



European
Commission

The European Higher Education Area in 2020

*Bologna Process
Implementation Report*



Education,
Audiovisual
and Culture
Executive Agency

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Luxembourg: Publications Office of the European Union, 2020

PRINT	ISBN: 978-92-9484-357-9	doi: 10.2797/851121	EC-02-20-828-EN-C
PDF	ISBN: 978-92-9484-356-2	doi: 10.2797/756192	EC-02-20-828-EN-N

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CHAPTER 1: EUROPEAN HIGHER EDUCATION AREA

KEY DATA

Chapter outline

This chapter provides information on the framework conditions for higher education in the different countries of the EHEA. A flavour of how these conditions vary dramatically and have evolved during the lifetime of the Bologna Process across the EHEA is provided through statistical data on key features of European higher education. The topics covered are: changes in student and staff numbers; changes to the number of higher education institutions; evolution of public funding in higher education.

Technical note

Data has been produced for reference years between 2000 and 2017 (the most recent year with statistical data available). It is important to note that ISCED 2011 (International Standard Classification of Education 2011) was introduced in the middle of the analysed time period, enabling greater clarity for many statistical representations. Some of the changes perceived in student enrolment may be due to the different classification of students before and after 2011, but this is unlikely to affect the overall trend or direction of change for particular countries.

The 2018 Paris Communiqué

The Paris Communiqué refers to the commitment made that the student body entering and graduating from European higher education institutions should reflect the diversity of Europe's populations.

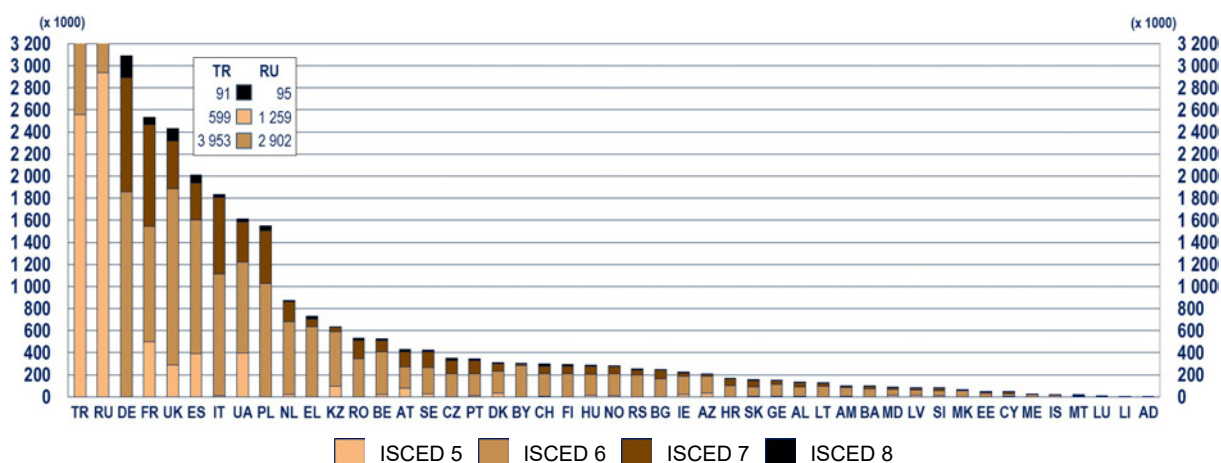
Key messages

- The EHEA has seen a continuous rise of total student numbers since its inception, reaching more than 38 million students in 2016/17. This is an increase of more than 18 million students compared to 2000. Turkey, Russia, Germany, France and the United Kingdom now account for almost 60 % of the EHEA student population.
- There has been an increase in numbers of academic staff in more than half of the 40 countries for which data are available. About 45 % of the academic staff is female.
- In 2016, public spending on tertiary education relative to GDP varies from 0.3 % to 2.1 % with a median value of 0.95 %.

1.1. Student population

Figure 1.1 shows the number of students enrolled in tertiary education in 2017, and the share in each ISCED level between ISCED 5 and ISCED 8. ISCED 5 corresponds to short-cycle programmes, ISCED 6 to first-cycle programmes (bachelor programme or equivalent), ISCED 7 to second-cycle (master programme or equivalent) and ISCED 8 to third-cycle programmes (Doctoral or equivalent).

Figure 1.1: Number of students enrolled in tertiary education by ISCED level, 2016/17



(x 1 000)	TR	RU	DE	FR	UK	ES	IT	UA	PL	NL	EL	KZ	RO	BE	AT	SE
ISCED 5	2 556	2 941	0.3	501.3	287.5	392.5	11.0	398.7	0.2	23.7	0.0	93.8	0.0	23.5	76.0	24.7
ISCED 6	3 953	2 902	1 860	1 042	1 597	1 212	1 102	823.1	1 027	659.6	634.0	496.2	347.9	384.2	196.0	240.7
ISCED 7	598.5	1 259	1 033	922.9	434.9	334.5	696.2	365.8	479.6	176.9	72.3	38.4	164.5	102.1	135.6	140.7
ISCED 8	91.3	94.6	198.3	66.9	112.3	71.5	27.7	27.1	43.2	15.1	28.7	3.6	19.2	17.0	22.9	20.3
	CZ	PT	DK	BY	CH	FI	HU	NO	RS	BG	IE	AZ	HR	SK	GE	AL
ISCED 5	1.0	11.0	35.6	0.0	4.1	0.0	13.3	8.4	0.0	0.0	19.5	30.3	0.1	2.8	4.8	2.8
ISCED 6	206.1	200.6	196.0	284.0	203.3	211.1	187.3	200.5	197.9	165.6	166.9	158.8	99.1	85.3	108.7	84.9
ISCED 7	122.3	115.8	71.2	15.0	68.4	65.6	79.0	67.0	46.8	77.6	30.2	13.6	62.7	60.5	30.3	41.9
ISCED 8	23.5	19.6	9.7	5.1	24.8	18.9	7.4	8.2	11.5	6.7	8.4	2.7	3.3	7.4	4.0	2.2
	LT	AM	BA	MD	LV	SI	MK	EE	CY	ME	IS	MT	LU	LI	AD	
ISCED 5	0.0	5.7	0.0	15.7	14.6	11.0	0.0	0.0	4.5	0.0	0.6	1.7	0.8	0.0	0.0	
ISCED 6	95.5	78.7	74.4	50.3	48.3	44.1	56.9	30.3	21.6	22.5	12.5	8.4	3.2	0.4	0.6	
ISCED 7	27.6	11.8	19.9	19.4	17.7	21.9	2.8	14.9	17.8	1.3	4.4	4.2	2.5	0.3	0.0	
ISCED 8	2.7	1.1	0.9	2.0	2.3	2.6	0.4	2.6	1.3	0.1	0.5	0.1	0.6	0.1	0.0	

NB: >1000 (x 1000) no decimals; <1000 (x 1000): 1 decimal

Source: Eurostat, UOE and additional collection for the other EHEA countries.

Notes:

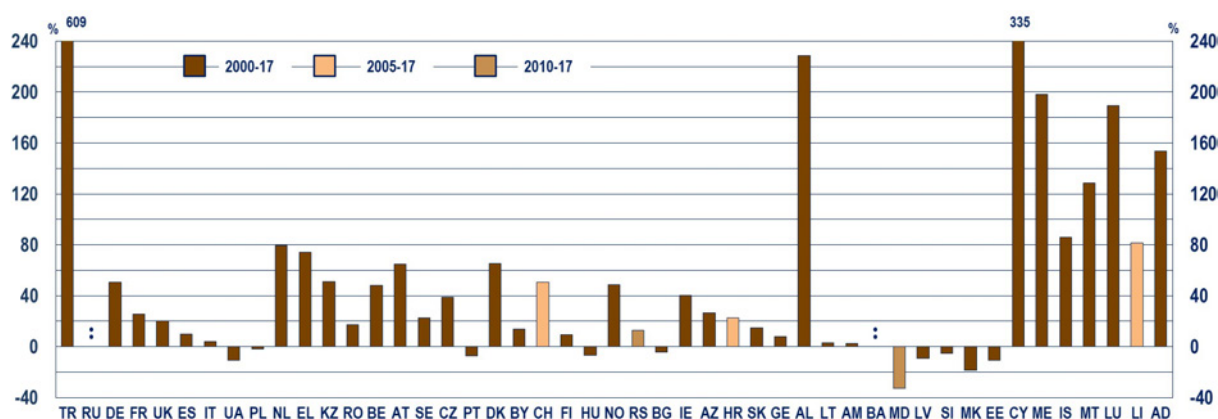
Countries are arranged by the total number of students in tertiary education. The graph is scaled to 3 million for readability.

