11.1. The coloured circle represents the Netherlands's position in the OECD distribution. The circle is not coloured when data are available for less than half of the OECD countries (the minimum number of countries with available data is 14). For more information on methodological issues and metadata, see OECD (2019[1]) and the references cited therein. Follow the *Statlink* to download the data underlying the calculation of the scorecard.

Source: Adapted from OECD (2019[1]), *Benchmarking Higher Education System Performance*, https://dx.doi.org/10.1787/be5514d7-en.

StatLink https://doi.org/10.1787/888933942982

Dutch researchers appear more likely to participate in international scientific collaboration, and often have a period of international mobility.

International collaboration in research and development facilitates the diffusion of knowledge and can help to increase the quality of research. According to bibliometric data, the Netherlands has one of the highest levels of international collaboration in the OECD. In 2015, 35% of international scientific documents published by Dutch researchers included some international scientific collaboration, placing the Netherlands in the top quartile of OECD countries.

Many higher education institutions in the Netherlands actively work to achieve greater levels of international collaboration, through heavy involvement in international alliances and consortia, such as the League of European Research Universities, the European Consortium of Innovative Universities and the IDEA League, among others. Many universities are also active members of research consortia funded by the European Commission. The government also includes the number of international research projects funded through the Horizon 2020 programme as an indicator in the allocation of formula funding for higher education institutions (see Chapter 6 of (OECD, 2019[1])).

Between 2002 and 2016, the Netherlands was close to parity on inflows and outflows of researchers (measured as a proportion of full-time equivalent researchers in the country), indicating no net "brain drain" or "brain gain" for the Netherlands, but instead an evenly matched "brain circulation" over the period. Higher levels of brain circulation (international inward and outward mobility of researchers) can create additional value for research and development systems, by circulating knowledge and enabling researchers to build networks beyond their immediate institutions or countries. The proportional volume of flows of researchers in and out of the Netherlands is similar to OECD average levels. In 2016, around 7% of scientific authors in the Netherlands left to another jurisdiction, while a similar percentage entered or returned to the Netherlands (Chapter 6 of (OECD, 2019[1])).

The Royal Netherlands Academy of Arts and Sciences (KNAW) and the Netherlands Organisation for Scientific Research (NWO) both provide funding to support researcher mobility, while individual higher education institutions also often allocate funds specifically to hire talented foreign researchers.

Open access to scientific documents is more prevalent than in most other OECD countries, but remains low overall

Ensuring that the results of research are as accessible as possible creates a number of potential benefits, including increasing the impact of knowledge, improving efficiency by reducing duplication of efforts and allowing results to be more easily validated. The main model of access to scientific publications across the OECD remains closed, with a majority of publications in all OECD countries published under closed access conditions.

Nevertheless, the Netherlands is in the top quartile of OECD countries on the proportion of scientific documents that are made available through some form of open access. In 2016, 31% of Dutch scientific documents in the Scopus database[7] were published using an open access model. This compares favourably to the OECD median level (26%), though still below leading countries such as the United Kingdom (40%) and Switzerland (36%).

The Netherlands has a number of policy initiatives that are aimed at increasing the accessibility of scientific research. For example, the Netherlands Organisation for Scientific Research (NWO) requires immediate open publication of results from research supported by public funds. The government also has a goal of making open access and open science the standard in Dutch research and, in conjunction with a number of research organisations, is working on a National Plan for Open Science with an ambitious target to make 100% of their publications openly available by 2020 (Chapter 7 of (OECD, 2019[1])).

11.5. Scenarios for policy

This section of the note extends the comparisons drawn in the previous sections by looking forward, and presenting a set of scenarios relevant to the future of the Netherlands' higher education system. The purpose of these scenarios is to provide evidence-based conjectures about future trends in an area of national policy importance, which can stimulate debate and support policy-planning exercises (Box 9.1).

Box 11.2. Scenario development for policy analysis

Governments plan for the future of higher education in the context of a number of sources of uncertainty. Scenarios can be defined as descriptions of hypothetical futures that could occur and that, although somewhat speculative in nature, are nonetheless internally consistent and causally coherent (OECD, 2006[17]). The development of scenarios can provide support to national discussions on contextual and systemic trends, highlight possible consequences of current circumstances on higher education and the economy, and outline the main available policy directions.

In a context of increasing complexity in societies and economies, more emphasis is being placed on anticipatory exercises in the policy process (OECD, 2015[18]). Contemplating different policy scenarios can feed into the development of broad long-term strategic planning for higher education systems or pre-policy research related to particular policy topics.

Short and medium-term scenarios are likely to be more accurate and useful to the decision-making process of policymakers. The scenario exercise presented in Section 5.1 therefore focuses on the immediate decade ahead (i.e. up to 2030), and is developed using the following steps:

- statement of a subject area or issue of national policy concern and the rationale for the concern
- outline of the assumptions used to develop the set of future scenarios
- explanation of the likely impact of the assumptions on future trends
- discussion of implications for policy.

11.5.1. The profile and organisation of the university and UAS sectors in the Netherlands may need some refinement in the future, as demand evolves.

Box 11.3. Summary of policy concern

The proportion of higher education enrolments in Dutch UAS has been trending downwards in recent years. In addition, while both domestic and international student enrolments have steadily risen in recent decades, there are some indications that overall enrolment levels may moderate or even reduce in the future. As demand for higher education in the Netherlands continues to evolve, the government may need to ensure that roles and missions (both specified and implied) of institutions in both subsectors can also evolve to meet changing needs.

11.5.2. Rationale

There are legally specified differences in the missions and orientations of the subsectors in the Netherlands

The Netherlands has a binary higher education system, with 18 institutions[8] in the university sector and 36 institutions in the UAS sector (also known as universities of applied sciences or *hogescholen*). These subsectors have legally defined differences in missions and orientations, with universities focused on academic education and conducting the majority of research, while UAS offer programmes that are more occupationally specific (Table 11.5).

Table 11.5. Subsector differences in mission and orientation in the Netherlands

	Universities	UAS
Programme orientation	"research-oriented education" (academic, learning, teaching and research)	"higher professional education" aimed towards specific occupations
Programme level offered	Programmes at ISCED 6-8 (bachelor's, master's and doctoral level)	Mostly programmes at ISCED 5 and 6 (short-cycle and bachelor's level)
Modes of delivery	Full-time and part-time	Full-time and part-time
Dual-training programmes	Offered	Offered
Research capacity	Broad range of research activities	Practice-oriented research related to specific industries and occupations

Source: Adapted from information provided by the Dutch Ministry of Education, Culture and Science.

There are also a number of other differences in characteristics between the subsectors

In addition to the legally defined differences in missions between the subsectors, evidence gathered during the benchmarking exercise shows that the subsectors also tend to cater to different student groups. One reason for this difference is the tracking process present in the Dutch upper secondary school system, meaning that decisions about which sector of higher education students will enter are made much earlier in the school career than at the point of admission to higher education. Dutch students from the general secondary school stream (HAVO) do not meet the entry requirements for universities and therefore can only attend UAS, while students from pre-university secondary education (VWO) are eligible to enter both subsectors (see Chapter 2 of (OECD, 2019[1])).

As Table 11.6 shows, the UAS sector caters to a much greater proportion of older students (7.1% of graduates are over 30, compared to just 1.5% of graduates in universities). Part-time students are also disproportionately enrolled in UAS, though in principle, institutions from both sectors are free to offer part-time education.

Table 11.6. Differences in subsector student characteristics and outcomes in the Netherlands, bachelor's level

	Universities	UAS
Share of first-time graduates older than 30 (%) (2016)	1.5	7.1
Part-time students (%) (2016)	1.1	8.3
International students (%) (2016)	13.1	7.4
Graduates with at least one tertiary-educated parent (%)[9]	73	47
Students graduating within the expected timeframe (%)	24.8	33.8
Non-completing students (%)	7.7	28.4

Source: Adapted from OECD (2018[2]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en; OECD (2018[19]), *OECD Survey of Adult Skills*, www.oecd.org/skills/piaac/data/; data provided by the Dutch Ministry of Education, Culture and Science.

Data from the OECD Survey of Adult Skills for the Netherlands show that graduates from UAS are less likely to have a tertiary-educated parent than graduates from universities, indicating that UAS tend to educate people from lower socio-economic backgrounds. Universities are more internationalised, having almost double the proportion of international students in bachelor level programmes (and also a much higher proportion in master's level programmes) than UAS.

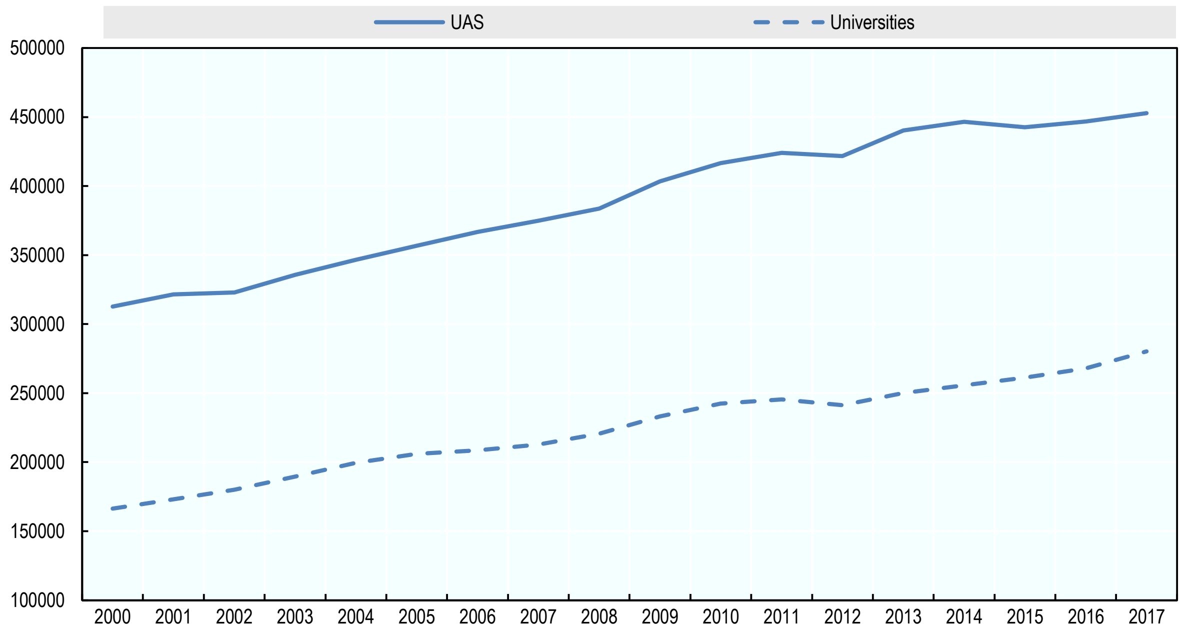
There are also marked differences in completion rates between the subsectors. While one-third of students who entered a bachelor's programme in UAS in 2008 completed their studies within the expected time, this proportion is lower in universities, where less than one-quarter of students complete their studies on time. However, in general, students in universities are more likely than UAS students to complete their studies. The overall rate of non-completion (defined as students who have not gained a qualification three years after the expected timeframe and are not in education) is much higher in UAS, where almost 30% of students end up not gaining any qualification, compared to less than 8% of students from universities.

UAS enrol the majority of students, though enrolments in universities have been growing at a faster rate than UAS in recent years

The UAS sector has always accounted for the majority of students in the Netherlands during recent decades. Of the three participating jurisdictions in the benchmarking exercise with a binary divide in their higher education systems, the UAS sector accounts for the largest share of enrolments in the Netherlands. Around 453 000 of the total of 732 000 students in public higher education institutions in 2017 were enrolled in UAS (62% of the total (Statline and Central Bureau of Statistics, 2019[20])).

Both sectors have been on a pathway of continuous growth in recent decades (Figure 11.16). Since 2000, however, the rate of growth in the university sector has been surpassing that of the UAS sector. Over the five-year period 2013-2017, university enrolments increased by almost 12% in total, while the rate of increase in the UAS sector was less than 3% over the same period.

Figure 11.16. Evolution of enrolments in the subsectors of the Netherlands (2000-2017)



Source: Adapted from Statline and Central Bureau of Statistics (2019[20]), *School size by type of education and ideological basis*, https://opendata.cbs.nl/statline/#/CBS/en/dataset/03753eng/table?dl=10641.

StatLink https://doi.org/10.1787/888933943001

The proportion of new entrants to higher education going to UAS have been reducing as well in recent years. In 2005, more than three-quarters of new entrants went to the UAS sector. However, over time, this share has been gradually reducing. In 2016, the most recent year with available data, the share of new entrants to UAS at the bachelor's level had reduced to 69% from a level of 77% in 2005 (Table 11.7).

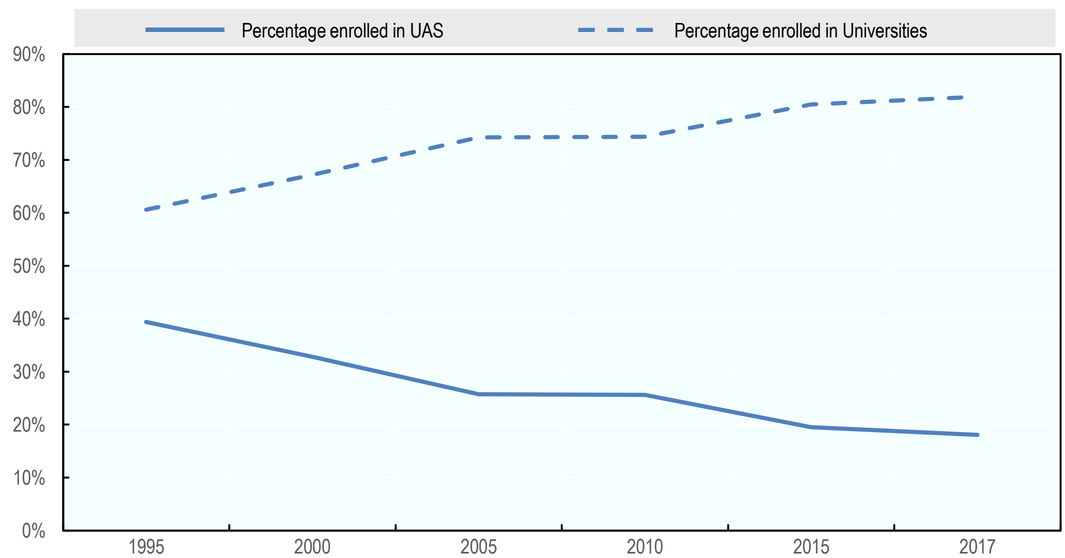
Table 11.7. Share of new entrants in UAS, bachelor's level (2005 to 2016)

	2005	2011	2014	2016
Estonia		31	29	31
The Flemish Community	64	55	60	62
The Netherlands	77	73	71	69

Note: The share of students in UAS is calculated over the total number of new entrants in universities and UAS. Institutions that are not classified in one of these two groups by the national statistical offices are excluded (for example, the Open University in the Netherlands).
Source: Adapted from data provided by the participating jurisdictions.

National data also show that students with a second-level pre-university (VWO) qualification (which provides access to both universities and UAS) are increasingly electing to enrol in universities rather than UAS. While in 1995, about 40% of all students with a VWO qualification enrolled in UAS, by 2017 that proportion had fallen to 18% (Figure 11.17).

Figure 11.17. First-year higher education students with a pre-university qualification (VWO), by sector of enrolment (1995-2017)



Source: Adapted from data provided by the Dutch Ministry of Education, Culture and Science.

StatLink https://doi.org/10.1787/888933943020

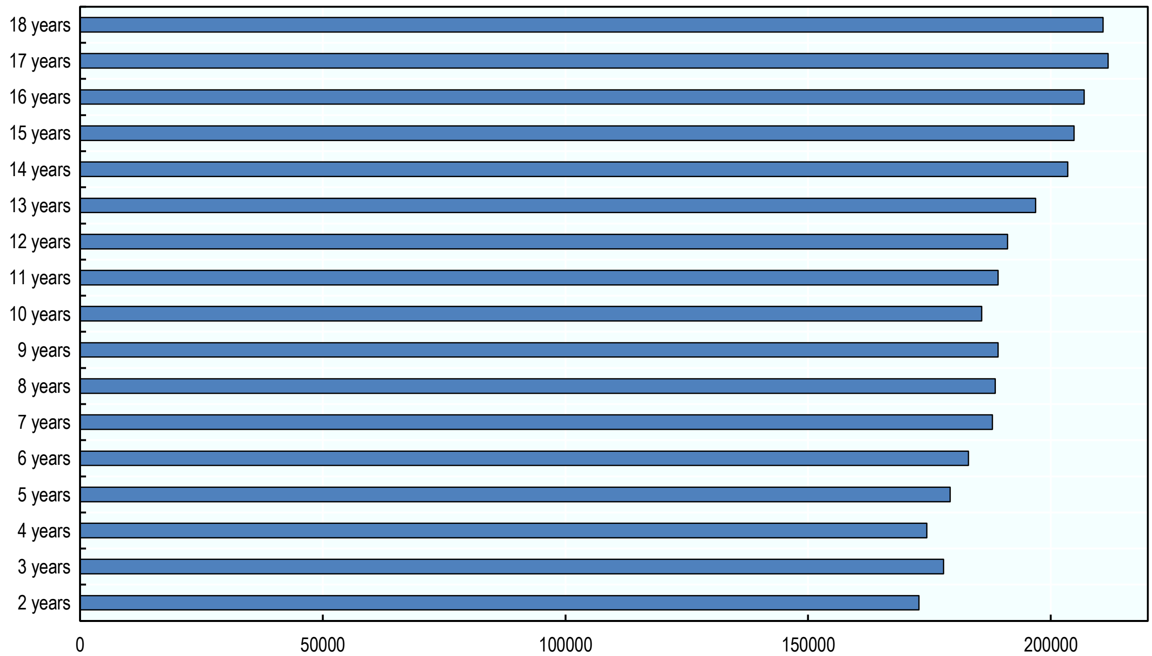
These trends, when considered together, could signal an increasing demand among prospective students for university education in the Netherlands compared to education in UAS.

International student numbers continue to grow, while the demographic profile in the Netherlands may lead to a reduction in domestic demand for higher education

The current demographic structure in the Netherlands indicates that the size of the cohorts entering higher education from secondary education is likely to shrink substantially in the coming years. Assuming there is no major change to migration patterns, the size of the cohort of 18 year-olds in the Netherlands could reduce by more than 20% from 2018 levels in the next 15 years (Figure 11.18).

Unless entry rates increase considerably, this could lead to a continuation of the reduction in enrolments in higher education by domestic students in the Netherlands in the future.

Figure 11.18. Population at each single year of age in the Netherlands (2018)



Source: Eurostat (2019[21]), *Population Database*, https://ec.europa.eu/eurostat/web/population-demography-migration-projections/data/database.

StatLink https://doi.org/10.1787/888933943039

Increased enrolments of international students could potentially offset reduced demand from domestic students. The Netherlands is an attractive destination for international students, due in part to the large-scale provision of higher education programmes in English, particularly at the master's level. While English-taught programmes have become increasingly commonplace across countries where English is not the first language, a 2014 study noted that the Netherlands is the leading provider of English-taught programmes in non-English speaking Europe, in terms of volume of programmes offered, and had the second-highest proportion of courses offered in English, after Denmark (Wachter and Maiworm, 2014[9]).

However, the Netherlands has been undergoing a period of reflection on the future direction of internationalisation of the higher education system, in particular about appropriate numbers of courses in the system that should be offered in English (Royal Netherlands Academy of Arts and Sciences (KNAW), 2017[10]). In a context where three-quarters of master's programmes in universities are carried out in English (Netherlands Association of Universities of Applied Sciences (VH) and Association of Universities in The Netherlands (VSNU), 2018[22]), master's programmes are offered only in English in some fields of study. There has been rising concern that the large increase in programmes offered in English may be resulting in the displacement of students who prefer to study in Dutch, as well as a decline in the use of the Dutch language in higher education.

In Denmark, which has a similar proportion of English-language higher education programmes to the Netherlands, the government has already moved to reduce places on courses taught in English. This decision was partly taken because of national research showing that only about one-third of international students remain in the workforce in

Denmark two years after graduation (Danish Ministry of Higher Education and Science, 2018[23]). If the Netherlands follows a similar course, the reducing size of the domestic entry cohort combined with a possibility that international student numbers may not grow as quickly in the future, could create a situation of declining enrolment numbers in the coming decade.

11.5.3. Scenarios for future demand in the subsectors

The trends outlined in the previous section provide indications of demand for higher education in the Netherlands, and raise important questions about how demand could develop into the future, taking into account the binary divide. The tendencies of the subsectors to cater to different sets of students, the demographic situation, stronger increases in enrolment rates in universities compared to UAS, and reflection about the internationalisation of higher education are issues that will all contribute to the future evolution of the higher education system in the Netherlands. Based on these trends, this section outlines some possible scenarios of future demand for higher education in each of the subsectors. The scenarios can be used to prompt reflection in the Netherlands on which of the possible outcomes described are desirable and attainable, and on associated implications for policy.

Table 11.8 sets out a number of assumptions used to generate scenarios of future demand for higher education in the Netherlands. Assumptions focus on two specific drivers: overall level of demand and the proportion of demand allocated to the UAS subsector. The starting point for each of the assumptions are the numbers of students enrolled in each subsector in the Netherlands, and recent trends in enrolments. Demand is measured in the scenarios as numbers of students, i.e. the numbers of students who could expect to achieve a place in a higher education programme in each of the subsectors. For this simple analysis, all other surrounding conditions are assumed to remain as they are currently (e.g. the open entry characteristic of Dutch higher education).

