

The expansion of tertiary education is supported by an increase in financial resources, although a larger share is spent on R&D than in other countries

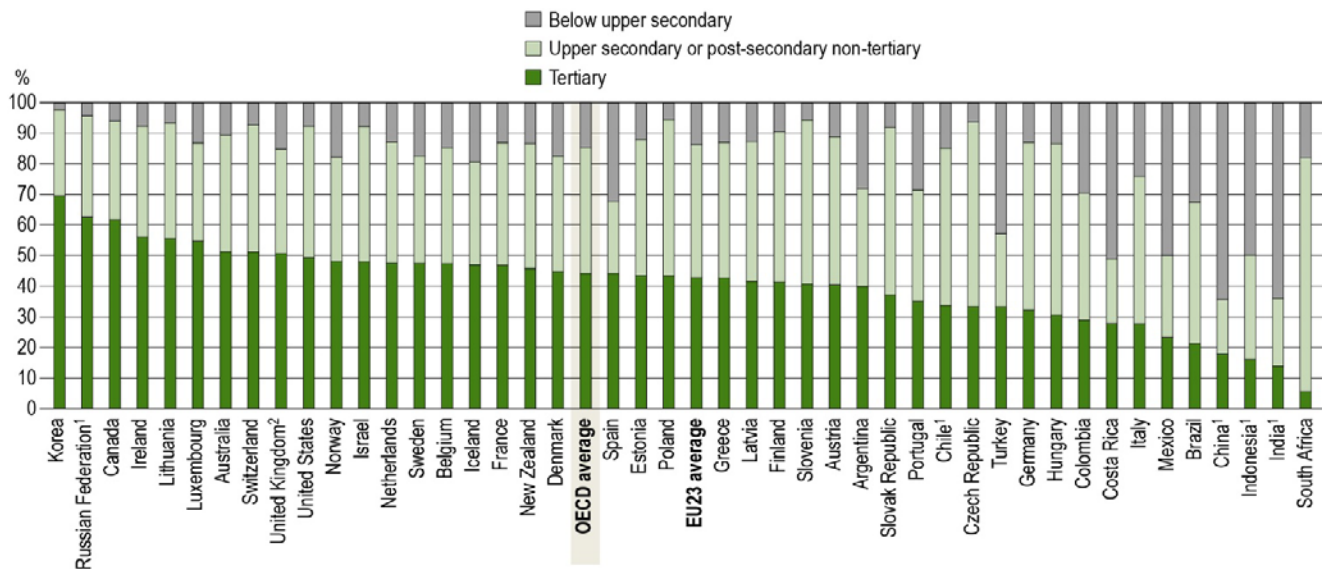
- Tertiary education has grown in Germany in the past decade. Between 2005 and 2017, the number of tertiary students increased at an average rate of 3% per year, compared to 1% on average across OECD countries (Figure 1). In 2018, 32% of young adults (aged 25-34) in Germany held a tertiary degree, compared to 24% in 2008. Despite this progression, tertiary attainment in Germany remains below the OECD average of 44%, mostly as a result of its strong vocational education system.
- Tertiary-educated young adults are more likely to progress to higher levels of tertiary education than on average across OECD countries. Close to 46% of them have master's or doctoral degree in Germany compared to 34% on average across OECD countries.
- Science, technology, engineering and mathematics (STEM) fields of study are attractive in Germany, where 35% of tertiary-educated adults held a degree in these fields compared to 25% on average across OECD countries. Among STEM fields, the largest share of tertiary-educated adults in Germany, 26%, have studied engineering, manufacturing and construction. This represents the second largest share across OECD countries after Austria. However, similar to the average pattern across OECD countries, the attractiveness of this field may be decreasing in Germany: only 22% of tertiary graduates earned a degree in this field in 2017. In contrast, other STEM fields of study, such as natural sciences, mathematics and statistics and information and communication technologies have shown a positive development in Germany. Similarly, the share of adults with a degree in the broad field of arts and humanities, social sciences, journalism and information is increasing: 19% of tertiary graduates in 2017 earned a degree in this field compared to 13% among the tertiary-educated adult population in Germany.
- However, tertiary-educated adults who studied arts and humanities, social sciences, journalism and information have the poorest labour-market outcomes in Germany: 86% of them are employed and they earn only 33% more than adults with an upper secondary education. In contrast, 91% of adults with a tertiary degree in engineering, manufacturing and construction are employed, and they earn 116% more than those with upper secondary education, one of the highest premiums across OECD countries with data.
- Admissions to tertiary education is open in Germany, in common with more than half of OECD countries and economies, and students from both general and vocational upper secondary programmes are qualified to directly enter first-degree tertiary programmes. However, the admission system places some limitations on some fields of study which have a quota of places available. In these fields, the grade obtained in the *Abitur* (the upper secondary school-leaving examination in Germany, also used as the higher education entrance qualification), is used to select candidates to fill the quota.
- Among first-time entrants to tertiary education in Germany, 82% enter a bachelor's programme, while 18% go directly into a long first degree programme (*Staatsexamen*). Short-cycle tertiary programmes are not very common. Less than 1% of first-time tertiary entrants enrol in them in Germany compared to 17% on average across OECD countries. However young adults with this level of education have the highest employment rates among tertiary-educated adults in Germany, 94% compared to 88% among those with masters and 92% among those with a doctoral degree.
- Germany invested significantly in tertiary education between 2005 and 2010. Spending at this level increased by 24% over this period, more than three times the 7% increase in the number of tertiary students. Between 2010 and 2016, the opposite pattern was observed: spending increased by 12%, less than half the 29% increase in the number of tertiary students. As a result, spending per student at tertiary level in Germany in 2016 was about the same as it was in 2005. In response to rising student numbers, the number of teaching staff also increased between 2005 and 2017 at an average rate of 4% per year, one of the highest increases across OECD countries.