There were about 38.1 million tertiary education students enrolled in the EHEA in the academic year 2016/17. Turkey and Russia, the most populous countries, accounted for the highest number of tertiary education students (both close to 7.2 million students), each equivalent to about 19 % of the EHEA total. Five countries (Russia, Turkey, Germany, France and the United Kingdom) accounted for almost 60 % of the total student population in the EHEA. Spain, Italy, Ukraine and Poland had the next largest student populations – each accounting for more than 1.5 million students in tertiary education – far higher number from the rest of EHEA countries, where the number of students did not exceed 900 000.

Overall across the EHEA, most tertiary students (56.4 %) were enrolled in first-cycle programmes (bachelor programmes), while 21.2 % was enrolled in second-cycle programmes (master degree or equivalent level) and 19.7 % in short-cycle tertiary education. Just 2.7 % of tertiary students were enrolled in third-cycle programmes (doctoral or equivalent).

Figure 1.2 shows the percentage change in the number of students enrolled in tertiary education between the earliest (1999/2000) and the most recent (2016/17) time points in the Bologna Process.

Figure 1.2: Percentage change in the number of students enrolled in tertiary education, 2000-2017



%	TR	RU	DE	FR	UK	ES	IT	UA	PL	NL	EL	KZ	RO	BE	AT	SE
2000-2017	609.0	:	50.5	25.7	20.1	9.9	3.8	-10.9	-1.9	79.5	74.0	50.9	17.4	48.1	64.7	22.9
	CZ	PT	DK	BY	CH	FI	HU	NO	RS	BG	IE	AZ	HR	SK	GE	AL
2000-2017	39.1	-7.2	65.1	13.9	50.5	9.4	-6.5	48.8	13.0	-4.4	40.1	29.6	22.7	14.8	7.9	228.6
	LT	AM	BA	MD	LV	SI	MK	EE	CY	ME	IS	MT	LU	LI	AD	
2000-2017	3.2	2.6	:	-33.0	-9.1	-5.1	-18.6	-10.9	334.6	198.5	85.9	128.4	189.6	81.6	153.6	

Source: Eurostat, UOE and additional collection for the other EHEA countries.

Notes:

Countries are arranged by the total number of students in tertiary education (2017).

Looking at the variations in the total student population within the EHEA over time (i.e. between 1999/2000 and 2016/17), the pattern across countries differs. The largest percentage increase in the number of enrolled students between 2000 and 2017 took place in Turkey, with an increase of over 600 %, followed by Cyprus (increase of over 300 %) and Albania (increase of over 200 %). Only a few countries experienced a decrease during the same period. The steepest decreases were in Moldova (33 %), North Macedonia (almost 19 %), Ukraine (over 10 %) and Latvia and Estonia (around 10 %).

Over this 17 year period, the absolute number of tertiary students in the EHEA increased significantly. Indeed the total increase between 2000 and 2017 was more than 18.2 million. Increases were observed in almost all countries, with the highest being recorded in Turkey – an increase of more than 6 million students – and Germany, with an increase of more than a million students. It is also notable that the number of students in Albania and Cyprus more than tripled. Despite the overall upward trend observed during this period, this was not without exceptions: slight decreases were recorded in Ukraine, Poland, Portugal, Hungary, Bulgaria, Latvia, Slovenia, North Macedonia and Estonia.

The overall picture hides some country variations at different periods. Looking at five different time points, namely 1999/2000, 2004/05, 2009/10, 2014/15 and 2016/17, 11 out of the 39 countries for which data are available for all periods, recorded consecutive increases in the rate of change in the number of students. In contrast, five countries (Kazakhstan, Italy, Hungary, Latvia and Finland) initially saw increases in the tertiary education population but have recorded three successive reductions for the most recent time points.

The period between 2005 and 2010 reveals a growth of more than 12 % across the EHEA as a whole. For this period, Romania, Austria, Cyprus, Turkey, Liechtenstein, Albania and Montenegro recorded increases above 30 %.

Between 2010 and 2015, Turkey recorded an increase in student numbers of 71.8 %. This was far beyond the next highest countries – Albania and Denmark – which were close to 30 %.

In contrast, decreases in student numbers were apparent in about half of the EHEA countries, including four of the larger countries (France, Italy, Ukraine and Poland). Decreases were most

pronounced in Romania and North Macedonia (both above 45 %), and also significant in Lithuania and Ukraine (both above 30 %).

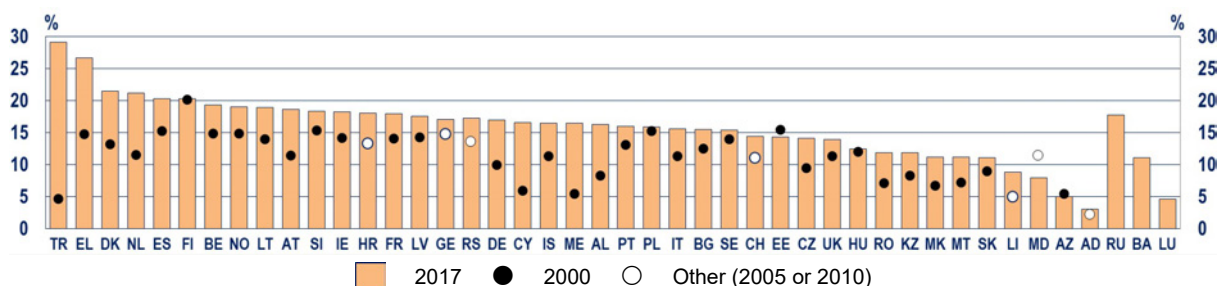
These changes over time should be viewed in combination with other factors, such as demographic changes (increases or decreases in the size of young population cohorts) which may have an impact upon the structure of the population as well on the human resources required for the functioning of education systems. The structure of the (higher) education systems is also important to bear in mind for example whether or not short-cycle tertiary programmes exist, and whether part-time study is facilitated. Country-specific characteristics, national policies aimed at increasing tertiary entry and completion rates, financing provided to institutions are all important features to consider in relation to this data.

Changes in economic conditions – such as the impact of the 2008 financial and economic crisis – also influence the desire and ability of young people to enrol in higher education. Institutional conditions are also relevant including: (a) admissions rules and procedures, (b) the cost/benefit analysis involved in acquiring higher education – such as fees, employment rates of graduates, and (c) the length of studies – which in turn depends on the structure of the programmes.

It is important to note that ISCED 2011 (International Standard Classification of Education 2011) was introduced in the middle of the analysed time period. Some of the changes observed in student enrolment may therefore be due to the different classification of students before and after 2011, but this is unlikely to affect the overall trend or direction of change for particular countries.

Figure 1.3 presents the change in enrolment rates in tertiary education between 2000 and 2017 for students aged 18-34, the typical age for attending higher education. The indicator thus shows the share of the population aged 18-34 that studies in tertiary education.

Figure 1.3: Enrolment rates in tertiary education for the 18-34 olds, 2000-2017



%	TR	EL	DK	NL	ES	FI	BE	NO	LT	AT	SI	IE	HR	FR	LV	GE	RS	DE	CY	IS	ME	AL	PT
2017	29.1	26.6	21.4	21.1	20.3	20.3	19.3	19.0	18.9	18.6	18.3	18.2	18.0	17.9	17.6	17.1	17.2	16.9	16.5	16.5	16.4	16.3	15.9
2000	4.6	14.7	13.2	11.5	15.2	20.1	14.8	14.8	13.9	11.4	15.4	14.1		14.1	14.3			9.9	5.9	11.3	5.4	8.2	13.0
2005													13.3			13.3							
2010																	13.5						
	PL	IT	BG	SE	CH	EE	CZ	UK	HU	RO	KZ	MK	MT	SK	LI	MD	AZ	AD	RU	BA	LU	EHEA	
2017	15.9	15.5	15.4	15.4	14.4	14.3	14.1	13.9	12.5	11.9	11.8	11.2	11.1	11.1	8.8	7.9	4.9	3.0	17.7	11.0	4.6	16.4	
2000	15.2	11.3	12.5	14.0		15.4	9.4	11.3	12.0	7.1	8.3	6.7	7.1	9.0			5.4		:	:	:	11.5	
2005					11.0										4.9								
2010																11.4		2.1					

Source: Eurostat, UOE and additional collection for the other EHEA countries.