Table 11.8. Assumptions for future trends used in scenarios

Scenario	Proportion of demand targeted at UAS	Overall demand
Base case	Decreases by 5 percentage points by 2030 (based on the annual average decline over 2015-2017)	Increases by 4.5% by 2030 (based on average change from 2015-2017)
Trend reversal	Increases by 5 percentage points by 2030	Declines gradually by a total of 15% by 2030 (based on demographic trends)
UAS resurgence	Increases by 5 percentage points by 2030	Stays constant at 2017 levels
Double decline	Decreases by 5 percentage points by 2030 (based on the annual average decline over 2015-2017)	Declines gradually by a total of 15% by 2030 (based on demographic trends)

Under the "base case" scenario, the 2017 data are projected forward to 2030 by applying the annual average change over the most recent three years for which data are available (2015-2017). This scenario shows what would happen to demand by 2030 if the most recent trends simply continued indefinitely. In a "trend reversal" scenario, recent trends for both drivers are reversed. In this case, the trend of recent increases in enrolment turns instead into a decrease in demand (by 15% over the period 2017 to 2030), and the trend of increasing share of enrolments in universities turns instead into an increasing share of demand for UAS (by 5 percentage points).

In a scenario of “UAS resurgence”, overall demand would remain static at 2017 levels, but the share of demand for UAS would gradually rise by 5 percentage points by 2030. Finally, a “double decline” scenario shows how the situation could evolve in the case that the demographic patterns reduced demand by 15% and the demand for UAS also decreased by 5 percentage points.

Table 11.9 shows numerically how demand could evolve under each of the different scenarios, while Figure 11.19 shows visually the diverse ways in which different scenarios can impact the future of demand in the university and UAS subsectors.

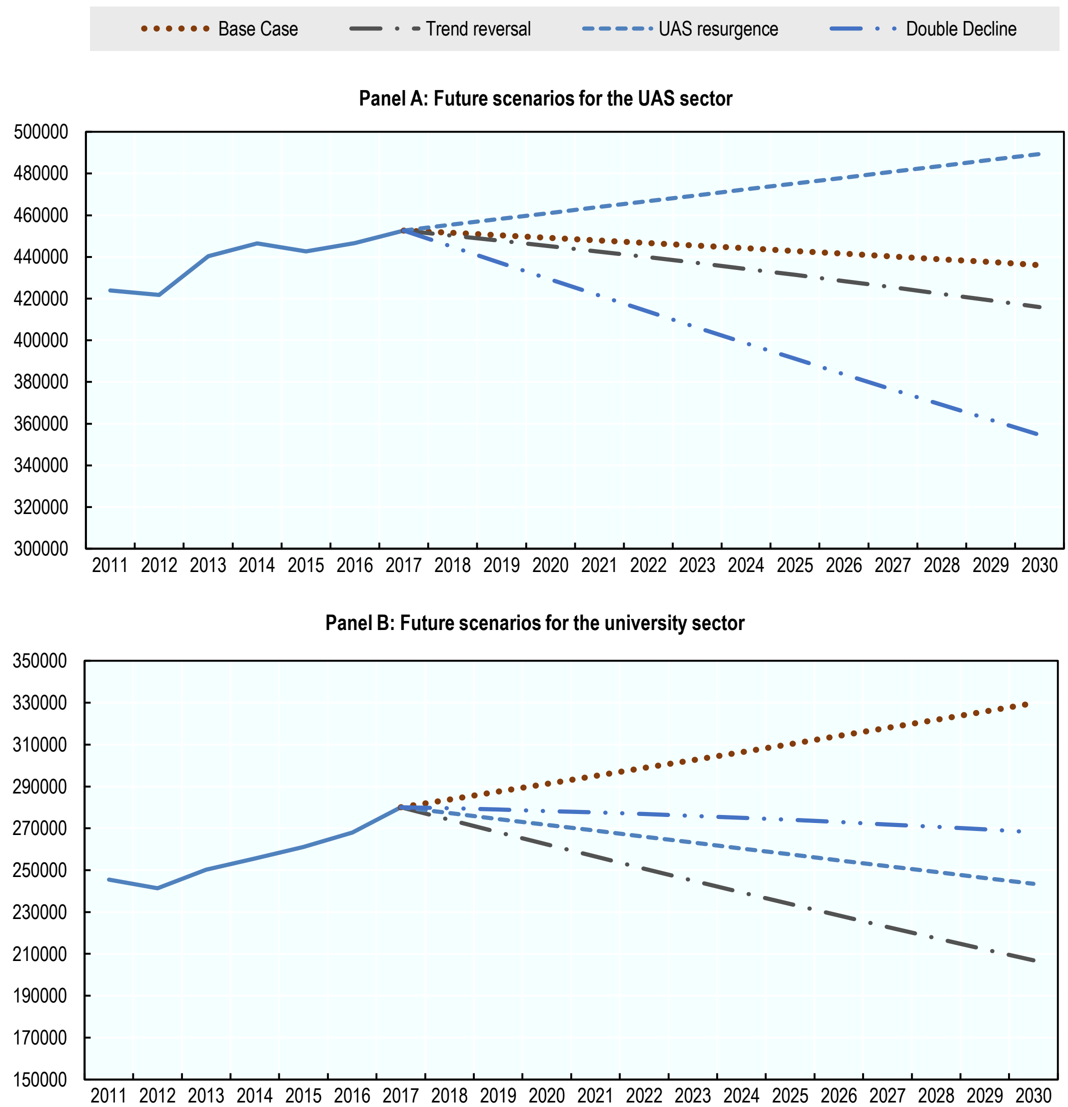
Table 11.9. Future demand for higher education in the Netherlands under different scenarios

	Demand for UAS (number of students)				Demand for university (number of students)			
	Base case	Trend reversal	UAS resurgence	Double decline	Base case	Trend reversal	UAS resurgence	Double decline
2017	452 690	452 690	452 690	452 690	280 114	280 114	280 114	280 114
2018	451 529	450 253	455 508	444 775	283 818	274 096	277 296	279 573
2019	450 349	447 750	458 327	436 924	287 541	268 143	274 477	278 969
2020	449 151	445 183	461 145	429 135	291 284	262 255	271 659	278 303
2021	447 933	442 550	463 964	421 409	295 045	256 432	268 840	277 573
2022	446 697	439 853	466 782	413 746	298 824	250 674	266 022	276 781
2023	445 442	437 090	469 601	406 145	302 623	244 981	263 203	275 926
2024	444 167	434 262	472 419	398 608	306 441	239 354	260 385	275 008
2025	442 874	431 370	475 238	391 133	310 277	233 791	257 566	274 028
2026	441 562	428 412	478 056	383 721	314 133	228 293	254 748	272 984
2027	440 231	425 389	480 875	376 372	318 007	222 860	251 929	271 878
2028	438 882	422 301	483 693	369 086	321 901	217 493	249 111	270 708
2029	437 513	419 149	486 512	361 862	325 813	212 190	246 292	269 476
2030	436 125	415 931	489 330	354 702	329 744	206 953	243 474	268 182

The scenarios highlight the disparities in potential outcomes in terms of demand for the higher education system, which could occur from even reasonably small changes in the driving factors. Actual outcomes and the ability to fulfil demand under different scenarios depends on how the context evolves and how policy actions work to nudge demand in different directions. For example, demand for university education in the Netherlands, under the “base case” scenario would continue to rise to almost 330 000 students by 2030, while under the conditions of the “trend reversal” scenario, demand could drop to just under 207 000 students.

The “UAS resurgence” scenario indicates a gradual increase in demand for UAS programmes (by approximately 10% on 2017 levels) and a corresponding gradual decrease in demand for university education (by approximately 15% on 2017 levels). On the other hand, under the “double decline” scenario, a combination of an overall decline in demand and a decline in the proportions electing to study in UAS would lead to reduced demand for education in both UAS and universities. However, UAS demand would reduce by more than 20% from 2017 levels, while the decrease in demand for university education would be much more marginal, at around 4% from 2017 levels.

Figure 11.19. Demand for higher education in the Netherlands (2011-2030)



StatLink https://doi.org/10.1787/888933943058

11.5.4. Implications for policy

Each of the possible future scenarios raises different implications for policy in the Netherlands. Scenarios that could create additional pressures on the system may require reactive measures, while proactive policy actions can move the system towards the more desirable future scenarios. This section discusses a number of possible policy implications of each of the scenarios.

Further increases in future demand for universities may not be fulfilled without additional investment

The "base case" scenario indicates more positive demand expectations for universities compared to UAS. This reflects recent trends and national data showing that the numbers attending public Dutch universities reached record highs in 2017 (Statline and Central Bureau of Statistics, 2019[20]). The "base case" scenario implies that, if recent trends continue on their current path, there could be close to 20% increase in demand for universities over 2017 levels by 2030. This level of demand may not be feasible to accommodate in universities without additional investment. Already, some institutions have struggled with increasing numbers in recent years, including the increase in international students, which disproportionately affects the university sector. As a result, institutions have proposed to apply conditions of *numerus fixus* to English-taught courses pending reflection on the development of more balanced future approaches to internationalisation in the sector (Netherlands Association of Universities of Applied Sciences (VH) and Association of Universities in The Netherlands (VSNU), 2018[22]).

The government of the Netherlands has already agreed with higher education institutions to reinvest the majority of income from the newly introduced student loan system back into higher education (Chapter 3 of (OECD, 2019[1])). However, the government has committed to targeting this investment towards improving education quality as opposed to financing increases in quantity. Further sustained growth in demand falling on a small number of institutions would require additional outlays on infrastructure and staffing, to ensure adequate accommodation of students and to allow the universities to maintain an appropriate balance between teaching, research and engagement activities.

A "double decline" scenario could limit access opportunities for students in certain groups

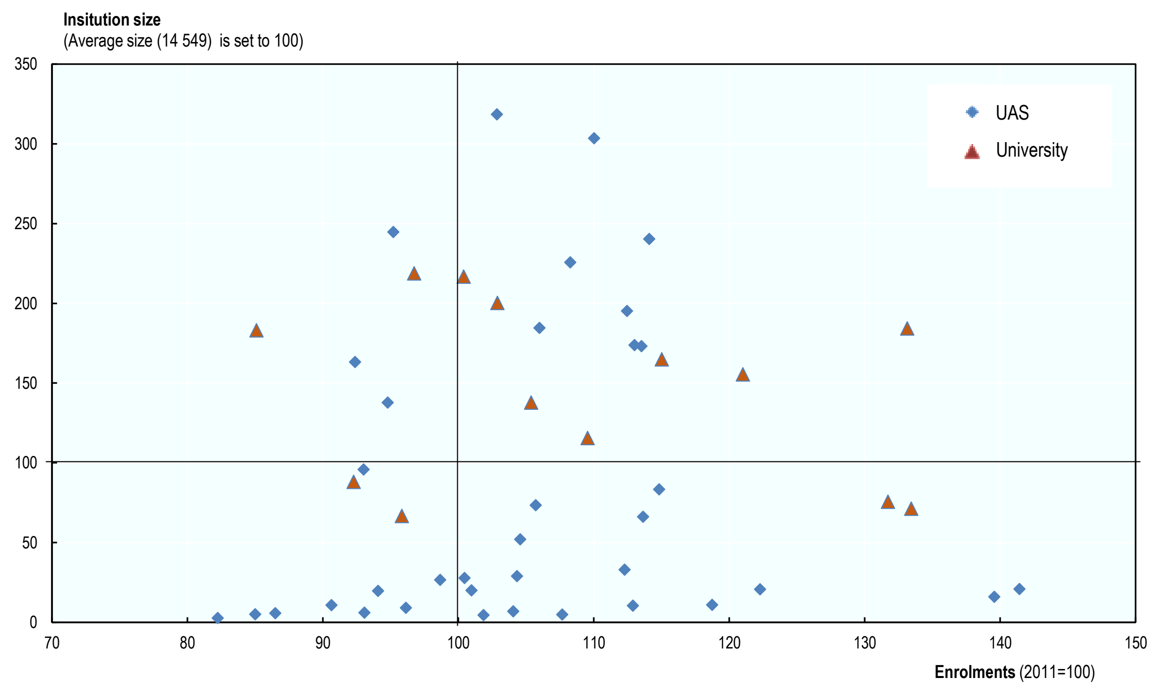
As the two subsectors in the Netherlands tend to attract different proportions of students from certain groups (Table 11.6), it can be beneficial for policy planning purposes to anticipate how future scenarios could affect these student groups. In the Netherlands, the UAS educate the majority of part-time students, older students and students without a tertiary-educated parent. A possible reduction of capacity in UAS, as could be envisaged in the "double decline" and (to a lesser extent) the "trend reversal" scenarios also could lead to a limitation of opportunities for students from the groups disproportionately represented in UAS to access higher education opportunities.

At present, ensuring equality of opportunity to access higher education to more disadvantaged and lower-participation groups is one of the major issues in the policy discourse alongside the future of internationalisation, further developing research capacity and the role of subsectors. In the Netherlands, specific policy for ensuring equity in education is targeted more at the school level, through the *Gelijke Kansen* agenda (Dutch Ministry of Education, Culture and Science, 2019[24]). The national strategy for higher education relates accessibility primarily to matching and course orientation initiatives (Chapter 2 of (OECD, 2019[1])). Previous OECD research also identified a possible need for the Netherlands to broaden its approach to promoting greater equity of access to higher education (OECD, 2008[5]). In a scenario of reducing enrolments in UAS, the Netherlands should ensure that the levels of participation in higher education of under-represented groups are monitored closely.

Changing patterns of demand will cut across the sectoral divide, and may lead to the need for consolidation.

While clear trends can be observed across subsectors as a whole, there are very diverse patterns in enrolments at the level of the individual institutions, which cut across subsector divides. While some universities have expanded their enrolments substantially between 2011 and 2015, four of the 13 universities had declining enrolments over this period. Some of the largest UAS have also increased enrolments over the period and maintained their share of overall enrolments (Figure 11.20). For example, the five largest higher education institutions in the Netherlands, which are all UAS in major urban centres, covered 27% of all enrolments in Dutch public institutions in 2011 and maintained the same proportion in 2015.

Figure 11.20. Enrolment changes in individual institutions (2015)



Source: Adapted from European Register for Tertiary Education (ETER) (2019[6]), *ETER Database*, www.eter-project.com/.

StatLink https://doi.org/10.1787/888933943077

Therefore, in scenarios that envisage a future reduction in demand for UAS, such as the "double decline" and "trend reversal" scenarios detailed in Figure 11.19, the decline is likely to affect a subset of institutions within the subsector more heavily. Despite the fact that there have already been many mergers in the UAS sector in recent decades, in a future scenario of declining demand overall, with uneven impacts between institutions, further consolidations may be required in order to better concentrate finite resources.

Future policy action could include mergers, networking between institutions or collaboration on specific programmes or fields of study. However, the Netherlands may find that scope to flexibly achieve efficiencies in the future and adapt to changing enrolment patterns is hampered by some systemic features and past history. For example, as a result of the strict binary divide, the traditional preference in the Netherlands has been for collaborations or mergers to take place between institutions with the same legal form, i.e. within subsectors (Williams, 2017[25]).

In addition, the Netherlands does not have a history of success with mergers of governance structures across the binary divide. A number of previous initiatives involving mergers were subsequently unwound following opposition from representative bodies, public concern that mergers would lead to the loss in diversity of institutional missions, and cultural differences between organisations which could not be overcome (de Boer, 2017[26]). Furthermore, joint degree programmes between universities and UAS are in general not allowed (Williams, 2017[25]), and collaboration and alliances between universities appear to be more commonplace than alliances within the UAS sector (de Boer, 2017[26]).

Despite these existing challenges and some constraints imposed by the binary system, new degrees of flexibility and innovation in adapting to changes in enrolment across sectors could assist the Netherlands in successfully adapting to changing patterns of demand in the future. There is scope to explore ways to promote greater collaboration between institutions to strengthen institutional capacity in both sectors while promoting greater efficiency in the provision of education across sectors. The Netherlands could take into account some recent innovative examples from other OECD jurisdictions of collaboration across binary divides (Box 11.4).

Box 11.4. Collaborations across institution types in OECD countries

Many OECD countries are developing new models of inter-sectoral collaboration between higher education institutions, which have the capacity to reduce inefficiency and improve the quality of education.

The **Flemish Community** provides an example of a strict binary system that has also been able to put in place official mechanisms for co-operation between sectors. UAS in the Flemish Community focus mainly on occupationally specific and labour market-relevant education and training, and provide regional coverage to support access. In 2003, a decree was introduced that required all UAS to develop "associations" with a university. Associations are official bodies where co-operation between a university and one or more UAS is formally established. The key goals of the associations were to align all Flemish programmes with the Bologna structure, including academically oriented programmes offered by UAS; build better connections between the two sectors; improve efficiency of programme offerings and reduce overlap. The associations also facilitate transfer arrangements for students from one type of institution to the other and the development of learning pathways across education levels and subsectors.

Institutions from different sectors (universities and polytechnics) in **Finland** have agreements to share facilities across the binary divide. Closer collaboration between sectors is also a defined operational goal of the system, particularly to meet regional needs (Williams, 2017[25]).

In **Germany**, while the UAS (*fachhochschulen*) are not allowed to independently offer programmes of doctoral education, inter-sectoral co-operation agreements are encouraged, which allow for the joint involvement of institutions in both sectors in doctoral education programmes. These co-operative doctoral degrees are increasingly used in Germany to expand doctoral education (Eurydice, 2019[27]).

A "UAS resurgence" scenario could be achieved by continued relaxation of certain restrictions on the UAS sector, and by building capacity for internationalisation.

The Netherlands appears to be committed to maintaining the binary divide between universities and UAS into the future, as evidenced by the maintenance of restrictions that delineate the sectors, and the continuation of sectoral agreements between the government and the sectoral representative bodies out to 2024.

Despite some previously identified difficulties with the binary system (Box 11.5), perpetuating the binary divide may have paid a dividend for Dutch research, which is concentrated mainly in the 13 research institutions and recognised internationally for its excellence (Chapter 6 of (OECD, 2019[1])). By maintaining the binary divide and restricting academic research to universities only, the Netherlands may have avoided some of the issues observed in other countries that have opened up research capacity to a broader range of institutions, such as fragmentation of research capacity and funding (OECD, 2008[5]). Such fragmentation may prevent research groups and activities from achieving the "critical mass" necessary for top-quality research (Kenna and Berche, 2011[28]).

Box 11.5. The OECD view of the binary system in the Netherlands in 2008

A previous OECD review of higher education in the Netherlands identified examples of cases where the lines had become blurred between the orientations and missions of the subsectors in the Netherlands. The academically oriented research universities train professionals for the labour market in some fields, while UAS also offer programmes that are more theoretical. In addition, overlap in fields of study including business, law and communications were observed. The traditional idea of the more localised orientation of the UAS may also be outdated in the modern Dutch society where graduates from both sectors are likely to work outside of their local areas and internationally in various sizes and types of enterprises.

The review team concluded that the binary line in the Netherlands provides for two sectors with distinct roles; but neither is functioning at an optimum level and the inflexibility of the binary structure may not accommodate the full range of national needs. Continued "drift" in missions could undermine the rationale for the binary system and constant monitoring is needed by national authorities to ensure that the binary line is maintained.

Source: OECD (2008[5]), *Tertiary Education for the Knowledge Society: Volume 1 and Volume 2*, https://dx.doi.org/10.1787/9789264046535-en.

In the right conditions, demand for attending UAS could increase in the coming decade and create the "UAS resurgence" scenario, which projects an increase in annual demand for UAS by around 35 000 students a year compared to 2017 levels, even if overall demand remains static over the same period. This scenario would remove some of the pressure on universities and ensure sustainable growth in the UAS sector enrolments. It could be achieved by encouraging a broader range of programmes of study in the sector, and by UAS developing a more prominent positioning within the global higher education system.

While master's programmes exist in UAS, they are relatively rare compared to the university sector. Master's programmes comprise 13% of programmes offered at UAS, while 63% of all programmes offered in universities are at the master's level (Netherlands Association of Universities of Applied Sciences (VH) and Association of Universities in The Netherlands (VSNU), 2018[22]). This may imply a greater role for UAS in providing master's programmes in the future, given the proportion of overall enrolments in master's programmes in general in the Netherlands, which is lower than the OECD average and many European countries (Chapter 2 of (OECD, 2019[1])).

Moreover, the majority of master's programmes in the Netherlands are only available in English, and the government is committed to ensuring that every graduate from a bachelor's level programme should have access to at least one master's programme in their field of study in Dutch in the future. Further encouraging and developing capacity in UAS (where programmes remain primarily taught in Dutch) to offer a wider range of appropriate master's programmes could lead to an increase in demand for studies in UAS.

Similarly, a general increase in demand, as foreseen in the default "base case" scenario, could also boost the demand and the numbers of the population eligible for doctoral training. The Netherlands appears to have a lower capacity to produce doctoral graduates compared to many other OECD countries (see Section 4), and currently, responsibility for doctoral education lies only with the universities. The rationale for restricting graduate programmes to only one sector in the Netherlands could be reviewed in light of current practices in the Netherlands and other jurisdictions.

Demand is high across Europe for doctoral education that is industry-focused (European Commission, 2017[29]). The Netherlands has already demonstrated an ability to introduce highly differentiated research activities in the UAS sector through the creation of the lector position and the establishment of Centres of Expertise for practice-based research (Chapter 6 of (OECD, 2019[1])). In the future, the Netherlands could build on these achievements and use them as a vehicle to create mechanisms for more advanced practice-based graduate programmes to be carried out in UAS under strict conditions (such as having a suitable staff profile), or give UAS a greater role in providing doctoral education, as is the case in Germany (Box 11.4).

Building capacity for a wider range of graduate programmes could also promote greater internationalisation of the UAS sector. The low level of internationalisation has been previously indicated by UAS students as one of the least satisfying aspects of their education experience (Studiekeuze123, 2018[30]).