- Although spending on tertiary institutions per student in Germany was USD 17 429¹ in 2016, higher than the OECD average of USD 15 556, the distribution of spending across services differed: 43% of total funds were devoted to research and development, the second highest share across OECD countries after Sweden. As a result, Germany spent less per student than the OECD average on core educational goods and services at tertiary level (USD 8 866 compared to USD 10 351).

Adults with upper secondary education have better employment prospects than a decade ago

- A larger share of the population have upper secondary or post-secondary non-tertiary education as their highest educational attainment in Germany compared to other OECD countries: 58% of adults in Germany compared to 44% on average across OECD countries. However this share has been falling among young adults in the past decade: 55% of 25-34 year-olds had attained upper secondary or post-secondary non tertiary in 2018 compared to 62% in 2008 (Figure 2).

Figure 2. Educational attainment of 25-34 year-olds (2018)



1. 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 (13% of adults aged 25-64 are in this group).

2. Year of reference differs from 2018. Refer to Table A1.1 for more details.

Countries are ranked in descending order of the percentage of tertiary-educated 25-34 year-olds.

Source: OECD (2019), Education at a Glance Database, <http://stats.oecd.org>. See Source section for more information and Annex 3 for notes (<https://doi.org/10.1787/8d7880d-en>).

- One of the reasons for the large share of adults at this level can be explained by Germany’s well established vocational education and training (VET) system and prospects for further education. VET begins at upper secondary level, with 44% of upper secondary graduates in Germany holding a vocational qualification compared to 40% on average across OECD countries. Post-secondary non-tertiary education provides a clear and regulated pathway for vocational students to pursue further education: 90% of graduates from this level earn a vocational qualification and the average graduation age of 24 is much lower than the OECD average of 31. In 2018, 12% of adults had attained this level in Germany,

¹ Values reported in equivalent US dollars (USD) have been converted using purchasing power parities (PPPs) for GDP.

double the OECD average of 6%. However, despite significant reforms, the route from post-secondary VET to academic higher education remains rarely travelled (Fazekas and Field, 2013^[2]).