Notes:

Countries are arranged by the share of enrolment rates for students aged 18-34 for 2017 when data for two reference years are available. EHEA: Refers to the EHEA median calculated based on countries with available data for both reference years.

In 2017, the median enrolment rate in the EHEA was 16.4 %. This signifies that half of the countries analysed record an enrolment rate higher than this percentage, while the other half had an enrolment rate below this figure.

For the year 2017, Turkey, Greece, Denmark, the Netherlands, Spain and Finland each reported enrolment rates higher than 20 %. At the other end of the spectrum, the enrolment rate was lower than 9 % in Moldova, Azerbaijan, Liechtenstein, Luxembourg and Andorra. It is important to note that in the latter three countries, more than two-thirds of the tertiary student population studied abroad (see Chapter 5) and these students are therefore not reflected in the national enrolment statistics.

In 2000, only Finland had an enrolment rate above 20 %. The next highest rates were in Estonia, Slovenia, Poland and Spain, where about 15 % of persons aged 18-34 studied in tertiary education. The lowest rates (below 5 %) were recorded in Turkey, Liechtenstein and Andorra although for these latter two countries the relevant issue is that the majority of students enrolled abroad.

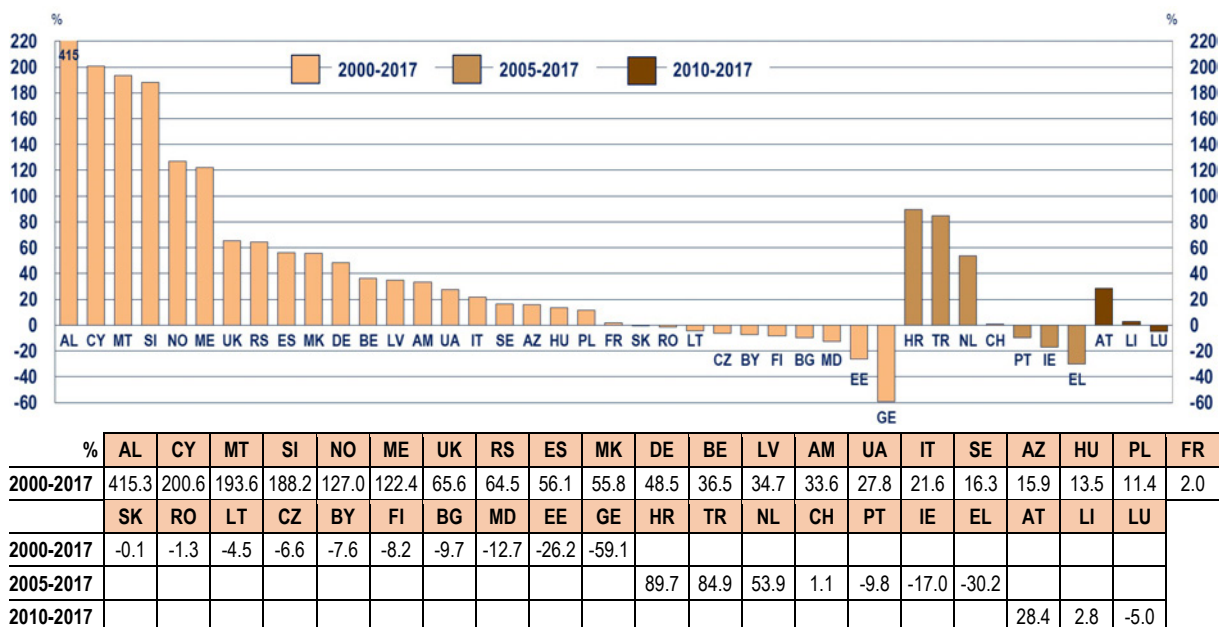
When analysing only the countries for which data are available throughout the five selected years, the median enrolment rate in the EHEA constantly increased: 12 % in 2000; 13.5 % in 2005; 15 % in 2010, and stabilising close to 16 % from 2010 onwards (16.1 % in 2015 and 16.4 % in 2017).

In eight countries (Belgium, Germany, France, Cyprus, Malta, the Netherlands, Portugal and Norway), successive increases were recorded throughout all the time points. Between the two most recent years (2015 and 2017), there has been an increase in the enrolment rates in 22 countries. The sharpest increases were recorded in Turkey and Cyprus (an increase of 4 and 2.5 percentage points, respectively). Comparing 2000 to 2017, a rise in the enrolment rates was recorded in the majority of countries. Greece, Albania and Montenegro experienced an increase of about 11 percentage points and the highest increase is of 24.4 % for Turkey.

1.2. Academic staff

Section 1.1 showed the ways in which student enrolments have developed throughout the lifetime of the Bologna Process. This section focuses on the corresponding trends with regard to academic staff. Figure 1.4 presents the percentage change in the number of academic staff between 2000 and 2017.

Figure 1.4: Percentage change in the total number of academic staff between 2000 and 2017



Source: Eurostat, UOE and additional collection for the other EHEA countries.

Notes:

Countries are arranged by the percentage change in the number of academic staff (2000). Where data are not available from 2000 they are presented from either 2005 or 2010.

There has been an increase in academic staff in more than half of the 40 countries for which data are available. The largest increases occurred in Albania and Cyprus (415 % and 200 % respectively), followed by significant increases of between 120 % and 195 % in Malta, Slovenia, Norway and Montenegro. Among the 13 countries which recorded a decrease, the largest decreases took place in Georgia, Greece and Estonia (a rate of change of 25 % or higher).

Four of the six countries with the largest increase in academic staff (Albania, Cyprus, Montenegro and Malta) also recorded high increases in the number of tertiary enrolments within the same period (see Figure 1.2). In contrast, Slovenia saw an increase in the number of the academic staff while the number of students in tertiary education recorded declined by 5 %.