Internationalisation can be promoted in UAS in many innovative ways, other than by switching programmes completely to the English medium of instruction. The concept of "internationalisation at home" has gained some policy attention in the Netherlands in recent years, and implies offering a more international orientation to higher education beyond increasing the numbers of international students. This can be achieved by creating a more internationally-focused curriculum, offering a section of a study programme in another language, or enrolling in online courses in a foreign higher education institution (Beelen and Jones, 2015[31]).

Internationalisation in UAS could also be encouraged by creating new partnerships with institutions in other countries through the joint provision of programmes, thus improving the circulation of international students. International partnerships between institutions are becoming increasingly commonplace, either in the framework of supranational programmes such as the Erasmus Mundus joint master's initiative (European

Commission, 2019[32]) or individual agreements between institutions. If UAS could play a role in doctoral education, they could also seek ways to promote joint supervision arrangements for master's and doctoral students with institutions in other countries, such as through the *cotutelle* model in use in some European countries, including Norway.

International partnerships can also enhance regional co-operation, which is an important part of the UAS mission in the Netherlands. For example, Estonia is working to strengthen links with neighbouring countries by offering higher education programmes of joint regional interest (see the Estonia country note).

Box 11.6. *Cotutelle* arrangements as a means of internationalisation

Cotutelle is an agreement on joint supervision of the doctoral degree level. Such agreements can be reached between the two co-operating institutions, the PhD candidate and the candidate's supervisors. A *cotutelle* agreement must always be reached on the individual level, but institutional agreements can also be made on *cotutelle* co-operation. The candidate receives a diploma from each of the institutions.

Cotutelle agreements across national boundaries are possible in many OECD jurisdictions, including Australia, France, Norway and Switzerland. Joint supervision agreements can act as a vehicle to promote a greater international profile for institutions, enhance brain circulation and increase the numbers of doctoral graduates with less commitment of resources from any one institution.

Notes

[1] The statistics for the Netherlands on R&D and education expenditure report the intended allocation of funding, rather than the actual spending by institutions. The statistical reporting conventions differ by country (see Chapter 3 of OECD (2019[1])).

[2] Household expenditure on higher education institutions includes tuition fees, other fees charged for educational services (e.g. registration fees and laboratory fees) and fees paid to institutions for lodging, meals and other welfare services. However, the amount of other (non-tuition) fees is small relative to tuition fees in the Netherlands.

[3] It should be noted that the ETER data on which this indicator is based exclude funding for the Centres of Expertise, organisations associated with UAS and devoted to stimulating cooperation with private and public partners in research and training.

[4] according to calculations from national administrative data

[5] Based on a random sample of 100 000 documents in the Elsevier Scopus database.

[6]It should be noted that in the Netherlands, external candidates are excluded from the calculation of entry rates, which causes an underestimate of the true entry rate given the relatively large proportions of external candidates in these jurisdictions. See (Chapter 6 of (OECD, 2019[1])

[7] Based on OECD analysis of a random sample of 100 000 documents in the Elsevier Scopus database. See Chapter 7 of (OECD, 2019[1]).

[8] These consist of the 13 research universities, the Open University of the Netherlands and four smaller, more specialised institutes for theological or humanistic study.

[9] This proportion was computed based on the background questionnaire of the OECD Survey of Adult Skills (PIAAC) national data file for the Netherlands. Data includes master's graduates in universities.

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Chapter 12. Benchmarking Higher Education System Performance: Norway

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

12.1. Higher education performance in Norway

12.1.1. Introduction

This country note draws on the evidence base of the OECD Benchmarking Higher Education System Performance project to review the performance of the higher education system in Norway. Its purpose is to assist Norway in taking stock of where it stands in relation to other OECD member countries on different aspects of higher education and to provide input into future national policy planning processes.

This stocktaking exercise is supported in this note in two ways. First, a scorecard of 45 indicators is presented, which highlights Norway's position within the OECD. This scorecard draws on the evidence compiled during the benchmarking exercise and is organised into three domains: financial and human resources; education; and research and engagement. The first sections of this note contain a brief discussion of the Norwegian higher education system's position within these three domains.

The final section of the note contains a policy scenario exercise. Topics chosen for scenarios in the benchmarking country notes are issues that appear to present important policy challenges for jurisdictions and are likely to persist for the near future. Assumption choices used for the scenarios take into account recent trends in Norway and across the OECD. Following the presentation of the scenarios, a set of policy options are examined that could be feasible responses to the challenges under discussion and consideration is given to how successful action might orient the system towards the achievement of more positive scenarios.

12.1.2. Context and structure of higher education in Norway

Norway is one of the most developed OECD countries, with one of highest rates of GDP per capita and one of the lowest levels of government debt. This means that Norway has been able to maintain spending on higher education in the years following the economic crisis. Employment rates are relatively high, and Norway is one of the more egalitarian countries in the OECD, with income inequality among the lowest in OECD countries.

Because of this favourable context, students in Norway are well supported and there are high levels of investment in the education systems at all levels. In total, more than 275 000 students in Norway are enrolled in higher education programmes.[1] Higher education is offered in universities (*universitet*), university colleges (*høgskole*), specialised university institutions (*vitenskapelig høgskole*) and private institutions. In recent decades, the system has moved from a previously binary structure to a more unitary system, and the system has been consolidated through a series of institutional mergers, which aim to enhance efficiency and competitiveness while maintaining geographic coverage (OECD, 2018[1]).

In Norway, higher education is considered a public good, encouraging economic development and fostering inclusiveness and equality in society. Based on this belief, the government finances most of higher education expenditure. There are many pathways into the higher education system in Norway for potential students of all ages and backgrounds, and there is a generous system of student financial support with a low burden on households compared to most other OECD countries.

Higher education policy is regularly reviewed and updated in Norway, and long-term plans for education and research are issued approximately every 4 years. The most recent long-term plan heavily emphasises initiatives that aim to improve the quality of teaching and learning in higher education, reflecting the growing focus internationally on the need to ensure high quality learning experiences for students in higher education.

12.1.3. Norway's higher education scorecard

Table 12.1 shows a summary of the relative position of Norway within OECD countries according to a set of 45 indicators spanning the resourcing, education, research and engagement functions of higher education, in a scorecard format where each box relates to one of the quartiles of the OECD distribution. These indicators are drawn from the compilation of evidence in the synthesis report of the OECD Benchmarking Higher Education Systems Performance project,[2] in which Norway participated during 2017-2018.

As can be seen in the scorecard, Norway has one of the best-resourced higher education systems in the OECD, and performs highly in general in the education, research and engagement missions, according to the indicators presented. Particular strengths include the levels of expenditure per student, including financial support directly to students for grants and scholarships, for which the levels in Norway are in the top quartile of OECD countries. Norway also spends more on higher education research and development than most OECD countries, and has one of the highest proportions of academic staff younger than 35, indicating successful policies to attract young researchers.

The scorecard also demonstrates the strength of employment prospects for higher education graduates in Norway. Employment rates for graduates with a master's degree are among the highest in the OECD. However, the relative returns on higher education are lower than in many other OECD countries, with an employment premium below the OECD median level, and one of the lowest differences in earnings between those who have and do not have a higher education qualification. This can reduce the incentives for students to enter and complete higher education programmes, and while today Norway benefits one of the most educated populations in the OECD, the scenario exercise presented in Section 12.5 suggests that this could possibly change in the future if recent trends in both Norway and the OECD as a whole continue.

The portion of the scorecard related to research and engagement shows that while Norway has one of the lowest levels of investment in basic research in the OECD, it is a leader in many other areas, including scientific production, attracting international talent and making scientific research publicly available for wider societal benefit.

Table 12.1. Higher Education system benchmarking: Norway

Selected higher education (HE) indicators and country position in the OECD distribution (by quartile). Reference year range: 2005-2017

Financial and human resources	← Low			→ High
Expenditure on HE, % of GDP			■	
Public expenditure on HE, % of public expenditure				■
Expenditure per student by HE institutions				■
Expenditure per student, 2015 relative to 2008		■		
HE R&D expenditure, % of GDP				■
Expenditure on R&D activities, %				■
Household expenditure on HE institutions per student	■			
Non-household private expenditure on HE institutions, %	■			
Expenditure per student on grants and scholarships				■
Academic staff younger than 35, %				■
Academic staff older than 60, %			■	
Women among academic staff, %			■	
Expenditure on staff costs, %			■	
Ratio of academic staff to students				■
Non-academic staff per 100 academic staff		▒		

Education	← Low			→ High
Entry rates into bachelor's or equivalent programmes				■
Students in master's and doctoral programmes, %			■	
*Socio-economic gap in HE access				▒
New entrants older than 25, bachelor's programmes, %			■	
Part-time students in bachelor's programmes, %				■
International students in master's programmes, %		■		
Completion rates of bachelor's students				▒
Young population (23-34) with a HE qualification, %			■	
HE graduates above literacy proficiency level 3, %			■	
Employment rates of master's graduates (25-34)				■
Employment premium, HE graduates (25-34)		■		
HE graduates (15-29) employed or in education, %				■
Relative earnings of bachelor's graduates (25-34)	■			
HE graduates' relative level of self-reported health				■
HE graduates' relative level of interpersonal trust			■	

Research and Engagement	← Low			→ High
FTE researchers per 1000 population				■
Researchers working in HE, %		■		
Women researchers in HE, %				■
Doctorate holders in the population, %			■	
Foreign citizen doctorate holders, %				▒
Business enterprise funding of HERD, %		■		
Higher education-business collaboration in R&D			■	
SMEs collaborating on innovation, %				■
PCT published applications from HE R&D, %		■		
HE R&D funding on basic research, %	■			
Number of publications per 1000 population				■
Publications among the 10% most cited, %			■	
International scientific collaboration			■	
International net flows of scientific authors				■
Open access of scientific documents, %				■

Note: The coloured square below each value represents Norway's position in the OECD distribution, from the bottom quartile (left square) to the top quartile (right square). The square is shaded in grey (instead of black) when data are available for less than half of the OECD countries (the minimum number of countries with available data is 14). No coloured square means that data are missing for Norway. For more information on methodological issues and metadata, see OECD (2019[2]) and the references cited therein. Follow the *statlink* to download the data underlying the calculation of the scorecard.

*For the indicator 'socio-economic gap in HE access': the top quartile implies that the difference between 18-24 year-olds with tertiary-educated parents and those with non-tertiary-educated parents is smaller.

Source: Adapted from OECD (2019[2]), *Benchmarking Higher Education System Performance*, https://doi.org/10.1787/be5514d7-en.

StatLink https://doi.org/10.1787/888933943096

12.2. Financial and human resources

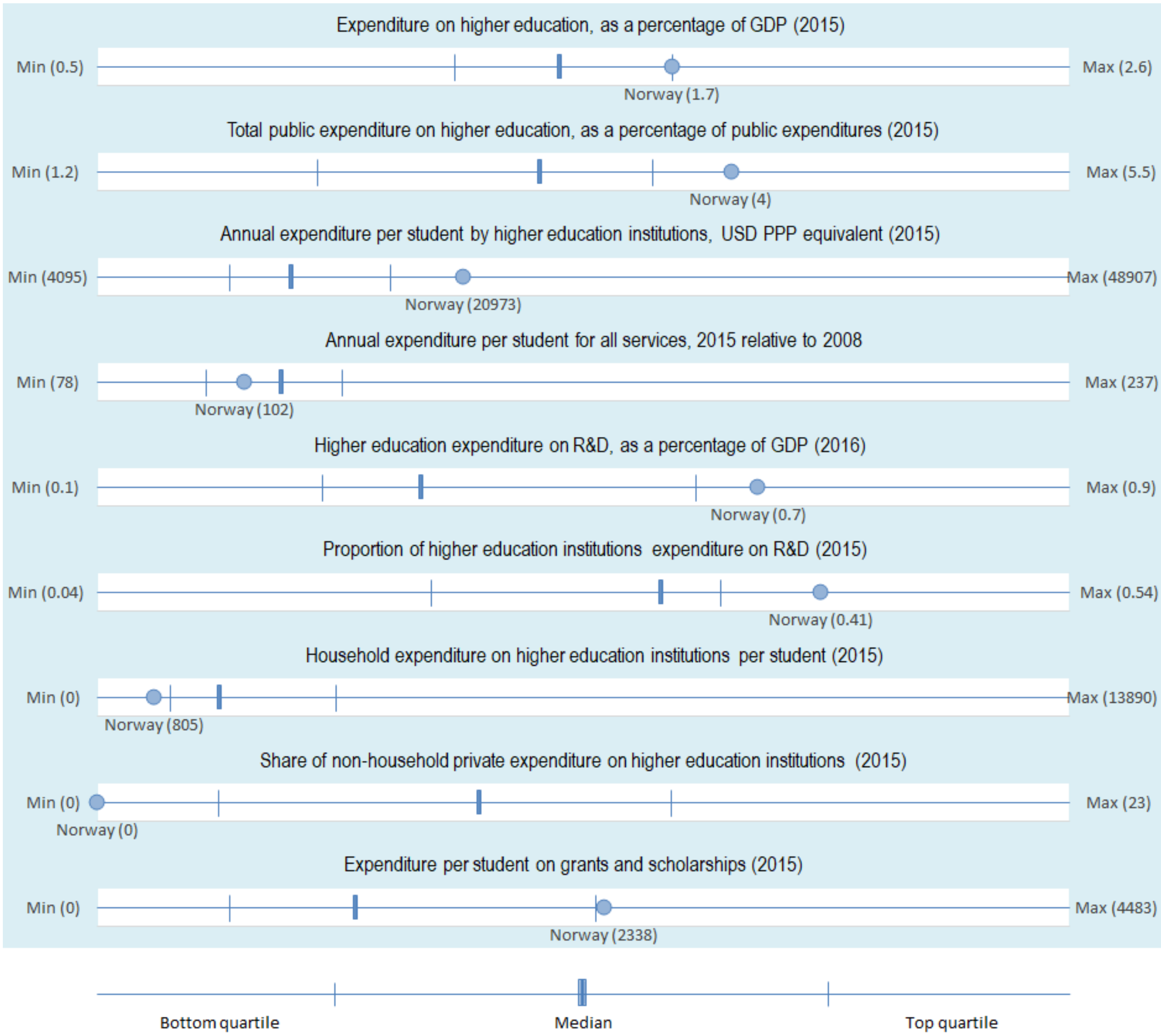
Highlights

- Norway devotes considerable financial resources to higher education. Higher education expenditure per student in Norway was one of the highest among OECD countries in 2015. The relatively wealthy economy and a strong commitment to higher education has enabled Norway to invest greatly in higher education over the last decade.
- Based on the belief that higher education provides substantial public benefits, the government finances most of higher education expenditure, and the burden on households is low compared to the majority of OECD countries. Students studying at public institutions pay no tuition fees and have access to public grants, scholarships and loans, allowing all eligible students to access higher education.
- Norway also prioritises research and development (R&D) activities at a national level. Both gross domestic expenditure on research and development (GERD) and higher education expenditure on research and development (HERD) have increased over the past decade. Norway plans to increase investment further in the coming decade.
- Nearly one-third of academic staff was younger than 35 in Norway in 2016, in the top quartile of OECD countries. The share of academic staff older than 60 was 16%, which was higher than the median of OECD countries.
- The share of women among academic staff in Norway was 46% in 2016, slightly above the median of OECD countries. However, the share of women academic staff in the age group younger than 35 was below the median.
- Academic staff in public institutions are employed as civil servants in most cases. They earned USD 61 000 annually on average in 2014, slightly more than the OECD median and the national average salary.
- Over two-thirds of academic staff with teaching duties (teaching staff) had a permanent contract in 2016, the second highest share among the four jurisdictions participating in the benchmarking exercise. However, less than one-quarter of young teaching staff had a permanent contract.

12.2.1. Financial resources

On the portion of the scorecard related to financial resources, Norway appears in the top quartile on many of the indicators, demonstrating the relatively high levels of resources invested in higher education compared to many other OECD countries. Figure 12.1 shows a more detailed view of the financial resources indicators for Norway presented in the scorecard (Table 12.1).

Figure 12.1. Where does Norway stand in the OECD distribution? Financial resources



Note: The indicators represented in this chart are a subset of the indicators presented in Table 12.1. The coloured circle represents Norway's position in the OECD distribution. The circle is not coloured when data are available for less than half of the OECD countries (the minimum number of countries with available data is 14). For more information on methodological issues and metadata, see OECD (2019[2]) and the references cited therein. Follow the *Statlink* to download the data underlying the calculation of the scorecard.
Source: Adapted from OECD (2019[2]), *Benchmarking Higher Education System Performance*, https://doi.org/10.1787/be5514d7-en.

StatLink https://doi.org/10.1787/888933943115

Expenditure per student is one of the highest among OECD countries

Norway spent 1.7% of its GDP on higher education institutions in 2015, placing it in the top quartile of OECD countries. This is a similar proportion to other Nordic countries (i.e. Denmark, Finland and Sweden), which as a group tend to devote relatively high levels of expenditure to social services.

Higher education expenditure per student was approximately USD 21 000 in 2015, which was one of the highest among OECD countries. This can be partly explained by Norway's relatively wealthy position, with one of the highest GDP per capita among OECD countries, which allows for greater investment in higher education. This resource-rich environment creates opportunities for higher education institutions to be able to invest more in improving their activities. Norway maintained the high rate of investment per student in the years after the economic crisis. Education expenditure per student has been stable for the past decade, increasing in total by 2% between 2008 and 2015, a rate slightly below the median increase across the OECD over the same period.

The relatively high level of higher education expenditure per student may also be explained by the government's strong commitment to higher education. The government spent 4% of its total government expenditure on higher education in 2015, placing it in the top quartile of OECD countries. Indeed, Norway is one of the few countries that appoints a minister to specifically focus on higher education and research[3] (Norwegian Ministry of Education and Research, 2018[3]).

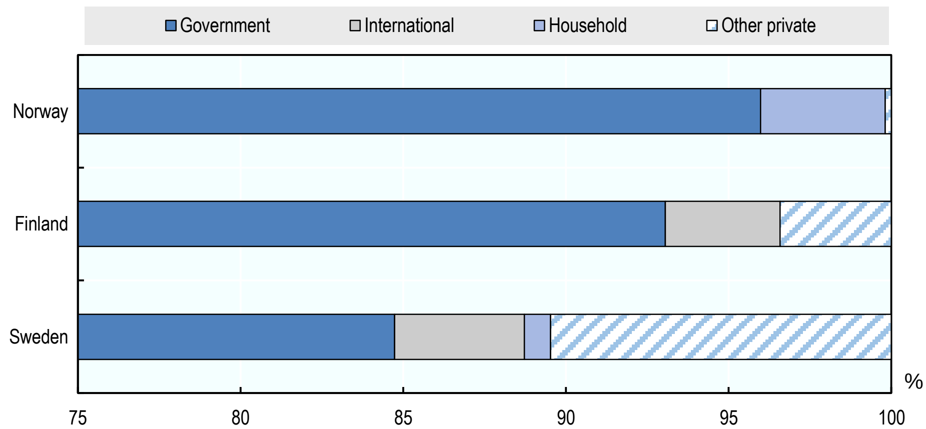
The government finances almost all expenditure on higher education

Virtually all (96%) of the financial resources for higher education in Norway came from the government in 2015, the highest share among OECD countries. Household expenditure on higher education was USD 800 in 2015, in the bottom quartile and one of the lowest levels in OECD countries. Students enrolled in public institutions pay no tuition fees.[4] In addition, public loans and grants are available in order to help students cover their living expenses. The average amount of public expenditure on grants, scholarships and loans per student in Norway was nearly USD 7 900 in 2015, which was the second highest among OECD countries. Of this amount, about 70% was spent on the student loan system (USD 5 600) while the remainder was spent on grants and scholarships (USD 2 300).

All students admitted to accredited higher education programmes are eligible to receive a 'basic support' package, which amounts to up to NOK 110 000 per year for a maximum of eight years (except for exceptional circumstances, see (OECD, 2019[2])). The basic support is a loan; however, part of it can be converted into a grant for students who live away from their parents and complete their programme within the expected time.

The Norwegian higher education system receives almost no support from other non-household private entities (Figure 12.2). In 2015, the share of funding from other private entities was the lowest among OECD countries (0.2%), considerably different from some other Nordic countries, e.g. Finland (3.4%) and Sweden (10.5%).

Figure 12.2. Share of higher education expenditure, by source (2015)



Source: OECD (2018[4]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en.

StatLink https://doi.org/10.1787/888933943134

There is a strong emphasis on research and development in the funding model

Gross domestic expenditure on research and development (GERD) was 2% of Norway's GDP in 2016, slightly above the OECD median level, and increased from 2007 levels when GERD was around 1.6% of GDP. Norway, along with many other European countries, has committed to further increase GERD to 3% of GDP by 2030 (Norwegian Ministry for Education and Research, 2015[5]).