- About one-third of upper secondary vocational graduates studied engineering, manufacturing and construction in Germany in 2017, a similar share to the OECD average. Another third studied business, administration and law, compared to 18% on average across OECD countries. In contrast, at post-secondary non-tertiary level, health and welfare is the commonest field of study, accounting for 43% of graduates, more than double the OECD average.
- Employment prospects for young adults with upper secondary or post-secondary non-tertiary education have expanded in Germany in the past decade: their employment rate increased from 78% in 2008 to 84% in 2018, whereas average employment rates fell slightly across the OECD from 79% in 2008 to 78% in 2018. This has led to a reduction in the employment advantage of tertiary-educated adults in Germany whose employment rate has remained stable over the same period at 88%. Across the OECD, although the employment rate of tertiary-educated adults fell from 86% to 84% during the same period, the employment advantage of tertiary-educated adults compared to those with upper secondary or post-secondary non-tertiary education increased slightly.
- In spite of improving employment prospects, adults with upper secondary education earn 39% less than those with a bachelor's degree in Germany, compared to 31% less on average across OECD countries.

Gender differences in the labour market are lower for those with upper secondary education than for those with tertiary education

- In spite of Germany's prominent vocational education system, it attracts more men than women: 40% of upper secondary vocational graduates were women in 2018 compared to 46% on average across OECD countries. However, women are more likely to continue on to post-secondary non-tertiary level, where their share increases to 60%. This is likely due to the strong prominence in Germany of the field of health and welfare at this level, where women make up more than 80% of students. In contrast, women make up only 14% of post-secondary non-tertiary vocational graduates in the field of engineering, manufacturing and construction in Germany compared to 18% on average across OECD countries.
- In contrast to other OECD countries where women strongly outnumber men among tertiary-educated adults, Germany is close to gender parity: 34% of women and 31% of men had attained tertiary education in 2018. This 2 percentage-point difference is one of the lowest across OECD countries, and significantly lower than the 12 percentage-point difference in tertiary attainment between men and women observed on average across OECD countries.
- Women make up about 50% of first-time entrants to bachelor's programmes and more than 60% of entrants to master's long first degree programmes in Germany, similar to the OECD averages at both levels. Women tend to be under-represented in science, technology, engineering and mathematics (STEM) but while they represent less than 30% of new entrants to these fields at bachelor's level, they represent almost half of those entering master's long first degree programmes, a similar pattern to the average across OECD countries.
- While the differences between the employment rates for young men and women decrease significantly with higher educational attainment on average across OECD countries, they remain the same in Germany. This is mostly due to the much higher employment rate for women with upper secondary education in Germany (80%) compared to the OECD average (68%) which reduces the gender gap at that level. Between 2008 and 2018, the employment of women with upper secondary education rose as a combination of better employment prospects and lower inactivity. In contrast, the share of inactive tertiary-educated women has remained constant over this period.
- Women earn less than men, and the earnings gap is wider at higher attainment levels in Germany than on average across OECD countries, particularly for 35-44 year-olds. While 35-44 year-old women with

upper secondary education working full-time earn 85% as much as similarly educated men in Germany, more than the OECD average of 77%, a tertiary-educated woman of the same age earns only 72% as much, lower than the OECD average of 77%. Women in particular tend to study and work in fields in which earnings might be lower and select to work part-time which may differ earning progression to later in their career: 31% of employed tertiary-educated women worked part time in 2017 in Germany compared to 24% on average across OECD countries.

Smaller classes and long teaching time characterise pre-primary education in Germany

- Although compulsory education starts at the age of 6 in Germany, there is near universal enrolment of 3-5 year-olds in early childhood education and care (ECEC): 95% in 2017, up from 88% in 2005. The enrolment of children under the age of 3 in ECEC (Krippen, Altersgemischte Einrichtungen, or Kindertagespflege) has also increased over this period, from 17% in 2005 to 37% in 2017, a similar rate to the OECD average. These trends are the result of policy initiatives across OECD countries that have aimed to expand ECEC services and simultaneously improve the quality of early childhood education.
- Compared to other OECD countries, ECEC settings in Germany are more likely to be government-dependent and privately owned, mostly run by not-for-profit providers such as religious institutions: 73% of children in early childhood development programmes (ISCED 01) and 65% of children in pre-primary education (ISCED 02) attend a private institution, compared to 47% and 34% respectively on average across OECD countries. In spite of this above-average reliance on private provision of ECEC, the share of private expenditure is very similar to the OECD average, at 19%. To support enrolment in ECEC, the federal government provided extra budget to the regions and local authorities responsible for the provision of ECEC in their *Länder*. Funding from private entities other than households is also higher in Germany than in other countries (OECD, 2017^[3]).
- Germany invests more in ECEC per child than on average across OECD countries, particularly on early childhood development programmes: it spends USD 16 169 on this level, 34% more than the OECD average of USD 12 080. At pre-primary level, Germany invests USD 10 101 per child compared to USD 8 349 on average. Total expenditure on ECEC represents 0.9% of Germany's gross domestic product (GDP), only slightly higher than the OECD average of 0.8%.
- Children in Germany who attend pre-primary benefit from a low teacher to child ratio with 9 children per teacher compared to 16 on average across OECD countries. Most contact staff are teachers and only 9% are teaching aides compared with 27% on average across OECD countries. Teaching time at pre-primary level is higher in Germany than in most other OECD countries. In 2018, pre-primary teachers were expected to teach 1 755 hours in 2018, 70% more than the OECD average of 1 034 hours.