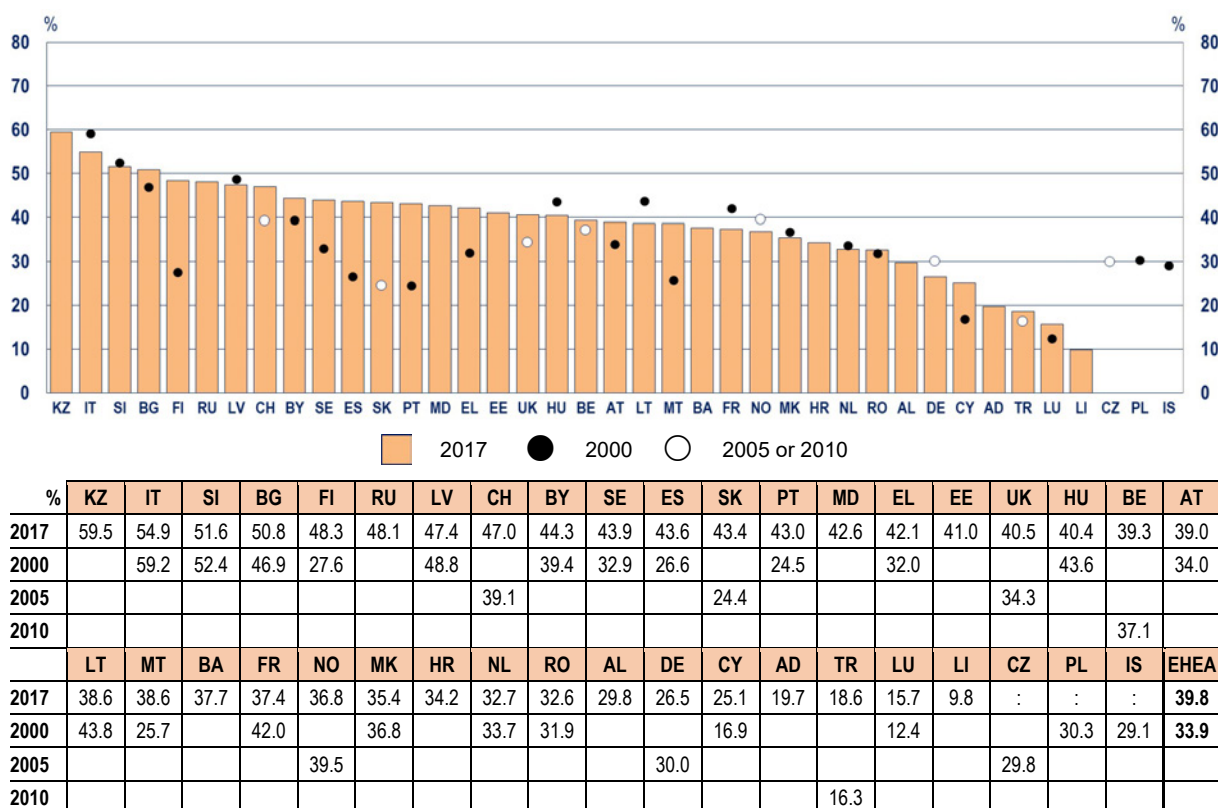
The analysis of the evolution of academic staff numbers between the sub-periods 2000-2005, 2005-2010, 2010-2015 and 2015-2017 reveals the most significant decline in academic staff occurred during the two most recent periods. In 21 countries, there was a decrease of academic staff between 2010 and 2015 and in 13 countries between 2015 and 2017.

Declines in the number of academic staff during the latest periods do not necessarily match changes in the number of students enrolling in tertiary education (see Figures 1.2 and 1.3). Indeed a number of countries have recorded a decrease in academic staff numbers alongside an increase in the number of students. This is the case in Czechia, Ireland, Greece, France, Moldova and Azerbaijan. However, there were also 14 countries where an increase in the number of academic staff was accompanied by an increase in the number of students ⁽¹⁾.

⁽¹⁾ Belgium, Bulgaria, Germany, Spain, Croatia, Cyprus, Malta, the Netherlands, the United Kingdom, Switzerland, Albania, Montenegro, Serbia and Turkey

Age is an important characteristic of academic staff, and particularly relevant in looking to system-level planning. Figure 1.5 presents the share of academic staff aged 50 and over for 2000 and 2017.

Figure 1.5: Percentage of academic staff aged 50 or over, 2000 and 2017



Source: Eurostat, UOE and additional collection for the other EHEA countries.

Notes:

Countries are arranged by the percentage of academic staff aged 50 or over (2017). Where data are not available from 2000, they are presented from either 2005 or 2010.

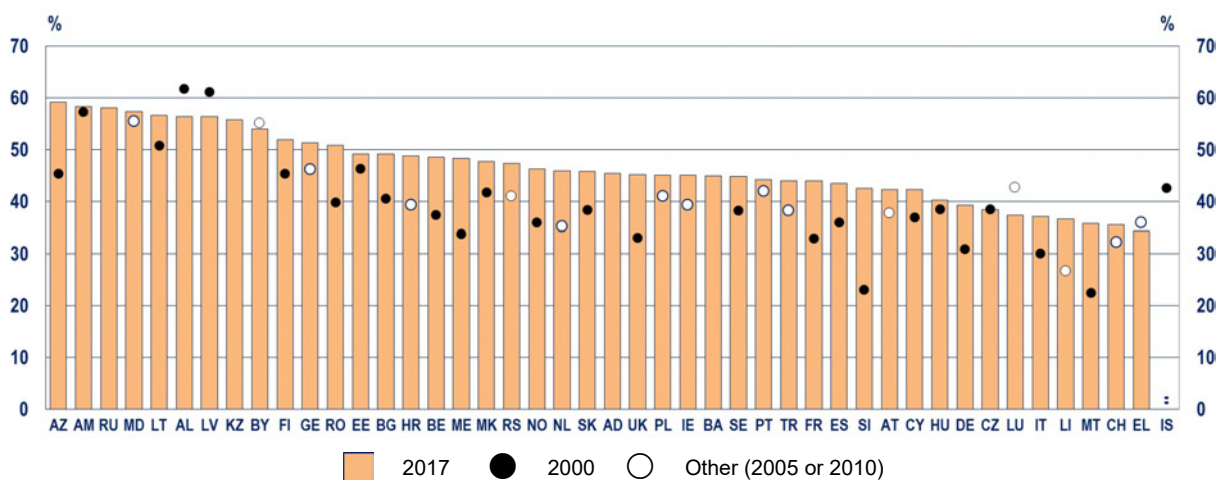
EHEA: Refers to the EHEA median calculated based on countries with available data for both reference years.

In a first group of countries (Kazakhstan, Italy, Slovenia and Bulgaria), more than half of the academic staff is over 50 years old. Potentially there will be issues in ensuring that the system has the human capacity to renew itself in the mid-term future. This share is also relatively high (between 46 % and 48 %) in Finland, Russia, Latvia and Switzerland. The percentage of academic staff aged 50 and over is less than 30 % in Albania, Germany, Cyprus, Andorra, Luxembourg and Liechtenstein. In three of these countries – Albania, Cyprus and Andorra – the 35-49 age group accounts for the largest proportion (more than 40 % of the staff) whereas in Germany, Luxembourg and Liechtenstein, 40 % of staff are under 35 years old.

Although Italy, Slovenia, Bulgaria and Latvia recorded a lower percentage of academic staff aged 50 and over in 2017 compared to 2000, the share still remained relatively high (45 % and over). Large increases (higher than 17 percentage points) in the over 50 academic staff population can be found in Spain, Portugal, Slovakia and Finland. In contrast, Lithuania, France and Italy recorded a fall of more than 4 percentage points in the staff aged 50 and over between these two years.

Achieving an equitable gender distribution should also be a system-level aim; Figure 1.6 portrays the gender distribution among academic staff showing the evolution of the share of female staff between 2000 and 2017.

Figure 1.6: Percentage of female academic staff, 2000 and 2017



%	AZ	AM	RU	MD	LT	AL	LV	KZ	BY	FI	GE	RO	EE	BG	HR	BE	ME	MK	RS	NO	NL	SK	AD
2017	59.1	58.3	58.1	57.3	56.7	56.4	56.4	55.8	53.9	51.9	51.3	50.8	49.1	49.1	48.8	48.5	48.3	47.7	47.4	46.3	45.9	45.8	45.4
2000	45.4	57.3	:		50.8	61.8	61.2	:		45.3		39.8	46.4	40.5		37.4	33.8	41.7		35.9		38.4	:
2005				55.5							46.2				39.3						35.2		
2010									54.9										41.0				
	UK	PL	IE	BA	SE	PT	TR	FR	ES	SI	AT	CY	HU	DE	CZ	LU	IT	LI	MT	CH	EL	IS	EHEA
2017	45.2	45.0	45.0	45.0	44.8	44.3	44.0	44.0	43.4	42.6	42.3	42.3	40.2	39.3	38.4	37.3	37.1	36.6	35.8	35.5	34.3	:	45.2
2000	33.1			:	38.3			33.0	36.0	23.1		37.0	38.5	31.0	38.4		30.0		22.5			42.6	38.4
2005		41.0	39.4		42.0	38.3														32.2	36.0		
2010										37.7						42.6		26.6					

Source: Eurostat, UOE and additional collection for the other EHEA countries.

Notes:

Countries are arranged by the percentage of female academic staff (2017). EHEA: Refers to the EHEA median calculated based on countries with available data for both reference years.

In 2017, the EHEA median was 45.2, which means that in half of the countries more than 45 % of staff was female. Across countries, there were wide variations. 12 countries ⁽²⁾ have an academic staff population where women are the majority sex. Greece (34.3 %), Switzerland (35.5 %) and Malta (35.8 %) are the systems with the lowest proportion of women among the academic staff population.