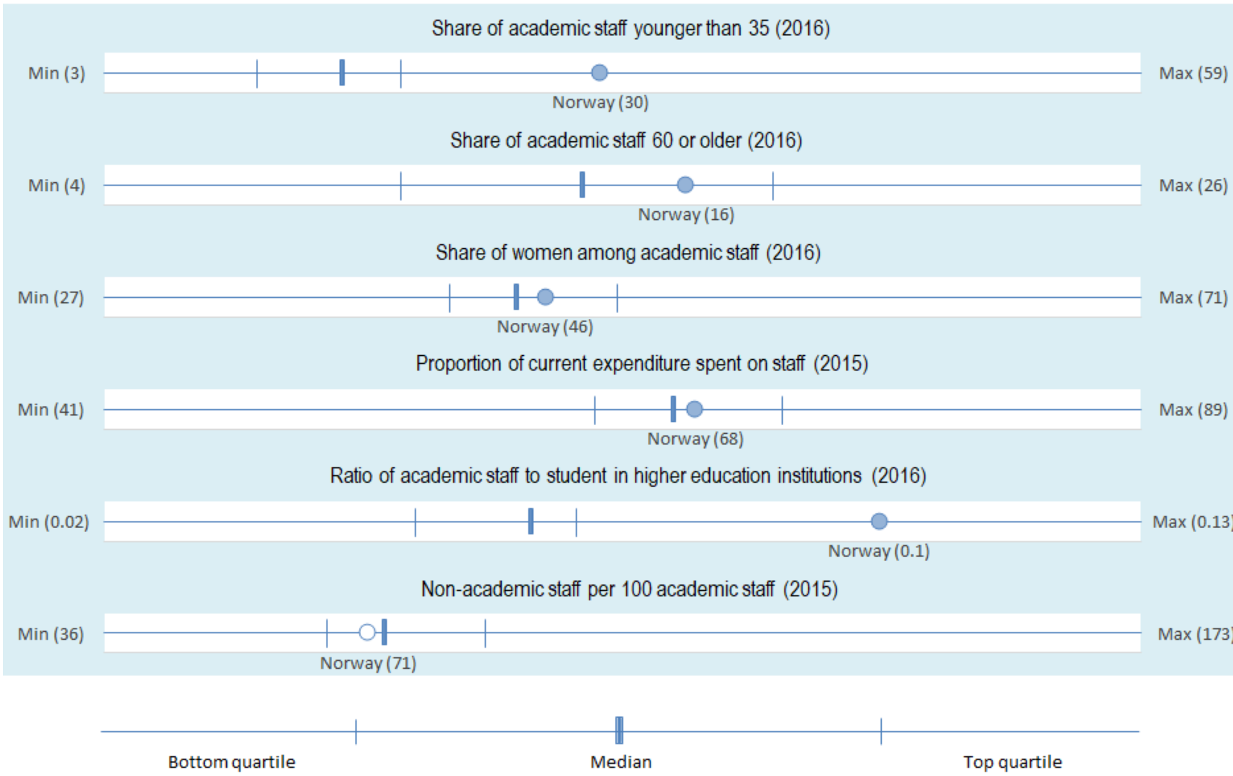
Higher education expenditure on research and development (HERD) made up about one-third of total expenditure on research and development activities in Norway in 2016, with the remainder allocated to the two other main R&D sectors (public research institutes and the business enterprise sector). The level of HERD as a proportion of GDP in Norway (0.7%) is in the top quartile of OECD countries, and is similar to the proportions of GDP invested in neighbouring Nordic countries.

In addition, Norway allocated over 40% of higher education expenditure per student on R&D activities in 2015, which was one of the higher shares of allocation within the OECD (in the top quartile). Key recent investments include the creation of 500 new fully funded PhD positions between 2015 and 2018 (Norwegian Ministry for Education and Research, 2015[5]), and a commitment to greatly expand capital investment through the Norwegian Research Infrastructures Roadmap (OECD, 2019[2]).

12.2.2. Human resources

Figure 12.3 provides a detailed overview of Norway's position in the OECD distribution on the scorecard indicators related to human resources.

Figure 12.3. Where does Norway stand in the OECD distribution? Human resources



Note: The indicators represented in this chart are a subset of the indicators presented in Table 12.1. The coloured circle represents Norway's position in the OECD distribution. The circle is not coloured when data are available for less than half of the OECD countries (the minimum number of countries with available data is 14). For more information on methodological issues and metadata, see OECD (2019[2]) and the references cited therein. Follow the *Statlink* to download the data underlying the calculation of the scorecard.
Source: Adapted from OECD (2019[2]), *Benchmarking Higher Education System Performance*, https://doi.org/10.1787/be5514d7-en.

StatLink https://doi.org/10.1787/888933943153

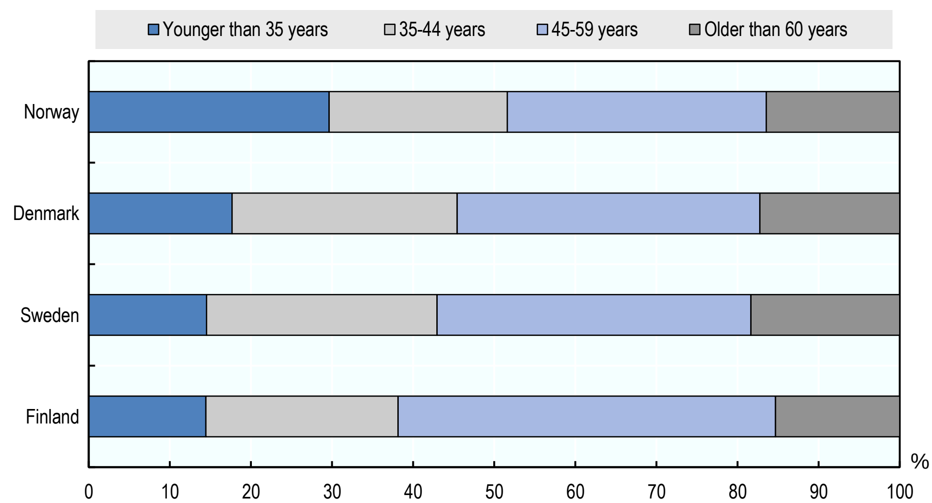
Norway has been successful in attracting younger talent to academia

The academic staff structure in Norway is well defined and includes professors, associate professors, docents, lecturers, postdoctoral fellows and doctorate research fellows (OECD, 2019[2]). Norway had a relatively high proportion of academic staff younger than 35 in 2016, which, at 30%, was in the top quartile of OECD countries and higher than in many neighbouring countries (Figure 12.4).

This may reflect the relatively stable funding environment for R&D in Norway and the success of recent policy initiatives. For example, the Research Council of Norway has been trying to make an academic career more attractive to young talent, including initiatives promoting interest in science among young people (e.g. the Science Knowledge Project for children (*Nysgjerrigper*) and the *Proscientia* project) (OECD, 2019[2]).

The high share of younger academic staff may also be partly related to the fact that, in Norway, doctoral candidates are classified as academic staff, which is not always the case in other OECD countries. In Norway, doctoral candidates have a contract with the higher education institution in which they study, the Research Council of Norway, a company or a public employer. Doctoral candidates employed by a higher education institution on a four-year contract are required to allocate part of their time to the work of the higher education institution through activities such as teaching.

Figure 12.4. Share of academic staff in higher education, by age group (2016)



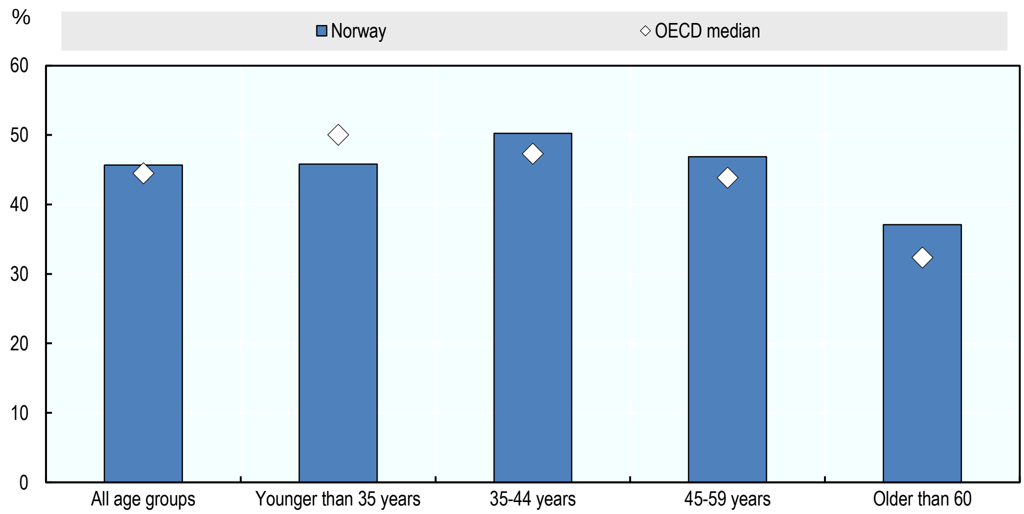
Note: Data exclude independent private institutions for Norway.
Source: OECD (2018[4]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en.

StatLink https://doi.org/10.1787/888933943172

Gender parity in academic staff has almost been achieved, particularly in younger age groups

The overall share of women among academic staff was 46% in 2016, placing Norway above the median of OECD countries (Figure 12.5). However, the share of women among academic staff younger than 35 in Norway was around 5 percentage points lower than the OECD median. All age groups up to 60 had a gender gap of 4 percentage points or less, while the oldest age group (older than 60 years) had a gender gap of 13 percentage points. This equity among age groups may reflect long-standing policies to encourage gender equity in employment in Norway (OECD, 2019[2]). Currently, all public institutions are obliged by law to take active steps to promote gender equality.

Figure 12.5. Share of women among academic staff in higher education, by age group (2016)



Note: Data exclude independent private institutions for Norway.
Source: Adapted from OECD (2018[4]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en.

StatLink https://doi.org/10.1787/888933943191

Teaching staff earn more than the national average salary

Higher education current expenditure covers goods and services consumed within the current year to sustain the activities of institutions. It includes compensation of personnel (both academic and administrative) as well as other costs, for example, for general supplies and for contracted services such as building cleaning and maintenance. Norway spent over two-thirds of its higher education current expenditure on staff in 2015, which was just above the median of OECD countries.

The average annual salary for teaching staff (academic staff with teaching duties) in Norway was approximately USD 61 000 in 2014, which was above the median of OECD countries with available data (USD 55 000) and the average salary in Norway in the same year (USD 51 000) (OECD, 2019[6]). Almost all employees at public higher education institutions have civil servant status; therefore, their salaries and other working conditions are determined based on public sector regulations.

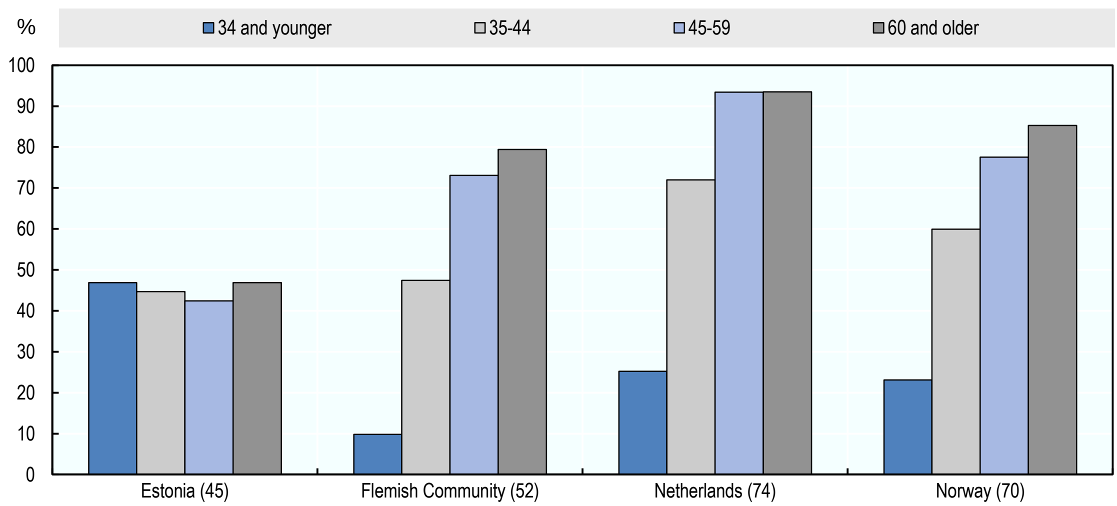
Over two-thirds of teaching staff have a permanent contract

Balancing the need to maximise efficiency in the academic workforce and the importance of ensuring high-quality working conditions is a key policy concern in many OECD higher education systems. In 2016, the share of teaching staff with a permanent contract was 70% (Figure 12.6). This proportion was the second highest among the four jurisdictions participating in the benchmarking exercise. The high share of teaching staff with an ongoing contract indicates high job security. However, this may also signal that higher education institutions in Norway have less flexibility as employers; they may find it more difficult than in other jurisdictions to adjust their staff profile to fluctuations in enrolments.

There is evidence that job insecurity in Norway, as in many other OECD countries, is a greater concern for younger academic staff. The share of teaching staff with a permanent contract differed considerably across the different age groups in 2016. While approximately 80% of academic staff older than age 60 had an ongoing contract, this proportion dropped to just 20% for staff aged less than 35 years-old.

Figure 12.6. Share of teaching staff with permanent contracts, by age (2016)

Academic staff with teaching duties, excluding doctoral students.
The share of staff with permanent contracts across all ages is reported in brackets.



Source: Adapted from OECD (2019[2]), *Benchmarking Higher Education System Performance*, https://doi.org/10.1787/be5514d7-en.

StatLink https://doi.org/10.1787/888933943210

The academic staff-to-student ratio is one of the highest among OECD countries

The ratio of academic staff-to-student in Norway was 0.1 in 2016, implying a ratio of around 10 students for every academic staff member. This was one of the most favourable ratios among OECD countries, and could theoretically indicate that academic staff are more likely to have greater time to interact with students, helping them to learn and develop. However, while the staff-student ratio is often used as a proxy for quality in higher education, it is important to note that this indicator does not take into account other important factors that impact the contact time between students and academic staff, such as relative proportions of time academic staff allocate to teaching, research and other activities.

12.3. Education

Highlights

- Over two-thirds of young Norwegians are expected to enter bachelor's level education at least once in their lifetime based on current enrolment patterns, placing Norway in the top quartile of OECD countries.

- Norway has a relatively large share of part-time students and mature students. Over one-third of students were enrolled part-time in 2016 (in the top quartile). In addition, mature students (25 or older) accounted for 21% of new entrants to bachelor's programmes in 2016 (above the median). Norway had one of the lowest shares of international students at all levels of higher education among OECD countries in 2016.
- 18-24 year-olds with parents with higher education were 40% more likely to enter bachelor's or long first degree programmes than their cohorts with parents with upper secondary education in 2015. However, the gap between the two groups was one of the smallest among OECD countries with available data.
- Half of students who entered full-time bachelor's programmes in 2014 completed their study within the expected time, placing Norway in the top quartile of OECD countries with available data. Female students and part-time students were more likely to graduate within the expected time than male students and full-time students.
- Higher education graduates are more likely to have good literacy and numeracy skills, and to report to be in good health and trust others, as compared to upper secondary graduates. They are also less likely to report having depression.
- Higher education graduates enjoy a moderate employment premium. The graduates of bachelor's programmes were 7 percentage points more likely to be employed than upper secondary education graduates. This was a similar employment premium to the median of OECD countries. Higher education graduates, however, have a relatively low earning premium as compared to other OECD countries. The graduates of master's and doctoral programmes enjoyed an earning premium of 15% over those with upper secondary education, which was one of the lowest earnings differences in OECD countries.

12.3.1. Access, student profile and completion

Figure 12.7 shows the relative position of Norway within the OECD distribution on indicators related to entry of students to higher education, student profile and completion of studies.

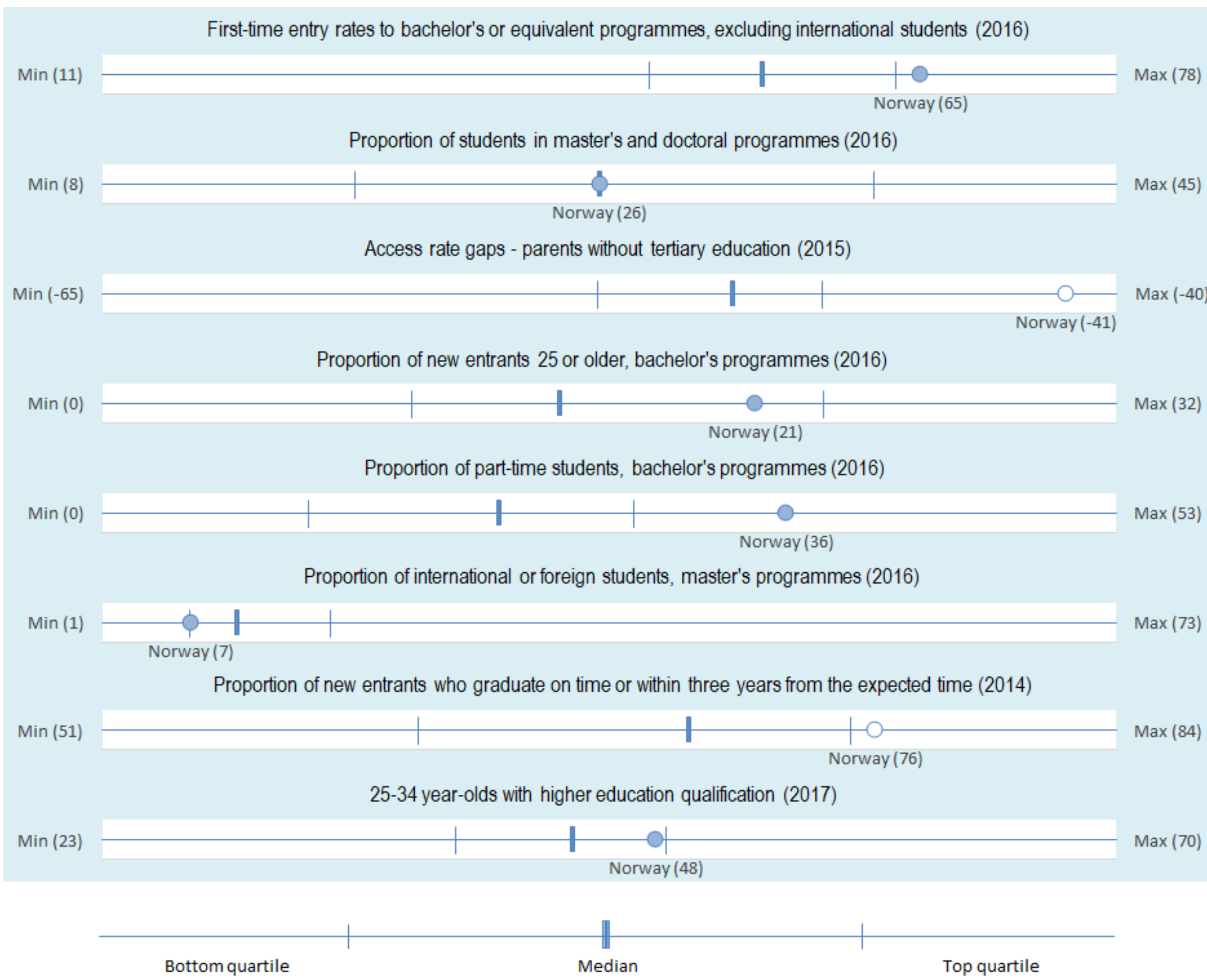
Access to higher education is widespread in Norway

The limited financial burden on households in Norway helps to create greater universal opportunities for access to higher education. Around two-thirds of young Norwegians are expected to enter a bachelor’s or equivalent programme over the course of their life, if current enrolment patterns remain unchanged in the future. These high entry rates place Norway in the top quartile of OECD countries for the expected share of the population who will enter programmes leading to advanced qualifications.

Relatively large and increasing entry and completion rates in recent years among OECD countries have led to a relatively highly qualified workforce. By 2017, in Norway around 43% of the population aged 25-64 had attained a higher education qualification. In the younger age group (25-34 year-olds), nearly half had completed higher education, which was above the OECD median level of 45%, though the slowing rate of attainment in recent years means that Norway’s position within the OECD is changing (see Section 12.5).

In Norway, gender equity in higher education attainment was achieved at a much earlier stage than in general across the OECD, and women began to surpass men in higher education attainment a decade earlier than in other OECD countries, starting with cohorts who were born after 1956 (Borgonovi, Ferrara and Maghnouj, 2018[7]). The gender gap has continued to widen; the proportion of women aged 25-64 with a higher education qualification was 48% in 2017, 9 percentage points higher than that of men in Norway (OECD, 2018[4]).

Figure 12.7. Where does Norway stand in the OECD distribution? Access, student profile, completion



Note: The indicators represented in this chart are a subset of the indicators presented in Table 12.1. The coloured circle represents Norway's position in the OECD distribution. The circle is not coloured when data are available for less than half of the OECD countries (the minimum number of countries with available data is 14). For more information on methodological issues and metadata, see OECD (2019[2]) and the references cited therein. Follow the *Statlink* to download the data underlying the calculation of the scorecard.

Source: Adapted from OECD (2019[2]), *Benchmarking Higher Education System Performance*, https://doi.org/10.1787/be5514d7-en.

StatLink https://doi.org/10.1787/888933943229

A relatively large share of students in Norway is enrolled in long first degree programmes

One-quarter of all higher education students were enrolled at the master's or doctoral level in 2016, in line with the OECD median. This includes students in long first degree programmes (integrated bachelor's/master's long-cycle study), i.e. programmes with a cumulative theoretical duration (at the higher education level) of at least five years that do not require prior higher education for admission. In Norway, long first degrees exist in a number of disciplines, such as medicine, psychology and teacher education. Students undertaking long first degree programmes in Norway accounted for 11% of new entrants in 2016, above the OECD median and Finland (both 6%), but well below Sweden (26%).

Inclusive access policies in Norway

Promoting inclusive access is an important higher education policy goal in Norway. This is related to the social and economic principles underlying the "Nordic model", an approach to government, economy, labour market, and skills favoured in Norway and its neighbouring countries, which places a strong emphasis on social inclusion (OECD, 2018[1]). Inclusive access is also related to the geography of Norway, a large country with sparsely populated areas, requiring active work to lower geographic barriers to participation and widen access to higher education.