High salaries and an ageing teaching workforce have contributed to higher expenditure on primary and secondary institutions

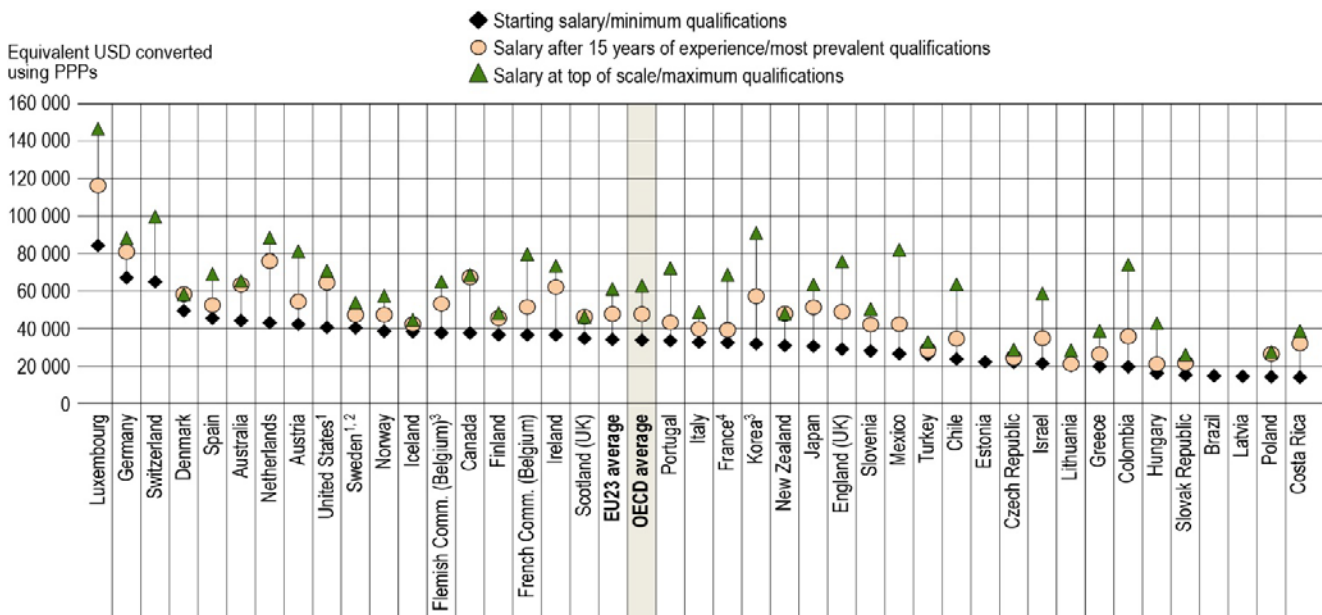
- In 2016, spending per student on primary, secondary and post-secondary non-tertiary institutions in Germany (USD 11 294) was higher than the average across OECD countries (USD 9 357). Spending was particularly high for upper secondary vocational programmes where Germany spent USD 16 323 per student, 49% more than the OECD average. However, spending at primary, secondary, and post-secondary non-tertiary levels represents a lower share of GDP in Germany, 3%, compared to 3.5% on average across OECD countries.
- Between 2010 and 2016, total expenditure on primary, secondary and post-secondary non-tertiary institutions remained stable in Germany although the number of students declined by 7%. In comparison,

on average across OECD countries, total expenditure increased by 5% whereas total student numbers remained constant over this period.