Compared to 2000, the share of female staff has increased in all countries except Albania, Greece, Luxembourg and Latvia. Slovenia had the most significant increase (84.4 %) between 2000 and 2017, followed by Malta (59.1 %) and Montenegro (42.9 %).

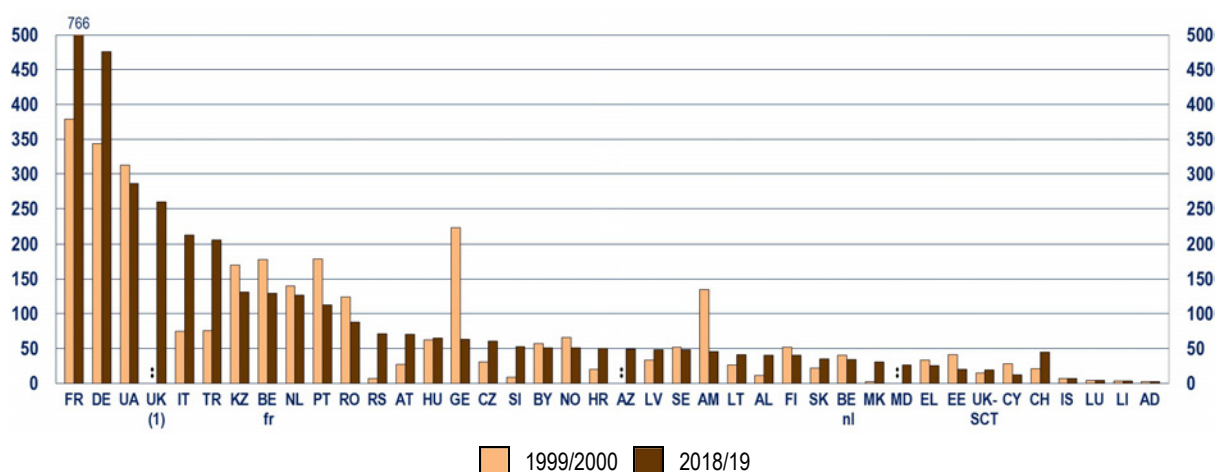
⁽²⁾ Azerbaijan, Armenia, Russia, Moldova, Lithuania, Albania, Latvia, Kazakhstan, Belarus, Finland, Georgia and Romania

1.3. Higher education institutions

When looking at the overall context for developments in the higher education sector, it is important to consider not only the evolution in student and staff numbers, but also the development of higher education institutions.

Figure 1.7a shows the number of higher education institutions in the academic years 1999/2000 and 2018/19.

Figure 1.7a: Number of higher education institutions in the EHEA, 1999/2000-2018/19



	FR	DE	UA	UK (1)	IT	TR	KZ	BE fr	NL	PT	RO	RS	AT	HU	GE	CZ	SI	BY	NO	HR
1999/2000	379	344	313	:	75	76	170	178	140	179	124	7	27	62	223	31	9	57	66	20
2018/19	766	476	286	260	213	206	131	129	127	113	88	71	70	65	63	61	53	51	51	50
	AZ	LV	SE	AM	LT	AL	FI	SK	BE nl	MK	MD	EL	EE	UK-SCT	CY	CH	IS	LU	LI	AD
1999/2000	:	33	52	135	26	11	52	22	40	2	:	33	41	15	28	21	7	4	3	2
2018/19	49	48	48	46	41	40	40	35	34	31	26	25	20	19	12	45	7	4	3	2

Source: BFUG data collection

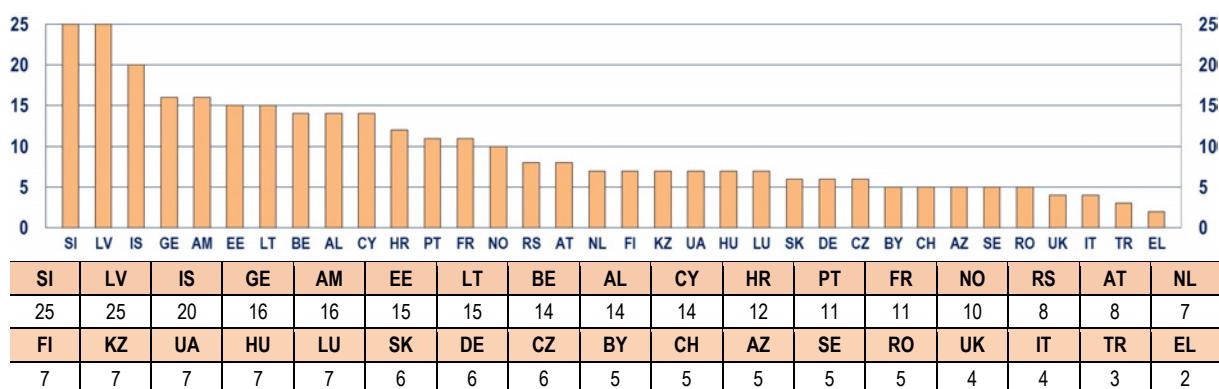
UK (1) = UK-ENG/WLS/NIR

In total, the number of higher education institutions in EHEA countries with available data for the two years increased from 3 009 institutions in 1999/2000 to 3 537 in 2018/19. However, different trends have taken place during the period. In some countries, there has been a significant growth in (mostly) private higher education institutions, while in others the number of private higher education institutions has reduced. Meanwhile some countries have seen the merging and consolidation of institutions.

The highest increase in the number of institutions took place in France (+387), Italy (+138) and Germany (+132). The large increases are explained in Germany by growth in the private university sector. In France, the sharp increase in the number of institutions can be attributed in particular to the art schools (*écoles supérieures d'art et de culture*) and business schools being included in the number of institutions for the reference year 2018/19. Also in Italy, the higher education institutions for art, music and dance were not included in the higher education system in 1999/2000. Conversely, in 15 countries the number of institutions has decreased, with the most significant declines taking place in Georgia (-160), Armenia (-89), Portugal (-66) and Kazakhstan (-39).

Another way of looking at the number of institutions is to see how many of them there are in proportion to the overall population. Figure 1.7b shows the number of institutions per million inhabitants. This is a rather crude measure, as it does not take into account the size of the institutions, but nevertheless it gives a more contextualised picture of the situation regarding higher education institutions in EHEA.

Figure 1.7b: Number of higher education institutions per million people in the EHEA, 2017



Source: Own calculation based on Eurostat and BFUG data collection

France is the only country with more than 10 million inhabitants that is above the median – which is eight institutions per million inhabitants. The main trend is for the most populous countries to be positioned below the median, even if they have the highest number of institutions. Meanwhile countries that are smaller in terms of population tend to have a higher number of higher education institutions.

1.4. Expenditure on higher education

European higher education institutions are funded predominantly from public sources. This section compares public expenditure on higher education in the EHEA based on Eurostat indicators: public expenditure as a percentage of GDP, and total public and private expenditure per student in purchasing power standard (PPS). Alone, none of the indicators presented below can provide a sufficient basis for comparing EHEA countries; but taken together they provide a broad overview of similarities and differences between them.