Norway has a relatively large proportion of part-time students and new entrants older than 24

The availability of programmes with flexible study options, along with the low financial barriers to higher education, may be one reason why people older than 24 accounted for 21% of new entrants to bachelor's programmes in Norway in 2016, 7 percentage points above the OECD median. Norway also has a relatively large share of part-time students (i.e. students with an intended study load lower than 75% of a full-time load). Over one-third of students were enrolled on in bachelor's programmes on a part-time basis in 2016, placing Norway in the top quartile among OECD countries.

Wide differences in access by socio-economic background persist

Young people without tertiary-educated parents in the age group of 18-24 years-old were about 40% less likely than other individuals in the same age group to enter a bachelor's or long first degree programme in 2015. Despite Norway being one of the more egalitarian societies in the OECD (OECD, 2018[8]), this continued wide gap in access indicates that important barriers to entering higher education remain for people from lower socio-economic backgrounds (see Section 12.5.1). Nonetheless, Norway was, together with Slovenia, the country where this gap was the smallest among 16 OECD countries with available data (see Chapter 5 of (OECD, 2019[2])).

The participation gap observed in access to bachelor's level or long first degree programmes was reversed for ISCED 5 level programmes, which in Norway are offered solely by vocational colleges.[5] In 2015, young people aged 18-24 whose parents did not obtain higher education were 14% more likely to enter these type of programmes than other individuals of the same age. A similar reversal can be observed in some other jurisdictions, for example Chile and Slovenia. This evidence suggests that tertiary vocational programmes in Norway can play a part in widening access to higher education, along with the other available alternative pathways into the higher education system (see Chapter 2 of (OECD, 2019[2])).

Three-quarters of new entrants to bachelor's programmes graduate on time or within three years from the expected time

A 2014 OECD survey shows that half of students who started full-time bachelor's programmes graduated within the expected time in Norway, placing it in the top quartile of 14 OECD countries with available data (OECD, 2016[9]). An additional one-quarter of the bachelor's new entrants completed their bachelor's programmes within three years after the expected graduation year, while approximately 20% of the bachelor's new entrants had not graduated and were not in education, which is one percentage point below the median of OECD countries with available data.

Female students enrolled in bachelor's programmes were four percentage points more likely to complete their study within the expected time than male students were, as was the case in most OECD countries. In addition, nearly 60% of part-time students in bachelor's programmes completed their study within the expected time, which was nine percentage points higher than the completion rate for full-time students.

The share of international students is low compared to other OECD countries

Norway had one of the lowest shares of international students at all levels of higher education among OECD countries in 2016. International students accounted for 7% of enrolments at the master's level in 2016, which was half of the OECD median of 14%. The government has implemented some measures to increase the number of international students. For example, legislation first granted the right to teach in a foreign language in 2002, and the share of modules taught in languages other than Norwegian had since increased to around 20% in 2016 (language studies excluded) (Norwegian Ministry of Education and Research, 2017[10]). The government has also set a target that 20% of students should have an international experience by 2020. In the longer term, the target is to increase the share significantly, up to 50%.

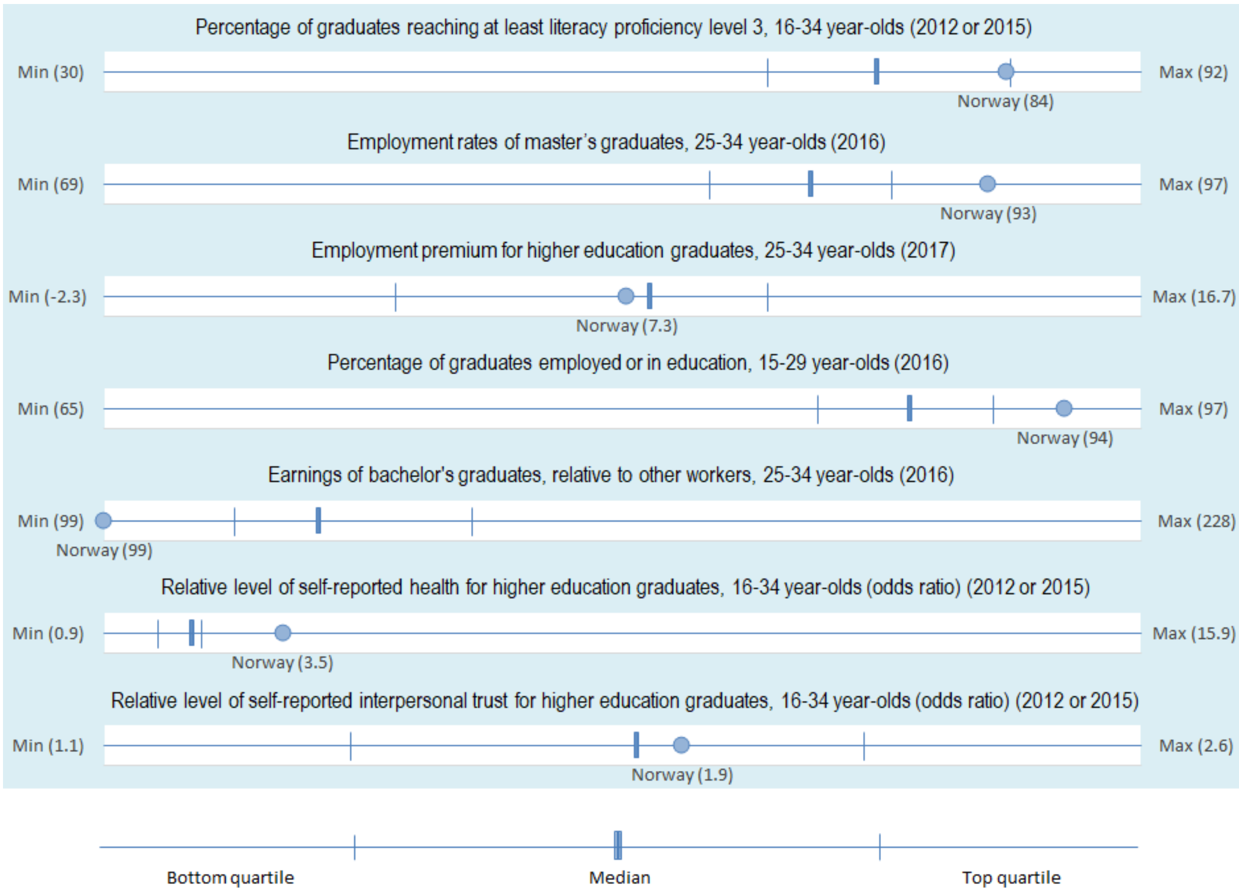
12.3.2. Graduate outcomes

Despite high levels of higher education attainment, graduate outcomes remain relatively strong in Norway, though the returns on investment in higher education are smaller than in most OECD countries (Figure 12.8). Norwegian graduates are more likely to be employed than those with only upper secondary qualifications, with an employment premium around the median OECD level. There are very low rates of unemployment or inactivity for young graduates. However, on average, there appears to be no earnings premium for young full-time bachelor's graduates compared to those with only upper secondary educational attainment.

The adult population is relatively well educated, and basic skills among graduates are above the OECD median

Internationally comparable measures of higher education learning outcomes are not currently available. However, the OECD Survey of Adult Skills can provide some insight into the cognitive and workplace skills of young graduates. These data allow for the performance assessment of higher education graduates in basic skills such as literacy and numeracy.

Figure 12.8. Where does Norway stand in the OECD distribution? Graduate outcomes



Note: The indicators represented in this chart are a subset of the indicators presented in Table 12.1. The coloured circle represents Norway's position in the OECD distribution. The circle is not coloured when data are available for less than half of the OECD countries (the minimum number of countries with available data is 14). For more information on methodological issues and metadata, see OECD (2019[2]) and the references cited therein. Follow the *Statlink* to download the data underlying the calculation of the scorecard.

Source: Adapted from OECD (2019[2]), *Benchmarking Higher Education System Performance*, https://doi.org/10.1787/be5514d7-en.

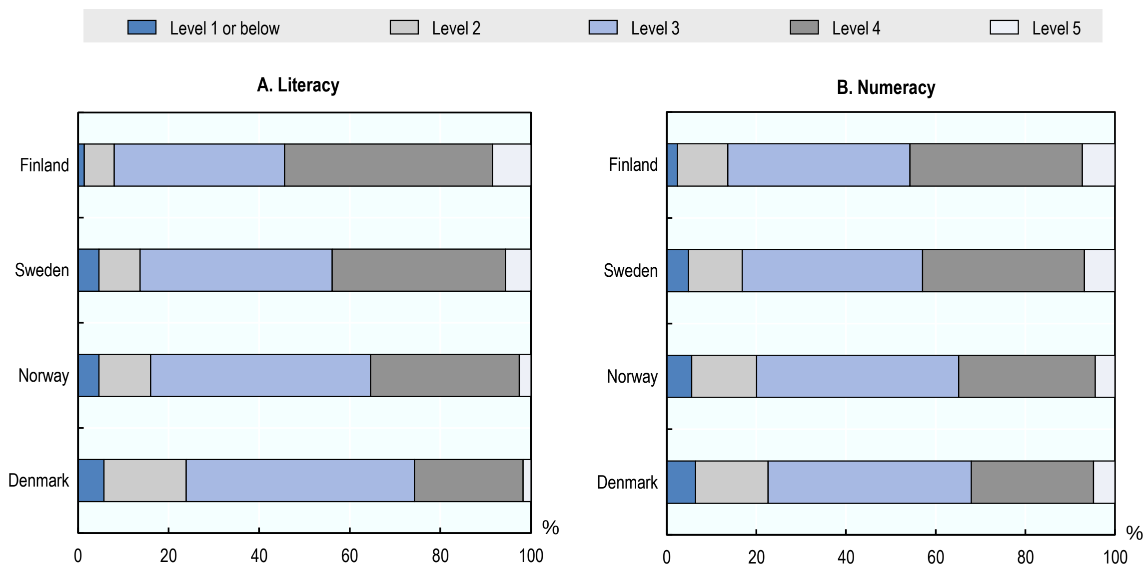
StatLink https://doi.org/10.1787/888933943248

Graduates in Norway demonstrate a higher level of literacy and numeracy skills than the median of countries participating in the OECD Survey of Adult Skills (PIAAC).[6] The proportion of graduates younger than 35 with level 3 literacy skills or above, at 84%, was above the median level (76%). Similarly, the proportion of graduates with numeracy skills at level 3 or above is 80%, compared to the median level of 69% for participating countries.

While the proportion of higher-skilled graduates is greater than average, there is also a cohort of graduates in Norway with much lower basic skills. Around one in five graduates under the age of 35 has low numeracy skills, while around one in six has low literacy skills, according to PIAAC. While these levels of low skills are below OECD average levels, they are larger in many cases than in neighbouring countries (Figure 12.9). A significant proportion of low-skilled graduates could be attributed to a weakness in the ability of the higher education system to increase the skills of graduates, or to a loss of skills experienced by graduates who are working in jobs with a large number of routine tasks and low autonomy (OECD, 2018[8]).

Figure 12.9. Proficiency distribution among higher education graduates, 16-34 year-olds (2012 or 2015)

Percentage of graduates at the different levels of proficiency in literacy and numeracy



Source: OECD (2018[11]), *OECD Survey of Adult Skills*, www.oecd.org/skills/piaac/data/.

StatLink https://doi.org/10.1787/888933943267

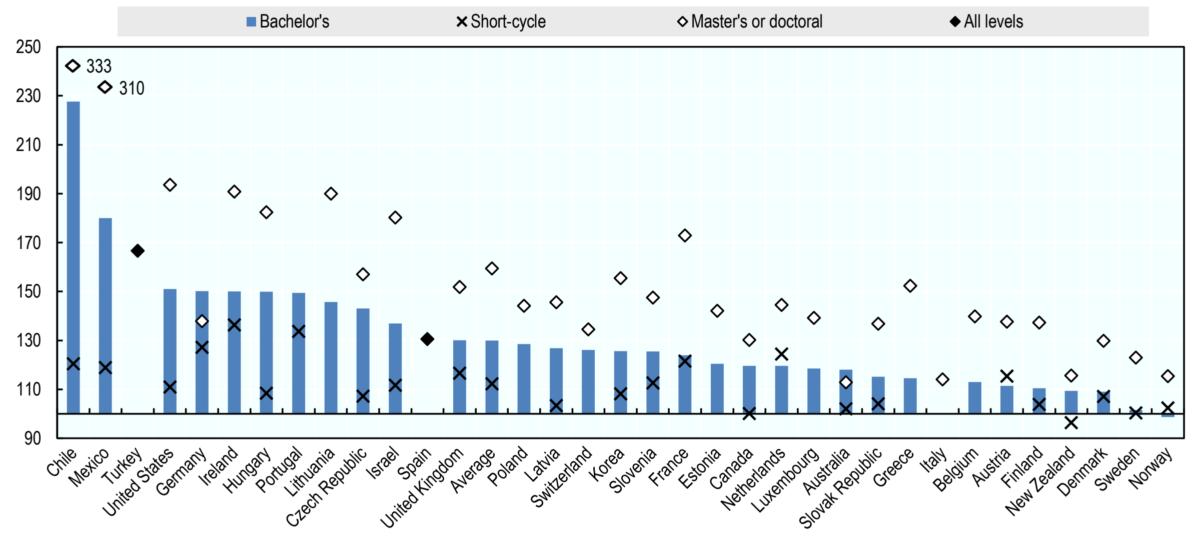
Higher education creates a moderate employment premium but a relatively low earnings premium for graduates

Norwegian graduates from bachelor’s level programmes enjoyed an average employment premium of around 7 percentage points compared to those who had achieved only an upper secondary qualification in 2017. This was a similar premium to the median of OECD countries. Norway also has one of the more positive outlooks for younger graduates, with very little unemployment or inactivity in the cohort of graduates aged 18-29. In total, 94% of Norwegian young graduates were either employed or in education in 2016, one of the highest values in the OECD, and well above the median value.

However, on average, young bachelor’s level graduates with full-time, full-year earnings did not earn more than upper secondary graduates. The full-time, full-year earnings of bachelor’s level graduates aged 25-34 was at 99% of the average equivalent earnings of the same age cohort with only upper secondary or post-secondary non-tertiary education in 2016. This was the lowest earnings premium for bachelor’s level graduates among OECD countries (Figure 12.10).

Figure 12.10. Relative earnings of 25-34 year-olds, selected education levels (2016)

Average earnings of full-time, full-year 25-34 year-old workers with a bachelor's degree compared to those with an ISCED level 5 or master's qualification (upper secondary or post-secondary non-tertiary education = 100)



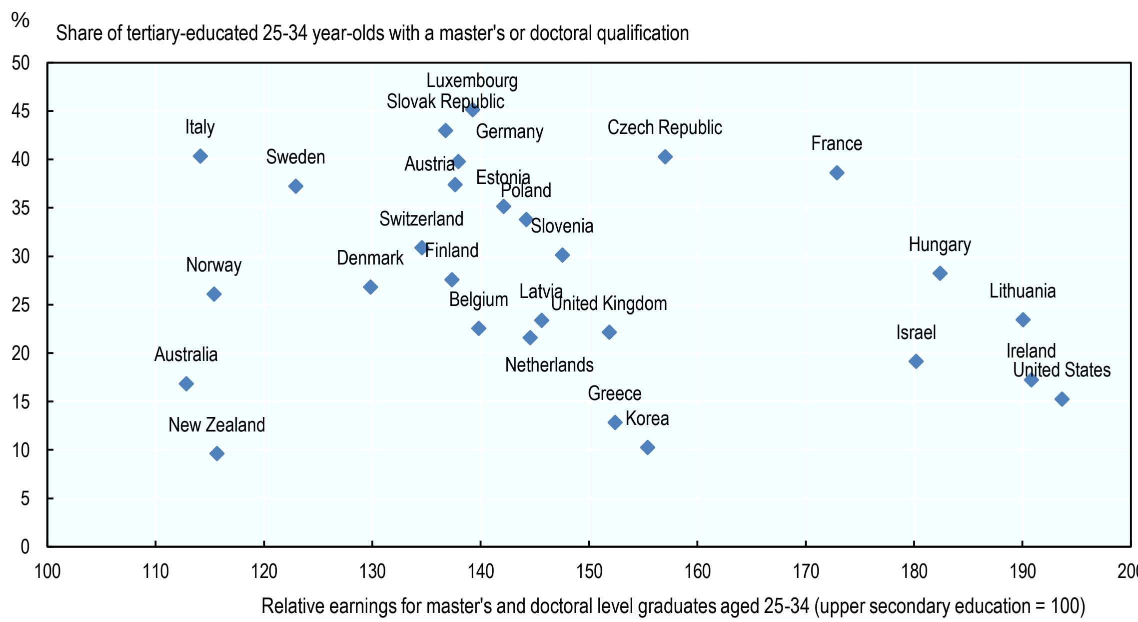
Note: The average for bachelor's and master's graduates is calculated across countries with available data for both series, while the average for short-cycle graduates is calculated separately.
Belgium, Canada, Chile, Czech Republic, Finland, Spain: Year of reference 2015.
Czech Republic, Slovak Republic, Switzerland, United States: Index 100 refers to upper secondary and post-secondary non-tertiary levels of education.
Denmark, Italy, Lithuania, the Netherlands: Year of reference 2014.
Ireland, Latvia, Luxembourg, Mexico, and Turkey: Earnings net of income tax.
Source: Adapted from OECD (2018[4]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en.

StatLink https://doi.org/10.1787/888933943286

The low earnings premium for young bachelor's level graduates may be partially because many students in Norway opt for longer-cycle programmes that lead directly to a master's level qualification. Graduates aged 25-34 at master and doctoral levels with full-time, full-year earnings enjoyed an earnings premium of 15% over those with only upper secondary education in 2016. This was also one of the lowest earnings differentials in OECD countries.

Lower relative earnings could also be linked to the relatively high proportion of young adults with a higher education qualification in Norway. However, there is no positive correlation between higher education levels in the population and higher relative earnings in general across OECD countries.[7] Figure 12.11 demonstrates the relationship between education levels in the population and relative earnings across OECD countries. Graduates with master's or doctoral degrees in Norway, Austria, New Zealand and Italy all earn a premium of 15-20% over upper secondary or post-secondary non-tertiary level graduates, despite having substantially different proportions of the population that had reached that level of attainment. Smaller potential economic gains from higher education could potentially reduce the attractiveness of the option of pursuing higher education.

Figure 12.11. Share of tertiary-educated 25-34 year-olds with advanced degrees (2017) and relative earnings (2016)



Source: Adapted from OECD (2018[4]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en.

StatLink https://doi.org/10.1787/888933943305

There appear to be very positive social outcomes of higher education

While the economic benefits of higher education in Norway may be relatively small, evidence from PIAAC shows that the increase in indicators of positive social outcomes for higher education graduates compared to those without higher education is among the largest in the OECD countries. The proportion of participants in PIAAC who reported themselves to be in good health was 3.5 percentage points higher for higher education graduates than for upper secondary graduates, in the top quartile of the PIAAC participating countries.

Other data also indicate that higher education attainment in Norway is associated with more positive social outcomes. According to PIAAC data, higher education graduates are also more likely to trust others than upper secondary graduates, with a larger difference in trust than the OECD median level. Higher education graduates (25-64 year-olds) were also 4 percentage points less likely to report having depression than upper secondary or post-secondary non-tertiary education graduates (OECD, 2017[12]), a difference which was slightly above the median of OECD countries with available data.

12.4. Research and engagement

Highlights

- Government funds are the key source of revenue in Norway's higher education research and development system, while funding from other sources makes up less than 5% of total revenue in the sector.

- There is a relatively high concentration of researchers in the population, and Norway's research and development workforce enjoy favourable terms and conditions. Norwegian academics have public servant status, with associated benefits.
- Norway produces one of the highest volumes of scientific publications among OECD countries as a proportion of the population. In addition, the volume of publications has increased over time at a faster rate than the total volume of publications in OECD countries.
- Norway has a higher proportion of top-cited scientific documents than the OECD median, with 11% of all scientific publications ranking in the top 10% of highly cited publications in 2015.
- Net flows of scientific researchers to Norway are positive, indicating that Norway is an attractive destination for foreign researchers. Norway also had a higher level of collaboration on scientific publications with authors from other countries than the OECD median in 2015.
- Norway is a leader in the OECD on making scientific publications openly accessible, with almost one-third of scientific documents published in 2016 made available through some form of open access.