- Germany devotes a similar share of total spending (93%) to current expenditure on primary, secondary and post-secondary non-tertiary institutions to the average across OECD countries. It devotes 82% of current expenditure to staff compensation at this level, a larger share than the 78% on average across OECD countries.
- Higher spending on staff compensation results in part from higher teacher salaries in Germany compared to other OECD countries: lower secondary public teachers at the start of their career can expect to earn an annual statutory salary of USD 67 163, almost twice the OECD average of USD 34 094. However, salary progression throughout a teacher's career is more limited in Germany than in other countries and economies. At the top of the scale, lower secondary teachers with maximum qualifications earn about 31% more than a starting teacher with minimum qualifications, compared to 89% more on average across OECD countries. Yet their salaries at this level remain among the highest across OECD countries and economies (Figure 3).

Figure 3. Lower secondary teachers' statutory salaries at different points in teachers' careers (2018)

Annual statutory salaries of teachers in public institutions, in equivalent USD converted using PPPs



1. Actual base salaries.
2. Salaries at top of scale and minimum qualifications, instead of maximum qualifications.
3. Salaries at top of scale and most prevalent qualifications, instead of maximum qualifications.
4. Includes the average of fixed bonuses for overtime hours.

Countries and economies are ranked in descending order of starting salaries for lower secondary teachers with minimum qualifications.

Source: OECD (2019), Table D3.1a, Tables D3.1c and D3.6, available on line. See *Source* section for more information and Annex 3 for notes (<https://doi.org/10.1787/f8d7880d-en>).


- Teaching is an attractive profession in Germany. Primary teachers earn 91% as much as other tertiary-educated workers, compared to 84% as much on average across OECD countries. Secondary teachers earn as much or more than tertiary-educated workers in Germany compared 88-93% as much on average. Salaries have also been increasing in Germany. Between 2010 and 2016, teachers' annual statutory salaries rose by 12% at primary level, 10% at lower secondary level and 8% at upper secondary level.

- The teaching profession is older in Germany than in other countries. In 2017, 42% of primary and secondary teachers in Germany were over the age of 50 and only 7% were under 30. In contrast, on average across OECD countries, 36% of primary to secondary teachers were over the age of 50 and 10% were under 30.

References

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- OECD (2017), *Starting Strong 2017: Key OECD Indicators on Early Childhood Education and Care*, Starting Strong, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9789264276116-en>. [3]

For more information on **Education at a Glance 2019** and to access the full set of Indicators, visit www.oecd.org/education/education-at-a-glance-19991487.htm.

Updated data can be found on line at <http://dx.doi.org/10.1787/eag-data-en> and by following the **StatLinks**  under the tables and charts in the publication.

Explore, compare and visualise more data and analysis using: 

<http://gpseducation.oecd.org/CountryProfile?primaryCountry=DEU&treshold=10&topic=EO>.

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On 25 May 2018, the OECD Council invited Colombia to become a Member. While Colombia is included in the OECD averages reported in this note, at the time of its preparation, Colombia was in the process of completing its domestic procedures for ratification and the deposit of Colombia's instrument of accession to the OECD Convention was pending.

Note regarding data from Israel

The statistical data for Israel are supplied by and are 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.