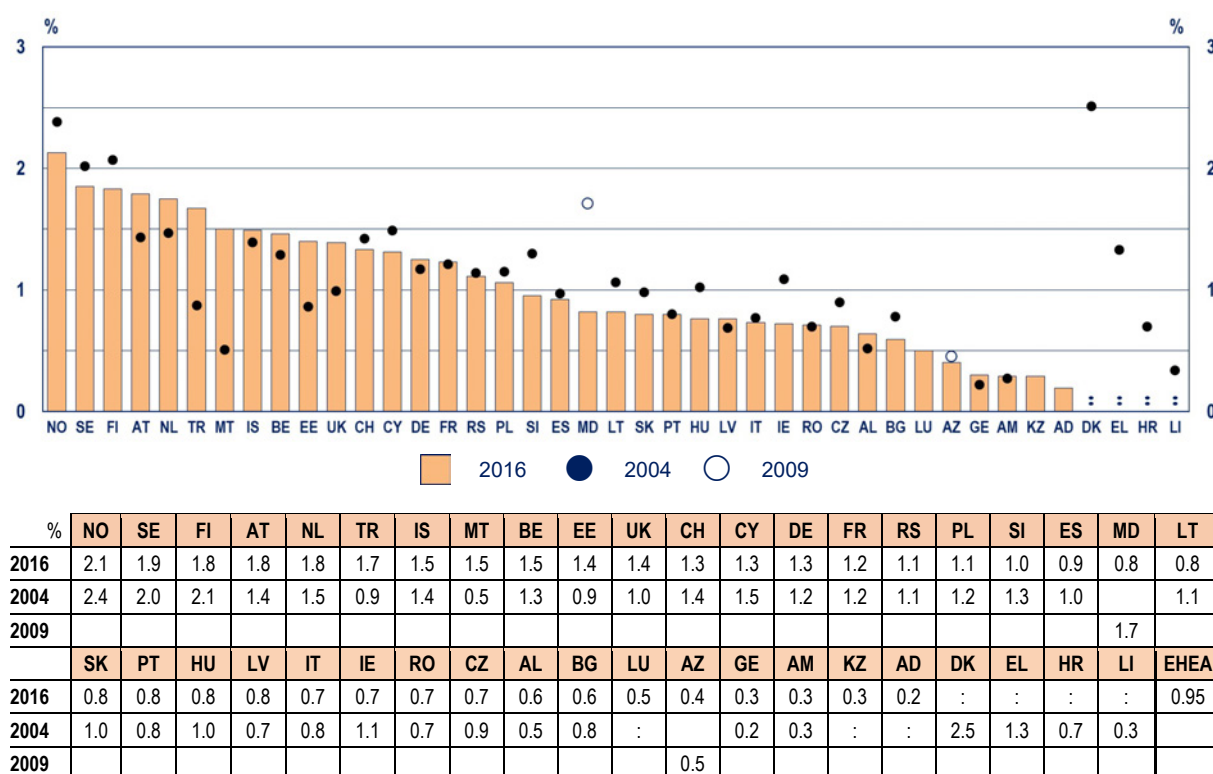
Annual public expenditure on tertiary education as a percentage of GDP provides a measure of a government's commitment to supporting higher education, and is useful when comparing countries of different economic sizes. Public expenditure on tertiary education covers expenditure from all levels of government combined and refers to direct funding on higher education as well as transfers to private households and firms.

The former includes expenditure that is directly related to instruction and research such as faculty and staff salaries, research grants, university and institutions' buildings, teaching materials, laboratory equipment, etc. The latter includes funding for entities that administer higher education (e.g. ministries or departments of education), that provide ancillary services (i.e. services provided by educational institutions that are peripheral to the main educational mission), and entities that perform educational research, curriculum development and educational policy analysis.

Transfers and payments to private entities include public subsidies to households and students as well as payments to other non-educational private entities (including scholarships and grants, public loans to students, specific public subsidies in cash or in kind for transport, medical expenses, books and other materials, etc.). However, annual public expenditure does not include tuition fees that are not covered by scholarships, grants or loans, and that are directly paid by households.

Figure 1.8 shows the annual public expenditure on tertiary education as a % of GDP (including Research and Development) in 2016 and 2004.

Figure 1.8: Annual public expenditure on tertiary education as a % of GDP (including R&D), 2016 and 2004



Source: Eurostat, UOE and additional collection for the other EHEA countries.

Notes:

Countries are arranged by the annual public expenditure as a % of GDP (2016). EHEA: Refers to the EHEA median calculated based on countries with available data for both reference years.

In 2016, the median public spending on tertiary education relative to GDP accounted for 0.95 % across the EHEA. With 2.1 % of GDP devoted to tertiary education in 2016, Norway was ahead of the other countries, followed by Sweden (1.9 %), Finland (1.8 %), Austria (1.8 %), the Netherlands (1.8 %) and Turkey (1.7 %). In those countries, in which relatively high shares of public spending in funding tertiary education were recorded, enrolment rates of persons aged 18-34 in tertiary education were also higher than 18.6 % (with the exception of Sweden in which the respective rate was 15.4 %) in 2017 (see also Figure 1.3). Azerbaijan, Georgia, Armenia, Kazakhstan and Andorra had the smallest shares (lower than 0.5 %) of tertiary educational expenditure as a percentage of GDP in 2016.

Moldova experienced the deepest reduction (a decrease of 0.89 percentage points) in the share of public expenditure on tertiary education between 2009 and 2016. Slovenia and Ireland had a fall of about 0.4 pp between 2004 and 2016. Decreases within the range of 0.03 to 0.26 percentage points were noted also in other 14 countries. Of the 17 countries which showed a decrease between 2009 and 2016, six (Slovenia, Hungary, Lithuania, Finland, Sweden and Poland) had also recorded a decrease in the enrolment rates of students aged 18-34 (see Figure 1.8).

The 2008 global economic crisis had a strong impact on the level of public funding of education and higher education systems. The data show that up until 2014 higher education systems were still dealing with the repercussions of the crisis, and decreases continued to be evident until 2016.

When analysing the evolution of the share of public expenditure directed to tertiary education as a percentage of GDP between 2009, 2014 and 2016, consecutive decreases were recorded in 17 countries out of 29 countries for which data are available at the three time points. In Estonia, Latvia, Lithuania,

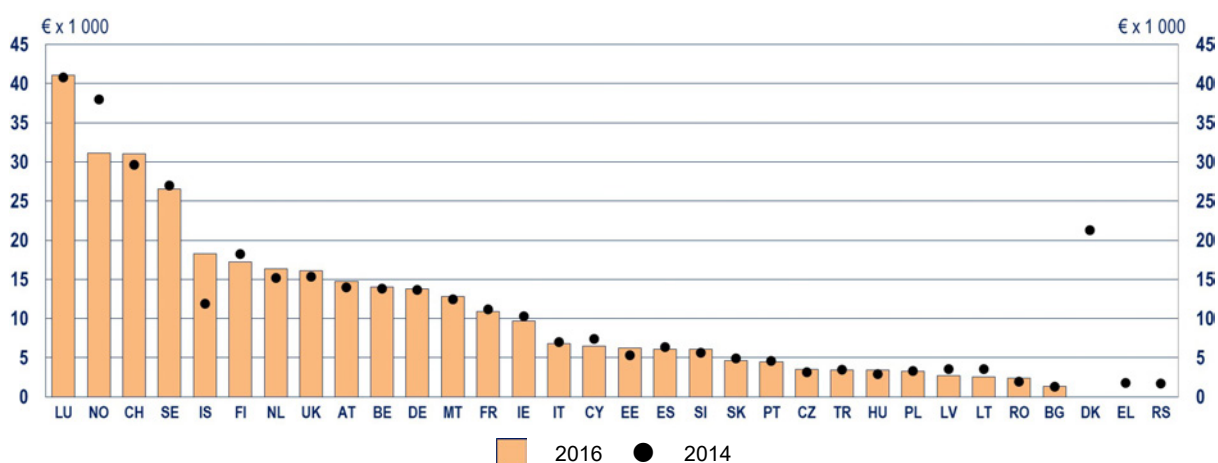
Poland and Albania, an increase in the respective share was recorded between 2009 and 2014, followed by a decrease within the next referenced time period. Only the Netherlands and the United Kingdom reported two consecutive increases in the years between 2009, 2014 and 2016.

The situation is similar when focusing on the evolution of the share of public expenditure on tertiary education as a share of GDP between 2009 and 2016. 25 countries (with the exception of Estonia, the Netherlands, Austria, the United Kingdom and Albania) saw a decline in the annual public expenditure on tertiary education as a percentage of GDP in this period.

Cross-country comparisons of the levels of expenditure spent on tertiary education cannot be made directly due to the different size of countries' student population. In order to account for a country's size of student population, the average expenditure per student is used.

Figure 1.9 shows the public and private expenditure on tertiary education per full-time equivalent student in 2014 and 2016. In addition to public expenditure, it also takes private expenditure into account to show an overall financial investment in higher education at national level.