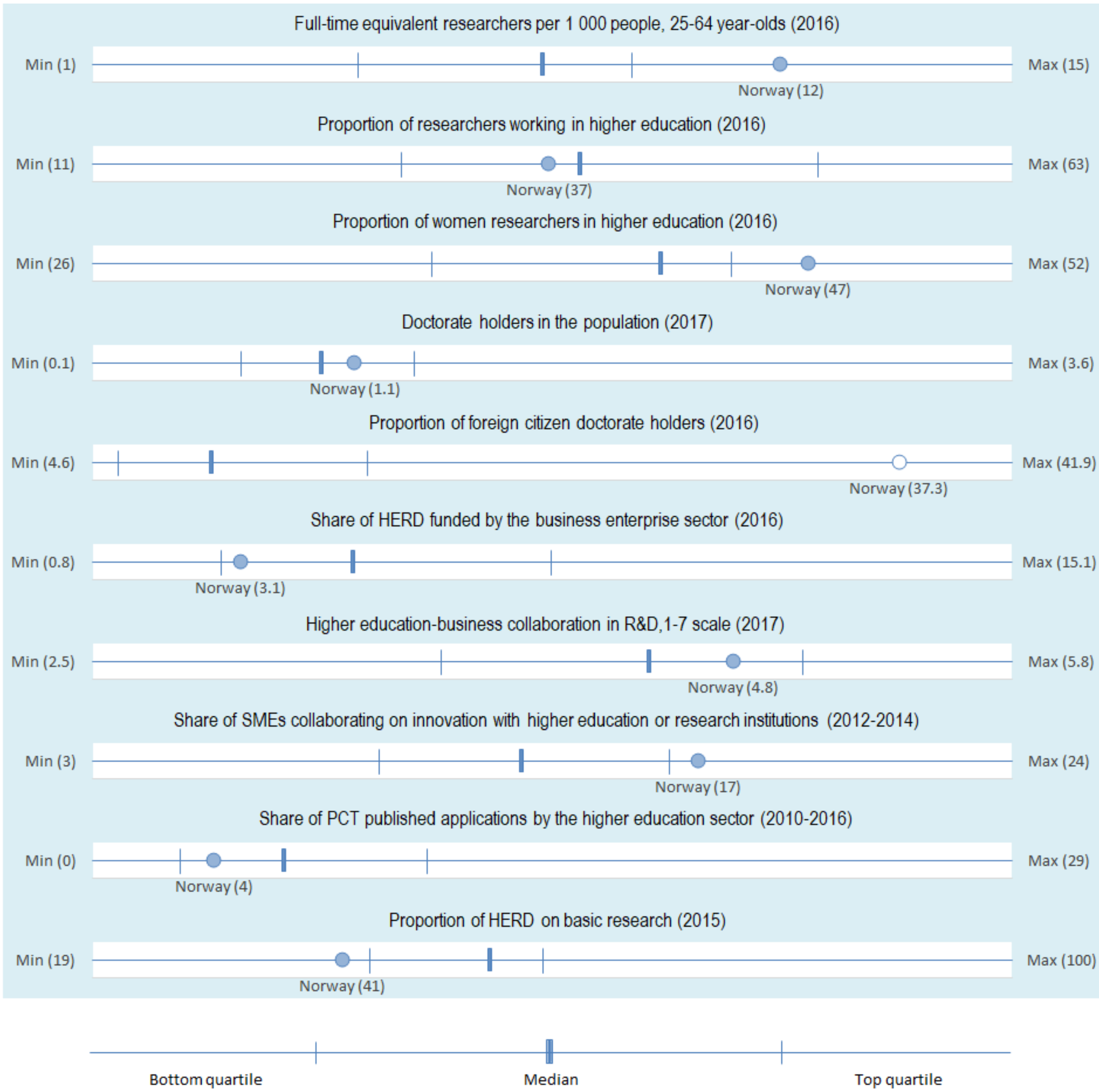
12.4.1. Inputs and activities

Figure 12.12 provides a detailed overview of where Norway stands within the OECD distribution on the section of the indicator scorecard related to research inputs and activities.

Public investment in research and development is on an upward trajectory

As discussed in Section 12.1, Norway invests heavily in higher education, having one of the largest proportions of public expenditure on higher education in the OECD. Norway also has a well-resourced national R&D system, consisting of three sectors of performance: industry, research institutes and higher education institutions. The recent increases in investment in the research and development sector as a whole (GERD) have pushed Norway from a country with average levels of investment in 2006 to its current position as a high performer relative to other countries in the OECD.

Figure 12.12. Where does Norway stand in the OECD distribution? Research inputs and activities



Note: The indicators represented in this chart are a subset of the indicators presented in Table 12.1. The coloured circle represents Norway's position in the OECD distribution. The circle is not coloured when data are available for less than half of the OECD countries (the minimum number of countries with available data is 14). For more information on methodological issues and metadata, see OECD (2019[2]) and the references cited therein. Follow the *Statlink* to download the data underlying the calculation of the scorecard.
Source: Adapted from OECD (2019[2]), *Benchmarking Higher Education System Performance*, https://doi.org/10.1787/be5514d7-en.

StatLink https://doi.org/10.1787/888933943324

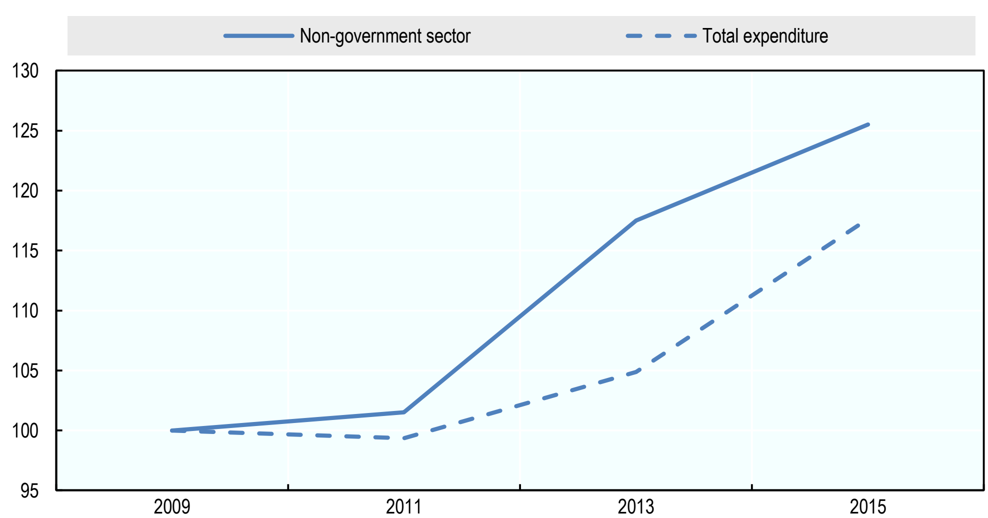
The substantial investment in higher education therefore also extends to research and development, and Norway is in the top quartile of OECD countries on the proportion of expenditure on higher education R&D activities (Table 12.1).

Government funds are the key source of revenue for the higher education sector. Funding from other sources (international, business, private non-profit and the higher education sector) makes up less than 5% of the overall funding for higher education R&D. For example, Norway is below the median of OECD countries in the percentage of business enterprise funding for R&D, with just 3.1% of funding coming from the business sector in 2016 (Figure 12.12).

The funding of R&D in Norway is also notable for stability and steady growth over time. Overall funding was stable during the last decade before beginning to increase incrementally as of 2012, and increased by more than 15% in total between 2009 and 2015 (Figure 12.13). The share of funding from non-government sources, though small, has also been keeping pace with the overall increase over time, with 25% more funding invested by these sources in 2015 than in 2009.

Figure 12.13. Trends in expenditure on higher education R&D in Norway (2009-2015)

2009 =100



Source: Adapted from OECD (2019[13]), *OECD Science, Technology and R&D Statistics*, https://doi.org/10.1787/strd-data-en.

StatLink https://doi.org/10.1787/888933943343

Norway also has one of the lowest levels of international funding of research and development across OECD countries. Many European countries have been able to boost international investment in higher education R&D through securing financing from EC funds for R&D, such as Horizon 2020. However, Norway, though also eligible for funding, appears to have had less success overall in securing Horizon 2020 funds compared to many other countries. While the proportion of successful applications is higher than in many other countries over the period 2014-2016, the numbers of applications for funding are substantially lower than neighbouring countries of similar size, such as Denmark and Finland (see Chapter 6 of (OECD, 2019[2])).

The R&D sector is likely to continue to increase in its importance to the Norwegian economy in the coming decade as the economy diversifies (OECD, 2016[14]). Recent long-term plans for research and higher education have accordingly provided for further increases in investment in R&D. (Norwegian Ministry for Education and Research, 2015[5]; 2018[15]). In the most recent plan, covering the period 2019-2028, focus areas for investment include boosting research in enabling and industrial technologies, and increasing the benefits of research for renewal and restructuring in business and industry. Norway also has a long-term roadmap for investing in the physical infrastructure necessary to underpin research and development in the country. The long-term plan 2018-2028 lays out the investment plan for buildings, equipment and other infrastructure in the research and higher education sector (Norwegian Ministry for Education and Research, 2018[15]).

There are favourable terms and conditions for researchers

There are good prospects for skilled researchers in the Norwegian R&D system,.Terms and conditions for researchers are favourable; most Norwegian academics have public servant status with associated benefits and job stability. This helps to ensure that a career in research is an attractive option in Norway; the concentration of researchers in the labour force was among the highest in OECD countries in 2016 (in the top quartile). There is also a slightly higher concentration of doctorate holders in the Norwegian population than in general across the OECD, with 1.1% of the population having attained this level of education in 2017, compared to the OECD median of 1.0%.

Norway also appears to be a particularly attractive destination for doctorate holders from other countries to pursue their careers, compared to many OECD countries. Results from the OECD Careers of Doctorate Holders survey show that around 37% of all doctorate holders in Norway are foreign citizens, one of the highest rates of all countries responding to the survey.

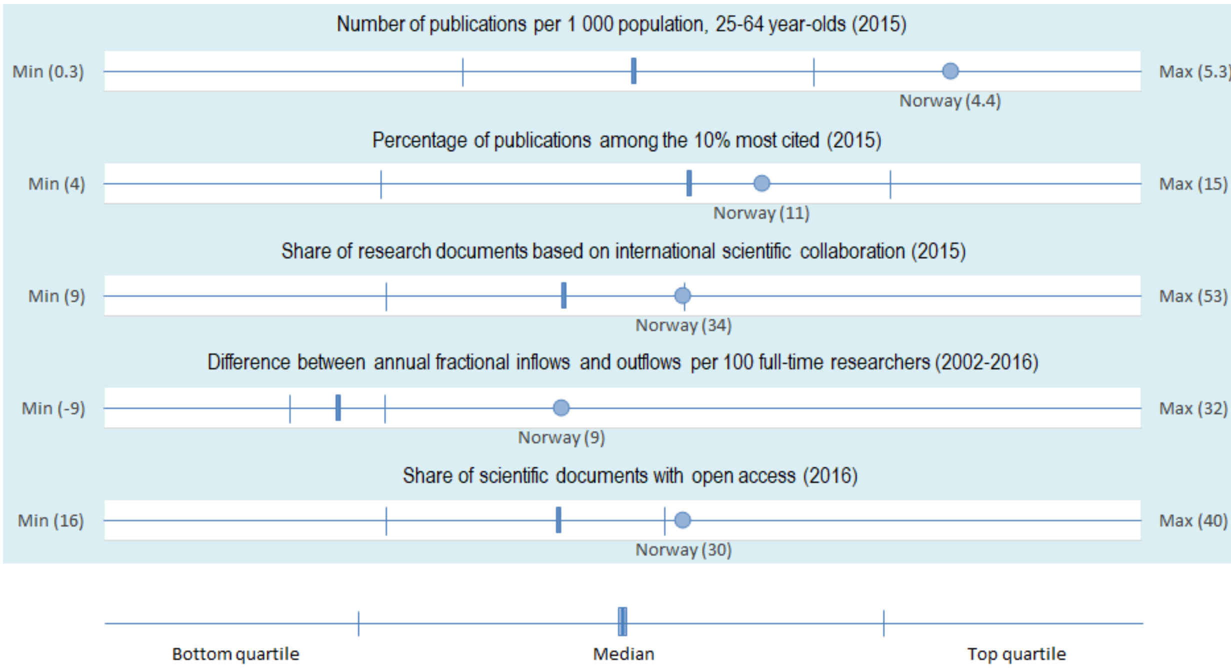
12.4.2. Internationalisation and knowledge production

Bibliometric indicators are the metrics most commonly used to compare the performance of countries on the quantity and quality of the scientific production of their research institutions. Despite methodological limitations, they represent the best available indicators of comparative research performance across countries (see Chapter 6 of (OECD, 2019[2])). Figure 12.14 provides an overview of the position of Norway on bibliometric indicators related to internationalisation of research and the production of scientific knowledge.

Norway has increased the volume of scientific production at a greater pace than other OECD countries…..

Norway is a high achiever in terms of the volume of scientific knowledge produced, ranking in the top quartile of OECD countries on this indicator, with 4.4 publications per 1000 of the population aged 25-64 in 2015, far above the OECD median level of 2.8 publications per 1000 people. This level of productivity reflects the significantly increased investment in the research and development system in recent years, and the greater than average proportion of researchers in the population in Norway (Figure 12.14).

Figure 12.14. Where does Norway stand in the OECD distribution? Internationalisation and knowledge production



Note: The indicators represented in this chart are a subset of the indicators presented in Table 12.1. The coloured circle represents Norway's position in the OECD distribution. The circle is not coloured when data are available for less than half of the OECD countries (the minimum number of countries with available data is 14). For more information on methodological issues and metadata, see OECD (2019[2]) and the references cited therein. Follow the *Statlink* to download the data underlying the calculation of the scorecard.
Source: Adapted from OECD (2019[2]), *Benchmarking Higher Education System Performance*, https://doi.org/10.1787/be5514d7-en.

StatLink https://doi.org/10.1787/888933943362

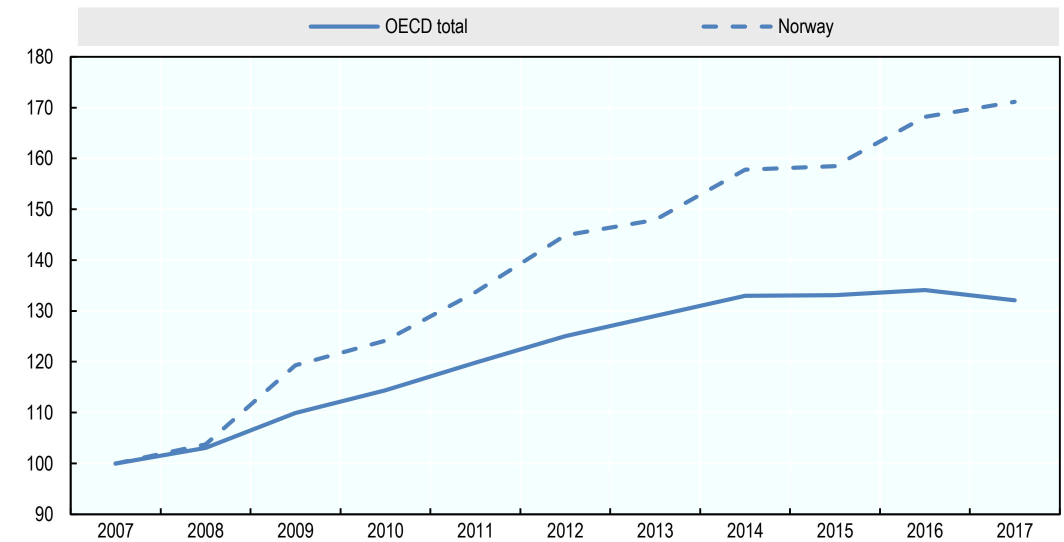
Bibliometric time series data for Norway also show that Norway has increased its volume of publications in recent years by more than the total proportion across the OECD (Figure 12.15). The volume of publications increased by 70% over the period 2007-2017, while total volume across the OECD increased by less than 30% over the same period. Overall, Norway ranked 30th in the world and 22nd among OECD countries in total volume of scientific output in 2017 (Scimago Lab, 2019[16]).

……but the impact of scientific production is closer to median levels

Citations of scientific publications by other authors are often used as a proxy to measure the impact of a scientific document on the work of other researchers, as they indicate that other researchers have taken note of the work and have incorporated the knowledge into further research. Norway was above the OECD median level for the proportions of publications that were in the top 10% most cited in 2015, with 11% of all scientific publications produced in Norway ranked among the top 10% of cited publications in the world, compared to the OECD median level of 10.3%. This could indicate that publications from Norway create slightly more of an impact with other researchers compared to the majority of OECD countries.

Figure 12.15. Increase in the volume of scientific production (2007-2017)

Based on whole counts of citable documents in the Scopus database (2007=100)

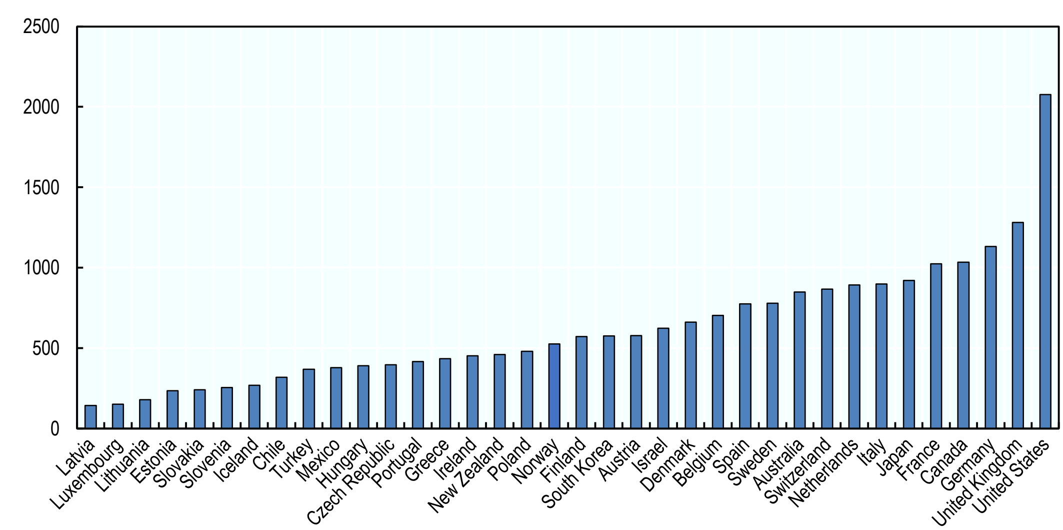


Source: Adapted from Scimago Lab (2019[16]), *Scimago Journal & Country Rank*, www.scimagojr.com/.

StatLink https://doi.org/10.1787/888933943381

Figure 12.16. H-index for OECD research and development systems (1996-2017)

Based on citations of publications on Scopus



Note: Designed to measure both productivity and quality at the individual level, the H index is defined as the highest number of publications that have been cited at least an equal number of times (Hirsch, 2005[17]). For example, an H Index of 10 implies that the author has 10 papers that have been cited at least 10 times.
Source: Adapted from Scimago Lab (2019[16]), *Scimago Journal & Country Rank*, www.scimagojr.com/.

StatLink https://doi.org/10.1787/888933943400

Norway also ranks around the median of OECD countries in the numbers of highly cited documents that it has produced (Figure 12.16). The ‘H-index’ is a bibliometric indicator, which counts the number of scientific documents, *h*, which have also been cited at least *h* times in other scientific documents. When aggregated to country level, it can give an indication of the relative impact of the body of research produced in a country. Norway scores around the median OECD level on this indicator, with an H-index of 526 (meaning 526 Norwegian scientific publications have been cited by other authors at least 526 times), a similar level to neighbouring Finland, though below the other Nordic countries.

Norway includes bibliometric indicators as part of the decision process for allocation of higher education funding, to create incentives for researchers to publish their work. Bibliometric information is verified or provided by public research organisations through the Current Research Information System in Norway (CRISTIN), an integrated national research information system (see Chapter 6 of (OECD, 2019[2])).

Beyond bibliometrics, other indicators attempt to measure the translation of research into innovative products and processes. For example, data on patent applications can provide a measure of the impact of research on the creation of goods and services that provide benefits to society. In general, across the OECD, the proportion of patent applications originating from the higher education sector tends to be low (less than 10% in the majority of OECD countries). However, Norway has a lower rate than the OECD median level of patent applications, as measured by the proportion of Patent Cooperation Treaty applications originating from the higher education sector between 2010 and 2016 (Table 12.1), with less than 6% of total patent applications coming from the higher education sector over this period.

There is a high level of international collaboration

Norway has achieved one of the highest levels among OECD countries of internationalisation of the higher education R&D sector, according to bibliometric indicators included in the benchmarking exercise. International scientific collaboration between Norway and other countries (measured by joint authorship of research papers by researchers based in different jurisdictions) was in the top quartile of OECD countries in 2015, with 34% of Norwegian scientific outputs having at least one foreign author. Furthermore, international net flows of scientific authors over the period 2002-2016 are positive in favour of Norway. For every 100 researchers, Norway had a net positive inflow of nine researchers in total over the period, suggesting that Norway is a relatively attractive destination for researchers from abroad (Figure 12.20).

However, this indicator also shows that relatively fewer Norwegian researchers choose to gain an international experience abroad. High inward flow could be due to the favourable terms and conditions available for researchers in Norway. At the same time, these conditions could have an adverse impact on brain circulation (the inflows and outflows of highly qualified or talented individuals between jurisdictions) by making the prospect of moving abroad less attractive for Norwegian academics.

Norway is a leader in providing open access to knowledge

Making research results widely available can have many benefits, including more efficient science due to less duplication of endeavours, engaging a wider audience and a greater number of participants in the scientific process, and fostering greater levels of collaboration (OECD, 2019[2]). Norway is a leader among OECD countries in making the results of research widely accessible. It ranks in the top quartile in open access to scientific documents, with around 30% of documents published in 2016 being available through some form of open access.

This relatively high rate could be linked to national structures and initiatives. For example, the Research Council of Norway requires grantees to publish scientific results in open access journals, and the Council also has a dedicated funding scheme for promoting open access, running over the period 2015-2019 (see Chapter 7 (OECD, 2019[2])).

12.5. Scenarios for policy

This section of the note extends the comparisons drawn in the previous sections by looking forward, and presenting a set of scenarios relevant to the future of Norway's higher education system. The purpose of these scenarios is to provide evidence-based conjectures about future trends in areas of national policy importance, which can stimulate debate and support policy-planning exercises (Box 9.1).

Box 12.1. Scenario development for policy analysis

Governments plan for the future of higher education in the context of a number of sources of uncertainty. Scenarios can be defined as descriptions of hypothetical futures that could occur and that, although somewhat speculative in nature, are nonetheless internally consistent and causally coherent (OECD, 2006[18]). The development of scenarios can provide support to national discussions on contextual and systemic trends, highlight possible consequences of current circumstances on higher education and the economy, and outline the main available policy directions.