Key Facts for Germany in Education at a Glance 2019

Source	Main topics in <i>Education at a Glance</i>	Germany		OECD average		EU23 average	
Tertiary education							
Educational attainment of 25-64 year-olds							
2018							
Table A1.1	Short-cycle tertiary	1%		7%		5%	
	Bachelor's or equivalent	15%		17%		14%	
	Master's or equivalent	12%		13%		15%	
	Doctoral or equivalent	1%		1%		1%	
Tertiary attainment of 25-34 year-olds, by gender							
2018							
Table A1.2	Men	23%	31%	31%	38%	28%	36%
	Women	25%	34%	40%	51%	38%	50%
	Total	24%	32%	35%	44%	33%	43%
Distribution of first-time tertiary entrants by education level							
2017							
Table B4.1	Short-cycle tertiary	0%		17%		12%	
	Bachelor's or equivalent	82%		76%		80%	
	Master's or equivalent	18%		7%		8%	
Share of international or foreign students, by education level¹							
2017							
Table B6.1	Bachelor's or equivalent	5%		4%		7%	
	Master's or equivalent	14%		13%		13%	
	Doctoral or equivalent	10%		22%		22%	
	All tertiary levels of education	8%		6%		9%	
Employment rate of 25-64 year-olds, by educational attainment							
2018							
Table A3.1	Short-cycle tertiary	90%		82%		82%	
	Bachelor's or equivalent	89%		84%		84%	
	Master's or equivalent	89%		88%		88%	
	Doctoral or equivalent	93%		92%		93%	
	All tertiary levels of education	89%		85%		86%	
Employment rate of tertiary-educated 25-64 year-olds, by field of study							
2018							
Table A3.4	Education	87%		84%		85%	
	Business and administration and law	90%		86%		87%	
	Engineering, manufacturing and construction	91%		89%		89%	
	Health and welfare	89%		87%		88%	
Relative earnings of full-time full-year 25-64 year-old workers, by educational attainment (upper secondary education = 100)							
2017							
Table A4.1	Short-cycle tertiary	149		120		121	
	Bachelor's or equivalent	163		144		138	
	Master's, doctoral or equivalent	183		191		174	
	All tertiary levels of education	169		157		152	
Upper secondary and vocational education and training (VET)							
Upper secondary or post-secondary non-tertiary attainment rate							
2018							
Table A1.2	Share of 25-34 year-olds with upper secondary or post-secondary non-tertiary as their highest attainment	55%		41%		44%	
Percentage of first-time upper secondary graduates with a vocational qualification							
2017							
Table B3.1	Vocational programmes	44%		40%		46%	
Age at graduation from upper secondary education, by programme orientation							
2017							
Figure B3.1	General programmes	19		18		19	
	Vocational programmes	22		21		21	
Share of women among upper secondary graduates, by programme orientation							
2017							
Figure B3.2	General programmes	54%		55%		56%	
	Vocational programmes	40%		46%		46%	
Employment, unemployment and inactivity rates of 25-34 year-olds, with upper secondary or post-secondary non-tertiary education							
2018							
Table A3.3	Employment rate	84%		78%		79%	
	Unemployment rate	3%		7%		8%	
	Inactivity rate	13%		16%		14%	
Total expenditure on upper secondary educational institutions, in USD² per full-time equivalent student, by programme orientation							
2016							
Table C1.1	General programmes	USD 11 893		USD 9 397		USD 9 671	
	Vocational programmes	USD 16 323		USD 10 922		USD 11 320	
Early childhood education and care (ECEC)							
Enrolment rate of 3-5 year-olds in education							
2017							
Table B2.2	ECEC and primary education	95%		87%		90%	
Share of children enrolled in private institutions							
2017							
Table B2.3	Pre-primary level (ISCED 02)	65%		34%		27%	
Ratio of children to teaching staff							
2017							
Table B2.3	Pre-primary level (ISCED 02)	9		16		15	
Expenditure on children aged 3-5 enrolled in education							
2016							
Table B2.4	Annual expenditure per child, in USD ² per child	USD 10 100		USD 8 141		USD 8 926	