Figure 1.9: Annual public expenditure on public and private tertiary institutions per full-time equivalent student in euro, 2014-2016



€	LU	NO	CH	SE	IS	FI	NL	UK	AT	BE	DE	MT	FR	IE	IT	CY	EE
2016	41 081	31 144	31 047	26 522	18 245	17 253	16 317	16 131	14 775	14 055	13 786	12 839	10 876	9 700	6 780	6 477	6 259
2014	40 777	38 012	29 599	26 975	11 878	18 236	15 194	15 308	13 960	13 825	13 692	12 474	11 151	10 329	7 009	7 420	5 283
	ES	SI	SK	PT	CZ	TR	HU	PL	LV	LT	RO	BG	DK	EL	RS	EHEA	
2016	6 113	6 072	4 593	4 505	3 514	3 449	3 443	3 250	2 667	2 571	2 351	1 320	:	:	:	6 780	
2014	6 319	5 621	4 942	4 594	3 154	3 505	2 938	3 310	3 580	3 563	1 965	1 275	21 273	1 746	1 678	7 215	

Source: Eurostat, UOE and additional collection for the other EHEA countries.

Notes:

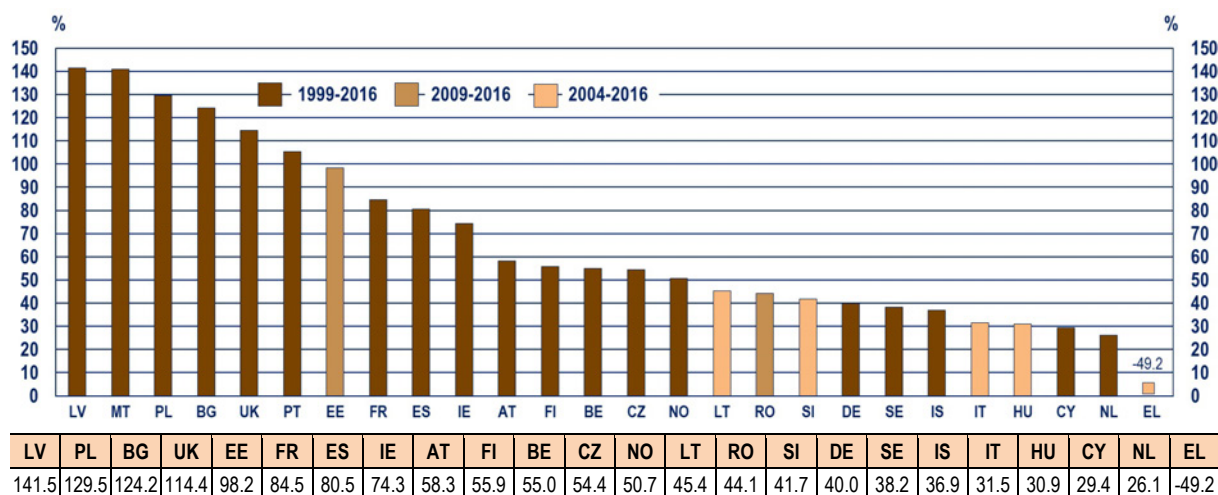
Countries are arranged by the annual public expenditure per FTE student in euro (2016). EHEA: Refers to the EHEA median calculated based on countries with available data for both reference years.

The median spending per student across EHEA in 2016 was EUR 6 780 per student. The highest spending countries, including the Nordic countries and Switzerland, spent more than EUR 17 000 per student in 2016, while eight countries at the other end (Czechia, Turkey, Hungary, Poland, Latvia, Lithuania, Romania and Bulgaria) spent less than EUR 4 000 per student.

The median level of expenditure per student was lower in 2016 compared to 2014 (when considering only countries for which data are available for both years). The financial increase per student was higher than EUR 1 000 in a small number of countries and was more than EUR 6 000 in Iceland.

Figure 1.10 provides a more precise comparison across countries as the measure of spending is adjusted in terms of the differences in price levels across the EHEA while taking into account the size of the student population in a country through the provision of the financial spending of a country per full-time student.

Figure 1.10: Percentage change in the annual public and private expenditure on public and private tertiary education institutions in PPS per full-time equivalent between 1999 and 2016



Source: Eurostat, UOE and additional collection for the other EHEA countries.

Notes:

Countries are arranged by the percentage change in the annual public and private expenditure in PPS per FTE (2016).

Between 1999 and 2016, Latvia showed the highest increase (141 %) in its spending on higher education institutions per full-time equivalent student, followed by notable increases in Poland (129 %), Bulgaria (124 %) and the United Kingdom (114 %). The smallest increases took place in Hungary, Cyprus and the Netherlands. In Greece, the expenditure invested per full-time equivalent student decreased by about half compared to 2004.

Overall, across countries for which data were available in 2016, the median EHEA annual (public and private) expenditure on tertiary education institutions was 9 164 per full-time equivalent student in PPS. Differences between countries appear to be significant. Sweden, the United Kingdom, Norway and the Netherlands spent more than PPS 14 000 per full-time student, while this spending fell below PPS 6 000 in Latvia, Lithuania, Bulgaria and Romania as well as Greece, which was far behind the other four countries at about PPS 2 400. The level of expenditure spent by the highest spending country in 2016 was about seven times higher than the country spending the least per full-time equivalent student.

Combining the information on changes in expenditure devoted in tertiary education institutions per full-time student and the student population in tertiary education reveals some interesting outcomes. Three countries – Latvia, Poland and Bulgaria – that showed significant increases in their investments between 1999-2016 also recorded slight decreases (11 % or less) in the number of students enrolled in tertiary education. This suggests that the increases in spending per student may not be solely attributed to higher investment but also to a decrease or slower pace of growth in the student population. The opposite is true for the United Kingdom, where the relationship between expenditure per full-time student and the student population is positive, i.e. the number of enrolled students has increased at the same time as spending per student has also increased. With reference to Greece, it can be noted that the growth in the number of students in the student population was accompanied by a decrease in the annual expenditure per full-time student.

In order to further review the intensity of investment in tertiary education, the next section undertakes a comparative analysis between the expenditure per full-time student and the size of the economy taking into account population size. This perspective avoids problems of different student populations as percentages of the total population, as is the case when considering the ratio of the government expenditure on education to GDP. For higher education, cross-country comparison is more complex as enrolment rates vary in greater proportions (see Figure 1.3): countries where the enrolment rate is low could show higher expenditure per full-time equivalent students than countries with higher enrolment rates. Dividing the GDP per capita by the expenditure per full-time equivalent student provides a more harmonised and comparable measure of the intensity of the expenditure on education.

Figure 1.11 shows the annual public and private expenditure on public and private education institutions on tertiary education, per full-time equivalent student in PPS relative to the GDP per capita in PPS for the years 2004, 2014 and 2016.

A positive relationship between the size of the economy taking into account its population (expressed through GDP per capita) and expenditure on education per full-time student (as expressed through the annual public and private expenditure on educational institutions per full-time equivalent) is revealed across the countries analysed. The fact that the correlation between the expenditure per full-time equivalent student and GDP per capita is positive indicates that, as may be expected, richer countries invest more per student, regardless of the size of the economy and the size of education sector.