In a context of increasing complexity in societies and economies, more emphasis is being placed on anticipatory exercises in the policy process (OECD, 2015[19]). Contemplating different policy scenarios can feed into the development of broad long-term strategic planning for higher education systems or pre-policy research related to particular policy topics.

Short and medium-term scenarios are likely to be more accurate and useful to the decision-making process of policymakers. The scenario exercise presented in Section 12.5.1 therefore focuses on the immediate decade ahead (i.e. up to 2030), and is developed using the following steps:

- statement of a subject area or issue of national policy concern and the rationale for the concern
- outline of the assumptions used to develop the set of future scenarios
- explanation of the likely impact of the assumptions on future trends
- discussion of implications for policy.

12.5.1. Progress in higher education attainment in Norway has been slowing, and other countries are catching up

Box 12.2. Summary of policy concern

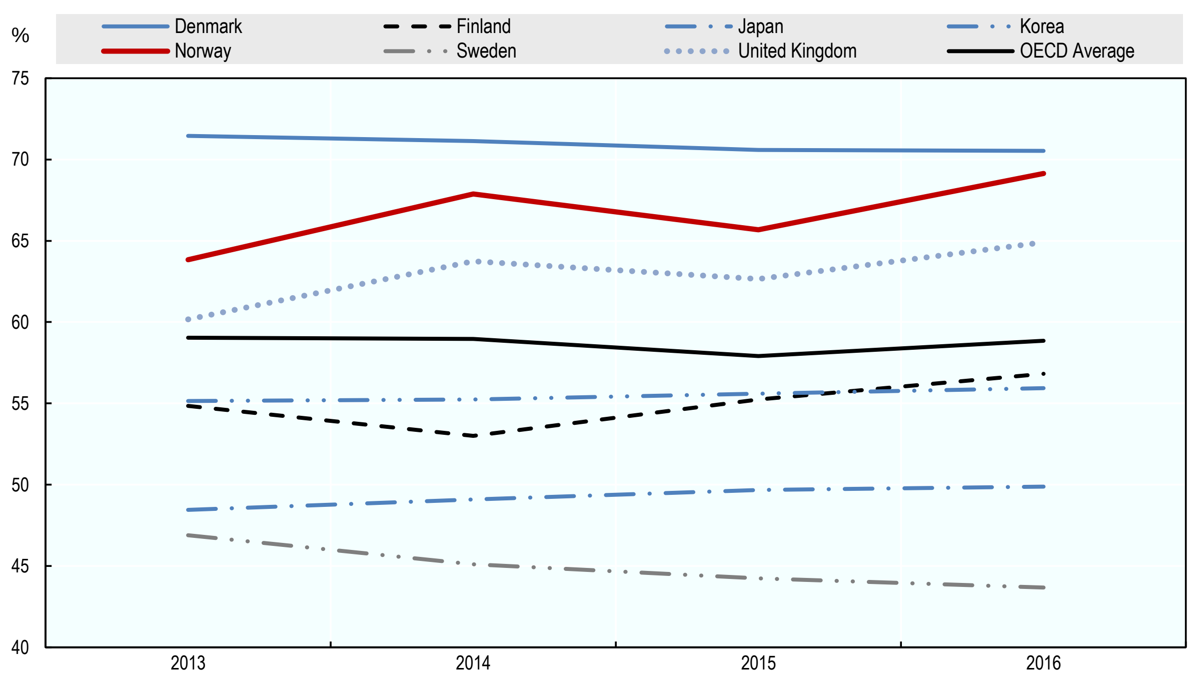
Norway has long been considered one of the most highly educated countries in the world, and still ranks in the top ten of OECD countries overall on educational attainment in the adult population. However, despite high entry rates in recent years, the rate of increase of educational attainment has slowed significantly in the most recent decade, and other OECD countries have caught up with, and even surpassed, Norway. Without policy action, Norway may risk falling further behind in the future as other OECD countries continue to increase opportunities for achieving higher education at a faster pace. This could affect Norway's future competitiveness and slow the timeframe for Norway to meet its central educational goal of achieving fully inclusive education.

12.5.2. Rationale

Around two-thirds of the population are expected to enter higher education in their lifetimes…

Figure 12.17. Entry rates to bachelor's level programmes, selected countries (2013-2016)

Sum of age-specific entry rates, including international students



Source: Adapted from OECD (2018[4]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en.

StatLink https://doi.org/10.1787/888933943419

Norwegian society places a high value on making educational opportunities available to citizens at all levels of education. Financial barriers to accessing higher education are low. Students do not pay tuition fees, and are eligible for up to eight years of financial support from the Norwegian government. As a result, entry rates (the expected rates of entry into higher education, if current trends continue into the future) are higher than the OECD average. Based on current age-specific entry rates, more than two-thirds of young

Norwegians can be expected to enter bachelor's level education over the course of their lives, and this rate has been increasing in recent years (Figure 12.17). Entry rates are higher in Norway than in all other Nordic countries except Denmark, and in other countries with high levels of educational attainment such as Japan, Korea and the United Kingdom (Figure 12.17).

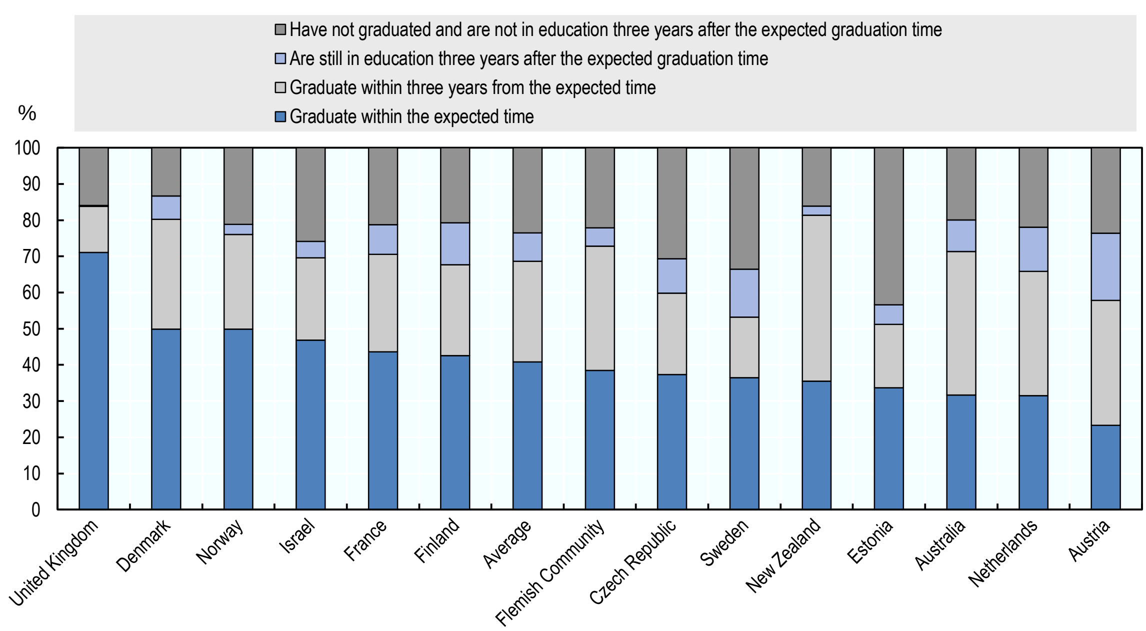
…but many students can take a long time to complete or do not complete at all…

Non-completion and late completion of studies is a significant issue in Norway, although not as serious as in some neighbouring countries. Still, a 2014 data collection covering 14 OECD countries indicated that only about half of Norwegian students complete their studies at the bachelor's level within the theoretical programme duration, while more than 20% had still not completed their studies three years after the theoretical duration or had left and were no longer in education.

As Figure 12.18 shows, while the on-time completion rates are similar to or higher than in most of the countries included in the data collection, they were substantially lower than in the United Kingdom. While comparable data on completion are not available for a wider set of OECD countries, graduation rates from the bachelor's level of education in Norway are also lower than might be expected given the high entry rates in Norway; in 2016 the graduation rate from bachelor's level, at 38%, was just above the OECD average of 40% (OECD, 2018[20]). In the same year, the entry rate into bachelor's level education was 69%, compared to the OECD average level of 59% (Figure 12.17).

Figure 12.18. Completion and non-completion rates of bachelor's level programmes (2014)

Proportion of full-time new entrants who:



Note: The year of reference is the expected graduation date plus three years. Countries are ranked in descending order of the proportion of new entrants graduating within the expected time.
Source: Adapted from OECD (2016[9]), *Education at a Glance 2016: OECD Indicators*, http://dx.doi.org/10.1787/eag-2016-en.

StatLink https://doi.org/10.1787/888933943438

Financial issues are often cited as a reason for students to leave higher education before completion; high proportions of non-completing students may be even more concerning in the context of the robust financial support package available to students in Norway.

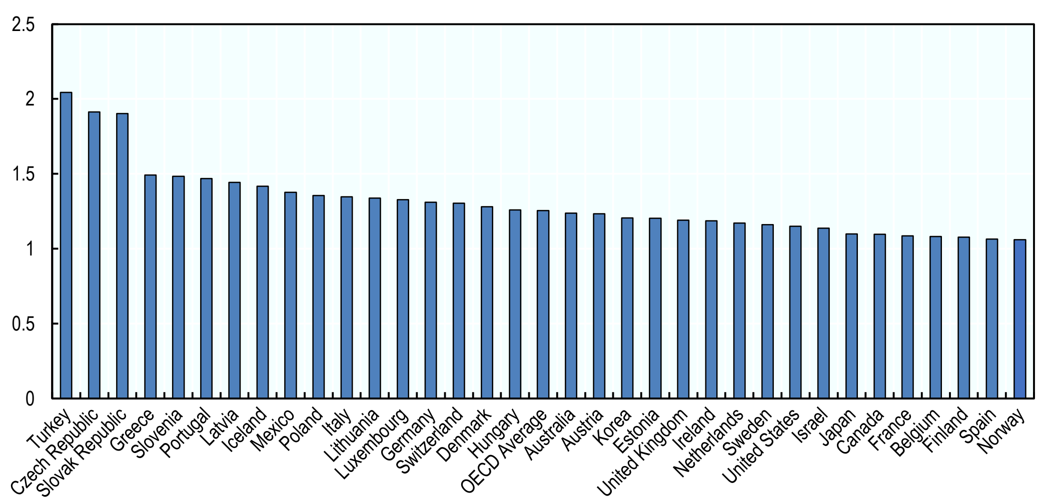
National data also suggest that while completion rates are improving, progress is slow; of the cohort of first-time students enrolling in a bachelor's degree in 2008, around 63.5% completed a qualification within five years. For the same cohort beginning in 2012, 67% completed a qualification within five years; equating to a 3.5 percentage point increase over the period 2008-2012. Over the same period, the percentage of students who dropped out of the course either in the first year or subsequent years has remained stable at just under 20% (Statistics Norway, 2019[21]).

….with the result that higher entry rates are not translating into the same levels of increase in attainment observed in other OECD countries over the past decade

In 2017, among OECD countries, Norway had the tenth highest proportion of the population that had achieved a higher education qualification, for both 25-64 year-olds and the younger cohort of 25-34 year-olds. However, in recent years, with rates of completion only slowly rising, Norway appears to have struggled to further increase the proportion with higher education qualifications at the same rate as many other OECD countries. Norway had the smallest increase in the share of young population with a higher education qualification over the period 2008-2017 of all OECD countries (6% compared to the OECD average of 25%) (Figure 12.19).

Figure 12.19. Increase in higher education attainment of the population aged 25-34 (2017)

2008 = 1

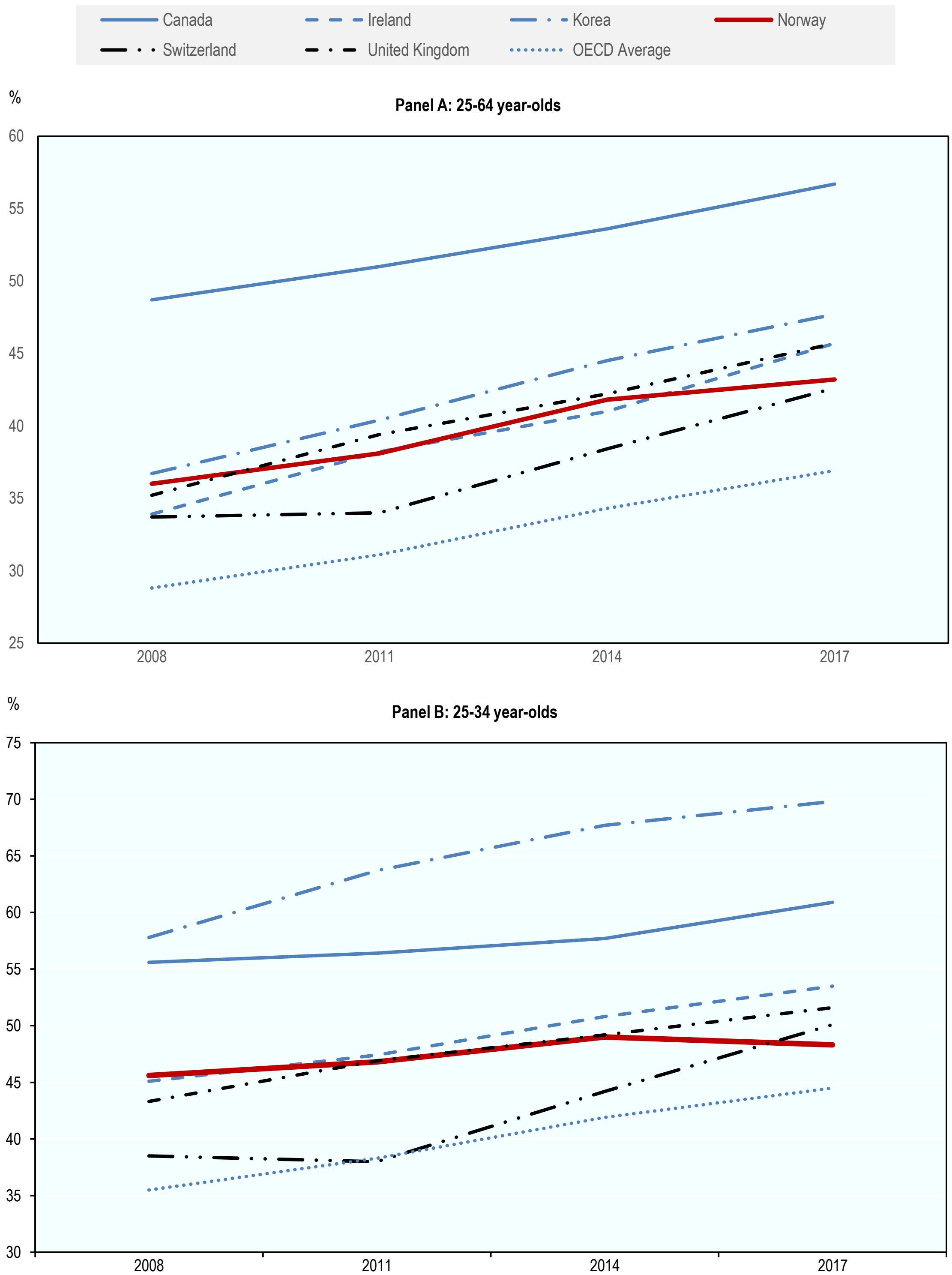


Source: Adapted from OECD (2018[4]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en.

StatLink https://doi.org/10.1787/888933943457

The extent to which other OECD countries are catching up is particularly evident for the younger age cohorts. In 2008, Norway had the fourth highest proportion of 25-34 year-olds with a higher education qualification in the OECD. Between 2008 and 2017, the gap between Norway and the OECD average has narrowed substantially (Figure 12.20).

Figure 12.20. Trends in higher educational attainment in the population (2008-2017)



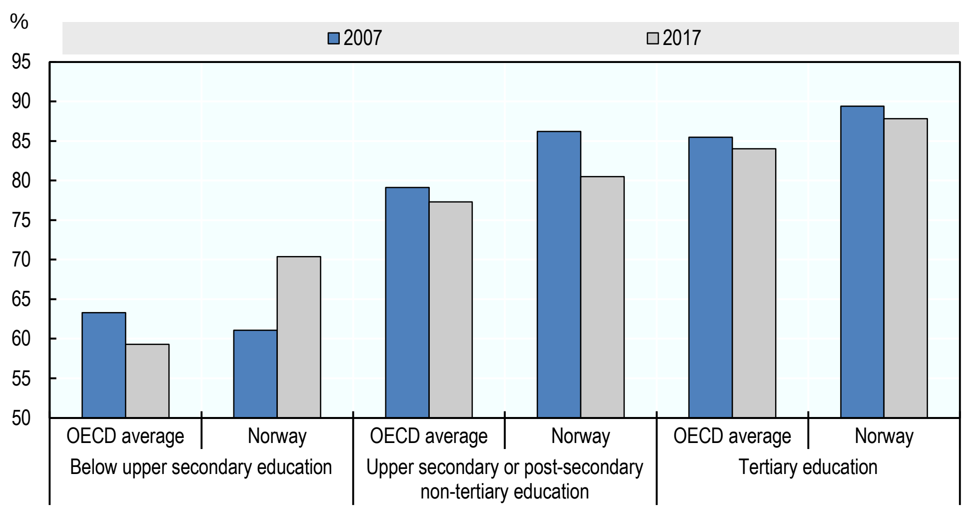
Source: Adapted from OECD (2018[4]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en.

StatLink https://doi.org/10.1787/888933943476

On one hand, lower rates of increase in attainment relative to other countries may be somewhat expected for Norway, given its higher starting point in 2008. However, as Figure 12.20 shows, there are examples of countries with even higher starting points, such as Canada or Korea, that have also been able to maintain or increase these higher levels over the period 2008-2017. In addition, as Figure 12.20 shows, some other countries with similar levels of attainment to Norway in 2008 have increased at a faster pace (e.g. Ireland and the United Kingdom), or have now exceeded the levels of Norway despite starting from a much lower base in 2008 (Switzerland).

This slowing progress could be a source of concern in Norway given the value placed on higher education in society, the evidence of strong social benefits of higher education and Norway's central policy principle that education should be universally accessible. While young people without a higher education qualification still generally enjoy relatively good labour market outcomes in Norway compared to many OECD countries, their outcomes are not as positive as for those with higher education, and employment prospects may be more volatile over time (Figure 12.21).

Figure 12.21. Employment rates of 25-34 year-olds by level of education (2007 and 2017)



Source: Adapted from OECD (2018[4]), *OECD Education Statistics*, http://dx.doi.org/10.1787/edu-data-en.

StatLink https://doi.org/10.1787/888933943495

Stagnating or slowly rising qualification levels in the population could also lead to greater inequalities in living conditions in the future, particularly as evidence indicates that the lower skilled jobs more likely to be carried out by workers without higher education are also often the jobs most vulnerable to automation. Finally, as there is a particularly strong premium on positive social outcomes for higher education graduates in Norway, a "well-being gap" could be perpetuated between those with and without higher education.

The following section presents some scenarios for the future rate of educational attainment in the younger population (age 25-34) in Norway and the OECD, and also considers how further increases in the entry rate and completion rate in Norway could influence the educational attainment rate in the future.

12.5.3. Scenarios for future developments to 2030

The starting point for the projection is the proportion of the population aged 25-34 with higher education in both Norway and the OECD in 2017. A baseline scenario assumes that attainment of higher education for 25-34 year-olds will continue to increase in Norway at a similar rate to the recent past, i.e. over the period 2007-2017 (approximately 13%). The baseline scenario also makes a similar assumption for the OECD average rate of increase (which was approximately 30% over 2007-2017).

The attainment rate in the population has two key drivers: the proportion of the population that is able to access and participate in higher education (entry rates) and the proportion of new entrants able to successfully complete a higher education programme and achieve a qualification (completion rates). While the baseline scenario by default assumes some positive changes to entry and/or completion rates in order to achieve the increase in attainment, the complexity of interplay between the two factors creates a difficulty in projecting their individual impacts within the baseline scenario, as many combinations of effects are possible to create the same overall increase.

However, by considering changes to each of the drivers separately and holding the other constant at the baseline level, two alternative scenarios can be developed which consider how modifications to one of the drivers could increase the overall attainment level above the baseline levels. These scenarios do not make numerical assumptions or define target values for the level of entry and completion rates, but instead are intended to provide a basis for contemplating which factors might be most influential in raising the attainment rate.

Table 12.2 outlines the assumptions used to develop two alternative scenarios, which would increase the future attainment in 25-34 year-olds in Norway above the baseline level. In a scenario of "higher entry rates", entry rates rise by one percentage point year-on-year over the baseline levels in the period 2018-2028, while completion rates are assumed unchanged from the baseline scenario. Under a "higher completion" scenario, the total completion rates of Norwegian students increase over the period 2018-30 by 10% over baseline levels, while the proportion of students completing on-time increases by 2% year-on-year over the period 2020-30.