Source	Main topics in <i>Education at a Glance</i>	Germany		OECD average		EU23 average	
Social outcomes and adult learning							
Participation in formal and/or non-formal education, by educational attainment³		2016					
Table A7.1	Below upper secondary	27%		n.a.		26%	
	Upper secondary or post-secondary non-tertiary	49%		n.a.		44%	
	Tertiary	69%		n.a.		66%	
Participation in cultural or sporting activities in the last 12 months, by educational attainment⁴		2015					
Table A6.1	Below upper secondary	52%		n.a.		56%	
	Upper secondary or post-secondary non-tertiary	78%		n.a.		77%	
	Tertiary	92%		n.a.		92%	
Financial resources invested in education							
Total expenditure on educational institutions, by level of education²		2016					
Table C1.1 and C2.1		USD/student	% GDP	USD/student	% GDP	USD/student	% GDP
	Primary	USD 8 960	0.6%	USD 8 470	1.5%	USD 8 548	1.3%
	Lower secondary	USD 11 159	1.2%	USD 9 884	0.9%	USD 10 302	0.9%
	Upper secondary	USD 14 094	0.9%	USD 10 368	1.1%	USD 10 308	1.9%
	Tertiary (including R&D)	USD 17 429	1.2%	USD 15 556	1.5%	USD 15 863	1.2%
Share of expenditure on educational institutions, by final source of funds		2016					
Table C3.1		Public	Private	Public	Private	Public	Private
	Primary, secondary and post-secondary non-tertiary	87%	13%	90%	10%	92%	8%
	Tertiary (including R&D)	83%	15%	66%	32%	73%	24%
Total public expenditure on primary to tertiary education		2016					
Table C4.1	As a percentage of total government expenditure	9.1%		10.8%		9.6%	
Teachers, the learning environment and the organisation of schools							
Actual salaries of teachers and school heads in public institutions relative to earnings of full-time, full-year workers with tertiary education		2017					
Table D3.2a		Teachers	School heads	Teachers	School heads	Teachers	School heads
	Pre-primary	**	**	0.78	**	0.78	1.16
	Primary	0.91	**	0.84	1.25	0.85	1.24
	Lower secondary (general programmes)	1	**	0.88	1.34	0.89	1.34
	Upper secondary (general programmes)	1.06	**	0.93	1.43	0.95	1.43
Annual statutory salaries of teachers in public institutions, based on most prevalent qualifications, at different points in teachers' careers²		2018					
Table D3.1a		Starting salary	Salary after 15 years of experience	Starting salary	Salary after 15 years of experience	Starting salary	Salary after 15 years of experience
	Pre-primary	**	**	USD 31 276	USD 42 078	USD 30 615	USD 41 354
	Primary	USD 60 507	USD 74 486	USD 33 058	USD 45 947	USD 32 987	USD 45 748
	Lower secondary (general programmes)	USD 67 163	USD 80 993	USD 34 230	USD 47 675	USD 34 261	USD 47 772
	Upper secondary (general programmes)	USD 70 749	USD 85 206	USD 35 859	USD 49 804	USD 35 104	USD 49 875
Organisation of teachers' working time in public institutions over the school year		2018					
Tables D4.1a and D4.1b		Net teaching time	Total statutory working time	Net teaching time	Total statutory working time	Net teaching time	Total statutory working time
	Pre-primary	1 755 hours	1 769 hours	1 024 hours	1 613 hours	1 062 hours	1 550 hours
	Primary	800 hours	1 769 hours	783 hours	1 612 hours	754 hours	1 539 hours
	Lower secondary (general programmes)	744 hours	1 769 hours	709 hours	1 634 hours	673 hours	1 572 hours
	Upper secondary (general programmes)	717 hours	1 769 hours	667 hours	1 629 hours	643 hours	1 558 hours
Percentage of teachers who are 50 years old or over		2017					
Table D5.1	Primary to upper secondary	42%		36%		39%	
Share of female teachers, in public and private institutions		2017					
Table D5.2	Primary	87%		83%		87%	
	Lower secondary	67%		69%		72%	
Total number of compulsory instruction time, by level of education		2019					
Table D1.1	Primary	2 896 hours		4 568 hours		4 258 hours	
	Lower secondary	4 526 hours		3 022 hours		3 002 hours	
	Upper secondary	**		**		**	
Average class size by level of education		2017					
Table D2.1	Primary	21		21		20	
	Lower secondary	24		23		21	

The reference year is the year cited or the latest year for which data are available.

1. For some countries, data on foreign students are provided instead of international students.

2. Values reported in equivalent US dollars (USD) have been converted using purchasing power parities (PPPs) for GDP

3. EU23 average refers to the average of OECD countries that participated in the Adult Education Survey (AES).

4. EU23 average refers to the average of OECD countries that participated in the European Union Statistics on Income and Living Conditions 2015.

** Please refer to the source table for details on these data.

Cut-off date for the data: 19 July 2019. Any updates on data can be found on line at <http://dx.doi.org/10.1787/eag-data-en>.