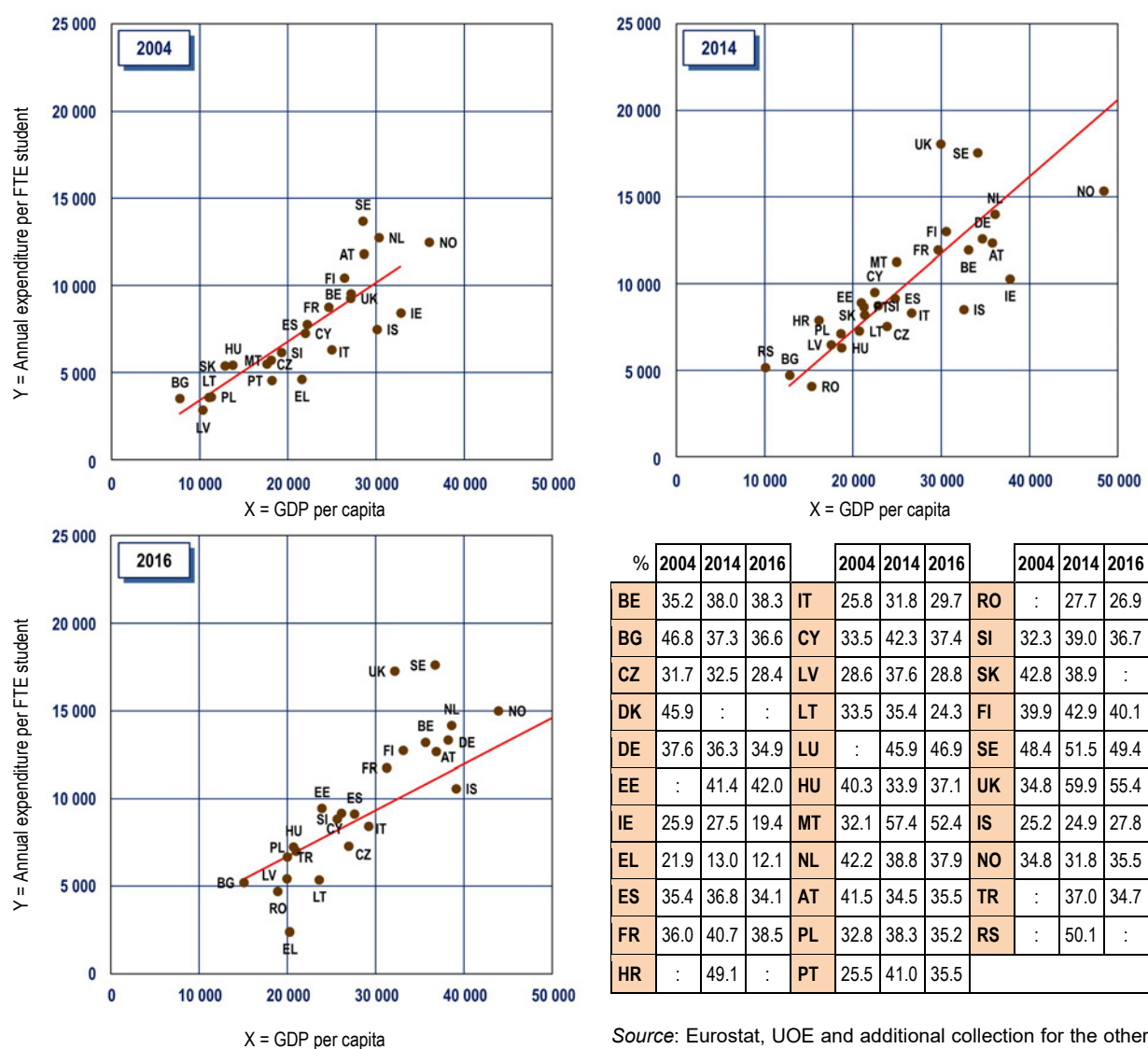
However, this correlation does not imply a direct causal relationship between the two variables in the short term. Indeed, public expenditure (i.e. the major part of total expenditure on tertiary education) involves long-term commitments (e.g. capital expenditure or staff salaries) and cannot be adjusted rapidly to unexpected changes in economic conditions; the number of students is the result of multi-cohorts behaviours and their attitudes towards tertiary education.

Throughout 2004, 2014 and 2016, countries providing relatively high expenditure on tertiary institutions and having a high GDP per capita were Sweden, the Netherlands, Austria and Finland, while there was lower expenditure on tertiary education institutions and lower GDP per capita in East European countries.

A clear increase from 2004 to 2014 is recorded in the United Kingdom in terms of the expenditure invested per student (from PPS 9 351 to PPS 18 019). This was not, however, accompanied by a substantial increase in GDP per capita during the same period (from PPS 26 900 to PPS 30 100). Looking more in detail at the trend of the expenditure per student throughout this period, the highest increase occurs between 2004 and 2006 as well as in 2012. One likely explanation of this finding is the increase of fees to £9 000 per year in 2012.

The tables in Figure 1.11 show the ratio of the expenditure (annual and private) on higher education institutions per student to GDP per capita, showing how much of the GDP per capita is spent on each student. This can be seen as a measure of public and private investment in higher education. It reveals that countries with different sizes of economy and annual expenditure per student may make a similar relative financial effort towards investment in tertiary education. For example, in 2014, Serbia and Croatia spent about 50 % of their GDP per capita on each tertiary student, which was close to the respective share spent by Sweden and Finland, in which the GDP per capita and annual expenditure per student are more than double. Similarly, Estonia had a similar intensity of investment to Sweden and Finland in 2016, despite the fact that the GDP per capita and the expenditure per student were more than 1.5 times higher in the latter countries.

Figure 1.11: Annual public and private expenditure on public and private education institutions on tertiary education, per full-time equivalent student in PPS relative to the GDP per capita in PPS, 2004, 2014 and 2016



The fluctuations in the intensity of the investment over time can be observed through combining two measures. Firstly, the total (public and private) expenditure on tertiary education per student and secondly the GDP per capita. A constant ratio across time signifies that both investment per student and GDP per capita increased or decreased at the rate, indicating that expenditure in education is given the same priority over time. It is important to note that this measure of expenditure includes both public and private spending, so it is impossible to tell from this particular indicator how public expenditure reacts to changes in the GDP per capita. As the discussion of the United Kingdom above demonstrates, it is possible to achieve an increase in the ratio even when public spending decreases if private spending on tertiary education increases at the same time (see Figure 1.9 for discussion of changes in public expenditure only).

Of the 25 countries for which data is available for all reference years analysed, the ratio of public and private expenditure per full-time equivalent student and GDP per capita decreased in 10 countries (Czechia, Germany, Ireland, Spain, the Netherlands, Lithuania, Hungary, Austria, Greece and Bulgaria). This means that in these countries public and private investment in higher education declined relative to the country's size of economy. In Germany, the Netherlands, Greece and Bulgaria, expenditure on tertiary education per student grew slower than GDP per capita, while in Austria and Hungary it grew slower than the GDP per capita during the period 2004 to 2014, while this was

reversed in the period 2014 to 2016. In Lithuania, Ireland, Spain and Czechia, expenditure declined at a faster rate, whereas in Greece expenditure declined at a slower pace than GDP per capita over this time period.

1.5. Conclusions

Although developments and trends vary largely between countries when it comes to student numbers or enrolment rates, the EHEA has seen a continuous rise of total student numbers since its inception. It has reached more than 38 million students in 2016/17. Turkey and Russia alone make up for 18.9 % of all students in the EHEA. Together with Germany, France and the United Kingdom, they represent almost 60 % of the total student population of the EHEA. The data paints a picture of significant growth of the student body in almost all countries, whereas the median enrolment rate has stabilised at about 16 % in the EHEA countries for which data is available, from 2010 onwards. The majority of tertiary students (56.4 %) are enrolled in first-cycle study programmes.

The majority of countries recorded a positive rate of change in student enrolments, from 3 % in Armenia and Lithuania to 609 % in Turkey. On the other side of the spectrum, a negative rate of change between 2000 and 2017 was recorded in 10 countries, which reported falls of 2 % (Poland) to 33 % (Moldova). Changes over time need to be viewed in combination with other factors, particularly demographic changes. The structure of education systems may also play a role.

There has been an increase in academic staff in more than half of the 40 countries for which data are available. An increase in staff does however not automatically imply an increase in student numbers nor is a decrease in staff necessarily a result of a smaller student body. Although the numbers vary strongly between countries – from over 60 % to 34 % – in half of the countries, about 45 % of the academic staff is female.

The overall number of higher education institutions has increased significantly in the EHEA countries for which data were available. However, there were both decreases in the number of institutions in many countries due to mergers of institutions and consolidation of private higher education, while in many others, the increase in the number of institutions was due to growth in the private university sector.

Norway, Sweden, Finland, Austria, the Netherlands and Turkey are the countries with the highest percentage share of GDP devoted to tertiary education.

A consecutive upward trend is observed in the expenditure spent on tertiary education institutions per full-time equivalent student until the period 2009-2014, before falling again during the period 2014-2016.

In 2016, the median public spending on tertiary education relative to GDP accounted for 0.95 % across the EHEA. Richer countries may invest more per student, regardless of the size of the economy and the size of education sector. In general, the percentage of public spending as a share of GDP varies strongly from 2.1 % in Norway to 0.3 % in Lithuania.

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