Table 12.2. Assumptions for the calculations of alternative attainment scenarios

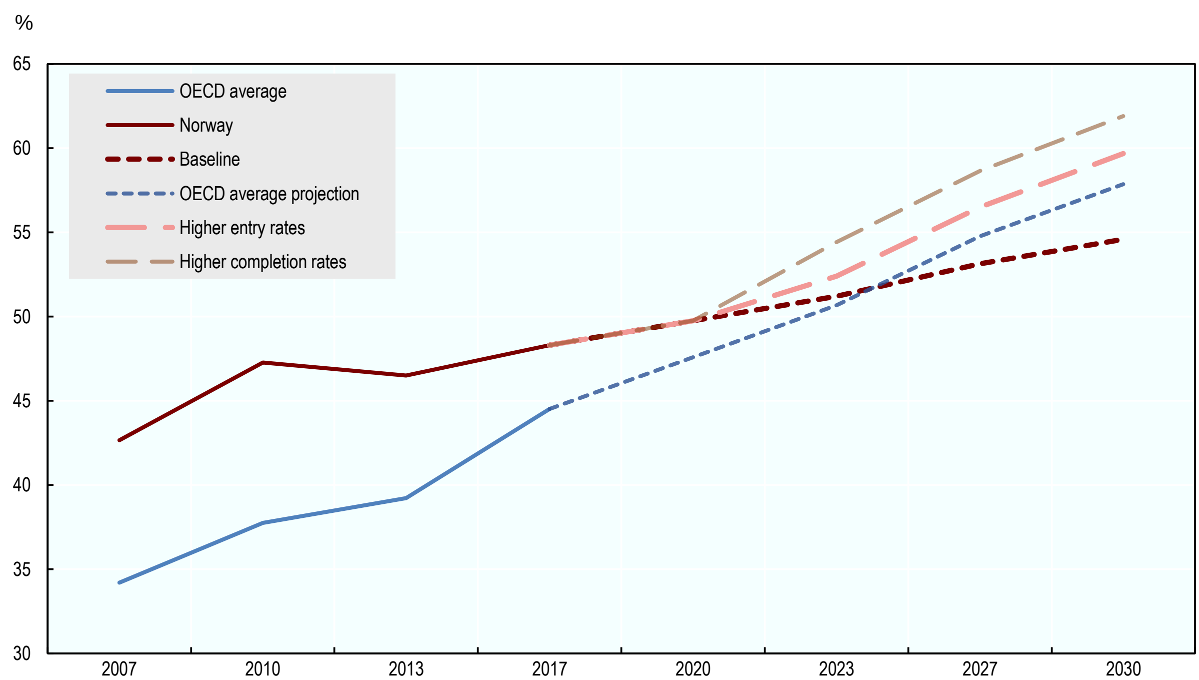
Scenario name	Change in entry rates into higher education	Change in completion rates for higher education programmes	Estimated impact on attainment rates[8]
Higher entry rates	Entry rates rise year-on-year by one percentage point between 2018 and 2028 (10 percentage points in total)	No change from the baseline scenario	Increase in attainment of 9.3% over baseline levels by 2030
Higher completion	No change from the baseline scenario	Overall completion rates increase by 10%, with 2% year-on-year increase in on-time completion from 2020-2030	Increase in attainment of 13.4% over baseline levels by 2030

Source: OECD calculations based on current and recent entry, completion and attainment rates

These assumptions on entry rates and completion rates are iterated over a set of simple test data to produce estimates of the proportion by which educational attainment would rise beyond the baseline levels under each of these conditions during 2018-30, taking into account the time delay to acquire a qualification, and rates of non-completion.[8]

In the baseline scenario, if the recent rates of increase observed for both Norway and the OECD average continue into the future, higher education attainment in the younger population would slip below the OECD average by around 2023 (Figure 12.22). This could have an impact in the long term on the supply of skilled personnel to the Norwegian labour market and could require skills gaps to be met by, for example, greater levels of inward migration. It would also imply that other OECD countries move ahead of Norway in having a highly qualified population, and could become more competitive in attracting investment at the same time as Norway is working to diversify its economy away from oil and gas.

Figure 12.22. Future scenarios for higher education attainment levels of 25-34 year-olds, Norway and OECD



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While raising entry rates by 10 percentage points would be an achievement, the dividends on the levels of qualifications in the population would only fully pay off over a longer period (without a parallel improvement in completion). This is due to the time between entry and graduation, high non-completion rates, and the time it would take for the increased flows of graduates to work through the cohort. This "higher entry rates" scenario would therefore lead to an estimated increase of 9.3% in educational attainment over the baseline level by 2030 (Table 12.2).

The "higher completion" scenario would have the greatest impact on raising Norway's educational attainment levels in the shorter term. If the proportion of students completing on time gradually improves over the coming period, and overall completion rises by 10%, then Norway could increase attainment levels of 25-34 year-olds by an estimated 13.4% (Table 12.2) to more than 60% by 2030 (Figure 12.22). This would also be the more efficient option for Norway, as Norway is already currently investing significant financial resources annually in students who will eventually not attain a qualification (see Chapter 8 of (OECD, 2019[2])).

12.5.4. Implications for policy

One of the central objectives of education policy in Norway is that education should be universally accessible, and Norway is strongly committed to achieving full inclusiveness and equity in higher education (OECD, 2016[14]). Norway works to achieve this objective by providing generous universal benefits. However, more targeted policy initiatives may deliver increases in entry and completion rates, which will ultimately result in more opportunities to achieve higher education for a larger proportion of the Norwegian population.

Achieving higher entry rates

Given that entry rates are already high relative to other OECD countries, Norway’s best potential for increasing rates in the future may be to focus on groups who appear to face greater barriers to accessing higher education. Despite being one of the more equitable countries in the OECD in access to higher education, certain subgroups of the young population in Norway enter higher education in lower proportions and are vulnerable to not making the same economic and social progress as their peers. In 2014, Norwegian 18-24 year-olds whose parents did not attain higher education were 40% less likely to themselves enter higher education than others in the same age cohort. In Norway, as in most other countries, young people whose parents do not have a higher education qualification are more likely to advance to short-cycle post-secondary education than are other individuals in the same age group.

For the foreign-born young population, the gap in access to higher education is smaller, yet foreign-born 18-24 year-olds are still around 20% less likely to enter higher education than are native-born peers. However, it should be noted that there are higher levels of intergenerational educational mobility for the native-born children of immigrants in Norway than in many other countries. Native-born children of non-natives are just 10% less likely to achieve a higher education qualification than children with native-born parents (OECD, 2017[22]).

There are also gaps in access for students living in different regions of Norway, although these gaps are smaller than in many other countries. There is about a 10% gap in the probability of 18-24 year-olds from Oslo and Akershus enrolling in bachelor’s and long first degree programmes compared to those from the rest of Norway (Table 12.3).

Table 12.3. Relative probability of accessing bachelor’s and long first degree programmes for 18-24 year-olds coming from rural or intermediate regions (2015)

Country	Australia	Chile	Germany	Norway	Poland	Sweden
Relative probability (18-24 year-olds from urban regions = 1.00)	0.81	0.70	0.90	0.91	0.60	0.82

Note: The definitions of rural, intermediate and urban regions are taken from the OECD (2011[23]) Regional Typology. Regions classified as rural or intermediate are those with low population density (below 150 inhabitants per square kilometre); at least 15% of the population living in counties or municipalities with low population density; and without any urban centre of more than 500 000 inhabitants representing at least 25% of the regional population. In Norway, this definition implies that the regions of Oslo and Akershus are classified as urban, and the rest of the country as rural or intermediate.
Source: Indicators of Education Systems (INES) Survey on Equity in Higher Education.

The smaller gap in the probability of enrolling in higher education among young people residing in different regions relative to many other countries could be attributed to Norway's long tradition of targeted policy to ensure regional equity of access and preserve the spatial patterns of population distribution, in order to reduce brain drain to urban areas. These policies include generous public support and maintaining a highly decentralised institutional structure, which ensures that regional access to higher education remains well-established, even after a recent wave of institutional mergers (OECD, 2016[14]).

While targeted policies for equity between regions as well as special supports for students with disabilities and other special needs exist, the approach to tackling socio-economic gaps in access in Norway has been more general in nature, by universally providing financial support to students and public subsidies so students do not have to pay tuition fees (Table 12.4). While universal supports ensure that students do not face basic financial barriers to access, gaps in access have nevertheless persisted in Norway.

Table 12.4. Policies to broaden access in higher education in Norway (2017)

Tuition is free in public higher education institutions
Universal system of student loans, some of which can be converted into grants under certain conditions
Part-time students (with an intended study load of 50% or higher) are eligible for public grants and loans
Historical role of distance learning for widening participation (8% of Norwegian students were enrolled in online distance programmes in 2015)
National survey on the state of digitalisation and distance learning in higher education carried out every few years
Most public higher education institutions in Norway offer some programmes in flexible mode (online, mixed mode, part-time)
Special provisions (additional financial support and study flexibility) available for students with children and students with a disability or special educational needs

Source: Adapted from OECD (2019[2]), *Benchmarking Higher Education System Performance*, https://doi.org/10.1787/be5514d7-en.

This may imply that more targeted policies are required to increase the proportion of students from lower socio-economic backgrounds who are able to progress to higher education. Many of these targeted policies may be school-based in nature. For example, policy efforts in the early part of the decade have been focused heavily on improving Norway's below average upper secondary completion rate (OECD, 2015[24]). While some progress has been made, the latest national figures show that around one-quarter of Norwegian students still do not complete upper secondary education within the prescribed time (Statistics Norway, 2019[21]). This can severely limit the possibilities for growing entry rates into higher education over time.

Progress could also be made by investigating other types of policy interventions rather than the default principal policy instrument of financial support. Recent international research into equity policies has suggested that the most common non-monetary policy responses used by governments include outreach and bridging programmes, affirmative action programmes or special admissions criteria for disadvantaged groups (Salmi, 2018[25]). There is a growing realisation among governments that a more comprehensive policy mix that aims to remove both financial and non-financial barriers may be more likely to succeed. Increasingly, governments are also providing incentives directly to institutions to encourage them to broaden access for students (Salmi, 2018[25]).

Norway could consider developing a comprehensive national educational equity strategy and targets to ensure that inequalities do not become more embedded and can reduce over time. Many OECD countries have developed such comprehensive strategies in recent years, including Australia, where the policy targets completion as well as access (Box 12.3).

Box 12.3. The Australian Strategy for promoting equity in higher education

The Higher Education Participation and Partnerships Programme (HEPPP) aims to ensure that Australians from low socio-economic backgrounds who have the ability to study at university have the opportunity to do so. Through its participation and partnerships components, HEPPP provides funding to assist universities in undertaking activities and implementing strategies that increase access to undergraduate courses for people from low socio-economic backgrounds, as well as in improving their retention and completion rates. Partnerships are created with primary and secondary schools, VET institutions, universities and other stakeholders to raise the aspirations and build the capacity of disadvantaged students to participate in higher education. Funding for the Participation and Partnerships Programme is provided to universities based on the number of enrolled students from low socio-economic backgrounds.

An additional component, the National Priorities Pool, funds projects that target and support building an evidence base for future equity policies, testing new equity interventions at the national and institutional levels, and improving implementation of HEPPP at these levels. A 2016 evaluation found that HEPPP has positively influenced the quantity and rigour of higher education equity activities and policies overall. It concluded that HEPPP provided wide-ranging support to a large number of students and institutions between 2010 and 2015. Some 2 679 projects were implemented at the 37 eligible universities. Over 310 000 students have participated in HEPPP projects, with additional students supported in schools and other institutions. In addition, at least 2 913 partner organisations participated in HEPPP outreach activities.

Source: OECD (2018[26]), *Education Policy Outlook 2018: Putting Student Learning at the Centre*, https://dx.doi.org/10.1787/9789264301528-en.

In terms of equity policy design, Norway could also take inspiration from a national example. The Norwegian national strategy to reduce social health inequalities, which began in 2007, has been positively recognised internationally for its comprehensive nature. The strategy developed a suite of interventions covering different aspects of health inequalities and associated national targets (Norwegian Ministry of Health and Care Services, 2007[27]). Notable features include a cross-sectoral approach which embeds the objectives of the strategy into a number of ministries and areas of policies, and an ethic of “proportional universalism”, which combines the provision of universal benefits with the recognition that additional efforts should also be directed towards the most vulnerable groups in society (Van der Wel, Dahl and Bergsli, 2016[28]).

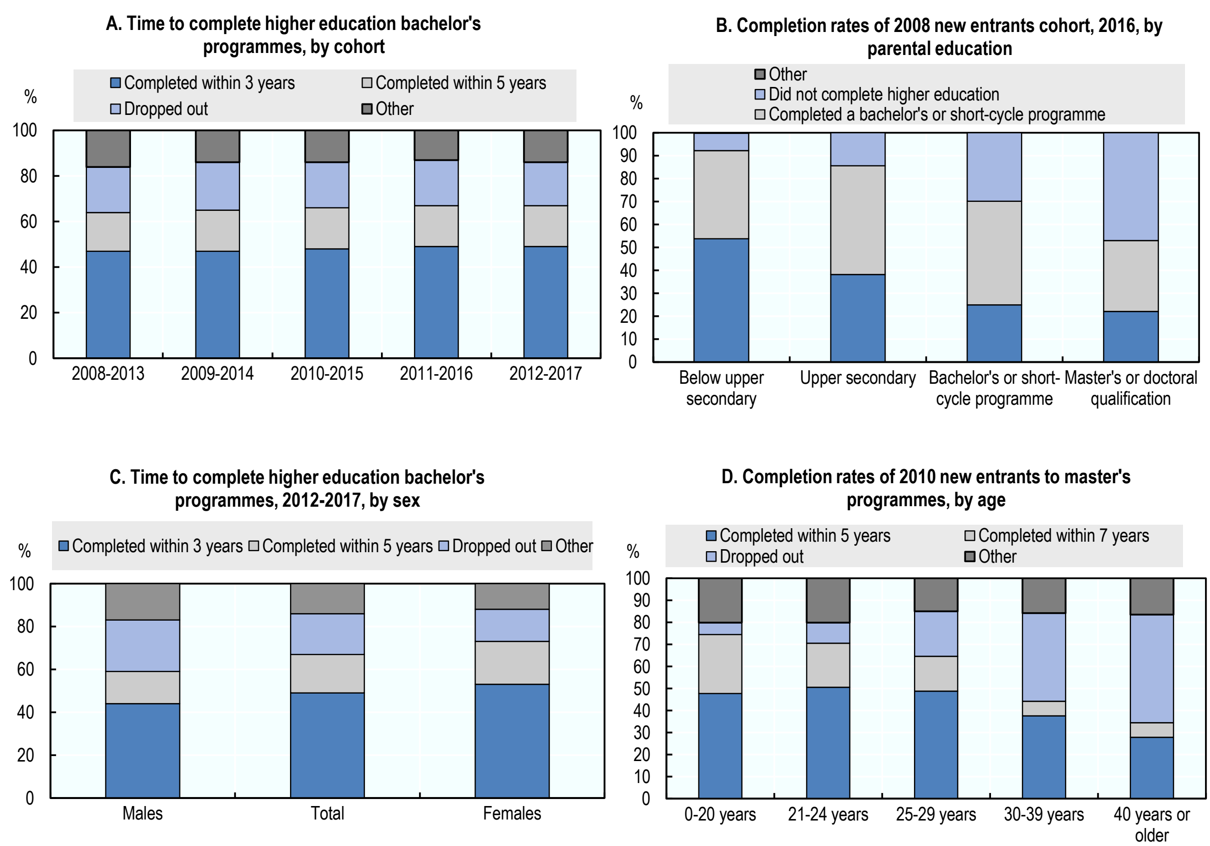
Achieving higher completion rates

According to national data, while completion rates have improved slightly in the most recent cohort of entrants, still less than half of students in bachelor’s level programmes complete the programme in the prescribed time (Figure 12.23). There are also important differences in completion rates for different subgroups of students, with older students, males and those without tertiary-educated parents particularly at risk.

The on-time completion rate for males is almost 10 percentage points lower than that of females for bachelor's level qualifications (44%, compared to 53% for females), and one-quarter of males eventually drop out of their programme. The probability of completing education is also heavily related to age of the student. For example, less than half of students aged over 30 entering a 5-year master's programme are able to complete the programme within 7 years, and more than 40% of them drop out entirely (Figure 12.23).

Furthermore, there is a strong relationship between the probability of dropping out and the educational attainment of students' parents. In the 2008 cohort of entrants, students whose parents did not have upper secondary education were more than twice as likely to drop out of education compared to students whose parents had attained a short-cycle or bachelor's level qualification (Figure 12.23).

Figure 12.23. Completion rates from selected programmes of study by entry cohort and selected student characteristics



Source: Adapted from Statistics Norway (2019[21]), *StatBank Norway*, www.ssb.no/en/statbank.

StatLink https://doi.org/10.1787/888933943533

Recent OECD analysis identifies a number of factors underlying Norway's low completion rates, including the ability of non-completing students to still achieve employment in the robust labour market without a qualification, the low cost of participation, inadequate career guidance and the presence of a large older cohort which may not be interested in pursuing a qualification to completion, but instead may be interested only in studying a particular subject (OECD, 2018[1]).

Norway's policy responses to date have focused on providing incentives to both students and institutions to stimulate quicker completion of studies, such as an ability for students to convert a portion of their student loan into a grant if they complete quickly, and including completion rates as an indicator in the funding formula for higher education institutions. However, these initiatives so far appear to not have achieved the desired level of improvement (Koutsogeorgopoulou, 2016[29]). The wide variety of contributing factors indicated in Figure 12.23 could indicate the need for a more multi-dimensional policy framework that extends beyond the provision of financial incentives.

One of the key policy responses in recent years to improving completion has been to strengthen student social support and peer mentoring during the transition into higher education and throughout the duration of their studies. A range of social support practices are in place across the OECD, including programmes that provide mentoring during the first year of study from more senior students and specialist counsellors (OECD, 2018[1]).

However, universal social supports could be further supplemented with specific initiatives that provide additional focus on certain groups who are more at risk of disengaging from the system, such as, in the Norwegian case, older students, males and students from families with lower levels of parental education.

Understanding non-completion of older students

The higher prevalence of non-completion of older students in Norway does not appear to have a clear explanation or be as well researched as non-completion for other groups of students. Common identified barriers to non-completion for older students include financial constraints or balancing attendance in higher education with other personal commitments, such as caring for children or elderly relatives.

Norway has a long-standing policy of ensuring that older students are able to access higher education, through the use of quotas and alternative access arrangements for students who do not meet the traditional entry requirements (see Chapter 2 of (OECD, 2019[2])). Furthermore, institutions can be more selective in admissions to high-demand courses, while they accept all eligible applicants to low-demand courses. This could create a situation where older students are disproportionately represented in less desirable or less labour market-relevant programmes, or fields of study where there are fewer incentives to complete.

The large share of non-completion in Norway has also been linked to the intentions of the older cohort only to study specific subjects and not pursue a qualification; Norway's continuing education system should be able to play a more prominent role in meeting the needs of students who do not intend to pursue a full qualification. Norway already has a well-developed continuing education system, which allows students to pursue individual courses on a non-credit or credit basis and count credits achieved towards a degree (see Chapter 7 of (OECD, 2019[2])). Norway could conduct some further investigation of the objectives of older students when accessing higher education, to inform how they could most efficiently be realised.

Closing the gap between male and female students

The completion gap between male and female students is the culmination of a series of achievement and attitudinal gaps that open up at earlier education levels in Norway. For example, in Norway, 15 year-old girls have higher career ambitions, and boys (particularly boys of lower socio-economic status) make much slower progress in reading. Crucially, Norway has one of the widest gaps in expectation of 15 year-olds to complete higher education, as recorded in PISA 2015; 71% of girls expected to obtain a higher qualification, compared to just 52% of boys, one of the largest gaps in the 57 participating countries (Borgonovi, Ferrara and Maghnouj, 2018[7]).

Tackling the completion gap between genders will therefore require policy responses that begin much earlier in the lifecycle. For Norway, policy responses could include school-based initiatives, creating stronger national visibility on the issue of gender gaps in outcomes to encourage more research, and strengthening policy evaluation mechanisms (Borgonovi, Ferrara and Maghnouj, 2018[7]).. Norway recently submitted a Green Paper on gender differences in pathways and results to address gender equity issues arising at lower levels of education, which also includes some policy recommendations related to access in higher education (Norwegian Ministry of Education and Research, 2019[30]).

Supporting first-generation students

First-generation or first-in-family students (those who do not have an immediate family member who has attended higher education) face additional hurdles to completion over and beyond financial constraints. For example, they may be less likely to understand expectations of teaching staff and what is required of higher education students, and be less likely to have awareness of the career advice and other services available to them (Collier and Morgan, 2008[31]; Pasero, 2018[32]). Identifying the specific challenges faced by first-generation students and providing support mechanisms designed to overcome these challenges can help increase the retention of these students in higher education.

Most programmes designed to provide additional assistance to first-generation students are organised at the institutional level, and include supports ranging from specialist support staff to extra advice sessions for first-in-family students. However, governments can incentivise institutions to provide assistance in a number of ways, such as providing targeted financial contributions, considering the student supports available as part of the assessment of institutional performance, or funding research to identify the most promising types of interventions. For example, in the UK, the government has created a "Student Opportunity" fund available to institutions, which is intended to be used specifically on widening participation and completion from groups who are more likely not to achieve study success (European Commission, 2015[33]).

Notes

[1] This includes about 9 000 students following programmes below the bachelor's level (ISCED 5), educated in vocational colleges (*fagskole*), which are not considered part of the higher education system.

[2] A wider discussion of the topics covered in this note, as well as many other topics spanning the resourcing, missions and performance of higher education can be found in the synthesis report for the project in (OECD, 2019[2]).

[3] The minister for higher education and research in Norway is responsible for higher education from the bachelor's level (ISCED 6) to the doctoral level (ISCED 8).

[4] Approximately 85% of higher education students were enrolled in public institutions in 2016.

[5] Two-year vocational college education programmes (*fagskole*).

[6] Countries that participated in PIAAC in either 2012 or 2015.

[7] The correlation coefficient of the two series as presented in Figure 12.11 is -0.22.

[8] The assumptions are used to estimate suitable multipliers for the projected attainment time series. For example, iterating a cumulative increase in the entry rate of 1 percentage point per year between 2018-2028 on a standard set of test data indicates that attainment would start to be impacted from 2021, and attainment levels would eventually increase by 9.3% over the baseline level by 2030, once the time lag to acquire a qualification and the rates of non-completion are taken into account.

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